Stormwater Management Program

2022-2026

Montana Department of Environmental Quality
General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)
MPDES Permit No. MTR040007

City of Missoula
Public Works and Mobility Department
Stormwater Utility
1345 West Broadway
Missoula, Montana 59802

February 2024

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ABBREVIATIONS

City	City of Missoula
County	Missoula County
CWA	Clean Water Act
ERP	Enforcement Response Plan
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MCM	minimum control measure
MDT	Montana Department of Transportation
MPDES	Montana Pollutant Discharge Elimination System
MS4	Municipal Separate Storm Sewer System
MDEQ	Montana Department of Environmental Quality
MVWQD	Missoula Valley Water Quality District
NPS	nonpoint source
Parks & Rec	City of Missoula Parks and Recreation Department
PSAs	public service announcements
SARA	Superfund Amendments and Reauthorization Act
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
USEPA	U.S. Environmental Protection Agency

Mission Statement: The Stormwater Utility is committed to protecting public health and safety, natural resources, waterways, and our aquifer, while meeting or exceeding state and federal environmental quality regulations.

INTRODUCTION

Nonpoint source (NPS) pollution, like stormwater runoff, is a significant problem in Montana and the single largest cause of impaired waters statewide (Montana Department of Natural Resources and Conservation, 2014). The City of Missoula (City) Stormwater Utility manages the quantity, quality, and routing of stormwater runoff through our community. The effectiveness and efficiency of stormwater management have a direct impact on public health and safety, surface water quality, wildlife habitat, and future development. Consequently, the federal government amended the Clean Water Act (CWA) of 1972 in 1987 to regulate the management of stormwater runoff from municipalities and specific industrial classifications. Federal and state regulations require designated municipalities obtain and maintain coverage under the Montana Pollutant Discharge Elimination System (MPDES) General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4 Permit), which is administered by the Montana Department of Environmental Quality (MDEQ) under permit no. MTR040007. The City has prepared this Stormwater Management Program (SWMP) to outline activities for this cycle of the City's MS4 Permit: April 1, 2022 through March 31, 2027. This SWMP is a dynamic document, with periodic updates and additions.

This SWMP covers programmatic elements the City has already implemented, is in the process of developing for implementation, or plans to develop in order to meet new or revised requirements set forth in the latest statewide requirements. Together, these programmatic elements address the six Minimum Control Measures (MCMs) required under the MS4 Permit, each MCM is addressed in the SWMP.

<u>MCMs 1 and 2 Public Education, Outreach, Involvement, and Participation</u> – The City must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps the public can take to reduce pollutants in stormwater runoff. The program must include approaches for involving the public in SWMP development and implementation.

MCM 3 Illicit Discharge Detection and Elimination – The City must adopt and enforce ordinances or take equivalent measures to prohibit illicit discharges. The City must also implement a program to detect and eliminate illicit discharges.

MCM 4 Construction Site Stormwater Management – The City must develop, implement, and enforce a program to control the discharge of pollutants from construction sites greater than one acre, including activities that are part of a larger common plan of development or sale that would disturb one acre or more.

MCM 5 Post-Construction Site Stormwater Management – The City must develop, implement, and enforce a program to address stormwater runoff from new and redevelopment projects that disturb more than one acre, including activities that are part of a larger common plan of development or sale that would disturb one acre or more. The City must ensure appropriate post-construction best management practices (BMPs) are in place that prevent or minimize water quality impacts, as well ensure the long-term operation and maintenance of BMPs.

MCM 6 Pollution Prevention and Good Housekeeping – The City must develop and implement an operation and maintenance program that includes an employee training component and has the goal of preventing or reducing pollutant runoff from municipal operations.

Through these MCMs, the SWMP aims to reduce the discharge of pollutants from the City's stormwater system to the maximum extent practicable and to protect water quality.

Background

The Missoula area has a long history of addressing water quality issues and in 1988, the Missoula City-County Health Department applied for and obtained *Sole Source Aquifer* designation from the U.S. Environmental Protection Agency (USEPA). This designation requires that all projects that obtain federal funding be reviewed by the USEPA. In January 1993, the Missoula Board of County Commissioners and the Missoula City Council passed a resolution creating the Missoula Valley Water Quality District (MVWQD), to protect water resources within the Missoula Valley. The MVWQD has since undertaken numerous projects to protect and improve water quality. These projects include removal of auto shop floor drains that discharge through subsurface injection, public education on issues pertaining to water quality, household hazardous waste collection, establishment of a permitting system for facilities that store regulated substances, and regulation of deicer products. In August 1998, the *Clark Fork River Voluntary Nutrient Reduction Program* was finalized and put into place as an agreement among major parties in the Montana portion of the Clark Fork River watershed to significantly reduce nutrient pollution along a 200-mile stretch the river (Tri-State Implementation Council, 1998). The nutrient and algae values established in this plan for the Clark Fork River through the City were accepted as Total Maximum Daily Loads (TMDLs) by the USEPA. More recently, MDEQ published a water quality improvement plan (including TMDLs for tributaries in the central Clark Fork basin (MDEQ, 2014a and b). TMDLs for Clark Fork River metals loads were defined in a separate document (MDEQ, 2014c). Further, there is some effort underway to draft the *Central Clark Fork Watershed Restoration Plan* (Missoula Current, 2019). The City's Stormwater Utility and the MVWQD work together to ensure water quality is maintained to the highest practicable standards per the current data.

Throughout much of the City's MS4, stormwater is discharged into Class V injection wells (commonly referred to as dry wells or sumps), which allow for subsurface infiltration and aquifer recharge. There are at least 8,075 dry wells within the City limits; 5,134 are managed by the City. Where soil type precludes the use of dry wells, stormwater is discharged into inlets and pipes that are routed to swales, detention points, or surface water outfalls. There are 100 outfalls within the City limits; 54 are within the City's MS4 jurisdiction. They discharge stormwater into one of eight surface waters, within the Middle Clark Fork or Bitterroot subbasins (Table 1). Detailed maps of the City's stormwater infrastructure are provided in Appendix A.

The areas within the MS4 are characterized as primarily residential, with some commercial and very little industrial. Three of the eight waters that receive stormwater runoff within the MS4 are designated as impaired by MDEQ (Table 1). The reasons for impairment vary (Table 2). For example, the main cause of impairment in Grant Creek is due to dewatering and habitat loss, while impairment in the Clark Fork River is primarily due to historical mining activities upstream.

Table 1. City of Missoula post-construction stormwater management

HUC[2] 8 Subbasin	HUC 12 Subwatershed	Waterbody	Outfalls		Pipe (feet)		Dry Wells		Detention Points		Levee (feet)	Flood Wall (feet)
			City[3]	Other[4]	City	Other	City	Other	City	Other	City	City
Middle Clark Fork (17010204)	Okeefe Creek (170102040204)	—	—	—	—	13,176	—	10	—	1	—	—
	Butler Creek (170102040201)	Butler Creek	—	16	586	65,187	—	85	17	19	—	—
	Grant Creek (170102040103)				43,968	31,645	248	420	18	24	2,764	—
		Irrigation Ditch	3	2								
		Grant Creek[IMPAIRED]	4	2								
	La Valle Creek (170102040202)	—	—	—	—	480	—	31	1	1	—	—
	Lower Rattlesnake Creek (170102040102)	Rattlesnake Creek	5	6	5,652	1,964	220	123	—	—	—	—
	Marshall Creek-Clark Fork (170102040104)				38,454	56,939	3,100	1,918	10	21	4,192	898
		Clark Fork River[IMPAIRED]	12	17								
		Orchard Homes Ditch	6	—								
		Missoula Irrigation	1	1								
	Martin Gulch-Clark Fork (170102040205)	—	—	—	18,648	65,448	2	18	9	11	—	—
Bitterroot (17010205)	Hayes Creek-Bitterroot River (170102051603)				123,420	42,304	1,429	538	22	8	6,060	—
		Bitterroot River[IMPAIRED]	2	4								
		Pattee Creek	6	1								
		Unnamed drainage	13	—								
	Miller Creek (170102051601)	Miller Creek[IMPAIRED]	—	—	1,217	1,248	132	28	—	—	—	—
Subtotal			**52**	**49**	**232,892 (44 mi)**	**289,602 (55 mi)**	**5,146**	**3,138**	**77**	**85**	**13,016**	**898**
		Total	**101**		**536,211 (101 mi)**		**8,363**		**160**		**13,016**	**898**

[1]municipal separate storm sewer system
[2]U.S. Geological Survey Hydrologic Unit Code
[3]Assets owned and managed by the City of Missoula
[4]Assets owned and managed by Montana Department of Transportation, private, or unknown
[IMP]Impaired surface water per *Montana Department of Environmental Quality Water Quality Integrated Report* (MDEQ, 2020a and b).

Table 2. Impaired waters within the City of Missoula (MDEQ, 2020a and b)

	Water Body (ID)	Cause of Impairment	Source
Bitterroot Subbasin	Bitterroot River, Eightmile Creek to mouth (Clark Fork River) (MT76H001_030)	• Alteration in stream-side or littoral vegetative covers • Lead^{TMDL} • Temperature^{TMDL}	• Agriculture • Rangeland Grazing • Source Unknown • Wet Weather Discharges (Non-Point Source) • Wet Weather Discharges (Point Source and Combination of Stormwater)
Bitterroot Subbasin	Miller Creek, headwaters to mouth (Bitterroot River) (MT76H004_130)	• Alteration in stream-side or littoral vegetative covers • Sedimentation/Siltation^{TMDL} • Temperature^{TMDL}	• Crop Production (Crop Land or Dry Land) • Grazing in Riparian or Shoreline Zones • Loss of Riparian Habitat • Silviculture Activities
Middle Clark Fork Subbasin	Clark Fork River, Blackfoot River to Rattlesnake Creek (MT76M001_030)	• Arsenic^{TMDL} • Cadmium^{TMDL} • Copper^{TMDL} • Eutrophication^{TMDL} • Iron^{TMDL} • Lead^{TMDL} • Zinc^{TMDL}	• Dam or Impoundment • Industrial Point Source Discharge • Mill Tailings
Middle Clark Fork Subbasin	Clark Fork River, Rattlesnake Creek to Fish Creek (MT76M001_020)	• Chlorophyll-a^{TMDL} • Copper^{TMDL} • Iron^{TMDL} • Lead^{TMDL} • Nitrogen, Total^{TMDL} • Organic Enrichment^{TMDL} • Phosphorus, Total^{TMDL}	• Industrial Point Source Discharge • Mill Tailings • Municipal Point Source Discharges
Middle Clark Fork Subbasin	Grant Creek, Rattlesnake Wilderness boundary to mouth (Clark Fork River) (MT76M002_130)	• Algae • Alteration in stream-side or littoral vegetative covers • Flow Regime Modification • Nitrate/Nitrite (Nitrite + Nitrate as N)^{TMDL} • Nitrogen, Total^{TMDL} • Sedimentation/Siltation^{TMDL} • Temperature^{TMDL}	• Crop Production (Irrigated) • Loss of Riparian Habitat • Site Clearance (Land Development or Redevelopment) • Streambank Modifications/destabilization • Water Diversions

^{TMDL}Total Maximum Daily Load has been established.

Montana Pollutant Discharge Elimination System

The contaminants with approved TMDLs fall under state and federal regulations for water pollutant discharge. In accordance with the CWA, MDEQ administers the MS4 Permit. Per Administrative Rules of Montana (ARM) section 17.30.1105, any entity that discharges stormwater from a point source must obtain coverage under an MPDES MS4 Permit. The MS4 Permit provides authorization to discharge stormwater (i.e., stormwater runoff, snowmelt runoff, and surface runoff and drainage) to state waters (75-5-103, Montana Code Annotated). The MS4 Permit defines effluent limitations; establishes monitoring, recording, and reporting requirements; establishes requirements for the SWMP; and sets standard permit conditions.

The City is working with a goal of achieving the cleanest stormwater practicable, utilizing existing knowledge, new and innovative ideas, and available resources from internal staff, MVWQD, and local professionals, non-profit/conservation groups, and citizens.

The MS4 Permit for the urbanized area within and around the City has been divided among four permittees that own and operate separate storm sewer systems. (An urbanized area is defined by the United States Census Bureau as an area that has a population over 50,000 and an average population density of 1,000 people per square mile.)

- City: areas within the city limits that are not owned by either the Montana Department of Transportation or the University of Montana, excluding state traffic routes.
- Missoula County: areas outside the city limits, but within the urbanized area, that are not owned by either the Montana Department of Transportation or the University of Montana, excluding state traffic routes.
- Montana Department of Transportation: parcels owned by the department and the numerous state traffic routes within the urbanized area.
- University of Montana: parcels owned by the University of Montana within the urbanized area.

Stormwater Management Program Requirements

Per the MS4 Permit, this SWMP aims to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality and comply with the CWA. The SWMP must include a section describing how the SWMP will manage discharges of pollutants of concern (Administrative Rules of Montana (ARM) 17.30.1105(5)(b) and ensure stormwater discharges will not cause or contribute to instream exceedances of water quality standards. These pollutants are defined as causes of impairment in the *MDEQ Water Quality Integrated Report* (MDEQ 2020a and b) (Table 2). MDEQ has assigned some wasteload allocations (WLAs) to the City's MS4, per TMDLs for the Bitterroot River (MDEQ and USEPA, 2014); Clark Fork River metals (MDEQ, 2014c); Clark Fork River non-metals (Tri-State Implementation Council, 1998); and Grant Creek (MDEQ, 2014a and b) (Table 3).

This SWMP includes management practices, control techniques, systems, designs, and other provisions necessary to control pollutants. Each MCM has requirements to identify how the success of the BMPs will be evaluated, including how the measurable goals for each of the BMPs were selected. In addition to these requirements, permittees are required to maintain documentation describing how and why each of the BMPs and measurable goals for the SWMP was selected.

Table 3. Wasteload allocations (WLAs) for the City of Missoula's MS4[1]

Waterbody Name	Waterbody ID	Pollutant	TMDL[2]	MS4 WLA
Bitterroot River	MT76H001_030	Lead	9.23 to 27.0 lbs/day[3]	0.08 lbs/day
		Temperature	1,853 kcal/sec	*
Miller Creek	MT76H004_130	Sediment	1,538 tons/year	*
		Temperature	2,246 kcal/sec	*
Clark Fork River, Blackfoot River to Rattlesnake Creek	MT76M001_030	Arsenic	136.08 to 626.4 lbs/day	**
		Cadmium	4.24 to 14.47 lbs/day	**
		Chlorophyll-a	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	149.41 to 487.04 lbs/day	0.009 lbs/day
		Iron	13,608 to 62,640 lbs/day	**
		Lead	55.19 to 151.93 lbs/day	0.0045 lbs/day
		Total N	300 µg/L	***
		Total P	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
		Zinc	1,916 to 6,265 lbs/day	0.00004 lbs/day
Clark Fork River, Rattlesnake Creek to Fish Creek	MT76M001_020	Chlorophyll-a	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	219.9 to 747.9 lbs/day[3]	1.1 lbs/day
		Iron	30,915 to 129,600 lbs/day[3]	**
		Lead	65.7 to 201.6 lbs/day[3]	0.51 lbs/day
		Total N	300 µg/L	***
		Total P	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
Grant Creek	MT76M002_130	Total N	31.72 lbs/day	0 lbs/day
		Sediment	1,440.2 tons/year	7.8 tons/year
		Temperature	470 kcal/sec	*

[1]municipal separate storm sewer system
[2]Total Maximum Daily Load
[3]Low to high flow
*Because there are no point sources, there is no WLA (MDEQ and USEPA, 2014).
**Insufficient data were available to provide numeric load estimates (MDEQ, 2014c).
***The TMDL was established prior to the creation of WLAs (Tri-State Implementation Council, 1998).

City Program Framework

On August 9, 2016, City Council adopted the first *Stormwater Specifications and Design Standards Manual*. Then, on October 12, 2016, the City Council unanimously passed Ordinance 3580, repealing Chapter 15.65 of the Missoula Municipal Code and establishing Chapter 13.27: Stormwater Utility, Rates, and Regulations. This chapter established the City Stormwater Utility, rates for the same, and outlined existing and new rules and regulations related to stormwater pollution prevention and control. The ordinance and standards address the protection of water quality, preservation of natural drainage systems, flood mitigation, site grading, and protection of property.

City Standards and Regulations

In 2020, Chapter 13.27 was revised to create a regulatory framework for permitting, inspections, and post-construction performance standards. The revision—renamed Stormwater Management—was presented to the City Council Public Works Committee on February 12, 2020, and a public hearing occurred on March 9, 2020. The City Council unanimously approved the new code, and it became effective on April 8, 2020. Chapter 13.27 also establishes a fee structure, penalties for commencing work without a permit, and penalties for violation of the code. A public hearing for the new Stormwater Permit and Dry Well Approval fees was held on September 14, 2020; they were approved by City Council on September 21, 2020. The Dry Well Approval became effective on October 1, 2020, and the Stormwater Permit became effective on January 1, 2021. The *2016 Stormwater Specifications and Design Standards Manual* was rescinded and replaced with the *Missoula City Public Works Standards and Specifications Manual*. The manual codifies City standards for construction and post-construction stormwater management; the first version became effective on November 18, 2020. The current version is in effect from January 1, 2023 until the next update.

Utility Rates

The Stormwater Utility was initially established under an interim rate. This rate provided the necessary funds to research how much money was needed to manage the utility in the long term. A *Stormwater Facility and Operations Plan* was completed in 2018. This document provided an evaluation of the existing and future staffing needs, operations and management plan, and a preliminary capital improvements plan. Additionally, the City hired a professional consulting company specializing in establishing utility rate schedules. Per their recommendation, the City pursued a stormwater rate associated with average daily trips (ADTs), according to the codes established by the Institute of Transportation Engineers. This rate structure was presented to City Council via resolution; and it was unanimously approved on December 16, 2019. The rate became effective January 1, 2020. A proposed rate increase was presented to City Council and a public hearing was held on December 6, 2021; the rates were approved on December 13, 2021 and became effective January 1, 2022. Per the new schedule, the rate increased by 6% in 2022, and will increase by 9% in 2023 and 9% in 2024.

The rate structure is composed of a flat regulatory compliance charge and a flat operations and maintenance charge. The trip rate varies per property type, according to the ADTs. An example stormwater rate for a single-family home is provided in Table 4.

Table 4. Stormwater Utility rate schedule for a single-family home

Rate Component	Annual Charges 2021	Annual Charges 2022	Annual Charges 2023	Annual Charges 2024
Regulatory Compliance	$27.97	29.65	32.32	35.23
Operations & Maintenance	$20.03	21.23	23.14	25.22
Average Daily Trips (ADTs) × Trip charge	9.45 × $0.27	10.02 × $0.29	10.92 × $0.32	11.90 × $0.35
Total	**$50.55**	**$53.79**	**$58.95**	**$64.62**

The stormwater rate provides approximately $1.36 million annually to the Stormwater Utility enterprise fund (Table 5). This money may only to be used for specific purposes related to the Stormwater Utility's mission statement. The rate is not sufficient to pay for capital improvement projects; the debt service is required to pay for loans for capital projects (Table 6).

Table 5. Stormwater Utility budget (fiscal year 2023)

Category	Amount
Grants	$56,878.11
SW Rates	$1,431,135.74
Total Revenue	**$1,488.013.85**
Salaries and Benefits	$589787.74
Operations and Maintenance	$579,214.48
Debt Service	$34,072.81
Total Expenses	**$1,203,075.03**

Table 6. Capital improvements (fiscal year 2023)

Project	Amount
Bitterroot Outfall Improvement	$19,059.27
Grant Creek Realignment	$2,013,561.37
South Hills Stormwater Improvements	$1,642,844.30
Total	**$3,675,464.94**

Stormwater Management Team

The Stormwater Management Team (Team) consists of diverse City and County personnel: Public Works; Streets; Wastewater; Engineering; Planning; Permits and Land Use; GIS; City Attorney; Parks & Recreation; and the Missoula Valley Water Quality District (MVWQD) (Figure 1). Since some agencies involved in the stormwater program are funded by both City and County taxes, these agencies have been shown on the chart using a dotted line to illustrate the relationship. The team meets regularly on the last Monday of each quarter. We have identified key responsibilities per MCM (Table 7); and these tasks/responsibilities will be reevaluated at the March 2023 meeting.

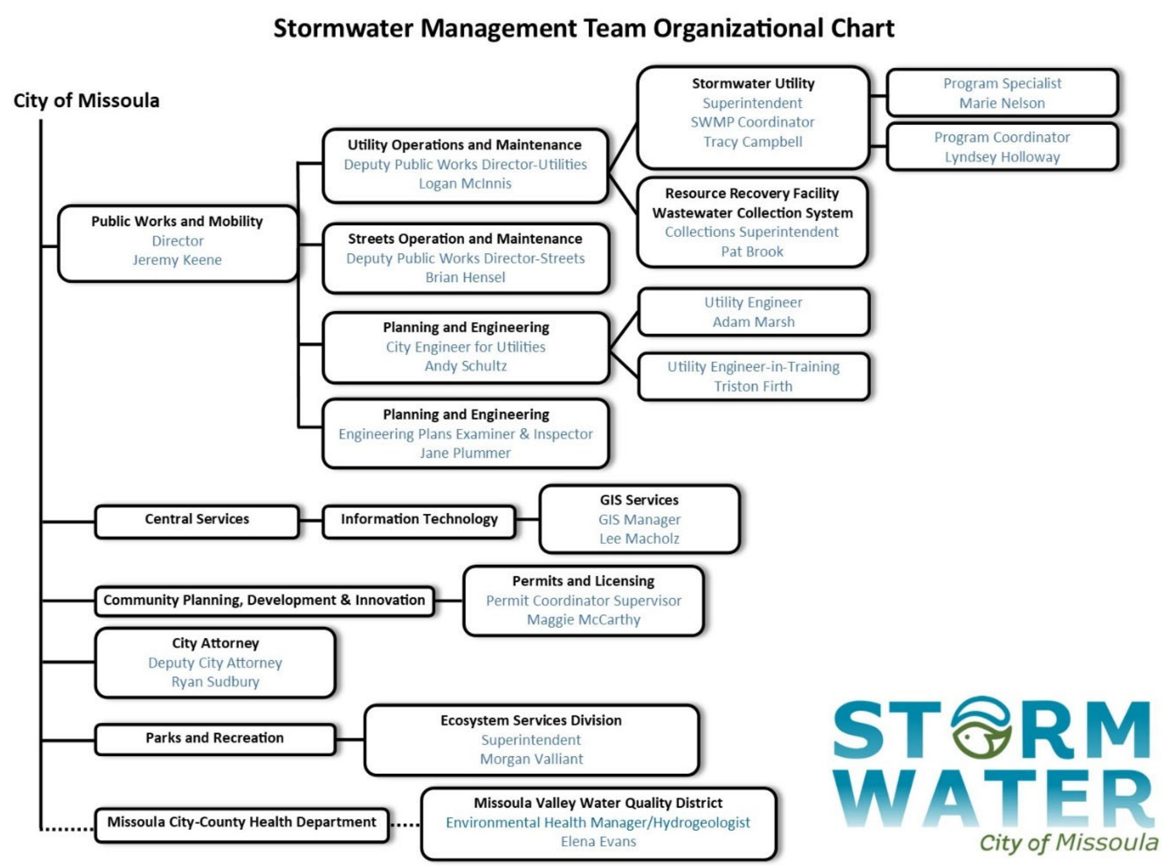

Figure 1. City of Missoula stormwater management program team organizational chart

Table 7. 2023 goals and responsibilities

MCM[1]	Description	2023 Goal	Lead(s)
1 and 2	Public Outreach and Participation	Host SWPPP Administrator training and BMP Workshop in spring 2023	SW Program Specialist
1 and 2	Public Outreach and Participation	Post training opportunities on City website and social media	SW Program Specialist
1 and 2	Public Outreach and Participation	Install 100 storm drain markers	SW Environmental Technician and BSWC Member
1 and 2	Public Outreach and Participation	Create web map of marker locations	SW Environmental Technician and BSWC Member
1 and 2	Public Outreach and Participation	Community-wide outreach via PSAs on the radio, Facebook, Instagram, and Mountain Line E-Buses to encourage citizen participation to clear storm drains and gutters to mitigate localized flooding in the spring, due to late leaf drop and early snow fall	SW Program Specialist
1 and 2	Public Outreach and Participation	Clark Fork River Market tabling on four Saturdays	SW Environmental Technician and BSWC Member
1 and 2	Public Outreach and Participation	Update Instagram account weekly: 26 posts and increase followers to 1,500.	SW Program Coordinator and SW Environmental Technician
1 and 2	Public Outreach and Participation	Meet or surpass total in-person citizen contacts from 2022 (1,060 contacts in 2022) - 1,200 participants	SW Program Specialist
1 and 2	Public Outreach and Participation	Continue Pattee Creek Restoration Project with 5 additional homeowners Steward signs	BSWC Member
1 and 2	Public Outreach and Participation	Distribute 500 watershed pamphlets at local community events	SW Environmental Technician and BSWC Member
1 and 2	Public Outreach and Participation	Distribute 100 organic gardening brochures at community events	SW Environmental Technician and BSWC Member
1 and 2	Public Outreach and Participation	Ensure Stormwater Management Awareness online training module is implemented and at least 35 employees complete the course	SW Program Specialist
1 and 2	Public Outreach and Participation	Distribute 100 biodegradable pet waste rolls at local community events	SW Environmental Technician and BSWC Member
1 and 2	Public Outreach and Participation	Pet waste clean-up day with local partner at Jacob's Island Park	SW Program Specialist
1 and 2	Public Outreach and Participation	Social media PSA on pet waste in spring, summer, and fall	SW Program Specialist

MCM[1]	Description	2023 Goal	Lead(s)
1 and 2	Public Outreach and Participation	Update main Stormwater page with relevant news articles regarding green infrastructure, new stormwater technology, water quality, training and educational opportunities, etc. at least six times annually	SW Program Specialist
3	Illicit Discharge Detection and Elimination	Review, document, implement, and update SOPs as necessary	SW Program Coordinator
3	Illicit Discharge Detection and Elimination	Meet with each facility supervisor to review SOPs	SW Program Coordinator
3	Illicit Discharge Detection and Elimination	Inspect each of the facilities identified in the SOPs	SW Program Coordinator
3	Illicit Discharge Detection and Elimination	Collaborate with Missoula Water for compliance with the General Permit for Disinfected Water and Hydrostatic Testing	SW Superintendent
3	Illicit Discharge Detection and Elimination	Use the Trimble R2 and Collector app, along digitization techniques, to update the Stormwater GIS inventory	SW Program Coordinator
3	Illicit Discharge Detection and Elimination	MVWQD will provide quarterly reports on illicit discharges to the Stormwater Utility	Missoula Valley Water Quality District
3	Illicit Discharge Detection and Elimination	Meet with MDT, UM, and County MS4 Stormwater Program Coordinators	SW Superintendent
3	Illicit Discharge Detection and Elimination	Discuss primary goals of each MS4 and determine opportunities to collaborate	SW Superintendent
3	Illicit Discharge Detection and Elimination	Map enforcement response and investigations	SW Program Coordinator
4	Construction Site Stormwater Management	Using the Site Evaluation Form to determine site priority, inspect 25% of sites with a City Stormwater Permit: 100% of high-priority; 10% of medium priority; and 1% of low priority	SW Environmental Technician
4	Construction Site Stormwater Management	Track and document violations per the ERP	SW Environmental Technician
4	Construction Site Stormwater Management	Track and document Erosion Control Site Plans	SW Environmental Technician
4	Construction Site Stormwater Management	Track and document construction site inspections	SW Environmental Technician
4	Construction Site Stormwater Management	Evaluate compliance by documenting the total number inspections and how many sites passed or failed	SW Environmental Technician
5	Post-Construction Site Stormwater Management	Track and document Stormwater Permits with post-construction stormwater management requirements	SW Environmental Technician

MCM[1]	Description	2023 Goal	Lead(s)
5	Post-Construction Site Stormwater Management	Draft ERP to ensure compliance with the installation, operation, and maintenance of post-construction stormwater management controls	SW Superintendent
5	Post-Construction Site Stormwater Management	Track and document Stormwater Management Site Plans	SW Environmental Technician
5	Post-Construction Site Stormwater Management	Identify regional stormwater management facilities	SW Program Coordinator
5	Post-Construction Site Stormwater Management	Track and document post-construction inspections	SW Environmental Technician
5	Post-Construction Site Stormwater Management	Digitize and field-reconcile stormwater facilities within the MS4 boundary	SW Program Coordinator, SW Environmental Technician, and BSWC Member
5	Post-Construction Site Stormwater Management	Inspect 80% of high-priority post-construction facilities	SW Program Coordinator and SW Environmental Technician
5	Post-Construction Site Stormwater Management	Conduct and track post-construction inspections per inspection frequency determination	SW Environmental Technician
5	Post-Construction Site Stormwater Management	Design and construction of the demonstration project at the Van Buren footbridge	University of Montana
5	Post-Construction Site Stormwater Management	Design and construction of green infrastructure (curb cut to swale) street drainage test area at 541 S 6th St W	SW Environmental Technician
5	Post-Construction Site Stormwater Management	Construction of green infrastructure at Creek Crossing	Public Works & Mobility Utility Engineer
6	Pollution Prevention and Good Housekeeping	Review, document, implement, and update SOPs as necessary	SW Program Coordinator
6	Pollution Prevention and Good Housekeeping	Meet with each facility supervisor to review SOPs	SW Program Coordinator
6	Pollution Prevention and Good Housekeeping	Inspect each of the facilities identified in the SOPs	SW Program Coordinator and SW Environmental Technician
	Training	Stormwater Management Team	SW Superintendent
	Training	Construction Site Personnel: Once per permit term SWPPP and ERP training for personnel, inspectors, and plan reviewers.	SW Program Specialist

MCM[1]	Description	2023 Goal	Lead(s)
	Training	Annual SWPPP training provided by Clean Water Technologies to be conducted April 2023.	SW Program Specialist
	Training	Create and implement ERP training module by December 31, 2023	SW Program Specialist
	Training	Post-Construction Site Personnel: Once per permit term, conduct plan review and inspection training for all personnel responsible for implementation of post-construction site stormwater management MCM 5.	SW Program Specialist
	Training	Develop and implement post-construction site stormwater management training module for plan reviewers and inspectors by December 31, 2023	SW Program Specialist
	Training	Field and Facility Personnel: 1st and 4th years of permit term: Conduct field and facility training for MS4 personnel responsible for completing work activities with stormwater pollution potential. Includes overview of permit, potential stormwater impacts, IDDE training, BMP training, and any SOP updates.	SW Program Specialist
	Training	Develop and implement field and facility training module by December 31, 2023	SW Program Specialist
	Training	Determine cost effectiveness of implementation through Articulate 360 and/or Storm-E School by Clean Water Technologies.	SW Program Specialist
	Sampling and Monitoring	Sample six locations twice annually	SW Program Coordinator
	Sampling and Monitoring	Evaluate effectiveness of BMPs and document findings in the Sampling Plan	SW Superintendent
	Sampling and Monitoring	Green infrastructure effectiveness monitoring at three sites, three times annually	SW Program Coordinator

[1]Minimum Control Measure per the Montana Department of Environmental Quality Small Municipal Separate Storm Sewer System (MS4) Permit

1 MCMs 1 and 2– Public Education, Outreach, Involvement, and Participation

- *Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps the public can take to reduce pollutants in storm water runoff.*
- *Implement a public involvement/participation program to involve key target audiences in the development and implementation of the SWMP that complies with state and local public notice requirements.*

According to the USEPA, NPS pollution is the largest contributor to water quality degradation in the United States (USEPA, 2016). NPS pollution directly affects Missoula stormwater, impairing water quality, aquatic life, and recreational opportunities. NPS pollution can come in the form of common household activities such as pet waste, lawn care, and automobile washing and maintenance or by way of construction work such as sediment runoff or an illicit discharge by way of many different construction site activities. Educating the Missoula community can reduce individual contributions to pollution and improve water quality as a whole.

1.1 2023 Goals and Results

1.1.1 Website

- Publicize the "Report an Issue" WebMap on Instagram and at community events to encourage better use from the public
  - "Report an Issue" WebMap posted on Instagram, main city webpage, stormwater page and at community events.
- Update main Stormwater page with relevant news articles regarding green infrastructure, new stormwater technology, water quality, training and educational opportunities, etc. at least six times annually
  - Training and education opportunities were posted 9 (nine) times in 2023.
- Research feasibility of a new public engagement program: Adopt-a-Drain
  - Program is feasible and worthwhile to pursue but will require significant funding to design, build, and implement. We will begin looking for grant opportunities to assist with this program. Potential implementation 2024 or 2025.
- Increase website visits by 10% in all categories from 2022
  - Website visits increased by 236%

1.1.2 General Common Education

- Community-wide outreach via PSAs on the radio, Facebook, Instagram, and Mountain Line E-Buses to encourage citizen participation to clear storm drains and gutters to mitigate localized

flooding in the spring, due to late leaf drop and early snow fall (passive/active)
    - Instagram, radio, and PSA during spring thaw specifically geared toward late leaf pickup and protecting stormwater infrastructure and drainage.
- Update Instagram account weekly: 26 posts and increase followers to 1,500 (passive)
    - 21 stormwater related posts and total followers at 1,557 as of Dec 31, 2023
- Sponsored Community Event: Clark Fork River Market tabling to educate the public, answer questions, and hand out educational materials on all target behaviors. Meet or surpass total in-person citizen contacts from 2022 (1,060 contacts in 2022) (active)
    - 1,265 In-person citizen contacts at tabling events in 2023
    - Collected 83 survey responses on general stormwater knowledge. (Data will be used to monitor citizen behavior changes).
- Educational Signage: Install 100 storm drain markers (passive)
    - Due to personnel issues no additional drain markers were installed. This goal will be moved to 2024
- Interactive web map of marker locations (active)
    - Due to personnel issues interactive web map with marker locations goal has been moved to 2024.

1.1.3 Home Chemical Care

- Brochures: Distribute 500 watershed specific brochures at community events (passive/active)
    - 562 watershed specific brochures were distributed at community events in 2023.
- Brochures: Distribute 100 brochures on organic gardening at community events (passive/active)
    - 42 organic gardening brochures were distributed at community events in 2023.
- Sponsored Community Event: Continue Pattee Creek Restoration Project with 5 additional homeowners, including stewardship signs (active)
    - Goal was adjusted for Pattee Creek Restoration after inspecting the survival rate of the riparian vegetation that was planted in 2022. Replacement vege was planted at the majority of previous participating properties, as well as, new vegetation planted at city owned Lester Park.

1.1.4 Pet Waste

- Advertisements: Social media public service announcement on pet waste in spring, summer, and fall (passive)

  - April 20, August 15, and Sept 27 Instagram posts regarding pet waste and pet waste focused events.
- Distribute 100 biodegradable pet waste bag rolls at local community events (passive/active)
  - Distributed 285 biodegradable pet waste bag rolls in 2023.
- Co-Host a pet waste clean-up day with local partner (TBD) at Jacob's Island Park. (active)
  - Event was updated to educational event only on September 27, 2023 with focus on pet waste management. Local non-profits, Home Resource, Watershed Education Network, Clark Fork Coalition, and the Missoula Conservation District were in attendance. 42 public contacts.

1.1.5 Construction Industry

- Industry Specific Training: Host SWPPP Administrator training and FREE BMP Workshop with Clean Water Technologies in spring 2023 (active)
  - Completed April 19-20, 2023. Fifteen (15) city staff members and nine (9) public citizens were received SWPPP certifications.
- Advertisements: Training opportunities will be posted on City website and social media (passive)
  - Training opportunities were posted eleven (11) times on the city website and social media.

1.2 2023 Performance Tracking Methods

1.2.1 Total Distribution of materials

- 500 watershed pamphlets – result: 562
- 100 organic gardening pamphlets – result: 42
- 100 biodegradable pet waste bags – result: 285
- 100 storm drain markers – goal moved to 2024 for completion.

1.2.2 Total Event Participants

- 1,200 community event participants
  - 1,256 community participants in 2023
- Continue to monitor Missoula Public Library SpectrUM water room attendance
  - 53,000+ attendees in 2023

1.2.3 Website Analytics

- Increase website visits by 10%: > 2,863 visits
  - Website visits in 2023 increased by 236% with a total visit count of 9,614

-

1.3 2024 Goals

1.3.1 Website

- Update main Stormwater page with relevant news articles regarding green infrastructure, new stormwater technology, water quality, and/or training and educational opportunities at least six times annually.
- Review and update stormwater website to fulfill all MCM 1and2 a.i.-ii. requirements.

1.3.2 Key Target Audience 1: General Common Education

- Participation in Community Event: Focus 2 public events specifically on General stormwater education. (active)
  - Aquifer
  - Watersheds
- Social Media: Bi-weekly Instagram posts regarding general common education topics: 26 posts. (passive)
- Educational Signage: Install new educational signage at reconstructed Cattail Corner wetlands. (passive)
- Stormwater survey: Continue collecting stormwater survey responses for data metric.

1.3.3 Key Target Audience 2: Home Chemical Care

- Work with HomeResource and Missoula Valley Water Quality District on opening of the new hazardous material disposal facility located at HomeResource. Provide marketing, joint tabling opportunities, and possibly staff volunteer hours. (passive/active)

1.3.4 Participation in Community Event: Focus 1 public event specifically on home chemical care. (active)Key Target Audience 3: Pet Wast e

- Participation in Community Event: Focus 1 public events specifically on Pet Waste impacts to water quality. (active)
- Distribute 300 pet waste bag rolls. (passive)

1.3.5 Key Target Audience 4: Construction Industry

- Industry specific training: Hold Annual SWPPP Administrator and Preparer training with Clean Water Technologies. Including a free BMP workshop to the public. Currently scheduled for May 7-8, 2024. (active)
- Brochures/Fliers: Select at least one targeted outreach to a construction industry company.

Possibilities include concrete, landscaping, BMP suppliers, etc. (passive)

- Student Outreach: Encourage stormwater focus in future design and engineering by working with new Engineering Program at Big Sky High School.

1.4 2024 Performance Tracking Methods

1.4.1 Total Distribution of materials

- 500 watershed pamphlets
- 50 organic gardening pamphlets
- 300 biodegradable pet waste bag rolls
- 100 storm drain markers

1.4.2 Total Event Participants

- 1,500 community event participants
- Continue to monitor Missoula Public Library SpectrUM water room attendance

1.4.3 Website Analytics

- Increase website visits by 10%: > 9,614
- Increase Instagram followers by 10%: >1,557
- Continue to track public stormwater survey metrics started in 2023.

2 MCM 3 – Illicit Discharge Detection and Elimination

- *Develop, implement, and enforce a program to detect and eliminate illicit discharges into the small MS4.*
- *Develop and annually update a storm sewer system map showing the location of all outfalls and the names/locations of all receiving waters.*
- *Through ordinance or other regulatory mechanism to the extent allowable under state or local law, effectively prohibit non-storm water discharges into the MS4 and implement appropriate enforcement procedures and actions.*
- *Develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, to the MS4.*
- *Inform employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.*

Illicit discharge is any discharge that is not comprised entirely of rainfall or snowmelt. To effectively control illicit discharges to the stormwater sewer system, the City has created an IDDE Program consisting of several components: a stormwater sewer system geographic database, ordinances prohibiting illicit discharges, an illicit discharge monitoring program, and an education program. Each serves a critical function in reducing illicit discharges to surface waters. Particular attention is paid to the causes of impairment per the *MDEQ Water Quality Integrated Report* (MDEQ, 2020a and b).

2.1 Frequent Non-Stormwater Illicit Discharges

The City has identified frequent categories of non-stormwater discharges (Table 8).

Table 8. Frequent categories of non-stormwater discharges

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
Water line flushing	No	Chlorine Sediment	General Permit for Disinfected Water and Hydrostatic Testing
Irrigation – Missoula Water	No	Chlorine	None
Irrigation - Ditches	No	Sediment Nitrogen Phosphorus Temperature Chlorophyll-a	Local ditches usually infiltrate the ground prior to reaching a surface water.
Diverted stream flows	No	Sediment	Joint Application and Construction Dewatering General Permit
Rising ground waters	No	None	None
Uncontaminated ground water infiltration	No	None	None
Uncontaminated pumped ground water	No	None	None
Discharges from potable water sources	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Footing/Foundation drains	No	None	None
Air conditioning condensation	No	None	None
Irrigation water	No	Chlorine Sediment Nutrients	None
Springs	No	None	None
Individual residential car washing	No	Sediment Detergent Metals	None
Flows from riparian habitats and wetlands	No	Sediment Nitrogen Phosphorus	None

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
Dechlorinated swimming pool/splash pad discharges	Yes	Cyanuric acid Algaecide Detergent Salt Variable pH Human waste Disinfection Byproducts	Municipal pools are not prohibited from discharging dechlorinated water into the MS4 (MMC 13.27.200).
Street wash water	Yes	Hydrocarbons Metals Trash Sediment Nitrogen Phosphorus	Wash water has high potential for pollutants and the street cleaning trucks vacuum the water after washing, to prevent the water from entering the MS4.

2.1.1 Evaluate Frequent Non-Stormwater Discharges

Annually, the Team will evaluate and update the frequent categories of non-stormwater discharges.

2.1.1.1 2023 Goals

- Review, document, implement, and update SOPs as necessary
    - Updated SOP document is located in Appendix J.
- Meet with each facility supervisor to review SOPs
    - All municipal facility supervisors were contacted by SW Program Coordinator to review SOPs.
- Inspect each of the facilities identified in the SOPs
    - All facilities were inspected in 2023 with the exception of the Catlin Police Station.

2.1.1.2 2024 Goals

- Review, document, implement, and update SOPs as necessary
- Meet with each facility supervisor to review SOPs
- Inspect each of the facilities identified in the SOPs

2.2 Occasional Incidental Non-Stormwater Discharges

The City has identified occasional/incidental non-stormwater discharges.

Table 9. Occasional incidental non-stormwater discharges

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
Charity carwash	No	Hydrocarbons Metals Trash Sediment Nitrogen Phosphorus	A free "Clean Suds' Car Wash Kit" is available from the MVWQD.
Water main break	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Water pressure testing	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Water line flushing	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Emergency firefighting activities	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Construction dewatering	No	Sediment	General Permit for Construction Dewatering

2.2.1 Evaluate Occasional Incidental Non-Stormwater Discharges

Annually, the Team will evaluate and update the categories of occasional incidental non-stormwater discharges. If any of these discharges are determined to be a significant contributor of pollutants, the MVWQD's Enforcement Response Plan (ERP) will be initiated.

2.2.1.1 2023 Goals

- Review, document, implement, and update SOPs as necessary
  - Updated SOP document is located in Appendix J.
- Inspect each of the facilities described in the SOPs
  - All facilities were inspected in 2023 with the exception of the Catlin Police Station.
- Collaborate with Missoula Water for compliance with the General Permit for Disinfected Water and Hydrostatic Testing
  - The permit NOI was submitted on February 12, 2024

2.2.1.2 2024 Goals

- Review, document, implement, and update SOPs as necessary
- Inspect each of the facilities described in the SOPs, including the Catlin Police Station
- Collaborate with Missoula Water and implement the conditions in the General Permit for Disinfected Water and Hydrostatic Testing
-

2.3 Infrastructure Inventory

The City uses GIS to map stormwater infrastructure: e.g., pipes, sumps, and outfalls. An interactive map is provided on the City's website: https://cityofmissoula.maps.arcgis.com/apps/MapSeries/index.html?appid=b214e2c0c909446a94a6bb92fec1e304.

2.3.1 Mapping

As-built drawings are submitted prior to project close-out for projects constructed within the City. Upon receipt of these drawings, the GIS database is updated to reflect the changes made during construction. As we update our inventory with new data, it is also important to reconcile existing data. The City's stormwater system is aging and deferred maintenance is a prime issue. It is important to track the condition of existing infrastructure, to prioritize projects and inform management decisions.

2.3.1.1 2023 Goals

- Use the Trimble R2 and Collector app, along digitization techniques, to update the Stormwater GIS inventory
    - The SW team reconciled 473 drywells, 208 inlets, 2 outfalls, 16 manholes, 2 detention basins, and 1.5 miles of pipe.

2.3.1.2 2024 Goals

- Use the Trimble R2 and Field Map app to update the Stormwater GIS Inventory
- Seek Montana State Library (MSL) funds to increase GIS reconciliation capacity

2.4 Ordinance to Prohibit Illicit Discharges

In 2000, the City Council and the Board of County Commissioners amended the Missoula Aquifer Protection Ordinance, originally adopted in 1993. The ordinance is intended to protect the public health, safety, and general welfare of those who depend upon the Missoula Valley Aquifer and surface waters in the Missoula Valley for drinking water, recreation, and other beneficial uses. The provisions of the ordinance (Chapter 13.26, Missoula Municipal Code) are applied to an area within five miles of the City limits.

2.4.1 Chapter 13.26 Missoula Municipal Code

The ordinance establishes prohibitions and/or restrictions on regulated substances and activities that have the potential of causing surface or groundwater contamination. Facilities that store regulated substances above the specific quantities are required to obtain a permit from the MVWQD. This requires facilities to report chemical quantities and steps taken to reduce the likelihood of spills to the MVWQD every two years. Regulated Substances are any substances that may threaten contamination of surface water or the Missoula Valley Aquifer, excluding substances used for personal household use. The Missoula Valley Water Quality Ordinance also gives the MVWQD the authority to perform inspections and enforce the provisions of the ordinance. The Montana Water Quality Act, City-County Health Code, Missoula Municipal Code, and Uniform Plumbing Code all prohibit on-site sewage disposal systems that flow into the stormwater system. Accordingly, the City maintains sanitary sewer connection records for all buildings.

In 2022, The MVWQD revised Missoula Municipal Code (MMC) Chapter 13.26 and adopted *BMPs for Pollution Prevention*: https://www.ci.missoula.mt.us/DocumentCenter/View/61948/2022_06_02-Water-Quality-District-BMP-Manual.

2.4.1.1 2023 Goals

- MVWQD will provide quarterly reports on illicit discharges to the Stormwater Utility
    - MVWQD did provide quarterly reports on all illicit discharge investigations
    - Summary tables and map provided in Appendix D

2.4.1.2 2024 Goals

- MVWQD will provide quarterly reports on illicit discharges to the Stormwater Utility

2.4.2 Assistance from Neighboring MS4s to Detect and Eliminate Illicit Discharges

The City shares overlapping MS4 responsibilities with MDT, University of Montana, and Missoula County. To date, there are no formal agreements in place between the neighboring MS4s. The City's SWMP Coordinator has engaged the other MS4s in dialogue to improve coordination between the permittees. This includes attending stakeholder meetings and improving communication regarding jurisdictional boundaries, to determine responsibilities and implement appropriate BMPs. It has been noted that the City requires a formal agreement for maintenance of MDT stormwater infrastructure within the City limits. A request for a Memorandum of Understanding was presented to MDT (Steve Felix, Maintenance Chief: Missoula District) on April 17, 2020. MDT stated that they did not have the funds necessary to compensate the City for managing their stormwater infrastructure within the City limits (Table 10).

Table 10. Estimated cost to manage MDT's stormwater system

Structure	Total	Quantity/Yr	Labor Cost ($82/hour)	Equipment Cost ($260/hour)	Subtotal
Dry Wells	612	102	$8,380	$26,520	*$34,900*
Inlets	306	51	$4,190	$13,260	*$17,450*
Storm Lids	178	15	$1,232	$3,900	*$5,132*
Pipes	37,918 ft	6,320 ft	$12,981	$41,080	*$54,061*
		Subtotal	*$26,784*	*$84,760*	**$111,544**

2.4.2.1 2023 Goals

- Meet with MDT, UM, and County MS4 Stormwater Program Coordinators
  - Discuss primary goals of each MS4 and determine opportunities to collaborate
    - The City and UM met several times in 2023: February 2; March 30; July 13; and September 28
    - The City removed UM's exemption from paying Stormwater rates, with concurrence from UM
    - Since UM is within the City Limits and are paying stormwater rates, they are now subject to City MS4 requirements for MCMs 4 and 5
    - The City and UM are working on a Memorandum of Understanding to clearly define each other's roles and responsibilities for MS4 compliance and coordination
    - The City contacted MDT on November 29 and December 18, 2023 to discuss coordinating efforts in general and particularly, to discuss improvements to

MDT's Reserve Street outfall to the Bitterroot River

- MDT has not responded yet

2.4.2.2 2024 Goals

- Meet with MDT, UM, and County MS4 Stormwater Program Coordinators
  - Discuss primary goals of each MS4 and determine opportunities to collaborate

2.4.3 Enforcement Response Plan

The MVWQD and City Fire Department have the legal authority to respond to hazardous material spills within the City limits. Both agencies possess the equipment, tools, and supplies as well as training in proper hazardous spill mitigation techniques. The MVWQD tracks and documents illicit discharges, investigations, and corrective actions. The MVWQD investigates illicit discharge complaints within 3 business days of receiving them. When possible, the investigation occurs within 24 hours. If necessary, a notice of violations is issued within 1 to 3 business days. If compliance is not achieved, the City-County Health Department will pursue compliance through the enforcement procedures outlined in Missoula Municipal Code and City-County Health Code. The Enforcement Response Plan is provided in Appendix B.

2.4.3.1 2023 Goals

- Map enforcement responses and investigations
  - Summary table and maps provided in Appendix D

2.4.3.2 2024 Goals

- Map enforcement responses and investigations

2.5 Dry-Weather Inspections

The City must conduct dry weather inspections of all outfalls by the end of the current permit cycle (2026).

2.5.1 Outfall Reconnaissance

The Stormwater Utility has drafted an Outfall Reconnaissance report that is provided in Appendix C. Currently, we have identified 101 outfalls within the City limits, 52 of which are owned and managed by the City. The Stormwater Utility will continue with proactive, dry-weather screening of outfalls.

2.5.1.1 2023 Goals

- Continue to field-reconcile outfalls in the GIS database

- The total number of outfalls within the city's MS4 is 101
  - The city is responsible for 52, while 49 are owned and managed by MDT, University of Montana, or unknown.

2.5.1.2 2024 Goals

- Continue to field-reconcile outfalls in the GIS database

2.5.2 High-priority Outfalls

Using the results of the outfall reconnaissance, the Stormwater Utility must identify the high-priority outfalls, per their potential to adversely affect water quality. The City is evaluating the criteria that will be used to designate outfalls as high priorities. When available, the method and the high-priority outfalls that we have identified will be presented in the SWMP (Appendix C). As the outfalls are screened throughout the remainder of this permit cycle, they will be evaluated according to various conditions: e.g., land use in drainage area; presence/absence of flow; odor; color; turbidity; floatables; outfall damage; and proximity to surface water. Once the high-priority outfalls have been identified, they shall be inspected at least once annually.

2.5.2.1 2023 Goals

- Inspect all high-priority outfalls owned and managed by the City
  - All 10 high-priority outfalls owned and managed by the City were inspected (Appendix C).

2.5.2.2 2024 Goals

- Inspect all high-priority outfalls owned and managed by the City

2.6 Investigate Suspected Illicit Discharges and Track Compliance

The WQD has developed an Illicit Discharge Investigation and Corrective Action Plan, to enforce the terms of the Missoula Valley Water Quality Ordinance (§13.26.120, Missoula Municipal Code).

2.6.1 Investigation and Compliance

The MVWQD tracks and documents suspected illicit discharges, investigations, and corrective actions, per their Illicit Discharge Investigation and Corrective Action Plan (Appendix B). A list of illicit discharge complaints and investigations during 2019 is provided in Appendix D.

2.6.1.1 2023 Goals

- Receive quarterly reports on suspected illicit discharges from the MVWQD
    - MVWQD provided all 2023 quarterly reports to the City.
- Map illicit discharges and investigations
    - Summary table and maps provided in Appendix D

2.6.1.2 2024 Goals

- Receive quarterly reports on suspected illicit discharges from the MVWQD
- Map illicit discharges and investigations

3 MCM 4 – Construction Site Stormwater Management

- *Develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre, including activities that are part of a larger common plan of development or sale that would disturb one acre or more.*
- *Develop and implement, at a minimum, the following:*
    - *An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under state and local law;*
    - *Requirements for site operators to implement appropriate erosion and sediment control BMPs, and to control waste;*
    - *Procedures for site plan reviews that incorporate consideration of potential water quality impacts;*
    - *Procedures for receipt and consideration of information submitted by the public; and*
    - *Procedures for site inspection and enforcement control measures.*

Stormwater runoff from construction sites can enter the stormwater system and has the potential to be discharged into local rivers and streams. Sediment is the main construction pollutant of concern in the Missoula Valley. Sedimentation reduces the amount of sunlight reaching aquatic plants, clogs fish gills, smothers aquatic habitat, covers riffles which oxygenate the water, impedes navigation, and contributes to flooding by reducing capacity. Sediment runoff rates from construction sites are typically 10 to 20 times greater than agricultural lands, and 1,000 to 2,000 times greater than forests. Construction sites have the potential to contribute more sediment to streams over several weeks than would be deposited naturally over several decades. Additionally, construction sites may discharge solid and sanitary waste, phosphorus, nitrogen, pesticides, oil and grease, concrete truck washout, construction chemicals, and construction debris to state waters.

3.1 Ordinance to Regulate Construction Stormwater Controls

On October 12, 2016, the City Council unanimously passed Ordinance 3580, repealing Chapter 15.65 of the Missoula Municipal Code and establishing Chapter 13.27: Stormwater Utility, Rates, and Regulations. This chapter established the City Stormwater Utility and regulations related to stormwater pollution prevention and control. Additionally, the first City *Stormwater Specifications and Design Standards* was adopted on August 9, 2016. Construction and post-construction stormwater standards are regularly updated and are provided in Chapters 6 and 8 within the *Public Works Standards and Specifications Manual* (Appendix E). Current details are provided in Appendix F; they can be accessed via the City website: http://www.ci.missoula.mt.us/2987/Standard-Drawings---2024.

3.1.1 Revisions to Chapter 13.27, Missoula Municipal Code

In 2020, Chapter 13.27 was revised to create a regulatory framework for construction site stormwater permitting and inspections. The revision—renamed Stormwater Management—was presented to the City Council Public Works Committee on February 12, 2020 and a public hearing occurred on March 9, 2020. The City Council unanimously approved the new code and it became effective on April 8, 2020 (Appendix G). Chapter 13.27 also establishes a fee structure, penalties for commencing work without a permit, and penalties for violation of the code. A public hearing for the new Stormwater Permit and Dry Well Approval fees was held on September 14, 2020 and approved by council on September 21, 2020. The *Stormwater Specifications and Design Standards Manual* was rescinded and replaced with the *Public Works Standards and Specifications Manual*. The new manual first became effective on November 18, 2020 and codifies City standards for construction and post-construction stormwater management, to comply with MS4 Permit conditions. The manual is updated annually: http://www.ci.missoula.mt.us/2941/Public-Works-Standards-Specifications-Ma.

The revisions address performance standards, permitting, site plan submittal, preservation of natural drainage systems, flood mitigation, site grading, and protection of property. It also establishes a permit fee structure and penalties for violations. Under the City's regulations, it shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of a lot by 3 feet or more, without first obtaining a City Stormwater Permit (Appendix H). Land disturbance activities related to agricultural practices or improvements are exempt from this requirement, as is any emergency activity that is immediately necessary for the protection of life, property, or natural resources. Activities that disturb one acre or more of land are also required to obtain coverage under MDEQ's *General Permit for Stormwater Discharges Associated with Construction Activity*, in addition to the Stormwater Permit.

MMC Chapter 13.27 was updated on May 8, 2023 to remove the exemption for existing MS4 permitted entities (like UM), require compliance with the *Public Works Standards and Specifications Manual,* and establish reinspection and investigation fees. If a site fails an inspection, the permittee shall be assessed a re-inspection fee equal to the permit fee. Failure to pay the re-inspection fee shall result in a hold on the issuance of any new City permits to the permittee and/or a hold on the Certificate of Occupancy until the fee is paid.

3.1.1.1 2023 Goals

- Using the Site Evaluation Form to determine site priority, inspect 25% of sites with a City Stormwater Permit
    - 227 permits were issued
    - 149 sites were inspected
    - 65.6% of permits were inspected

3.1.1.2 2024 Goals

- Using the Site Evaluation Form to determine site priority, inspect 25% of sites with a City Stormwater Permit
    - Implement process to track permits per priority and inspect per priority
        - 100% of high-priority sites
        - 10% of medium-priority sites
        - 1% of low-priority sites

3.1.2 Enforcement Response Plan

The MVWQD implements a formal ERP to investigate suspected illicit discharges (Appendix B). Construction stormwater runoff is a potential source of illicit discharge; however, the ERP does not currently list it as a source. The City is responsible for enforcing construction site requirements per MMC Chapter 13.27. Therefore, the City must develop and implement an ERP for violations of these regulations, apart from MVWQD's ERP.

3.1.2.1 2023 Goals

- Track and document violations per the ERP
    - We do not currently have an organized way to track and document enforcement actions

3.1.2.2 2024 Goals

- Implement an organized way to track and document enforcement actions

3.2 Erosion Control Site Plan

The City requires a Stormwater Permit for projects that disturb 2,500 square feet of land or more or propose to change the grade of a lot by 3 feet or more. Additionally, projects that require a *General Permit for Stormwater Discharges Associated with Construction Activity* must demonstrate coverage under this permit. Erosion Control Site Plans are reviewed by City staff prior to project approval.

3.2.1 Erosion Control Site Plan Review Checklist

In 2020, the City updated MMC Chapter 13.27, to regulate construction site stormwater management. The Stormwater Permit replaced the Grading, Drainage, and Erosion Permit. An Erosion Control Site Plan is required as part of the Stormwater Permit package (Appendix H). This plan provides details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to manage stormwater runoff during construction. The applicant completes the Erosion Control Site Plan Review Checklist, to ensure their plan meets the City's requirements. This checklist is also be used by City personnel to ensure consistent, thorough reviews of these plans.

3.2.1.1 2023 Goals

- Track and document Erosion Control Site Plans
    - 227 Erosion Control Site Plans were submitted

3.2.1.2 2024 Goals

- Track and document Erosion Control Site Plans

3.3 Construction Inspections

The purpose of the proposed Stormwater Permit is to improve the City's process for tracking and documenting compliance with the MS4 Permit. Part of this process includes performing construction inspections, to ensure stormwater controls are being installed, operated, and maintained in order to function as designed.

3.3.1 Inspection Form Checklist

The City has a construction site stormwater management inspection form (Appendix H). To support these inspections, staff members who review, approve, and inspect Stormwater Permits are certified SWPPP Administrators.

3.3.1.1 2023 Goals

- Track and document construction site inspections
  - 149 out of 227 permits were inspected
  - 408 total inspections were completed
- Inspect 25% of sites with a Stormwater Permit
  - 65.6% of sites were inspected
- Evaluate compliance by documenting the total number inspections and how many sites passed or failed
  - 296 out of 408 inspections passed
  - 72.5% of inspections passed

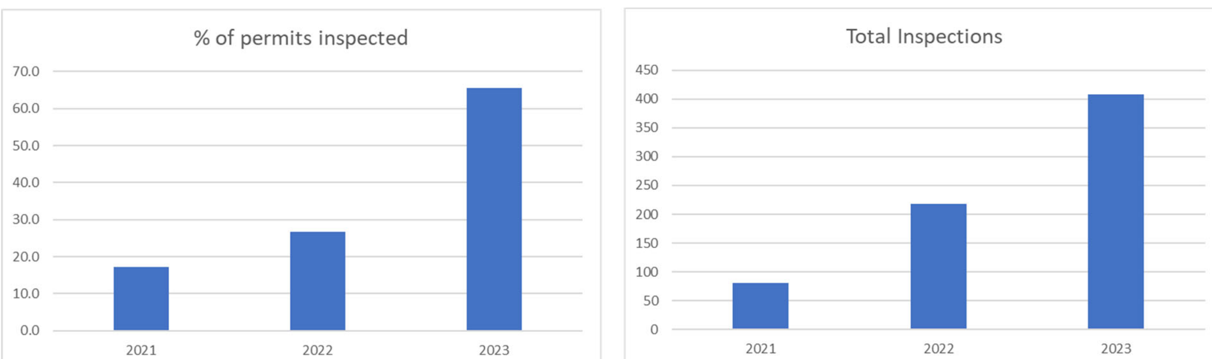

Figure 2. Percent of Stormwater Permits inspected and total inspections by year

3.3.1.2 2024 Goals

- Track and document construction site inspections
- Inspect 25% of sites with a Stormwater Permit
- Evaluate compliance by documenting the total number inspections and how many sites passed or failed

3.3.2 Inspection Frequency Determination

The Stormwater Permit applicant shall complete the Site Evaluation Form to identify their project's priority ranking (Appendix H). The priority ranking of their project determines how often the site will be inspected. The Site Evaluation From was implemented on January 1, 2021.

4 MCM 5 – Post-Construction Site Stormwater Management

- *Develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. Ensure that controls are in place to prevent or minimize water quality impacts.*
- *Develop and implement strategies that include a combination of structural and non-structural BMPs appropriate for the community.*
- *Develop and implement an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under state or local law.*
- *Ensure adequate long-term operation and maintenance of post-construction BMPs.*

There are generally two forms of substantial impacts of post-construction runoff. The first is caused by an increase in the type and quantity of pollutants in stormwater runoff. As runoff flows over areas altered by development, it picks up sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g., nitrogen and phosphorus). These pollutants often become suspended in runoff and are carried to receiving waters. The second kind of post-construction runoff impact occurs by increasing the quantity of water delivered to waterbodies during storms. Increased impervious surfaces (e.g., parking lots, driveways, and rooftops) interrupt the natural cycle of gradual infiltration of water through vegetation and soil. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems, where large volumes of runoff quickly flow to the nearest receiving water. The effects of this process include streambank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property. City regulations are BMPs that address these impacts.

4.1 Ordinance to Regulate Post-Construction Stormwater Controls

Various City ordinances address growth and the protection of sensitive areas, riparian resources, and open space, to provide watershed protection. Chapter 20.20 Open Space and Public Districts defines two types of open space that offer watershed protection. Zoning district OP1 is primarily intended to preserve open space and sensitive natural resource areas. Zoning district OP2 is intended to preserve open space and sensitive natural resource areas, while also allowing very low-density residential use, ideally in the form of cluster development.

MMC Chapter 20.25 Overlay Districts defines a Planned Unit Development Overlay, which is intended to accommodate development that may be difficult—if not impossible—to carry out under otherwise applicable zoning district standards. One such example would be developments that offer enhanced protection of natural resources and sensitive environmental features, including streams, water bodies, floodplains, wetlands, steep slopes, woodlands, wildlife habitats, and native plant communities.

The developer must provide describe how the community benefits of the proposed development supersede those of a development carried out in accordance with otherwise applicable zoning ordinance standards.

Chapter 20.50 Natural Resource Protection sets requirements for developments and disturbances on average slopes greater than 15% and in areas of riparian resources. The purpose of this chapter, among other things, is to preserve drainage channels and streams, encourage innovative pollution prevention techniques in environmentally sensitive areas, and mitigate adverse impacts including erosion and the degradation of air and water quality. This chapter is part of the zoning compliance permit process and must be completed before a zoning compliance permit is issued.

MMC §20.50.030 Riparian Resource Protection defines areas of riparian resources and restricts development within those areas. Construction is permitted in areas of riparian resource only when a detailed management plan provides for restoration and/or replacement of the riparian area.

4.1.1 Revisions to Chapter 13.27, Missoula Municipal Code

Chapter 13.27 was revised in 2020. The revisions addressed performance standards, permitting, site plan submittal, preservation of natural drainage systems, flood mitigation, site grading, and protection of property. It also established a permit fee structure and penalties for violations. Under these regulations, it shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of a lot by 3 feet or more, without first obtaining a City Stormwater Permit. The trigger for identifying post-construction stormwater management controls is linked with the priority rank of the Erosion Control Site Plan, per the Site Evaluation Form. Medium- to high-priority sites must also submit a post-construction Stormwater Management Site Plan with the Stormwater Permit application (Appendix H). Post-construction stormwater management criteria are described in the City's *Public Works Standards and Specifications Manual*. The manual first became effective on November 18, 2020 and codifies City standards for stormwater management. The manula The Stormwater Permit was implemented on January 1, 2021.

4.1.1.1 2023 Goals

- Track and document Stormwater Permits with post-construction stormwater management requirements
    - 160 low/medium-priority post-construction permits issued since 2021
    - 6 high-priority post-construction permits issued since 2021

4.1.1.2 2023 Goals

- Track and document Stormwater Permits with post-construction stormwater management requirements
  - Annual and total number issued

4.1.2 Enforcement Response Plan

The MVWQD implements a formal ERP to investigate suspected illicit discharges (Appendix B). The ERP does not address post-construction stormwater controls. The City is responsible for enforcing post-construction site stormwater management requirements per MMC Chapter 13.27. Therefore, the City must develop and implement an ERP for violations of these regulations, apart from MVWQD's ERP.

4.1.2.1 2023 Goals

- Draft ERP to ensure compliance with the installation, operation, and maintenance of post-construction stormwater management controls
  - The ERP is provided in Appendix H

4.1.2.2 2024 Goals

- Implement inspection program for permittee-owned and privately owned post-construction stormwater management facilities

4.2 Stormwater Management Site Plan

Site plans and stormwater controls are reviewed by Development Services, Public Works, City-County Health Department, and MVWQD, prior to project approval.

4.2.1 Stormwater Management Site Plan Review Checklist

Per MMC Chapter 13.27, a Stormwater Management Site Plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction stormwater management, including drawings, engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation. A Stormwater Management Site Plan is required for medium- to high-priority projects, per the Site Evaluation Form (for determining construction site inspection frequency).

Additionally, the applicant shall use the Stormwater Management Site Plan Review Checklist to ensure their plan meets the City's requirements. This checklist will also be used by City personnel to ensure consistent, thorough reviews of these plans. Post-construction requirements include a recorded covenant for maintenance, utility easement, and an accurate as-built plan of the system, signed and sealed by a Montana-licensed professional engineer. The Stormwater Management Site Plan Review Checklist was implemented on January 1, 2021.

4.2.1.1 2023 Goals

- Track and document Stormwater Management Site Plans
    - 166 Stormwater Management Site Plans have been submitted since 2021

4.2.1.2 2024 Goals

- Track and document Stormwater Management Site Plans
    - Submitted per year and total number submitted

4.2.2 Performance Standards

MMC Chapter 13.27 states that all projects subject to a Stormwater Permit must implement post-construction stormwater controls that are designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall, from a 24-hour storm preceded by 48 hours of no measurable precipitation (Appendix G). For projects that cannot meet 100% of the runoff reduction requirement, the remainder of the runoff must be treated using BMPs expected to remove 80% total suspended solids. City regulations state that developments must retain all stormwater on site; specifically, they must retain the difference between pre- and post-development runoff. Also, the use of dry wells means that few sites require off-site treatment.

4.2.2.1 2023 Goals

- Identify regional stormwater management facilities
    - Not completed

4.2.2.2 2024 Goals

- Identify regional stormwater management facilities

4.3 Post-Construction Inspections

The purpose of the proposed Stormwater Permit is to improve the City's process for tracking and documenting compliance with the MS4 Permit. Part of this process includes performing post-construction inspections, to ensure stormwater controls are being operated and maintained to function as designed.

4.3.1 Inspection Form Checklist

The City has drafted a post-construction site stormwater management inspection form (Appendix H). The Stormwater Permit became effective January 1, 2021.

4.3.1.1 2023 Goals

- Track and document post-construction inspections
    - The Annual Inspection Report for the City's major flood control facilities is provided in Appendix K.

4.3.1.2 2024 Goals

- Track and document post-construction inspections

4.3.2 Inventory

The City developed an inventory of all City-owned and private post-construction stormwater management controls by reviewing approved development plans from January 1, 2017 on and digitizing in ArcGIS. The city will visually inspect all assets to ensure that they were installed according to the development plans. The locations will be field verified with a GPS unit with sub-meter accuracy. In 2020, the City recorded data for 23 new outfalls, 1,126 new dry wells, 9 new miles of pipes, and 79 new detention basins. Since 2021, the city has cataloged 1,006 new dry wells, 21 detention basins, and 31 miles of pipes.

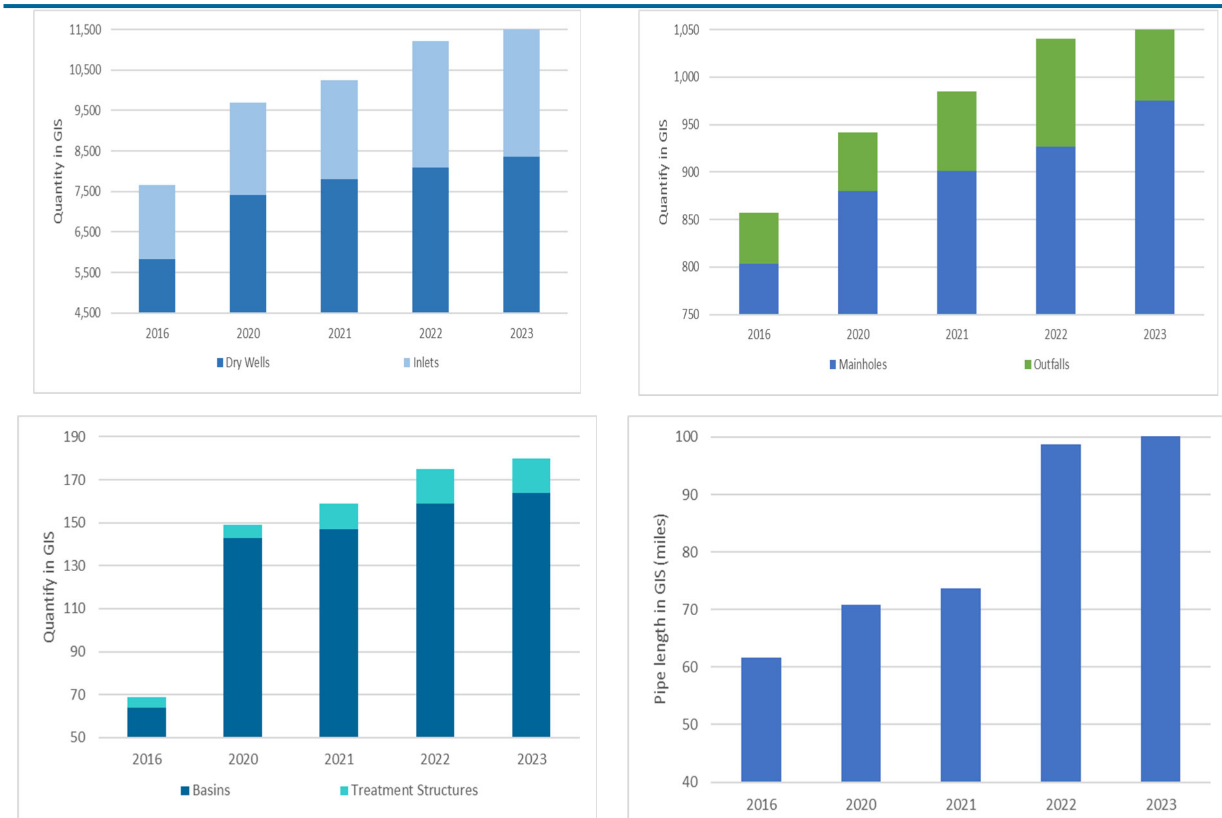

Figure 3. Stormwater assets in the City of Missoula GIS database from 2016 to 2022

4.3.2.1 2023 Goals

- Digitize and field-reconcile stormwater facilities within the MS4 boundary.
  - The City added 281 drywells, 100 inlets, 48 manholes, 1 outfall, 5 basins, and 3 miles of pipe (Figure 3) to the SW dataset in 2023.

4.3.2.2 2024 Goals

- Field reconcile stormwater facilities within the MS4 boundary and update SW dataset

4.3.3 Inspection Frequency Determination

Per the proposed ordinance, the Stormwater Permit applicant shall complete the Post-Construction Inspection Frequency Determination to identify their project's priority ranking, with the City making the final determination of priority ranking (Appendix H). The priority ranking determines how often the site will inspected. Low- to medium-priority sites will be self-inspected annually, with high-priority sites inspected annually by the City. All sites will require a Stormwater Permit renewal every 5 years and the

City will conduct a 5-year inspection of these sites. The Stormwater Permit was implemented on January 1, 2021.

4.3.3.1 2023 Goals

- Inspect 80% of high-priority post-construction facilities
    - The City's high-priority post-construction stormwater control facilities include two Clark Fork River Levees, Grant Creek Levee, Pattee Creek Levee, Playfair Park High-Hazard Dam, and the South Hills Stormwater System. The annual inspection report for these facilities is provided in Appendix K.

4.3.3.2 2024 Goals

- Inspect 100% of high-priority post-construction facilities

4.3.4 Inspection Program

The City is working on implementing a post-construction stormwater management inspection program, using the Stormwater Permit. Per the Post-Construction Inspection Frequency Determination, low- to medium-priority sites shall be inspected annually by the owners, while the City will annually inspect high-priority sites. All sites require a 5-year inspection and Stormwater Permit renewal. This addresses inspection and reporting of both permittee-owned (public) and high-priority privately owned post-construction stormwater controls. The City's Stormwater Permit was scheduled to become effective on June 1, 2020. This was not accomplished because significant backend programming was required to implement the new permit into the City's permitting software. A consultant was hired to assist with implementation and the Stormwater Permit became effective on January 1, 2021. This permit outlines the process for conducting post-construction inspections. Once projects are given a priority rank per the Stormwater Permit, they will be inspected by the City.

4.3.4.1 2023 Goals

- Conduct and track post-construction inspections per inspection frequency determination
    - The City's high-priority post-construction stormwater control facilities include two Clark Fork River Levees, Grant Creek Levee, Pattee Creek Levee, Playfair Park High-Hazard Dam, and the South Hills Stormwater System. The annual inspection report for these facilities is provided in Appendix K.

4.3.4.2 2024 Goals

- Conduct and track post-construction inspections per inspection frequency determination

4.4 Low Impact Development

The City has implemented a standard that requires stormwater to be retained on site (Appendix E). However, no formal guidelines exist to instruct design engineers and developers on implementing low impact development (LID) standards.

4.4.1 Evaluate and Implement Low Impact Development Requirements

The City *Public Works Standards and Specifications Manual* includes post-construction design standards, including design storm data for calculating runoff. It also offers information on LID and green infrastructure design methods. The SWMP Team discussed barriers to LID on September 28, 2020 (Table 11). The major issues related to implementing LID and green infrastructure surround conflicting demands for space in the right-of-way, cost, and local expertise. Multiple demands for space in the ROW, like bicycle and pedestrian facilities, lead to diminished availability for stormwater detention. There are also questions about maintenance responsibilities that need to be clarified prior to construction. In many areas, boulevards are maintained by private property owners or homeowners' associations. There can be significant variability between parcels. If using the boulevard for stormwater management, there needs to be more consistency across the landscape.

Table 11. Barriers to low impact development and green infrastructure in Missoula

Barrier	Reasons		
Right-of-Way	• Conflicting demands for space: biking and pedestrian facilities	• Questions about maintenance responsibility	• Inadequate space to meet all the demands
Cost	• May cost more to construct and maintain	• Too few designs for comparative analysis	• Maintenance costs have not been tracked, hard to estimate future costs
Local expertise	• Lack of demonstration areas	• Novel approaches, lack of experience	• Few time-tested systems for Montana weather

To promote more green infrastructure and green parking in particular, we drafted a Fact Sheet that has been shared widely among City departments, the Missoula Valley Water Quality District, Water Quality Advisory Council, and at various public outreach and tabling events. The Fact Sheet is provided in Appendix K.

4.4.1.1 2023 Goals

- Design and construction of the demonstration project at the Van Buren footbridge
    - UM received an American Rescue Plan and Recovery Act grant for stormwater improvements. The grant has been used to install infiltration facilities and effectively remove their two outfalls. The demonstration project was not funded and we will continue to look for funding sources for this project.
- Design and construction of green infrastructure (curb cut to swale) street drainage test area at 541 S 6th St W
    - The grade was appropriate to construct a swale. We installed a catch basin in the curb line and piped it to a remote dry well in the boulevard. This design allows for improved water quality treatment over the standard dry well that is not piped to a catch basin.
- Construction of green infrastructure at Creek Crossing
    - This project was completed and now successfully moves water off the right-of-way and into a natural area.

4.4.1.2 2024 Goals

- Design the Takima Park Wetland Detention Basin
- Collaborate with the Missoula Public Library on a project to install a green roof on their building

5 MCM 6 – Pollution Prevention and Good Housekeeping

- *Develop and implement an operation and maintenance program that includes a training component and has the goal of preventing or reducing pollutant runoff from municipal operations. he program must include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.*

5.1 Operation and Maintenance Program

5.1.1 Standard Operating Procedures

The department/division-specific SOPs will be amalgamated to develop comprehensive SOPs that address MCM 6. The City intends to use Articulate 360 and/or Storm-E School by Clean Water Technologies for pollution prevention training. This training will be made available to all staff that are directly involved with implementing the SOPs. Using Articulate 360 and/or Storm-E School by Clean Water Technologies, the City will maintain documentation to track training. Municipal SOPs completed and included in Appendix J

5.1.1.1 2023 Goals

- Review, document, implement, and update SOPs as necessary
  - SOP document maintained throughout inspections for city-owned facilities.
- Meet with each facility supervisor to review SOPs
  - All facility supervisors were visited by SW Program Coordinator to review SOPs.
- Inspect each of the facilities identified in the SOPs
  - All facilities were inspected with the exception of the Caitlin Police Station.

5.1.1.2 2024 Goals

- Review, document, implement, and update SOPs as necessary
- Meet with each facility supervisor to review SOPs
- Inspect each of the facilities identified in the SOPs

5.2 Stormwater System Improvements and Maintenance

The City Stormwater Utility is dedicated to updating aging infrastructure, addressing flooding, and improving water quality. In fiscal year 2022, we spent over $800,000 on capital improvements (Table 12).

Table 12. Capital improvement projects (fiscal year 2022)

Project	Purpose	Amount
Caras Park Phase 2 – Infiltration Gallery (design and construction)	Improve water quality in the Clark Fork River by infiltrating the first 0.5” of stormwater runoff from downtown Missoula; Phase 1 of the project was completed in 2017 when a hydrodynamic separator was installed	$687,512.74
South Hills Stormwater Improvements (design)	Improve water quality in the Bitterroot River by adding an in-line hydrodynamic separator and restoring a wetland retention basin; address localized flooding through improved drainage facilities	$130,481.30
	Total	**$817,994.04**

Resources are also allocated to maintaining the stormwater system, to ensure it functions per design. There are various conditions that indicate that facilities require maintenance or repair: including structural damage, erosion, corrosion, blockages, debris, siltation, and undesirable vegetation. Inspections help to determine when maintenance is required, before problems occur; and they can also be used to identify potential illicit discharges. Inspections are intended to prevent any potential discharges of pollutants into waterways; pollutants typically include nutrients, sediment, trash, and other types of waste generated from the roadways.

Stormwater assets must be routinely inspected and receive the routine maintenance necessary to ensure they continually function as designed. If any component of an asset is not functioning properly, the cause must be determined, and the site be restored to working order as soon as practicable. The frequency at which stormwater assets should be inspected will depend on the age of the asset, the type, its location (near a water body, for example), and in some cases, after a storm event.

5.2.1 Stormwater System Maintenance Plan

In many cases, inspections at high-priority sites should occur in the spring prior to any runoff event to ensure the asset is in good functioning condition. In other cases, asset life spans can be up to 20+ years with inspections recommended every 5 years.

Maintenance describes work that is performed to maintain the condition of the stormwater system or to respond to specific conditions or events that require a restoration to a functional state of operation. It is performed to delay, prevent, or correct deterioration and to maintain facilities as close to their original or reconstructed condition as practical. Maintenance also includes emergency repairs due to accidents, weather conditions, or other unexpected damage to a structure or facility.

Preventive maintenance measures include street sweeping efforts to remove sediment and other pollutants from the roadways and drainage system, and trash and litter pick-up, with internal schedules for maintenance crews and as-needed situations. The Stormwater Utility, in cooperation with the Streets Division, will continue to perform preventive maintenance measures to reduce sources of sediment and debris from entering the stormwater system.

Routine maintenance is any procedure performed on a regular basis to maintain the proper working order of a stormwater asset. All routine maintenance and/or emergency repair needs found at the time of inspection should be identified and reported using our ArcGIS maintenance program. Visual observations, maintenance performed, and any additional maintenance recommended at the time of the inspection must be documented within the ArcGIS web map.

The following is a list of typical problems that may be encountered during an inspection of any stormwater asset.

5.2.1.1 General Site Conditions

- Trash and debris
- Animal burrows
- Algae, stagnation, and odors
- Vandalism
- Sediment accumulation

- Obstructions of the inlet or outlet devices by trash, debris, sediment, and vegetative growth

5.2.1.2 Structural/Mechanical

- Cracks and deterioration of inlets, outlets, pipes and catch basins
- Malfunctioning valves, gates, locks, and access hatches
- Slow draining infiltration
- Inadequate outlet protection
- Water seepage or ponding

5.2.1.3 Vegetation

- Poor and distressed vegetation
- Unwanted vegetative growth that impairs functionality
- Bare ground

5.2.1.4 Earthwork

- Excessive erosion or sedimentation, particularly in flood prone areas
- Cracks or settling in the embankment
- Deterioration of downstream channels

5.2.1.5 Spills/Releases

- Hazardous spill
- Illicit discharge
- Illegal dumping

5.2.2 Drywell Pre-Inspection & GIS Verification

Through the process of drywell pre-inspection and GIS verification, we can address two important aspects of maintaining stormwater infrastructure:

- Update and correct GIS mapping of existing stormwater infrastructure.
- Utilize vac truck crew time and equipment more effectively, thus increasing the percentage of infrastructure cleaned annually.

5.2.3 Vegetation Maintenance

Vegetation helps control erosion, provide structural stability, promotes infiltration, and removes pollutants from stormwater runoff. It can also enhance the appearance of the BMPs and help them blend into the landscape. Periodic maintenance of vegetation is required to ensure that it remains healthy, established, and does not impede stormwater flow.

5.2.4 Trash and Debris Removal

Trash and other debris can pollute surface waters and damage or constrict stormwater control devices. Trash should be removed on a routine basis as part of maintenance activities from outlet orifices, trash racks, basin and swale floors and side slopes, and other components, as well as from the area surrounding the BMP, to reduce the potential for clogging during storm events.

5.2.5 Mechanical/Structural Component Maintenance

Mechanical and structural components need to be maintained regularly in accordance with manufacturers or design recommendations to ensure that they always remain functional. Valves, gates, pumps, filters, fences, trash racks, and access hatches or locks should be operated during each inspection to ensure that they function properly.

5.2.6 Sediment Removal

The degree to which sediment accumulates will depend on rainfall intensity and the amount of runoff that the BMP receives. Accumulated sediment that may affect the function of the stormwater management control must be removed. In general, sediment should be removed when it exceeds 50% of storage capacity or the original design sediment storage depth. All sediment removed must be transferred to an appropriate facility for dewatering or disposal.

5.2.7 Mechanical/Structural Repair

Mechanical and structural repairs to the BMP should be made promptly. Equipment, materials, and personnel should be readily available to perform repairs on short notice. Contracted services will be used if City personnel are not available for a timely repair. Conditions that could lead to structural failure and may necessitate an emergency repair include cracks in concrete outlet structure, settling, scouring, cracking/furrowing on embankments, and seepage around outflow pipes. Inspectors shall look for damaged joints, dents, and rust.

5.2.8 Erosion Repair

Failure to maintain a vegetative or riprap cover could result in structural failure and sediment loss. Repair activities must be tailored to the specific site conditions, vegetation or cover type, and seasonal variations. Repairs may include the use of erosion control blankets, riprap matting, sodding, and/or seeding/mulching.

5.2.9 Undesirable Woody Vegetation

Tree and shrub root systems can penetrate deep into a basin and clog drywells and piped systems. Decaying plant roots can create voids in embankments when mature trees die or are cut. Remove any vegetation if it reduces the free movement of water. Remove undesirable woody vegetation when found and dispose of off-site. Any void created by removal activities must be filled and properly compacted. Reestablish desirable (native) vegetation to stabilize the area and prevent erosion.

5.2.10 Animal Burrow Repair

Voids created by animal burrows can weaken embankments and result in structural failure. These voids should be filled in as soon as possible. If burrowing problems persist, local wildlife officials should be consulted for information regarding preventive tactics or animal removal.

5.2.11 Levee Maintenance

Annual levee inspection and maintenance is required to preserve acceptable ratings from the U.S. Army Corps of Engineers (USACE). Accreditation allows a discounted rate on insurance for homes and businesses in special flood hazard areas and guarantees assistance from the Federal Emergency Management Agency (FEMA) in a flood event.

City personnel conduct annual inspections every summer. The USACE inspects the Clark Fork levees annually and performs periodic inspection of all the City's levees every two years. The City's inspectors record maintenance tasks and overall conditions: trash and debris removal; structural repairs; scour and riprap repair; condition of outfalls; presence of animal burrowing; undesirable vegetation removal; and any unauthorized encroachments.

5.3 Maintenance Tracking

Table 13. Annual maintenance goals and 2023 accomplishments

Action/Asset	Responsibility	Goal	2023
Drywell pre-inspections	Streets Stormwater	400 (5%)	610
Drywells vacuumed	Streets	600 (8%)	679
Inlets cleaned/inspected	Streets	300	216
Storm main inspections	Streets Wastewater	8 areas	1 area
Storm main jetting	Streets Wastewater Private Contract	3,600 LF (1%)	1,973 LF
Reconstruction of dry wells without pretreatment	Streets Private Contract	25	16
Retrofit dry wells with catch basins or other pretreatment	Streets Private Contract	15	1
Construct **new** dry wells without pretreatment	Streets Private Contract	0	1
Construct **new** dry wells with pretreatment	Streets Private Contract	5	0
Road debris removed	Streets	Continue to track and document debris removal	7,227 CY
Debris removed from the stormwater system drywells	Streets Wastewater Private Contract	Continue to track and document debris removal	614 CY
Debris removed from the stormwater system inlets	Streets Wastewater Private Contract	Prevent 20 CY of debris from entering water bodies	58 CY
Leaf collection	Streets	Continue to track and document leaf removal*	21,952 CY

We aim to make changes to the City's leaf collection program, to reduce the total amount of leaves allowed in the City right-of-way. This change will potentially have a significant effect on the total quantity of leaves collected and the amount collected should decrease over time.

Table 14. Annual excavation and vegetation maintenance goals

Action	Responsibility	Location	Tasks
Excavation	Stormwater Streets Parks & Rec Wastewater Private Contract	Cattail Corner	Excavate outfall at southeast corner, jet pipe, and remove road sand buildup
		High Park diversion	Hydro-excavate drainage and jet pipe
		Grit Chamber	Remove road sand where Pattee Creek enters the pond
		Bancroft Ponds	Jet outfall at SE corner remove debris
			Remove cattails where Pattee Creek enters the park
		Prospect Drive & Old Quarry Road	Jet pipe and remove debris at SE corner
		Honeysuckle Swales	Jet culverts and remove debris
Vegetation Maintenance	Stormwater Parks & Rec Northwestern Energy Private Contract	Maloney Ranch	trees blocking storm pipe termination at Lower Miller Creek Rd.
		<u>Levees</u> Clark Fork III and V Pattee Creek Grant Creek	Control weeds and remove undesirable vegetation
		Grit Chamber	Control weeds and remove undesirable vegetation
		Bitterroot Outfall	Remove large trees and debris encroaching on apron, wing walls, and energy dissipators

6 Training

City personnel participate in various trainings and workshops throughout the year, but these activities have not been routinely tracked or documented. The Stormwater Utility will be responsible for maintaining documentation on employee training for stormwater pollution prevention. Training will be implemented using a combination of Articulate 360, Storm-E School by Clean Water Technologies, SWPPP Administrator trainings, and BMP field workshops.

6.1.1 Tracking Training

The City intends to implement various training modules using Articulate 360 in combination with Storm-E School by Clean Water Technologies; Construction Site Stormwater Management; Post-Construction Stormwater Management in New and Redevelopment; and Pollution Prevention and Good

Housekeeping. Using Articulate 360 and Storm-E School, the City will maintain documentation to track training accomplishments.

6.1.1.1 2023 Goals

- Permit Section II.B.1. Stormwater Management Team: Completed in 2022
- Permit Section II.B.2. Construction Site Personnel: Once per permit term SWPPP and ERP training for personnel, inspectors, and plan reviewers.
    - Annual SWPPP training provided by Clean Water Technologies to be conducted April 2023.
    - Create and implement ERP training module by December 31, 2023 – moved training to spring 2024.
- Permit Section II.B.3. Post-Construction Site Personnel: Once per permit term, conduct plan review and inspection training for all personnel responsible for implementation of post-construction site stormwater management MCM 5.
    - Develop and implement post-construction site stormwater management training module for plan reviewers and inspectors by December 31, 2023 – moved post-construction site stormwater management training to future date, to occur prior to end of permit term..
- Permit Section II.B.4. Field and Facility Personnel: 1st and 4th years of permit term: Conduct field and facility training for MS4 personnel responsible for completing work activities with stormwater pollution potential. Includes overview of permit, potential stormwater impacts, IDDE training, BMP training, and any SOP updates.
    - Develop and implement field and facility training module by December 31, 2023
- Determine cost effectiveness of implementation through Articulate 360 and/or Storm-E School by Clean Water Technologies.

6.1.1.2 2024 Goals

- Permit Section II.B.1. Stormwater Management Team: Complete 2022
- Permit Section II.B.2. Construction Site Personnel: Once per permit term SWPPP and ERP training for personnel, inspectors, and plan reviewers.
    - Annual SWPPP training provided by Clean Water Technologies to be conducted May 7-8, 2024.
    - Implement ERP training module prior to start of building season of 2024.

- Permit Section II.B.3. Post-Construction Site Personnel: Once per permit term, conduct plan review and inspection training for all personnel responsible for implementation of post-construction site stormwater management MCM 5.
    - Develop and implement post-construction site stormwater management training module for plan reviewers and inspectors prior to end of permit term.
- Permit Section II.B.4. Field and Facility Personnel: 1st and 4th years of permit term: Conduct field and facility training for MS4 personnel responsible for completing work activities with stormwater pollution potential. Includes overview of permit, potential stormwater impacts, IDDE training, BMP training, and any SOP updates.
    - Develop and implement official field and facility training module with Clean Water Technologies by December 31, 2024

7 Special Conditions and Monitoring, Reporting, and Recording Requirements

The City Stormwater Utility strives to improve water quality, protect public safety, and comply with its MS4 Permit through a sampling and monitoring program.

7.1.1 Water Sampling Plan

The City submitted a Water Sampling Plan to MDEQ at the end of 2019. Since a new MS4 Permit became effective this year, we re-evaluated the 2019 plan and made some necessary changes. The Water Sampling Plan is provided in Appendix I.

7.1.1.1 2023 Goals

- Sample six locations twice annually
    - Six sites were sampled twice annually
- Continue green infrastructure performance monitoring and collect at least two samples per site
    - Completed green infrastructure monitoring
    - Collected two samples per site: June, July, and August 2023

7.1.1.2 2024 Goals

- Sample six locations twice annually
- Continue green infrastructure performance monitoring and collect at least two samples per site

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Appendix A
Infrastructure Maps

STORM WATER
City of Missoula

0 1000 2000 Feet
N

Infrastructure Map

City Infrastructure:
- Basin
- Culvert
- Drywell
- Gravity Main
- Infiltration Chamber
- Inlet
- Mainhole
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- Outfall
- Treatment Structure

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- Non-City Land
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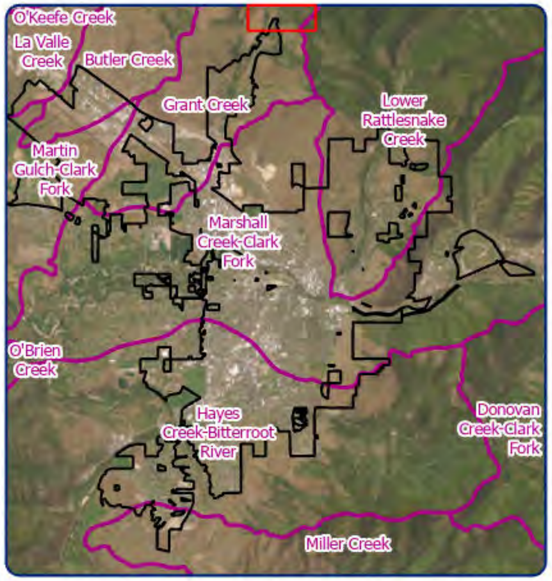

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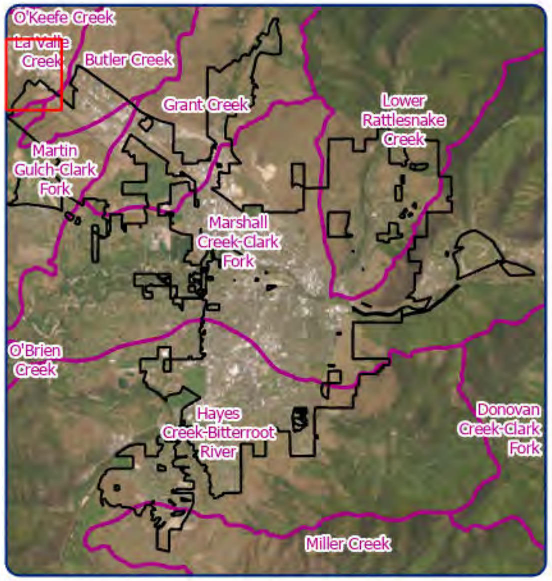

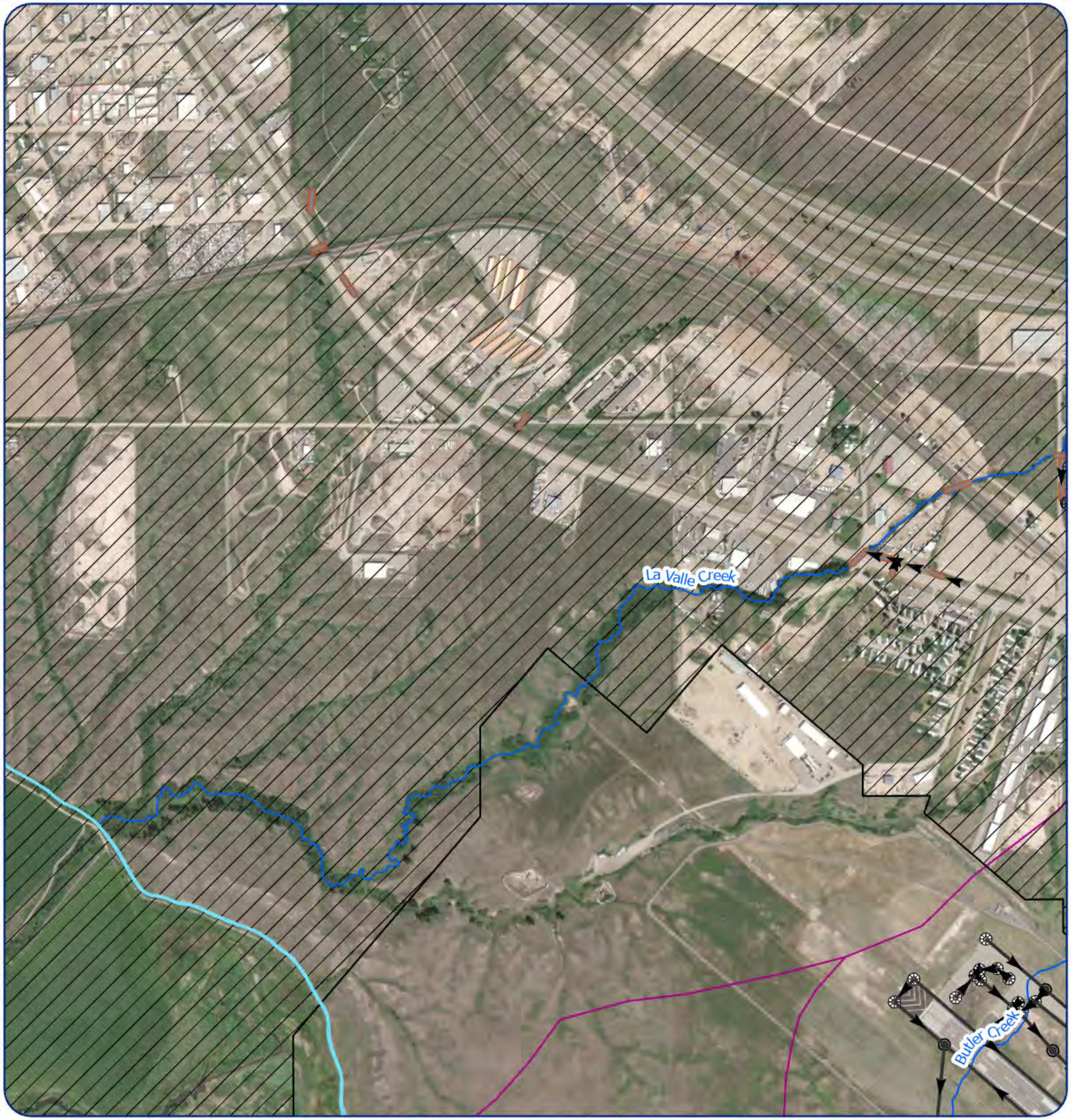

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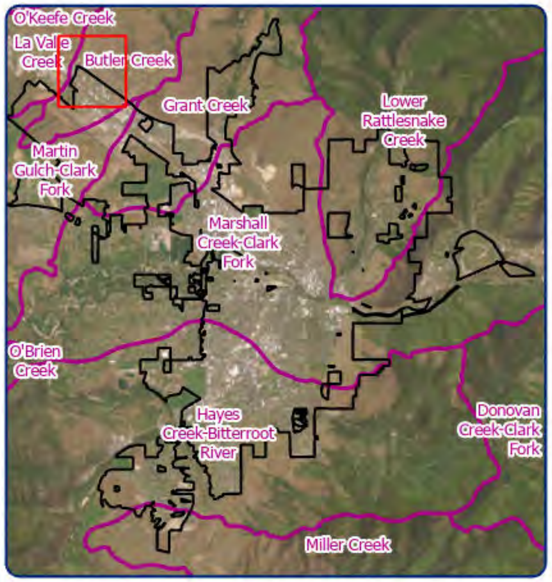

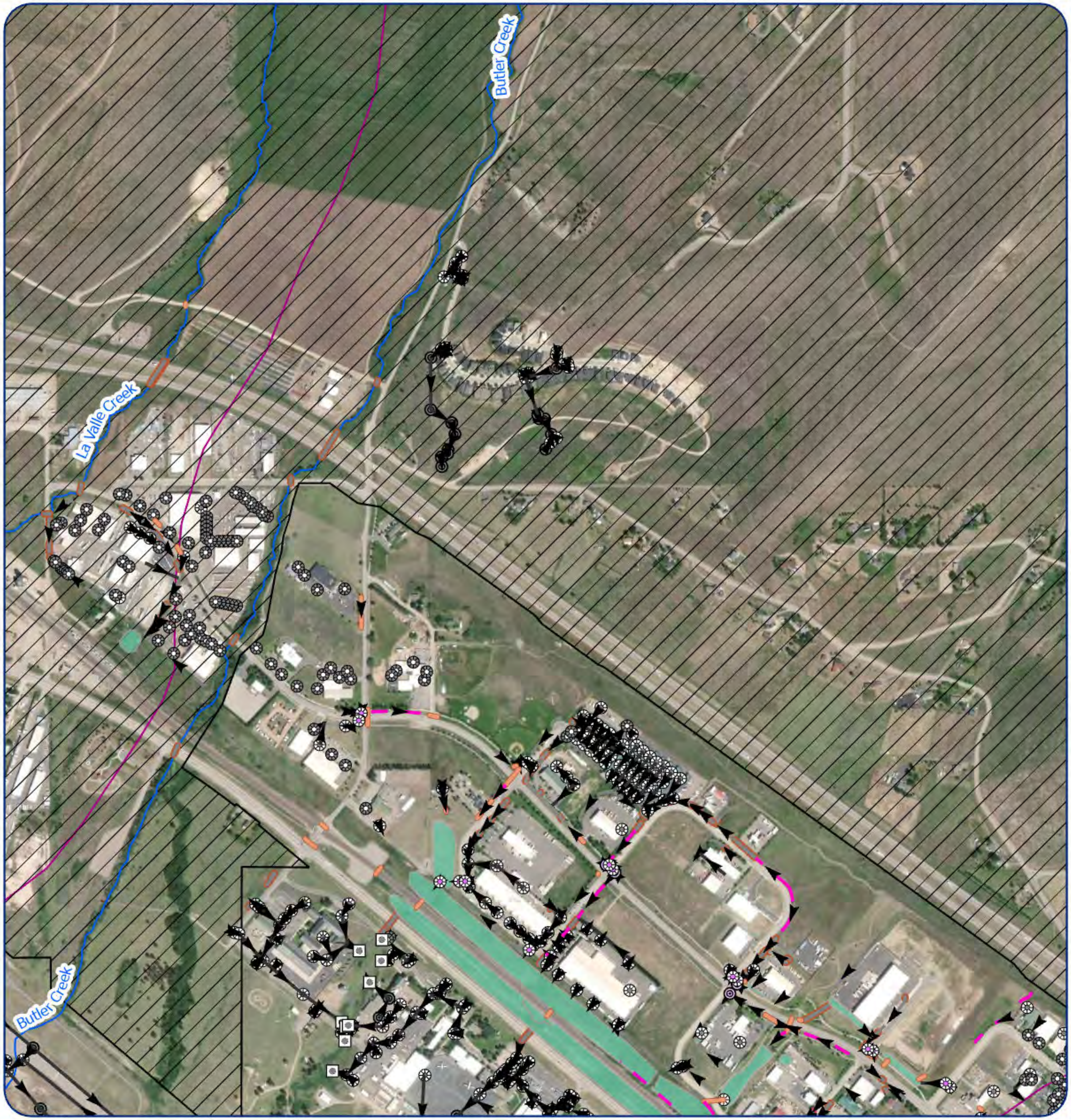

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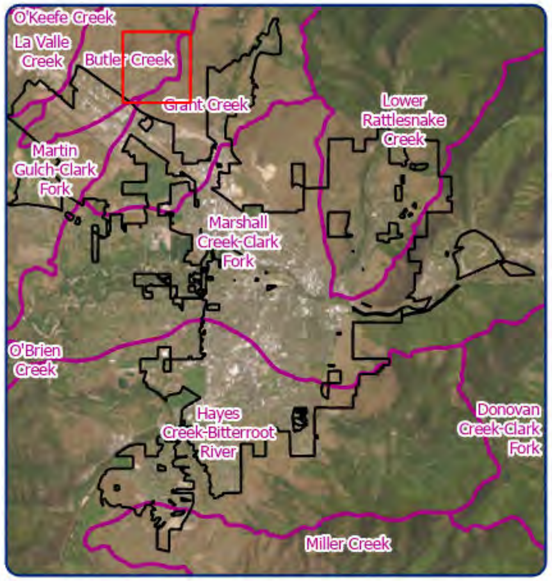

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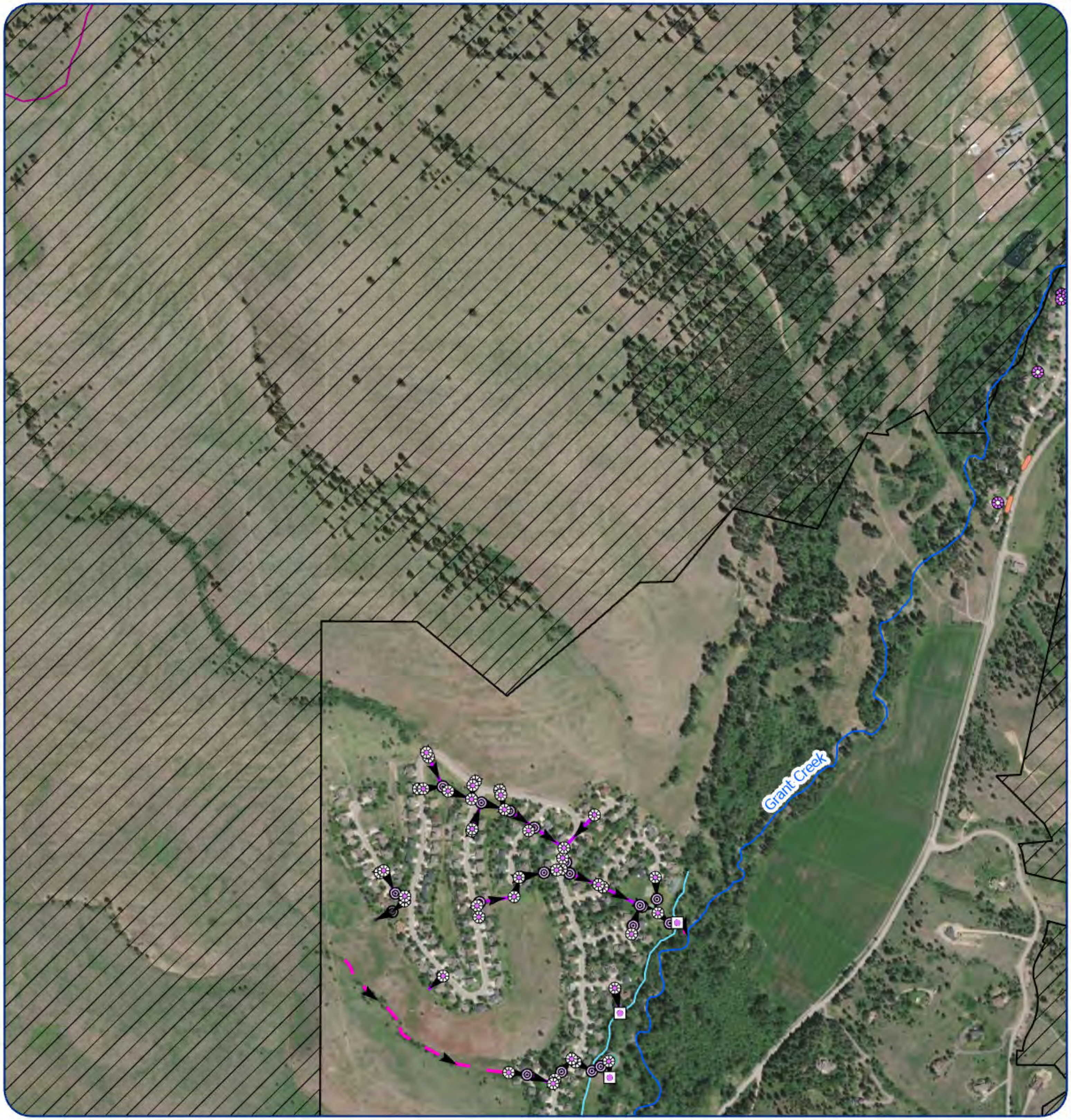

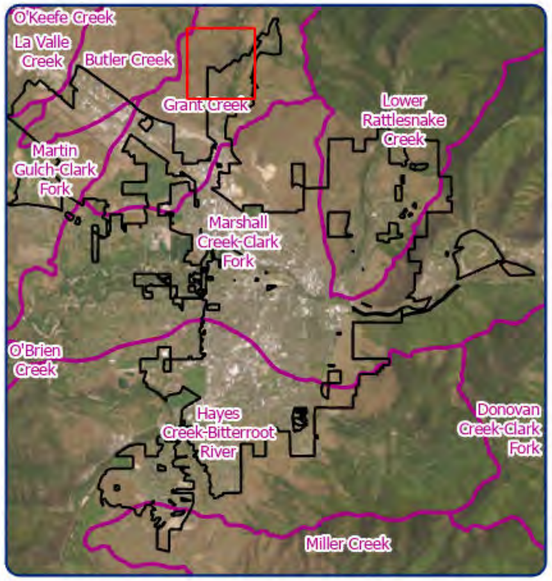

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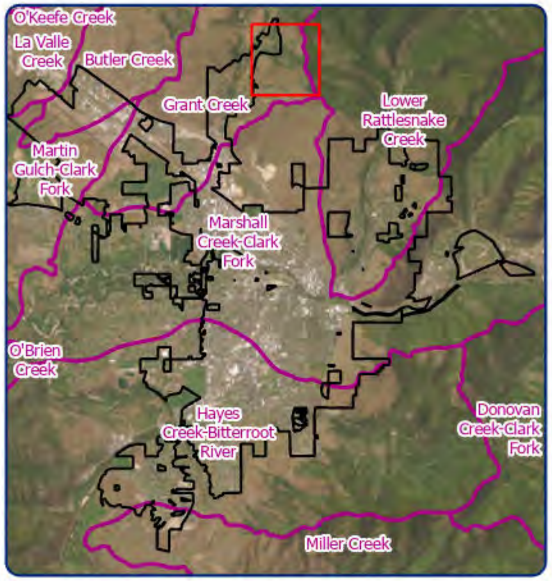

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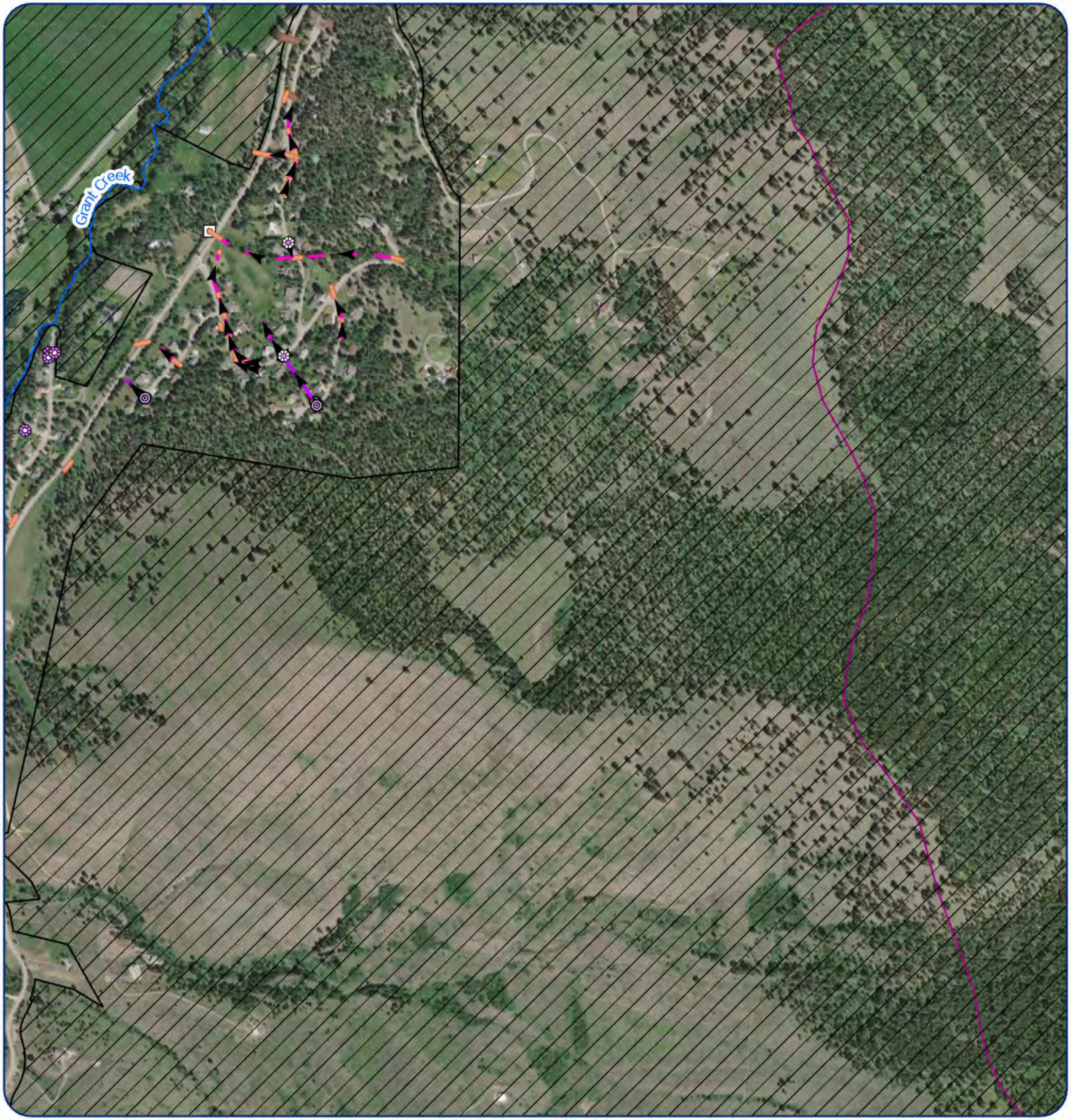

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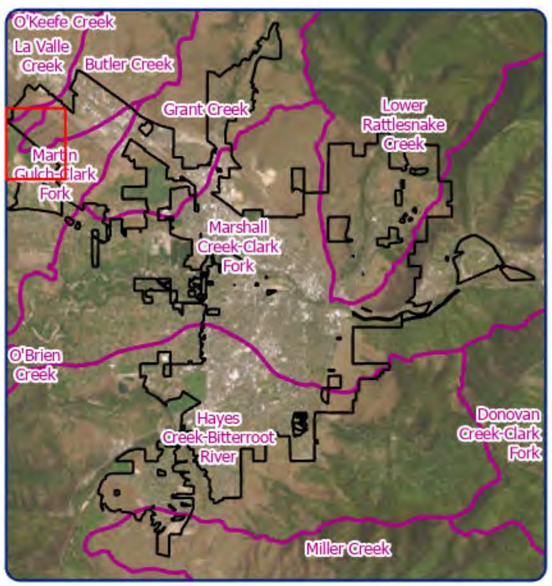

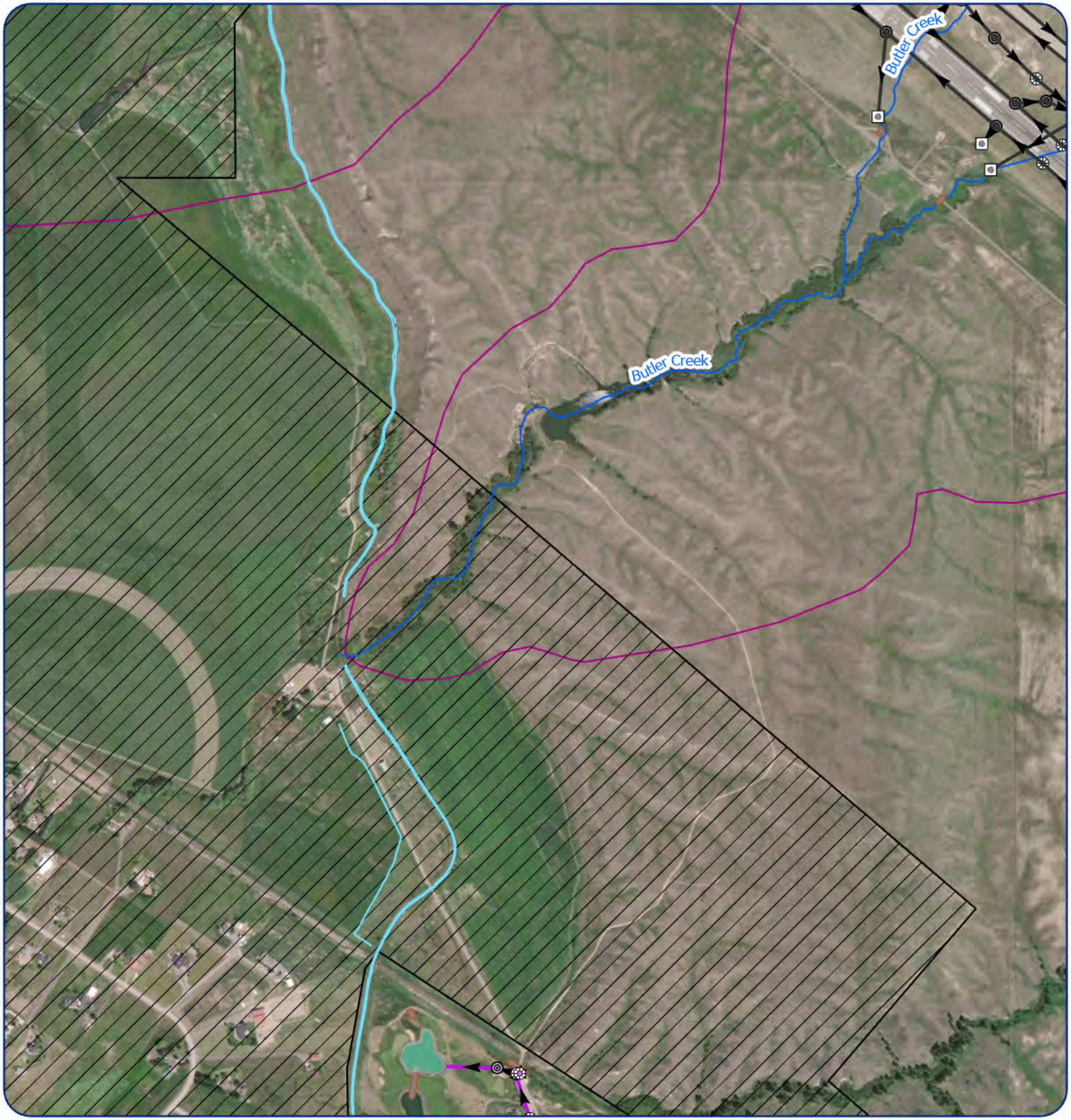

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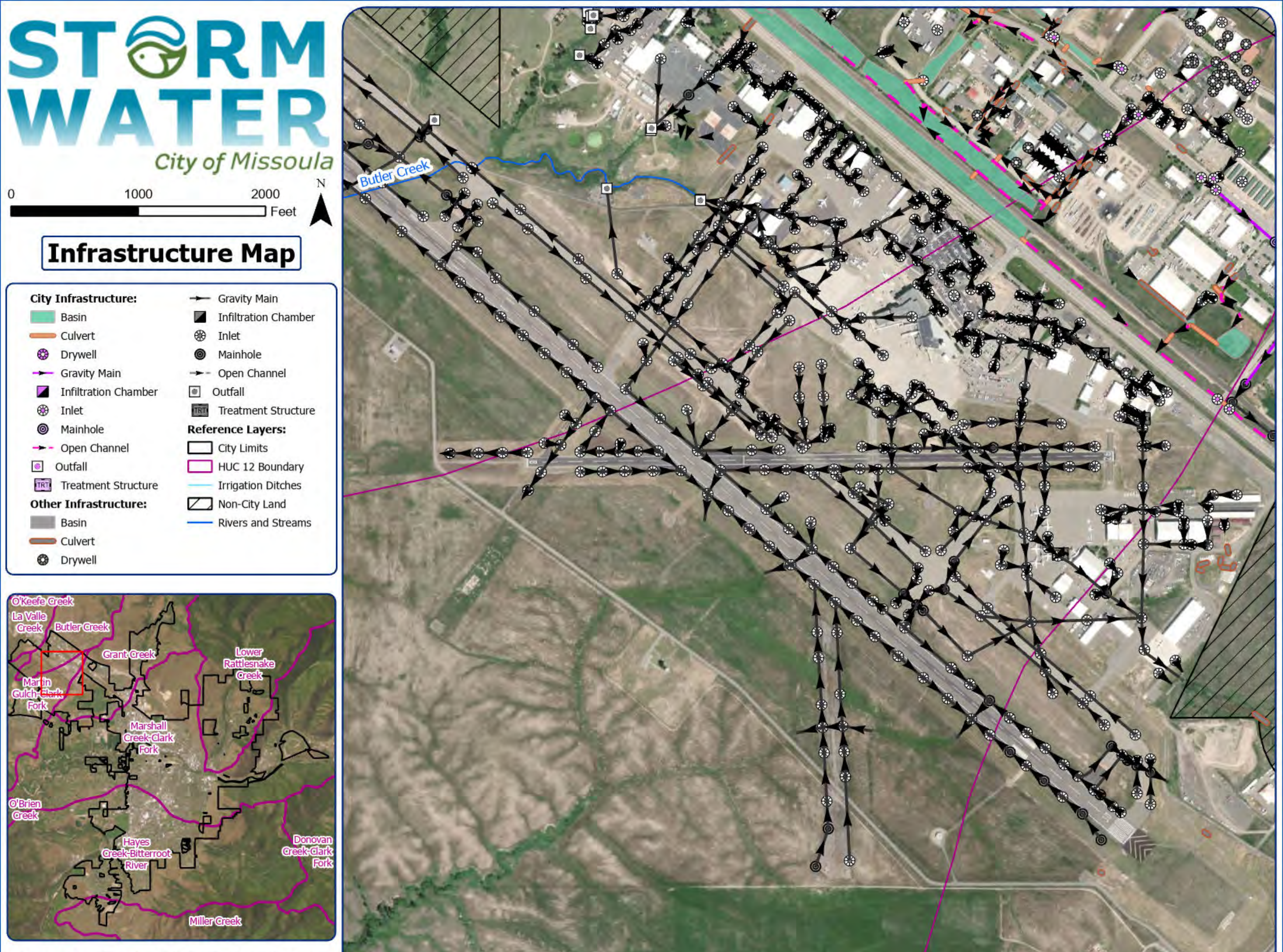

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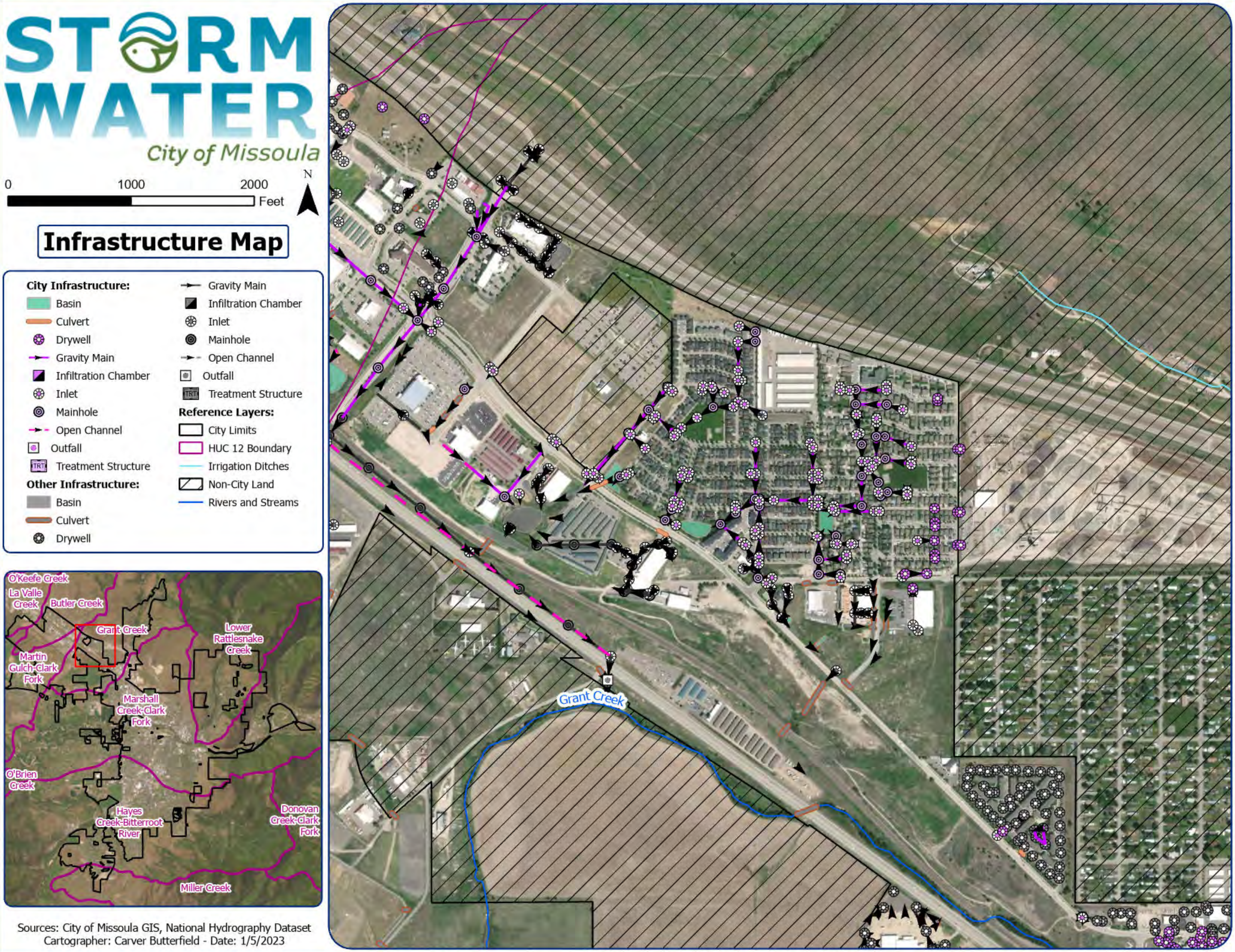
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Rivers and Streams
O'Keefe Creek
La Valle Creek
Butler Creek
Grant Creek
Lower Rattlesnake Creek
Martin Gulch-Clark Fork
Marshall Creek-Clark Fork
O'Brien Creek
Hayes Creek-Bitterroot River
Donovan Creek-Clark Fork
Miller Creek
Grant Creek
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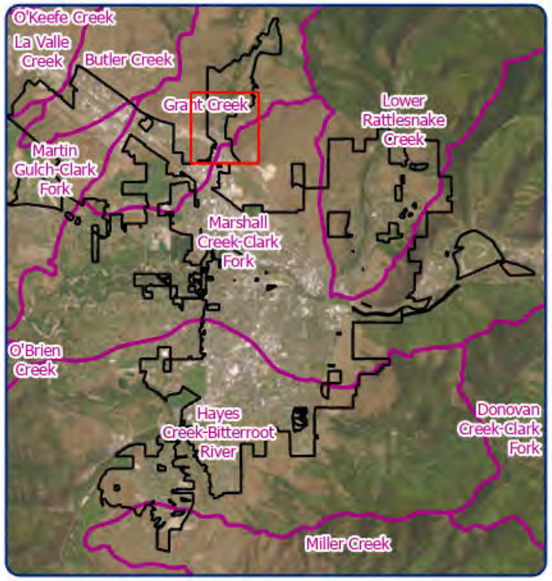

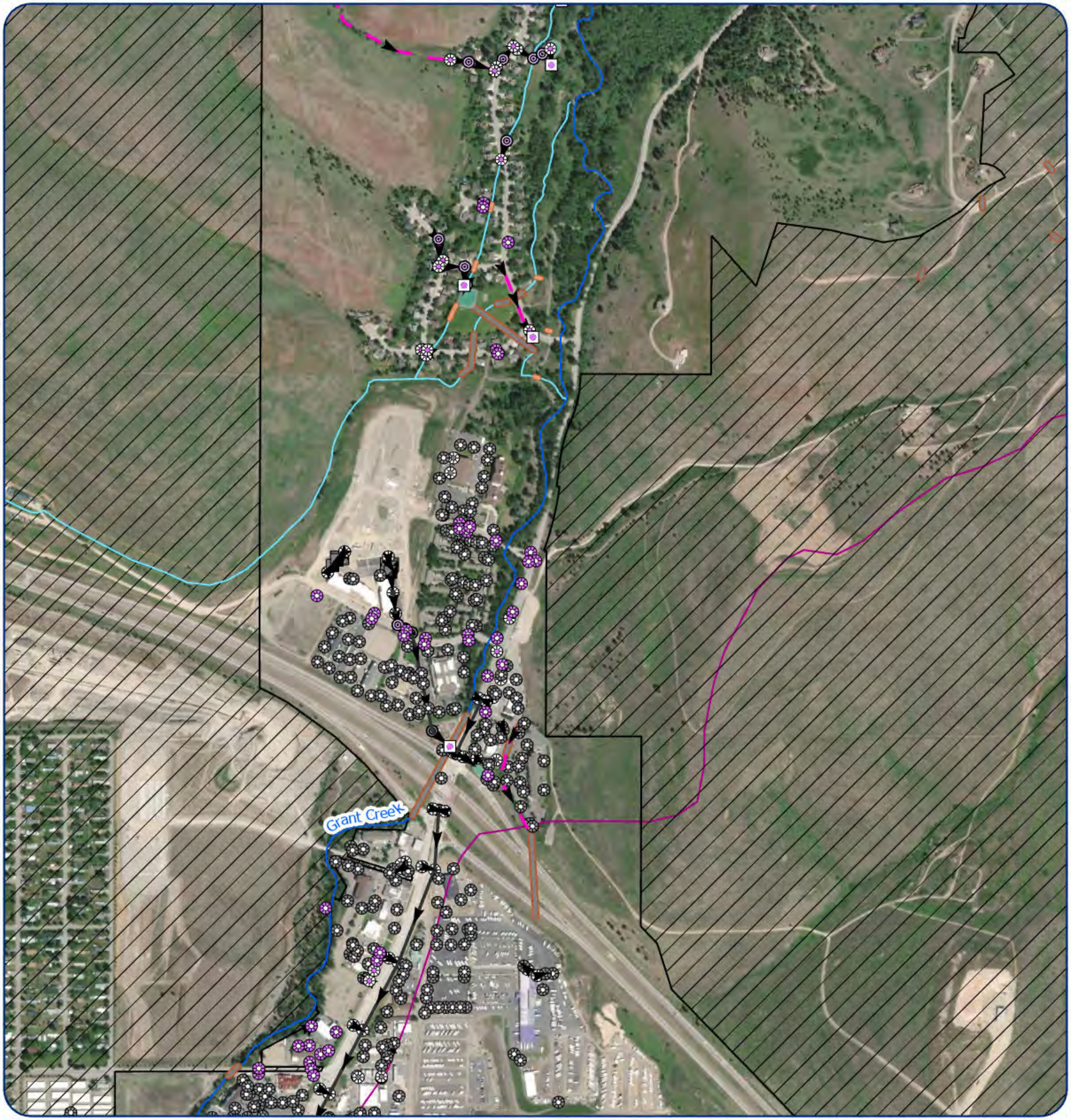

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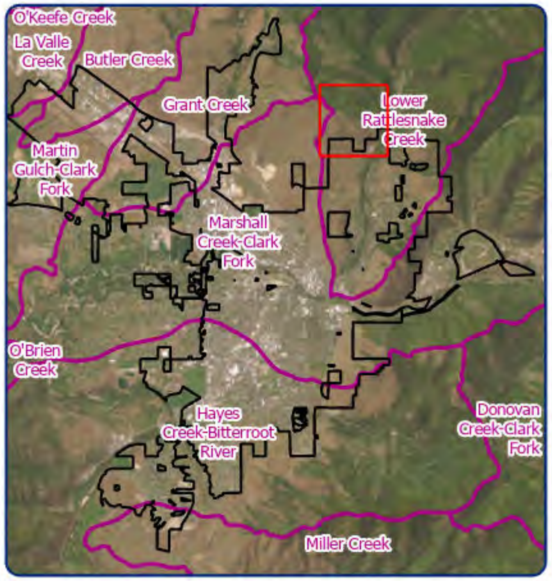

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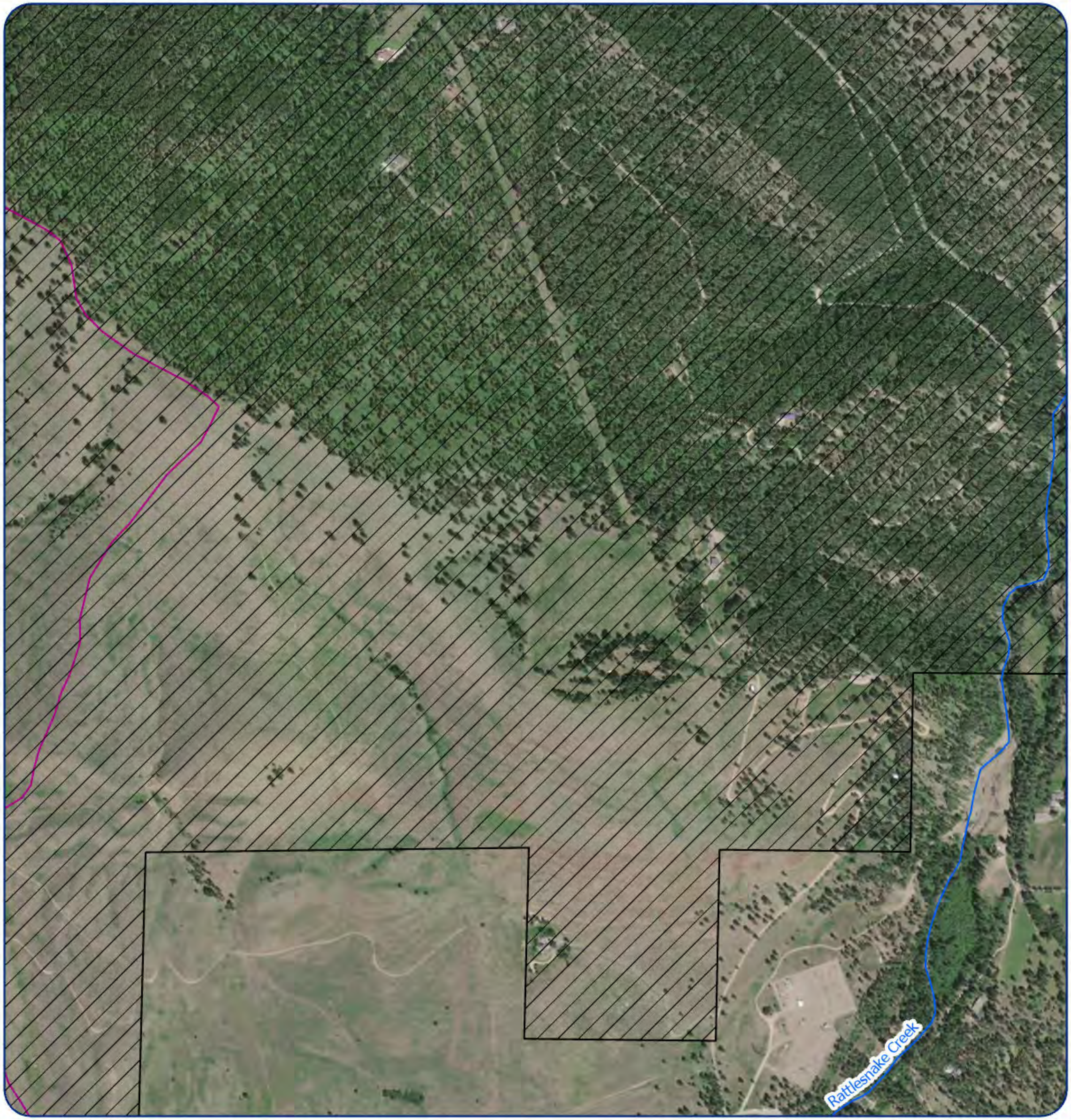

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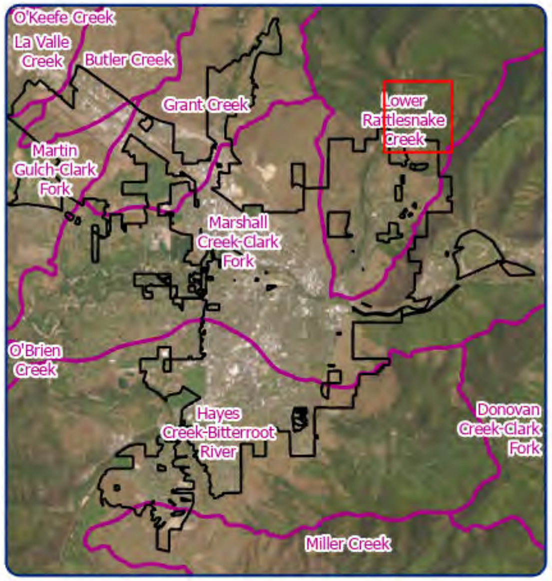

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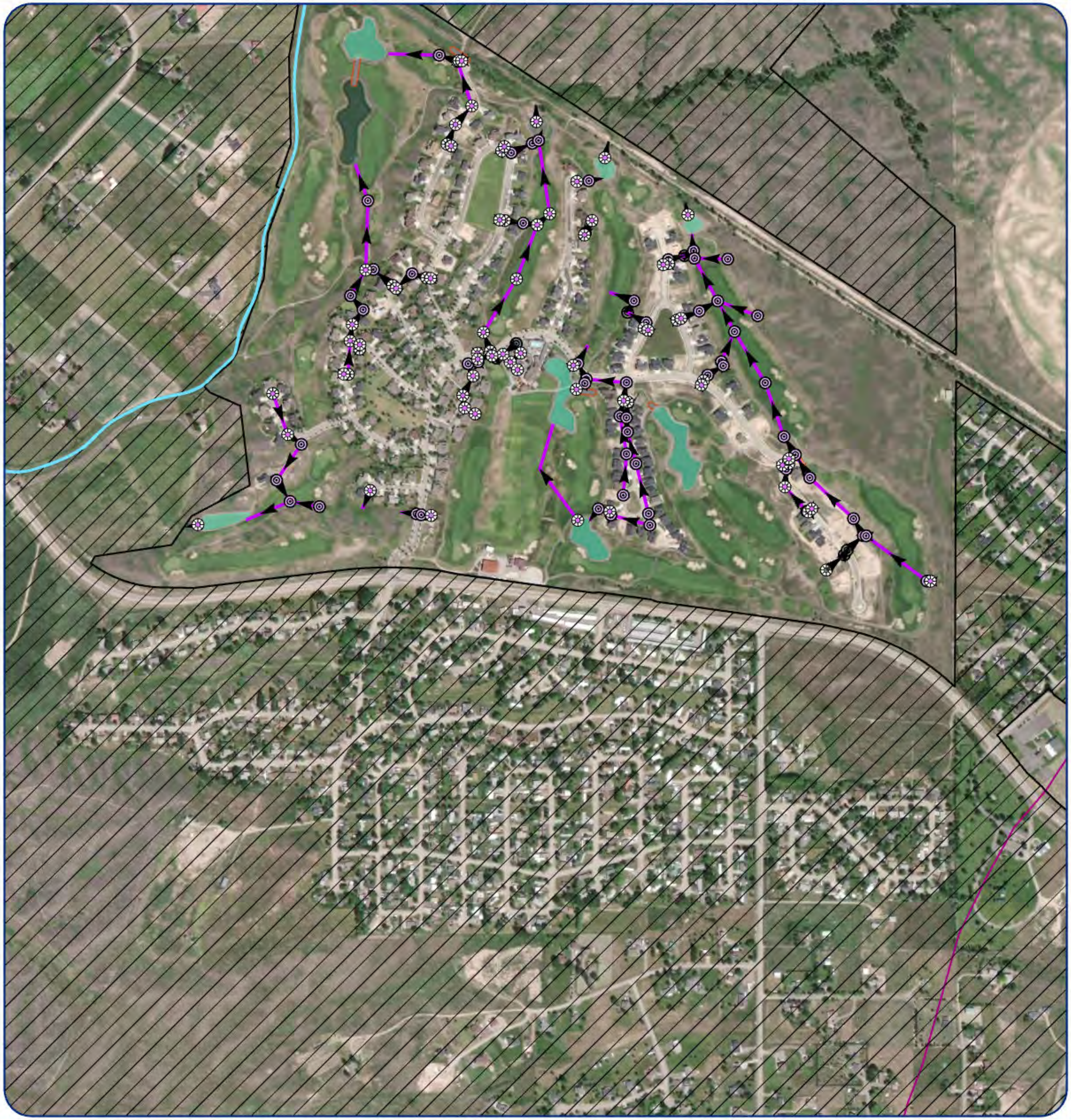

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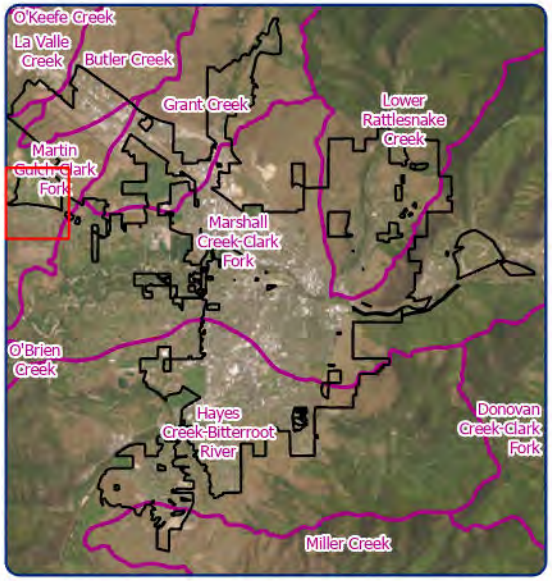

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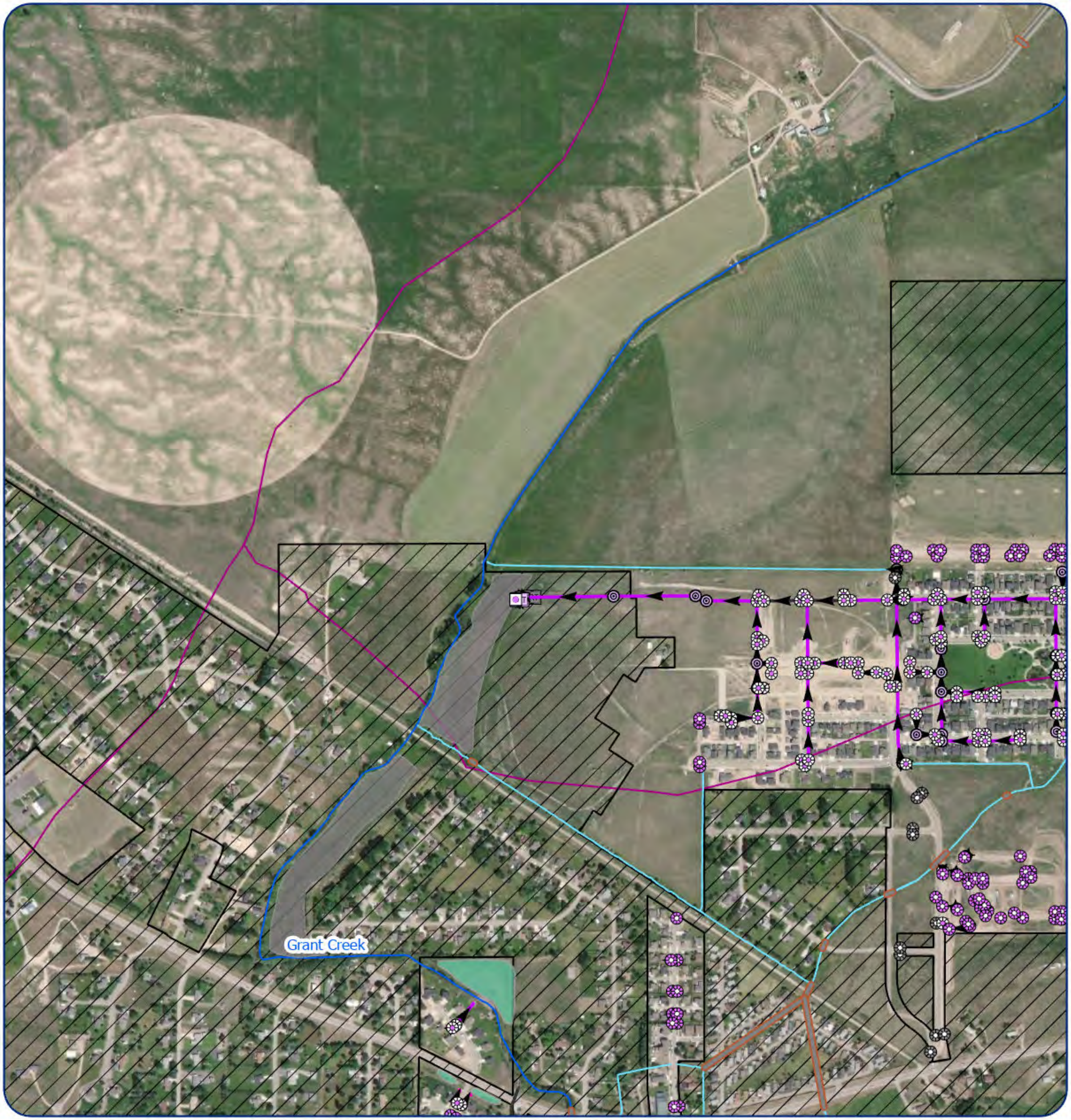

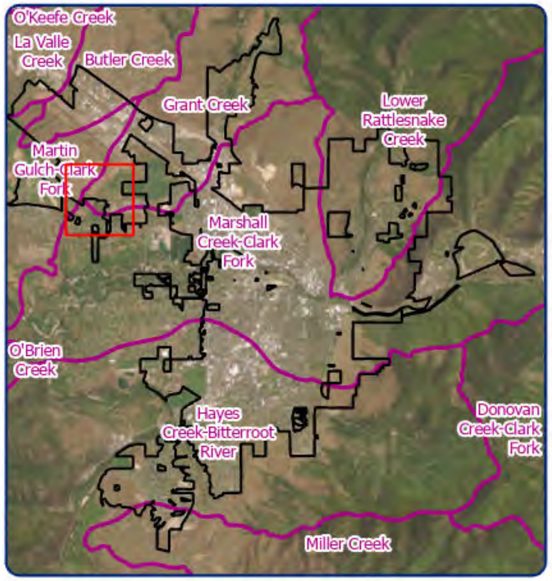

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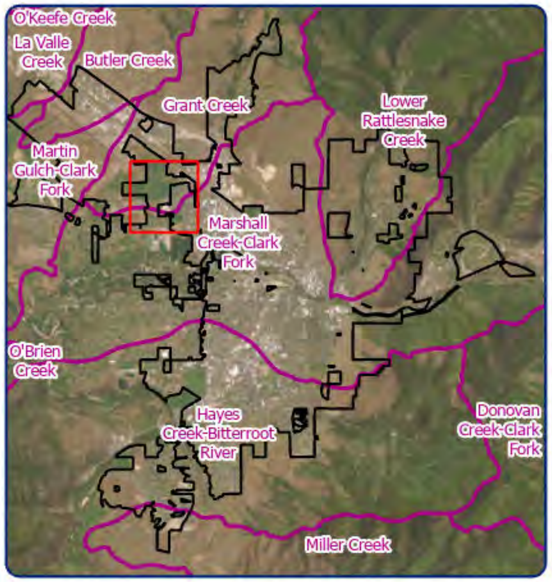

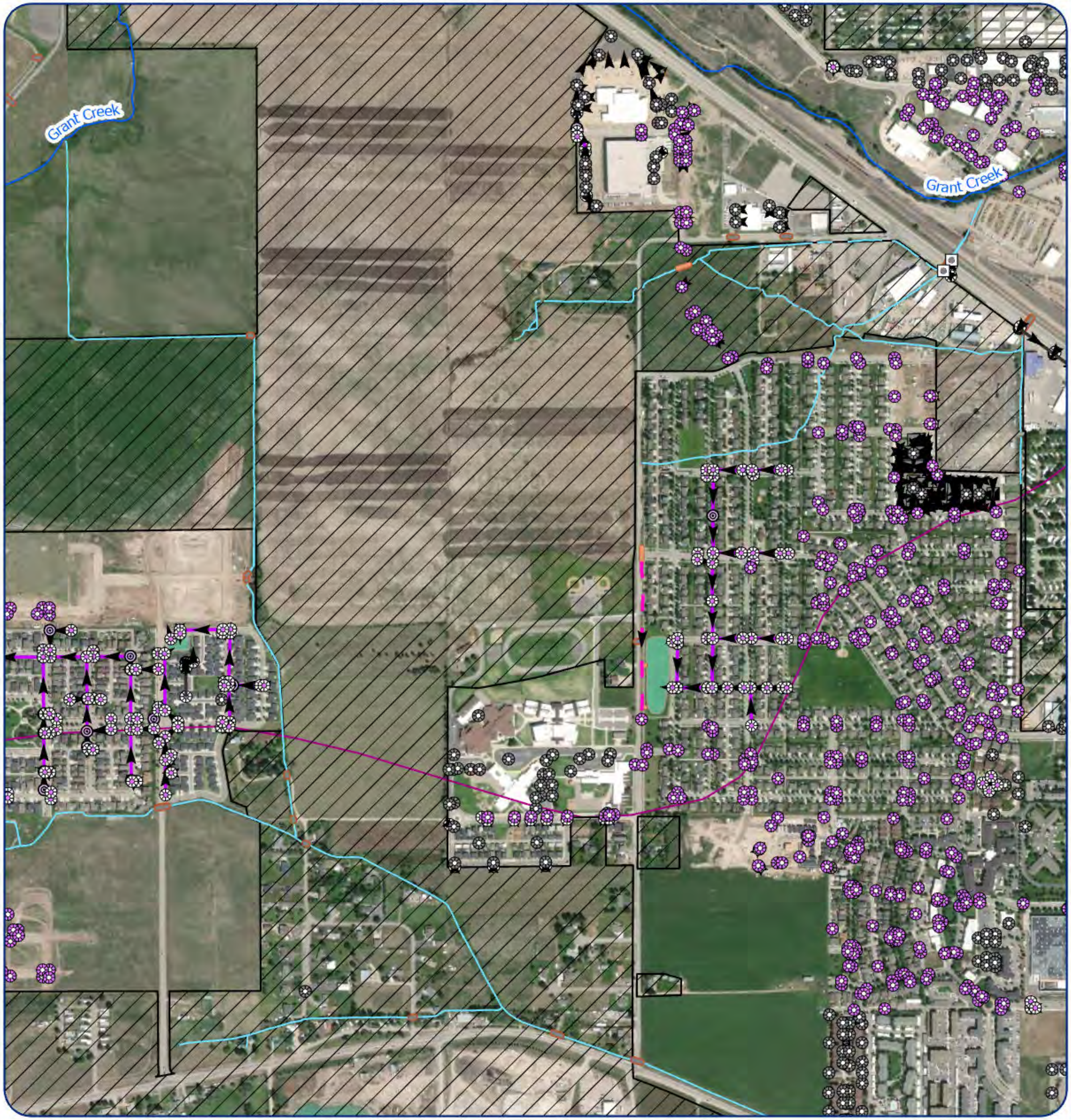

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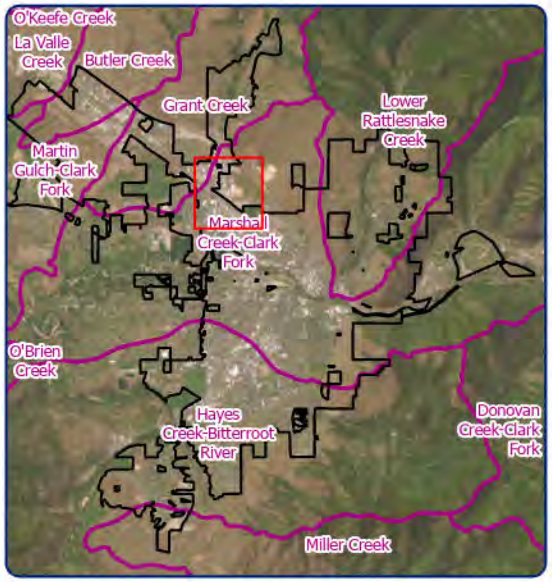

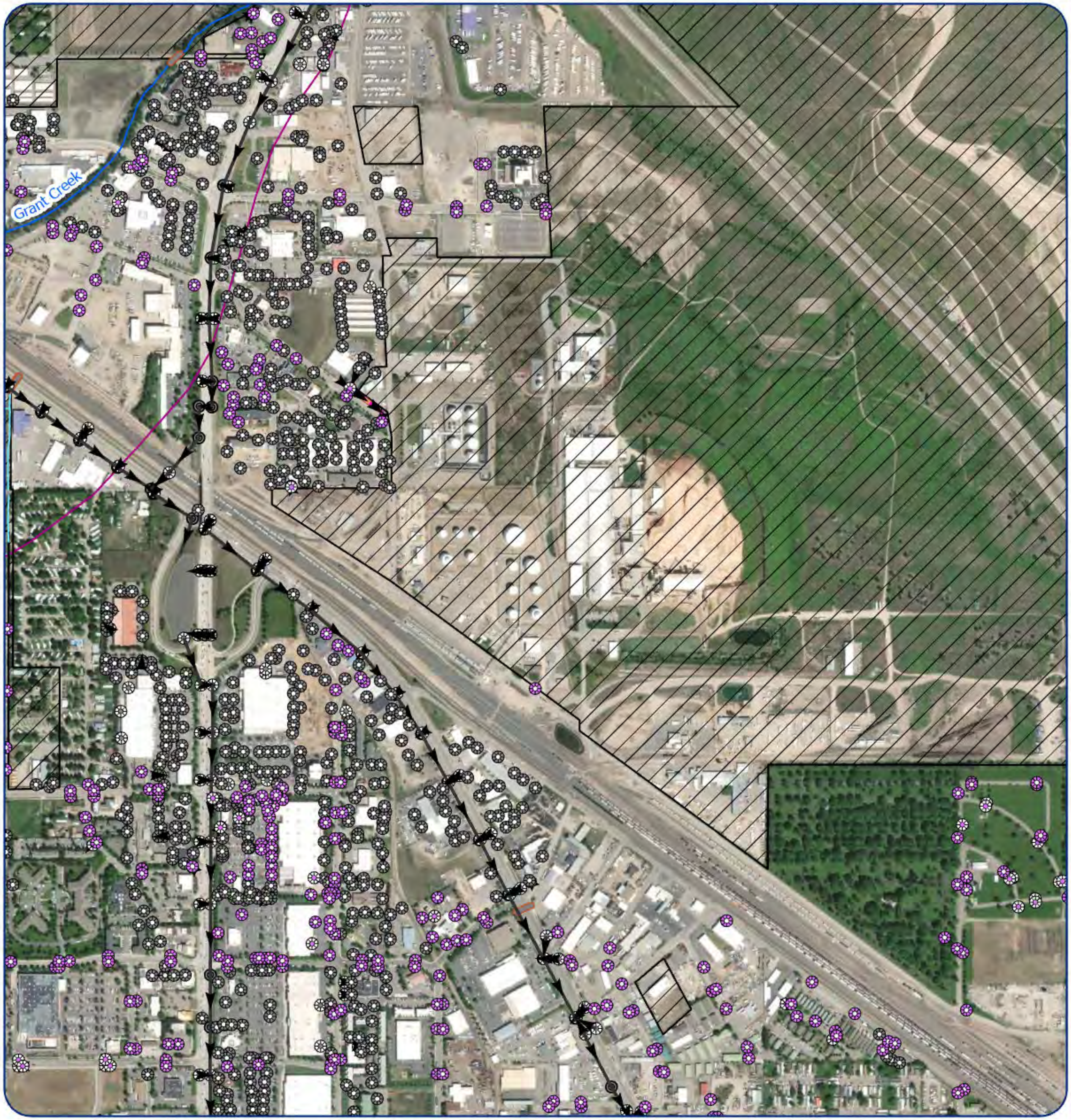

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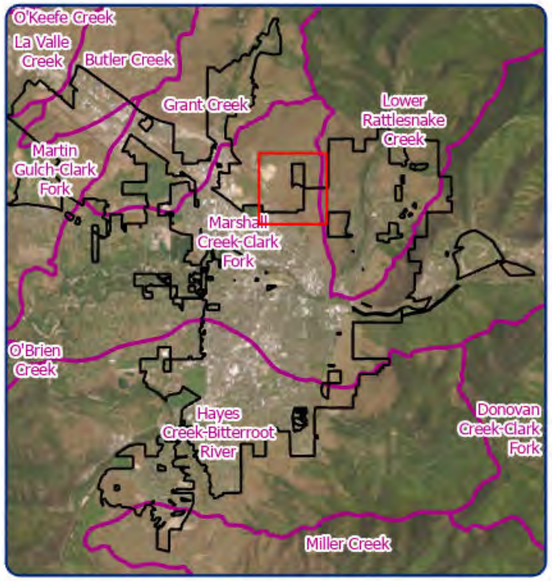

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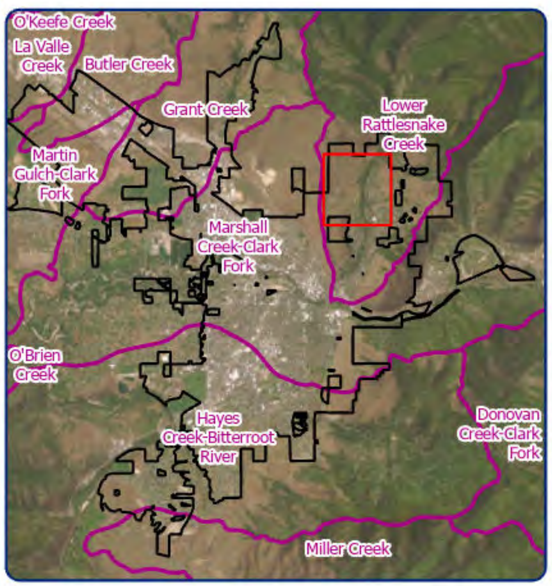

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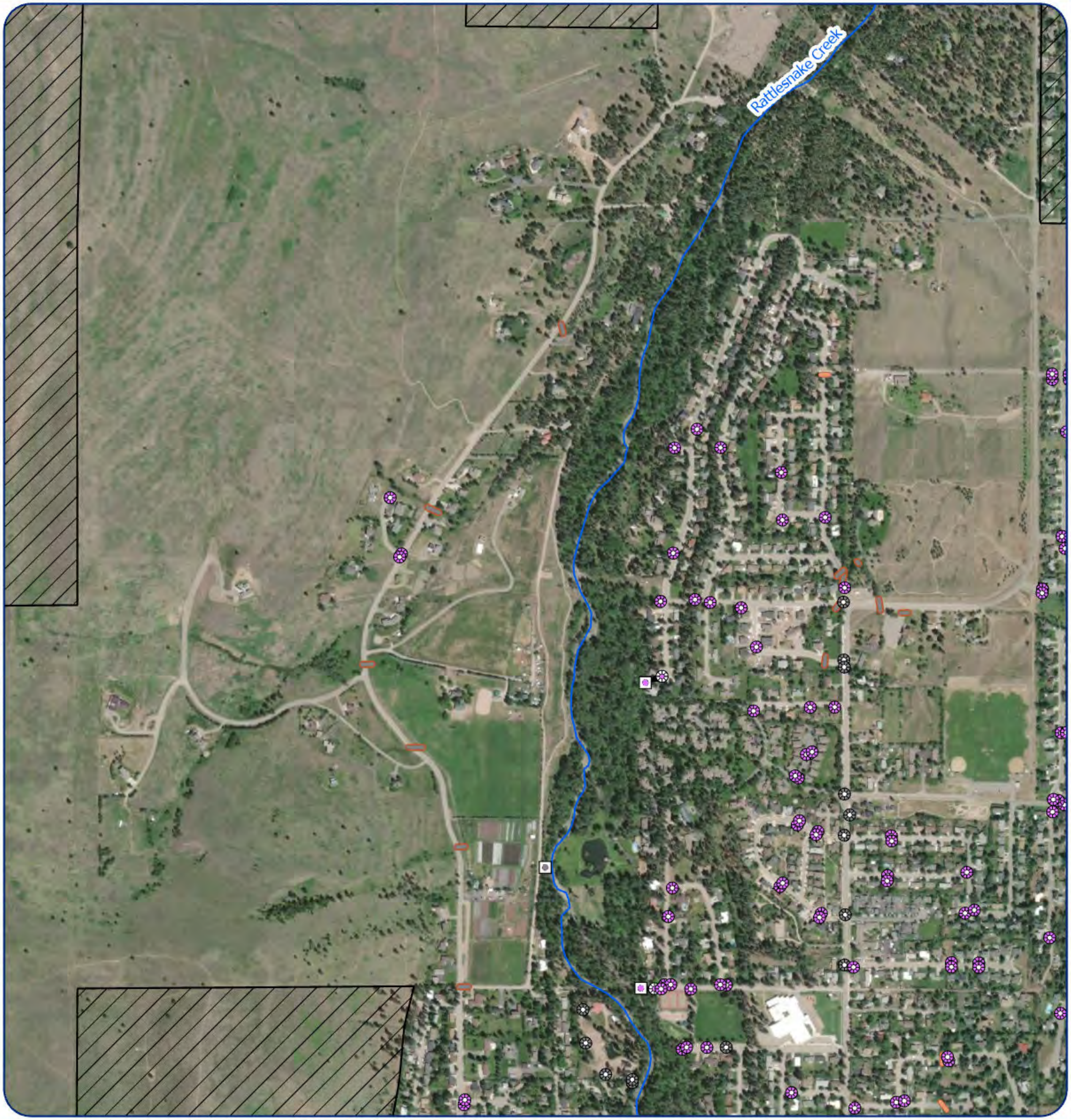

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Reference Layers:
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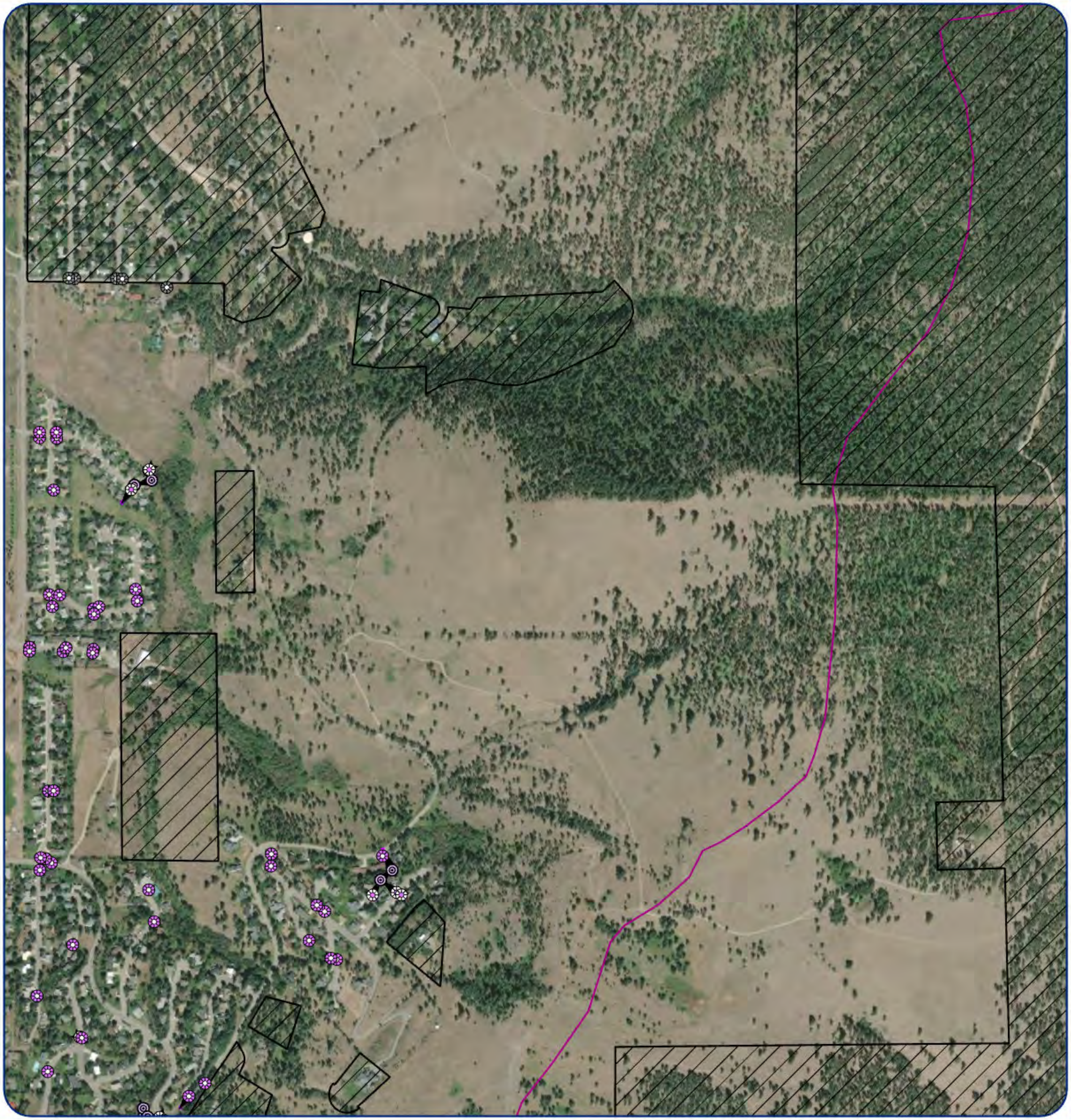
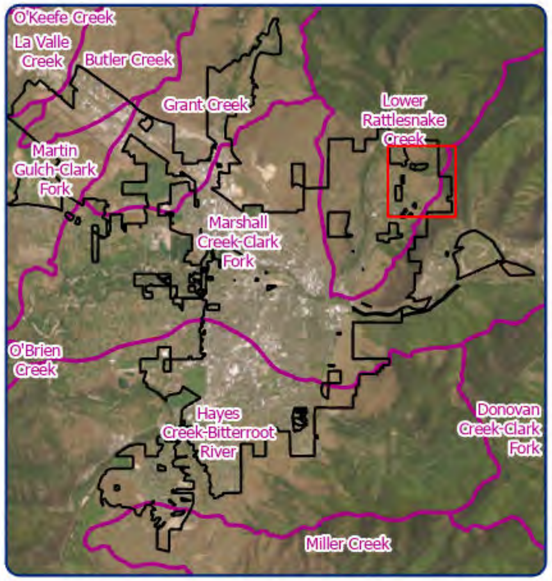
- Irrigation Ditches
- Non-City Land
- Rivers and Streams





Sources: City of Missoula GIS, National Hydrography Dataset
Cartographer: Carver Butterfield - Date: 1/5/2023

STORMWATER
City of Missoula

0 1000 2000 Feet
N

Infrastructure Map

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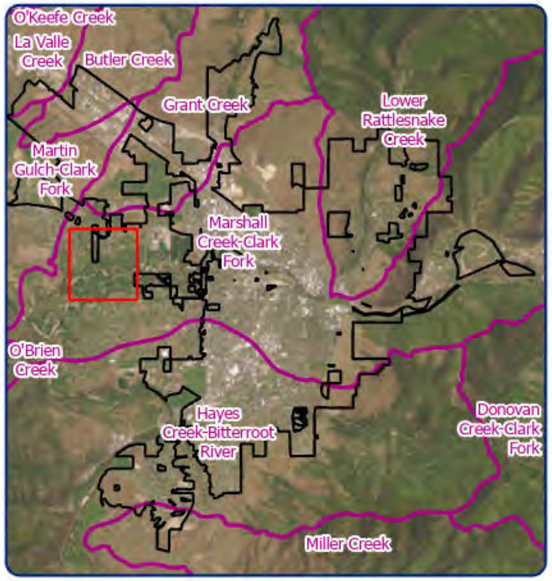

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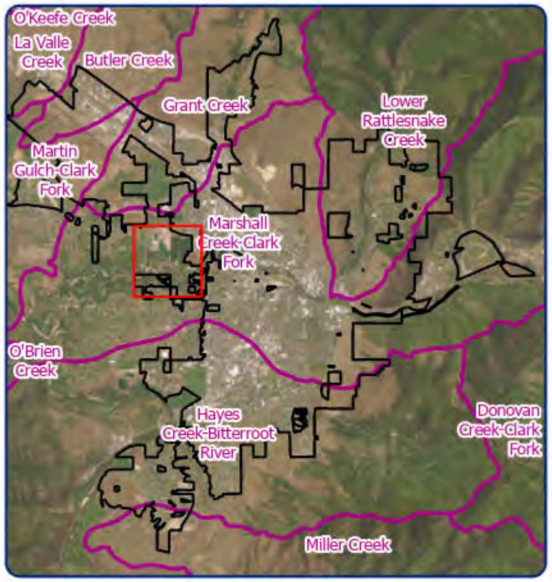

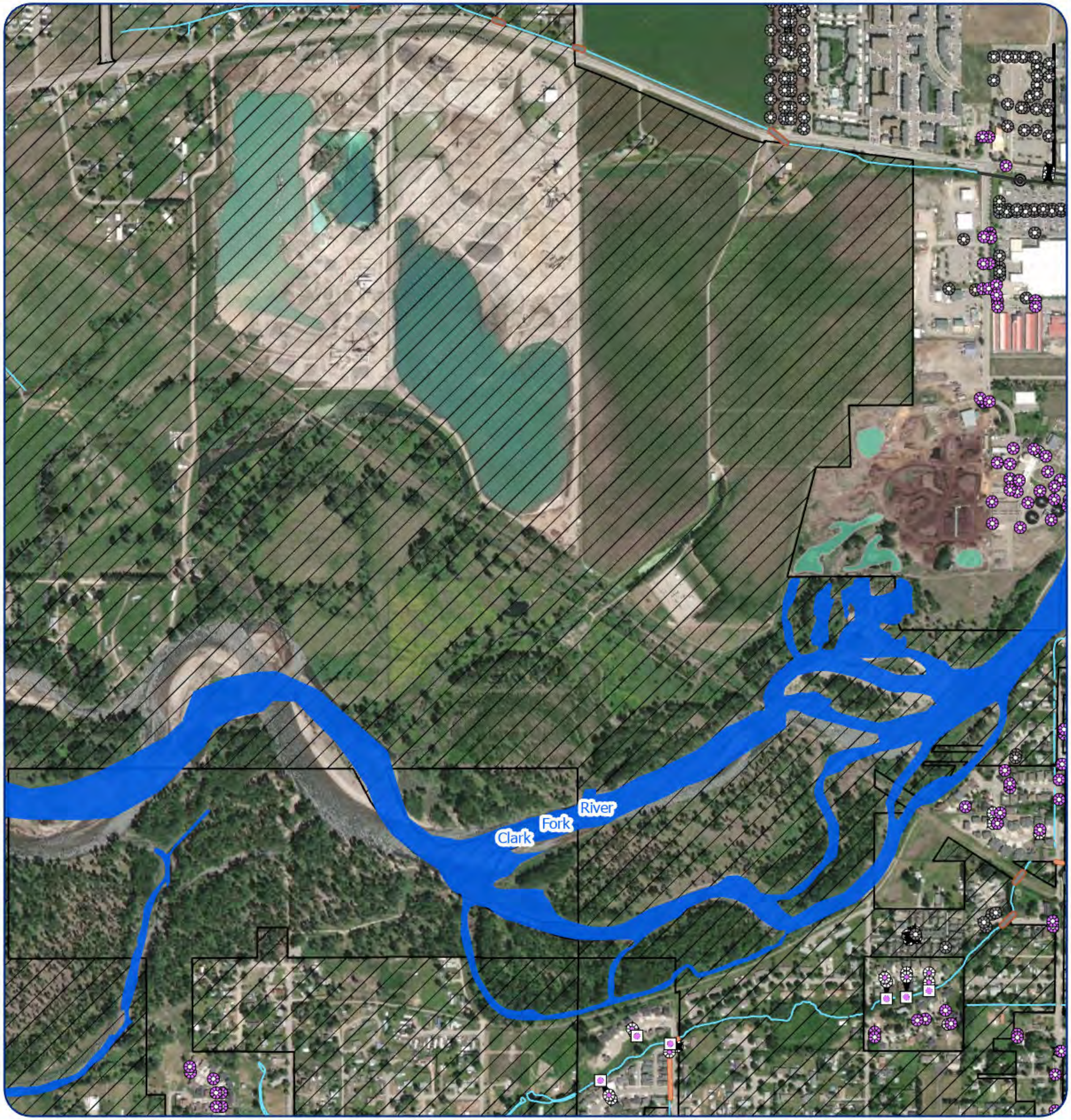

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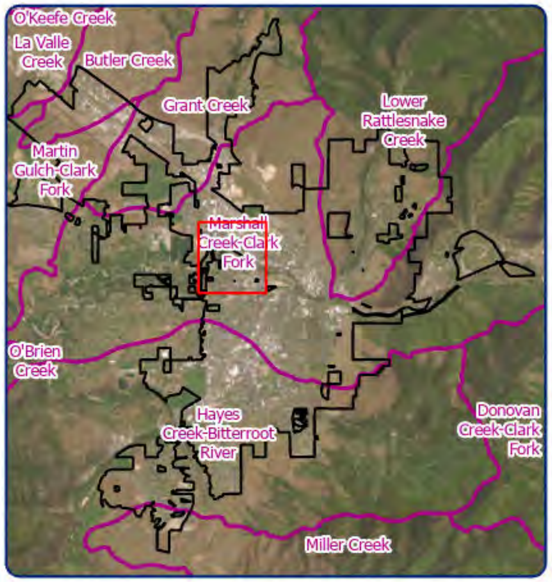

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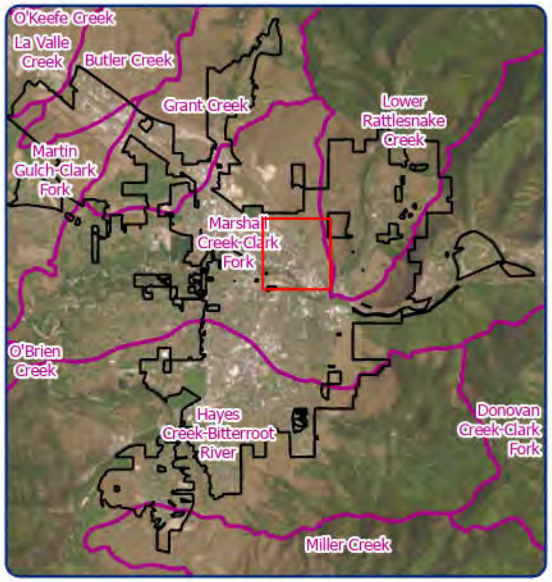

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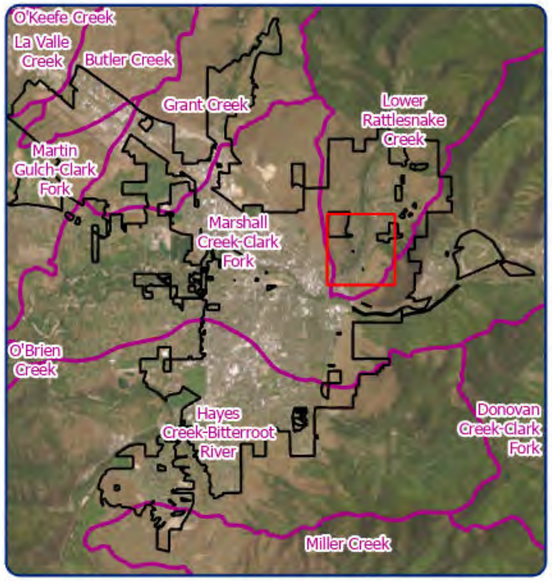

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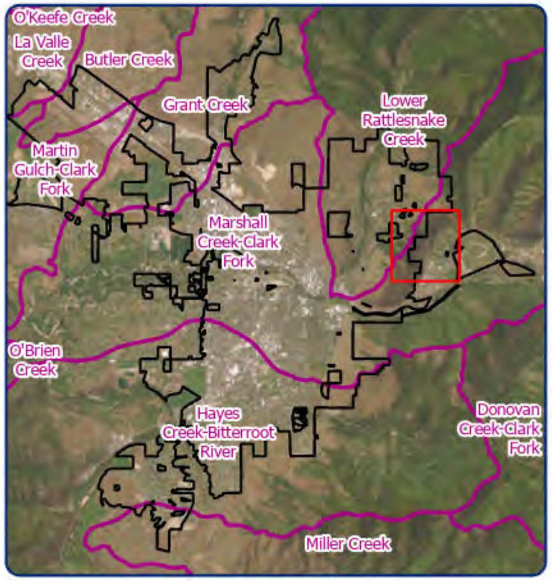

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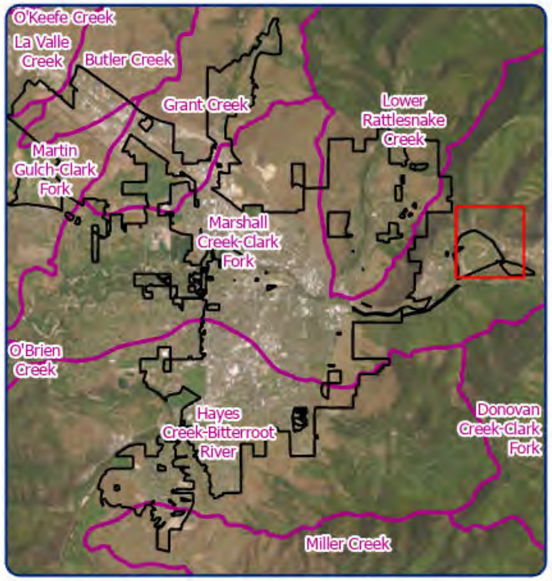

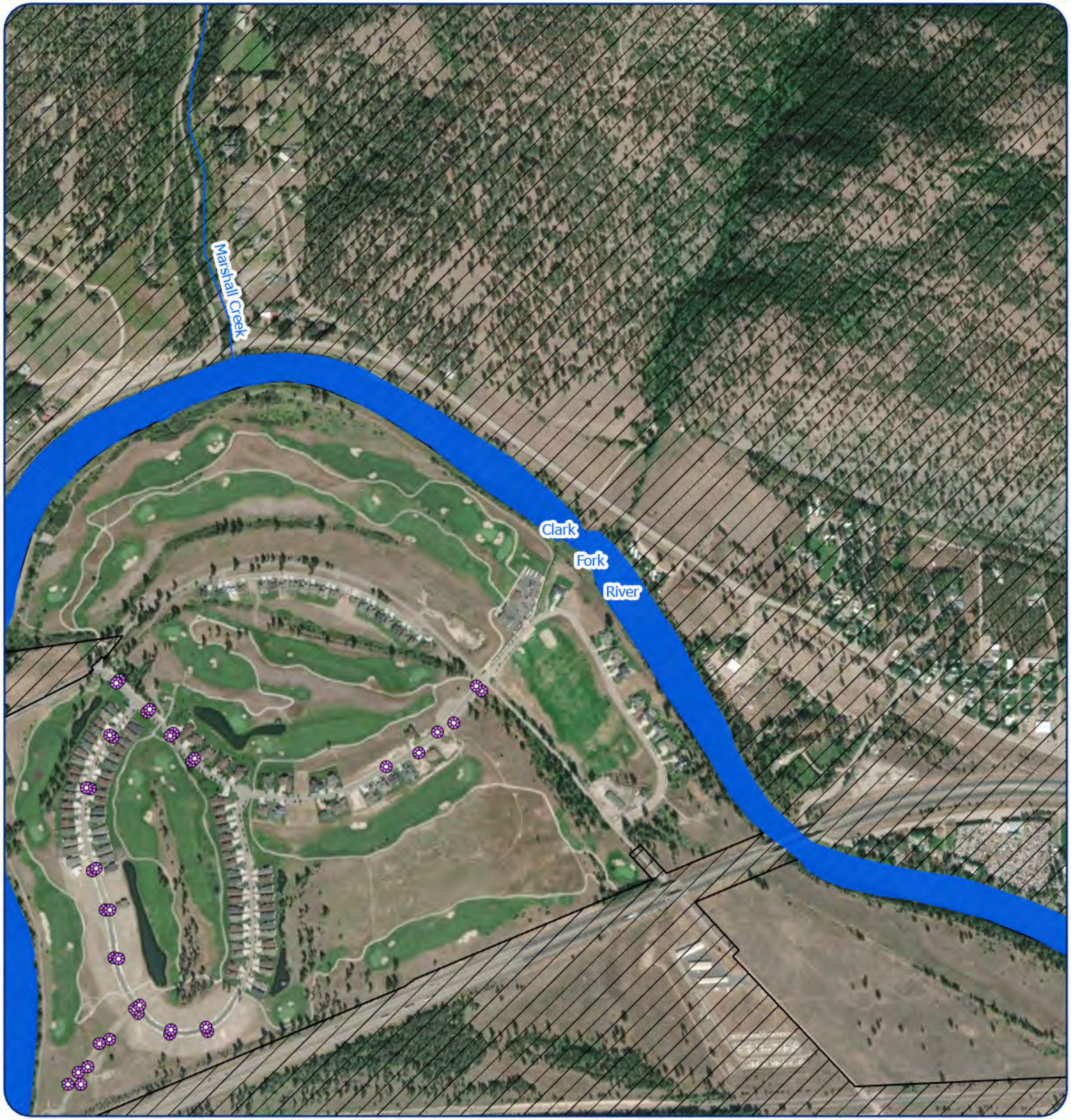

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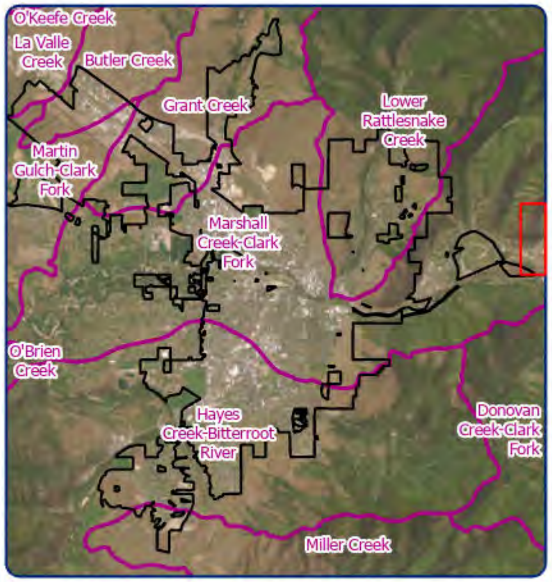

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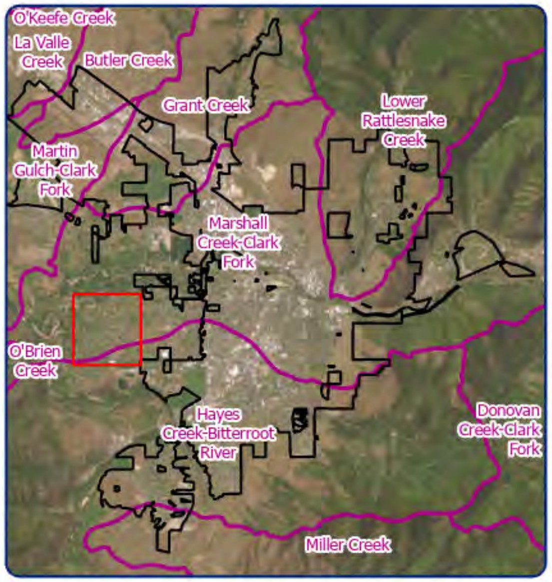

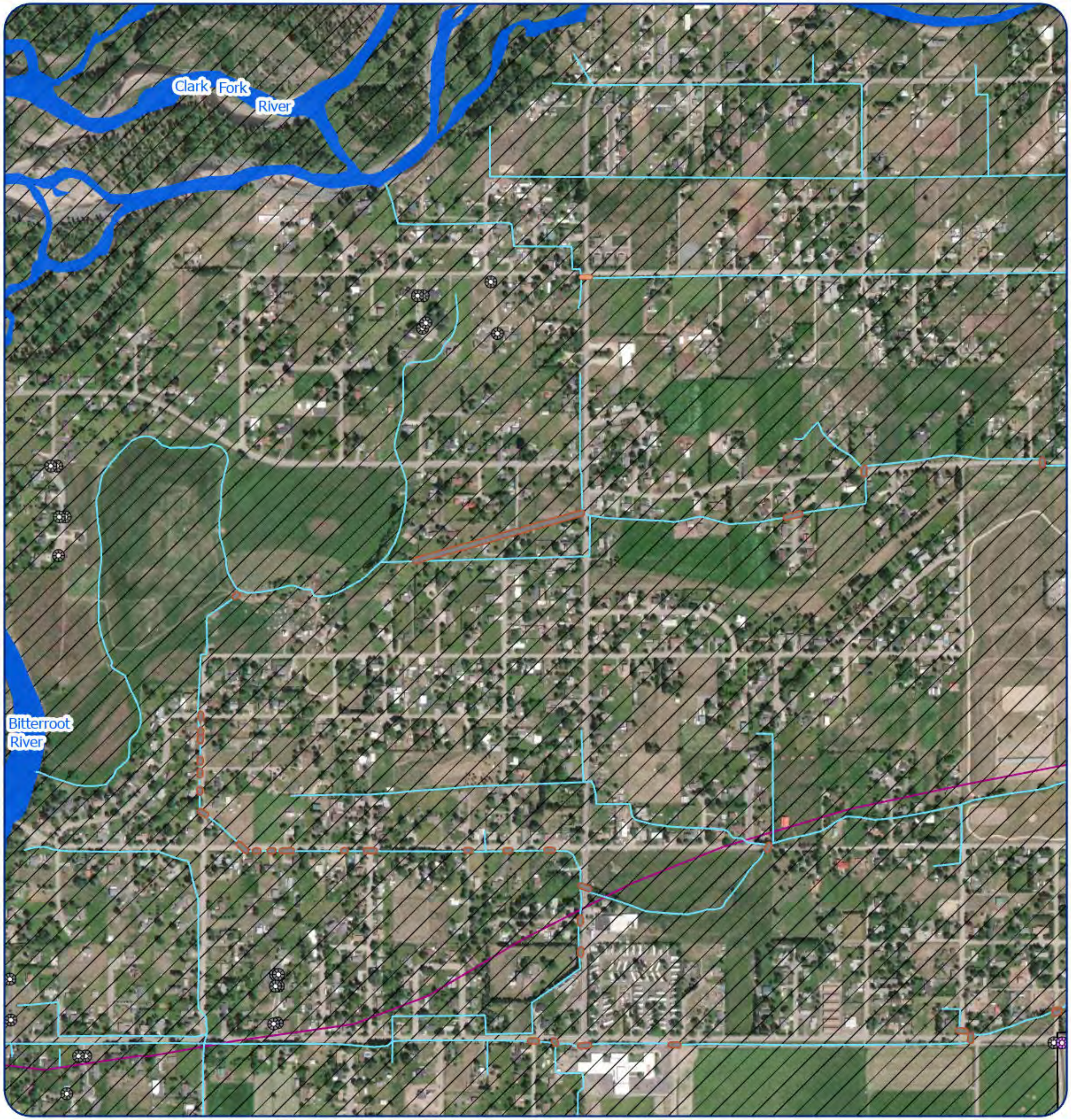

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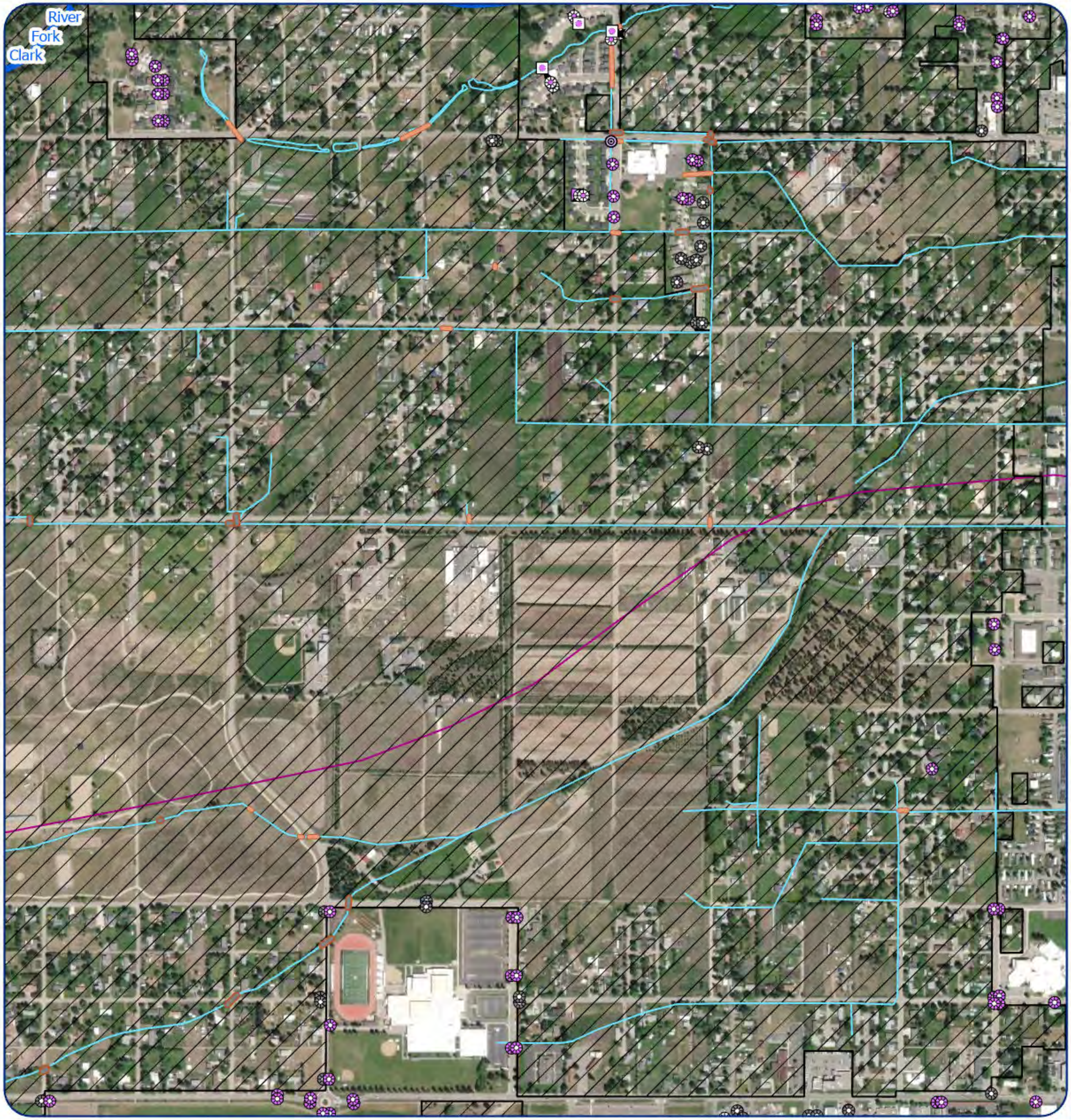

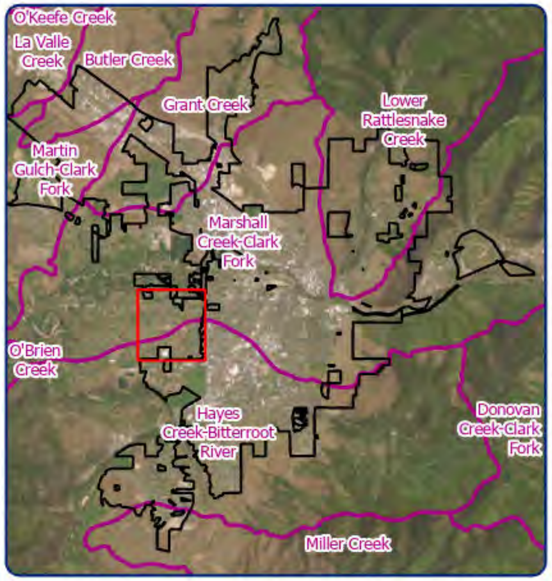

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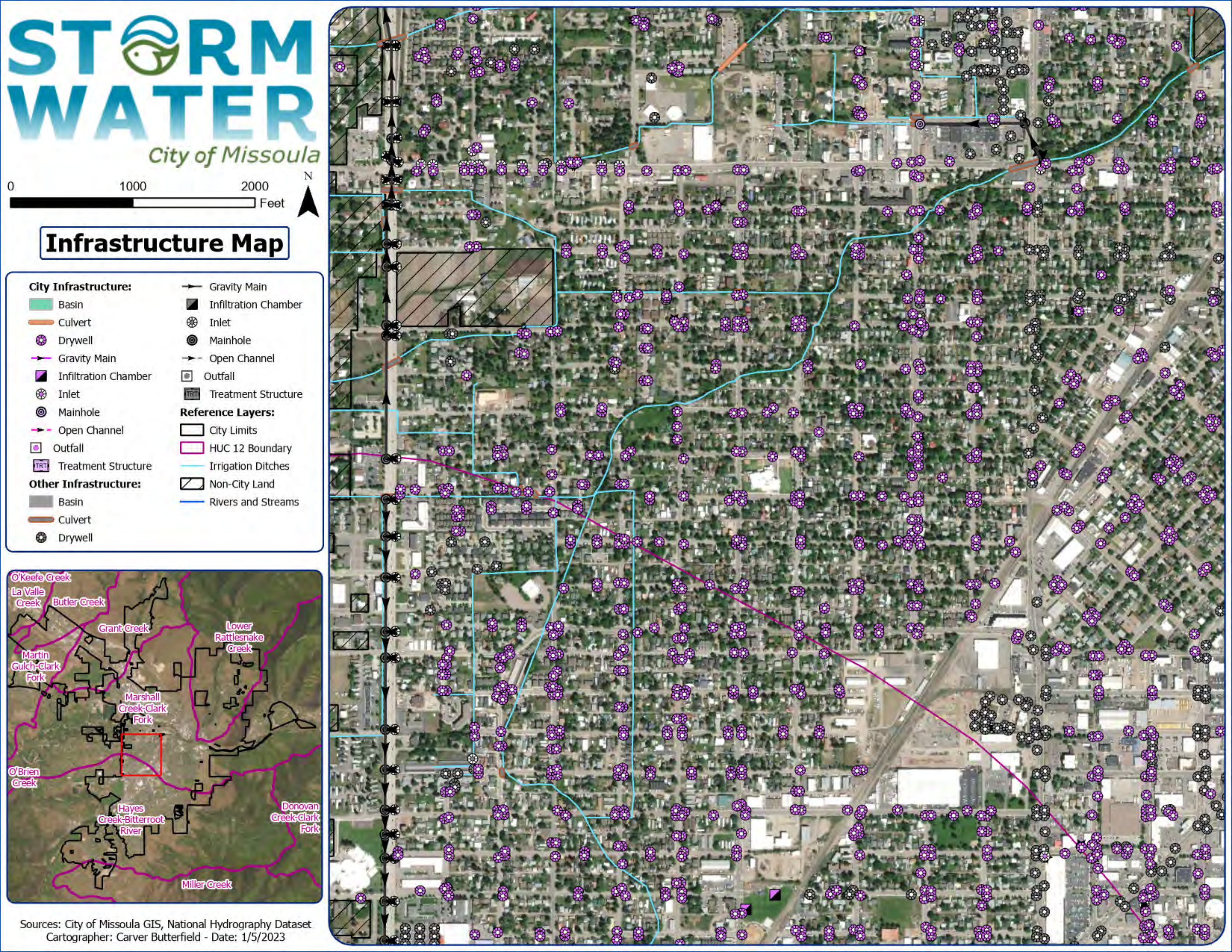
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Infrastructure Map
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Rivers and Streams
O'Keefe Creek
La Valle Creek
Butler Creek
Grant Creek
Lower Rattlesnake Creek
Martin Gulch-Clark Fork
Marshall Creek-Clark Fork
O'Brien Creek
Hayes Creek-Bitterroot River
Donovan Creek-Clark Fork
Miller Creek
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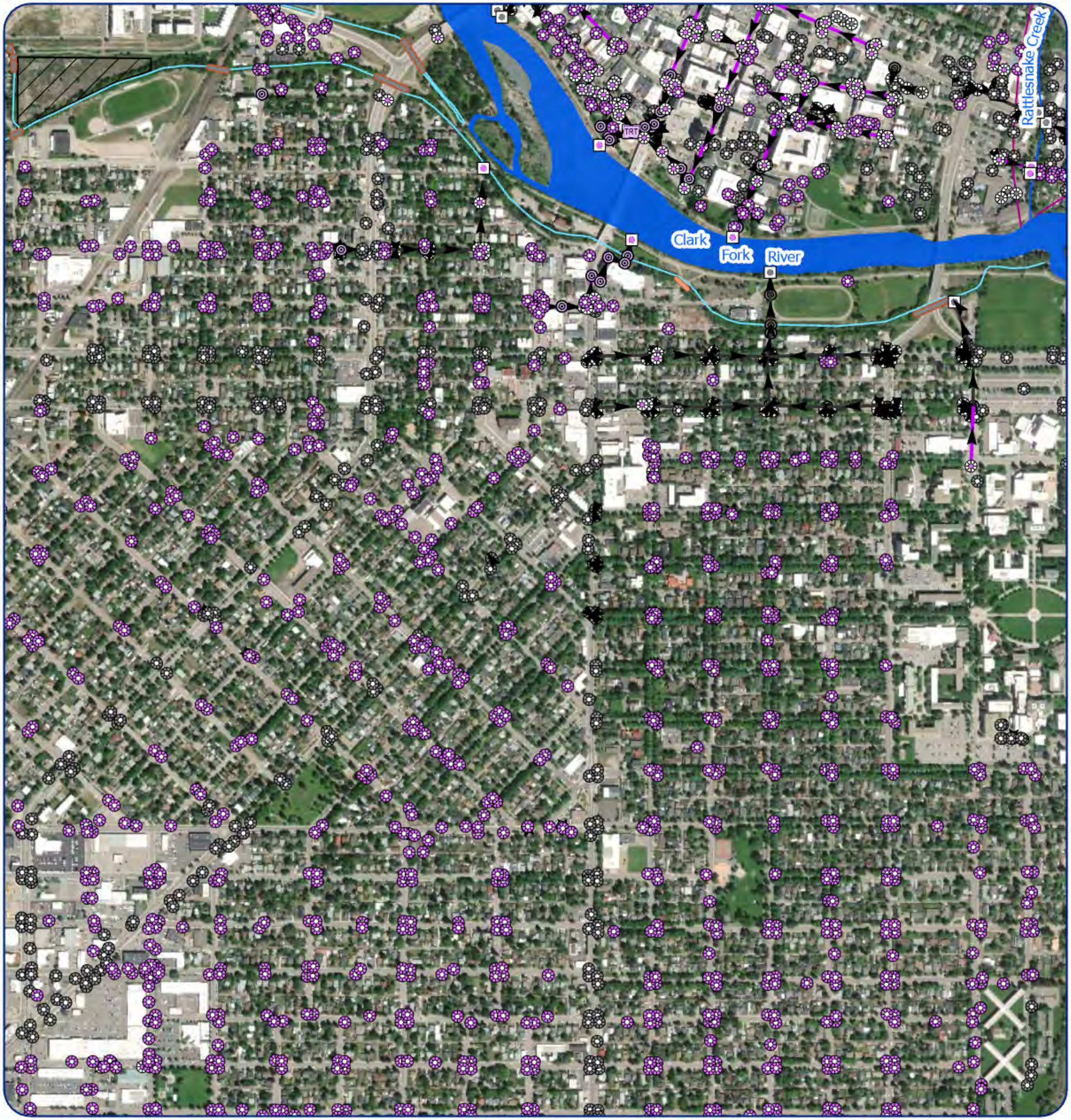

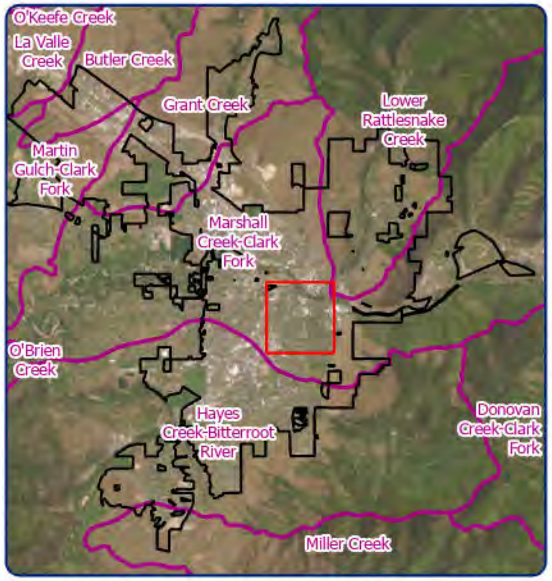

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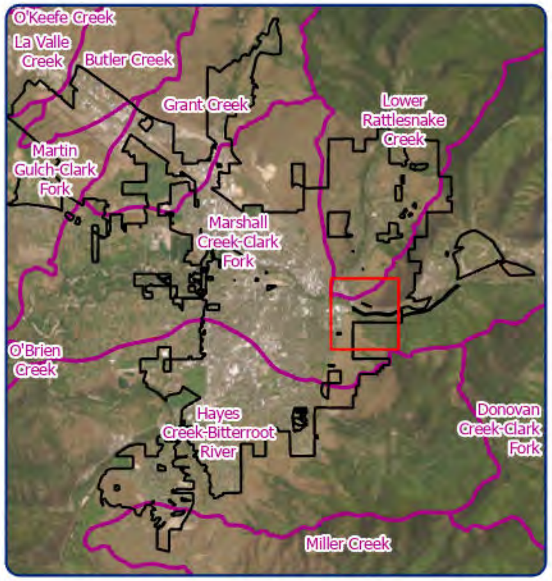

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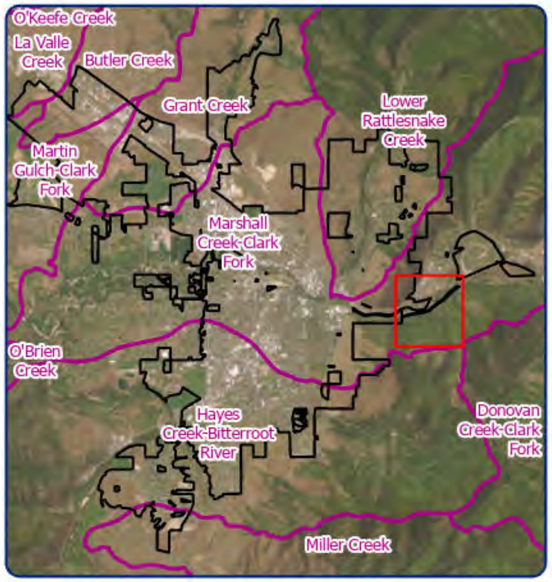

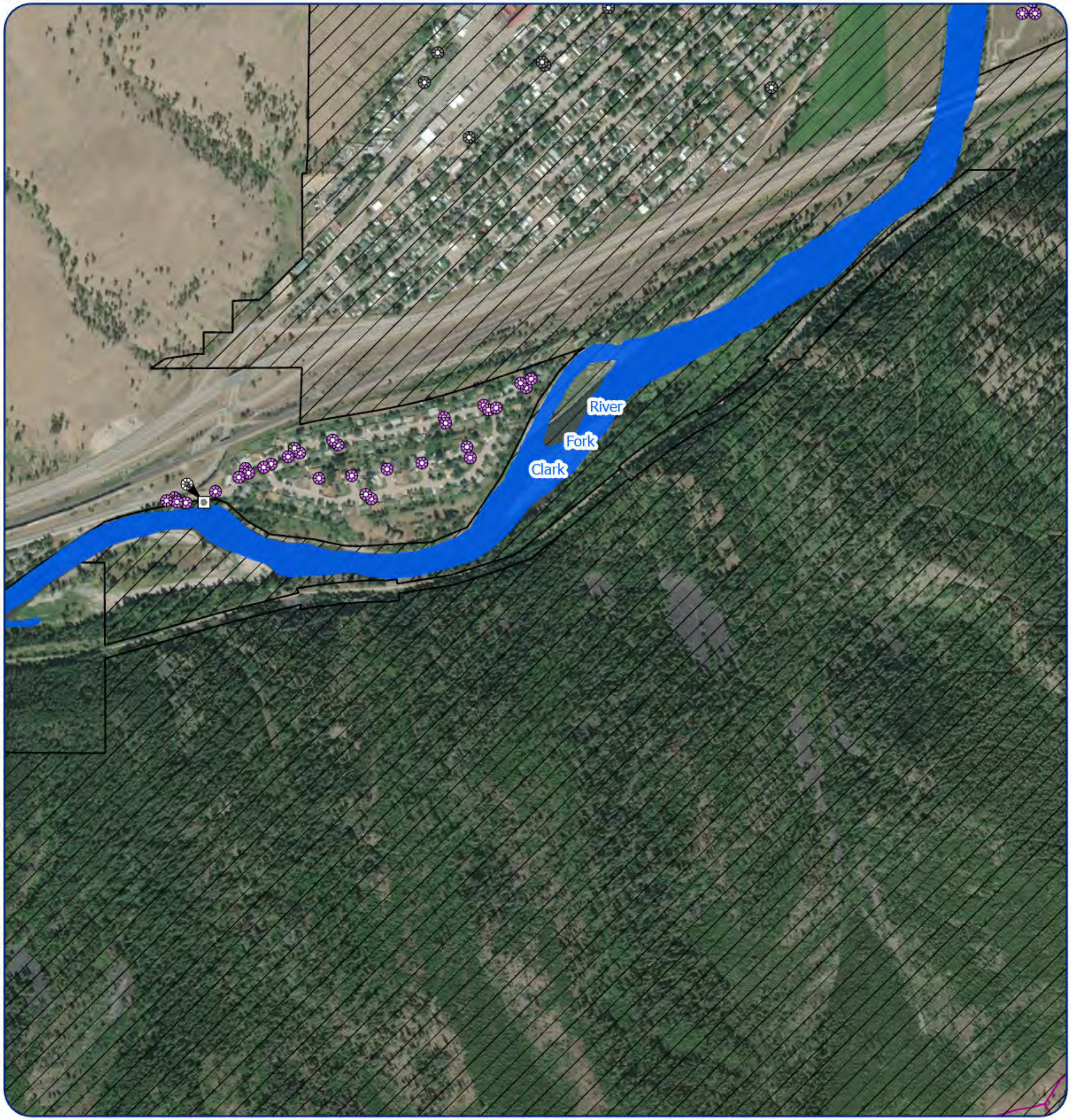

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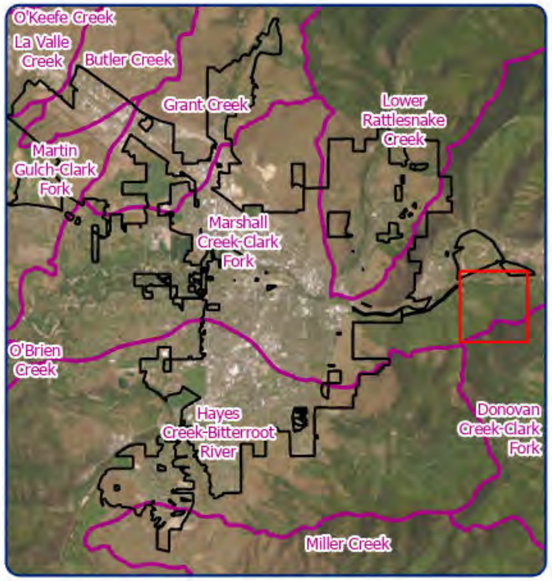

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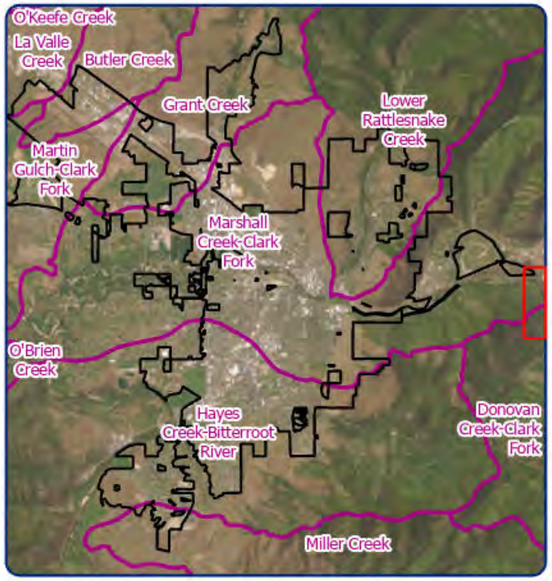

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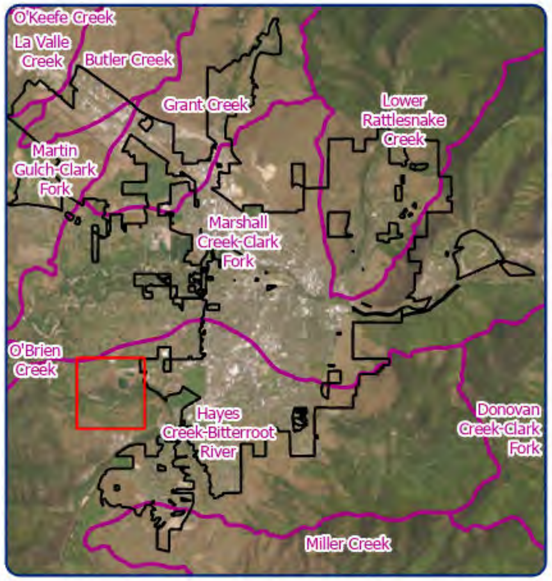

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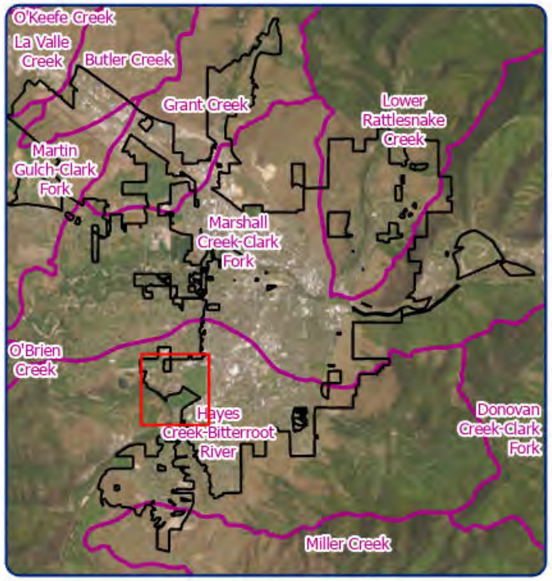

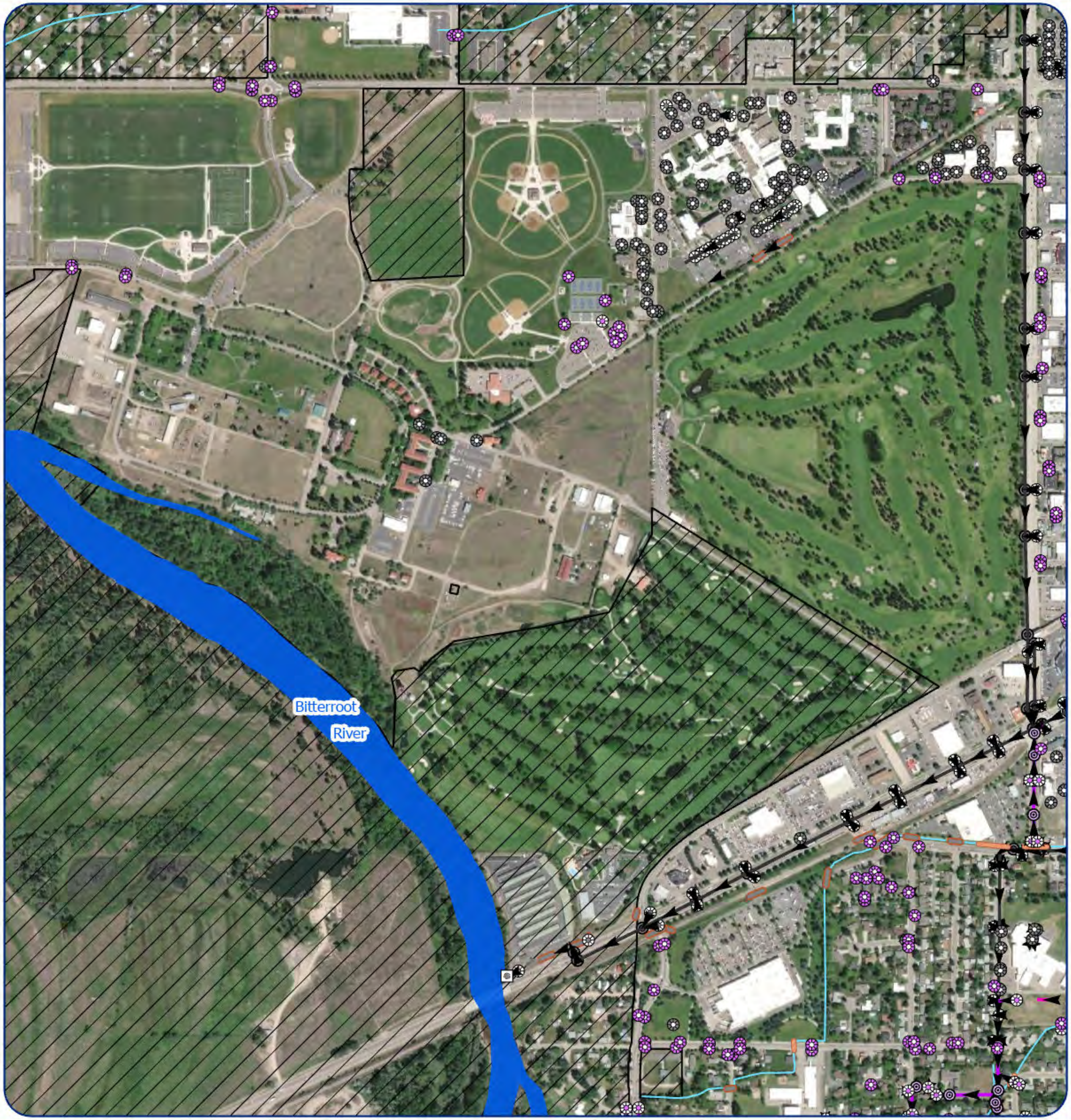

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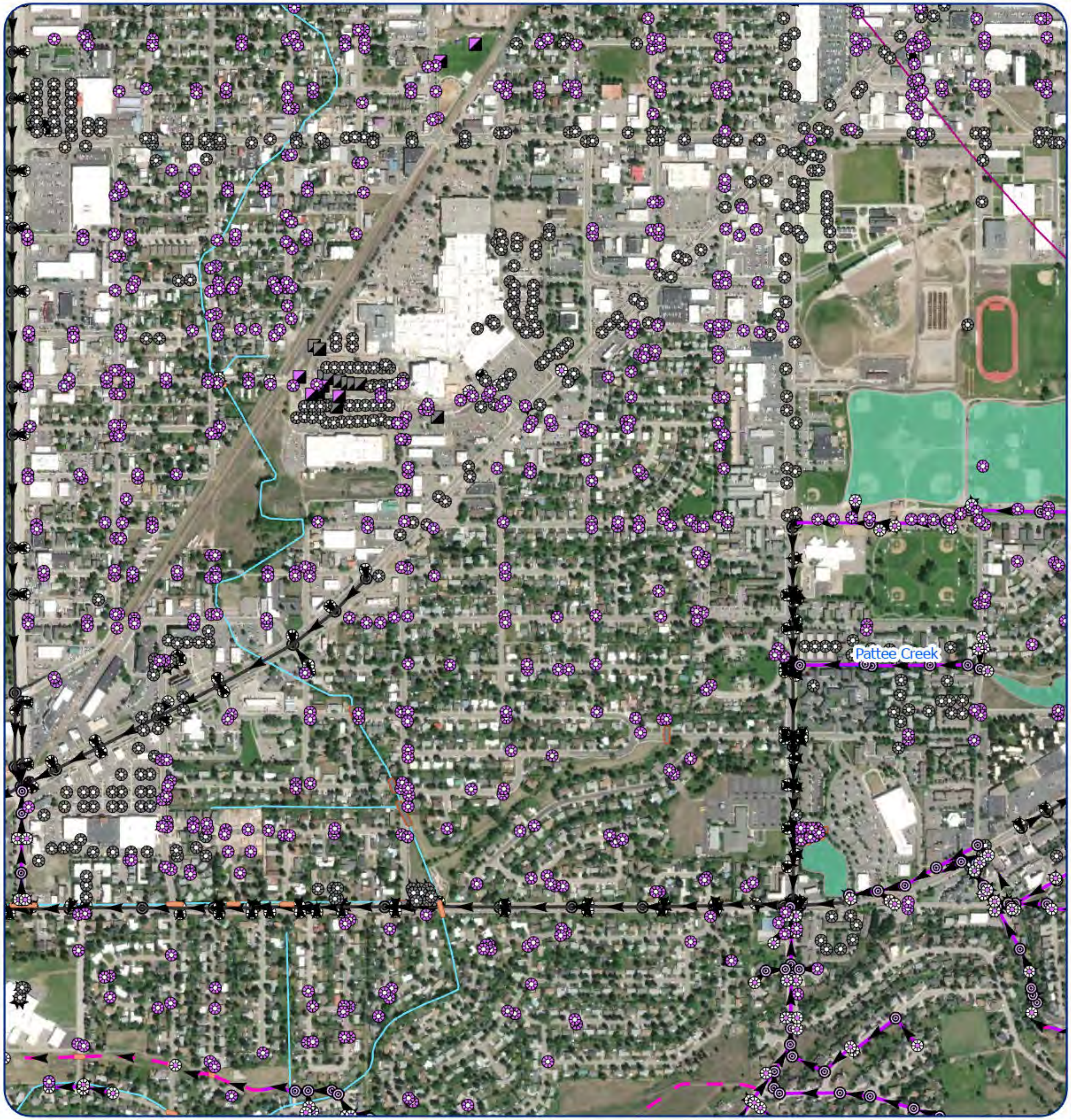

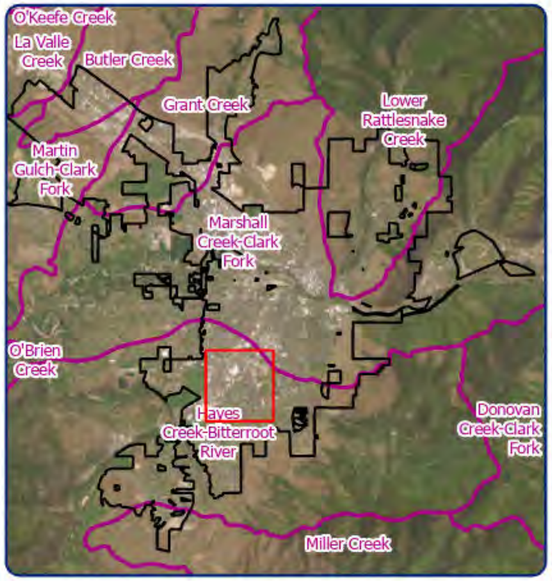

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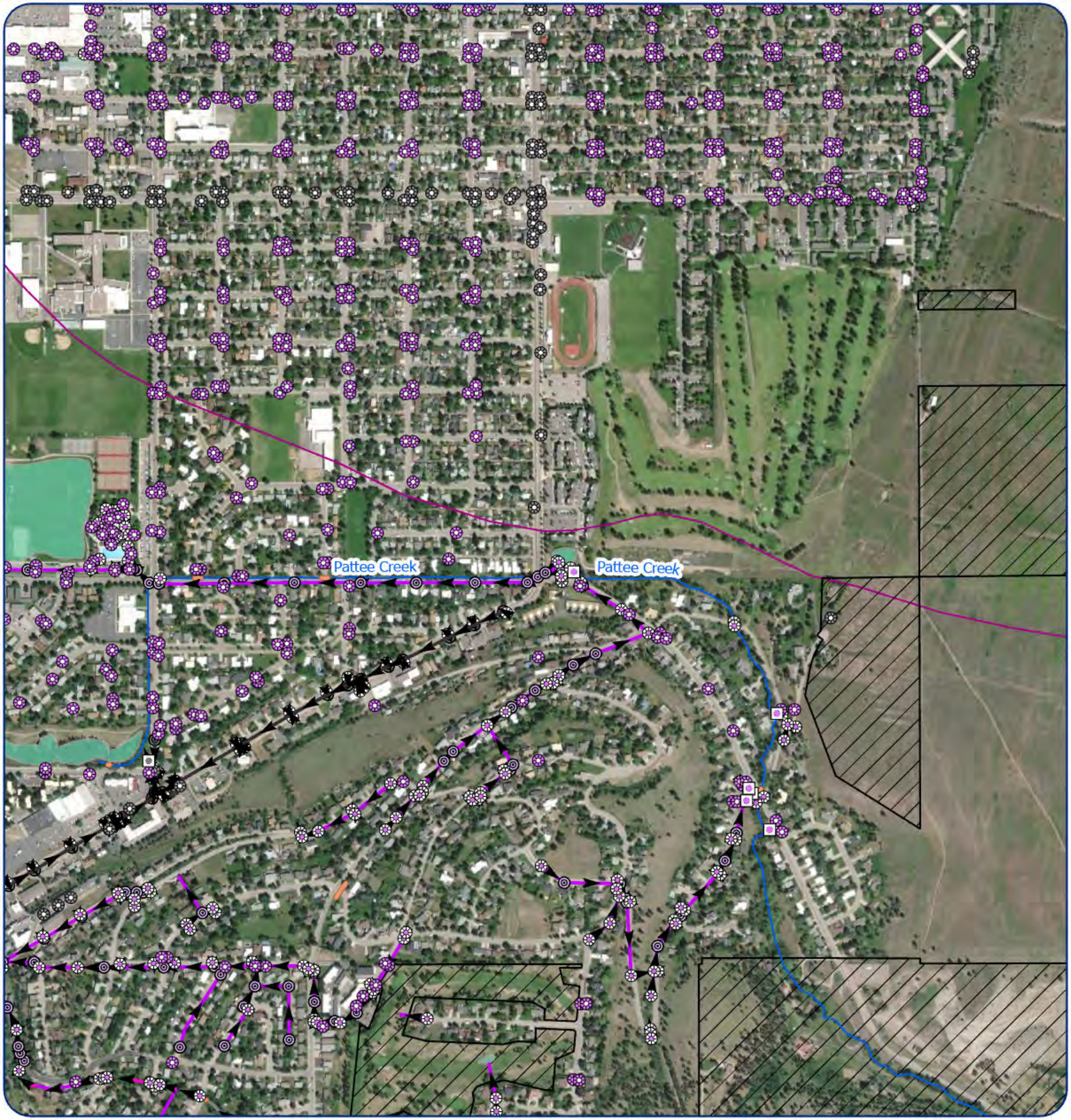

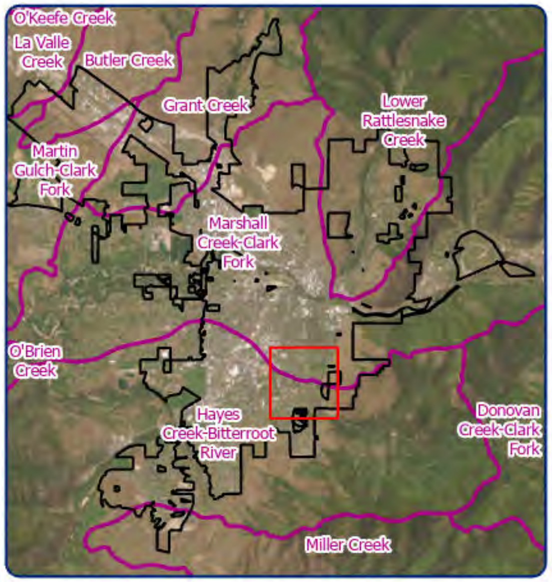

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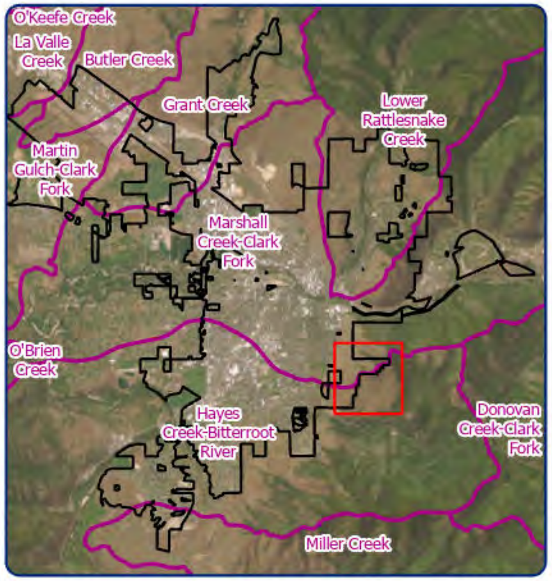

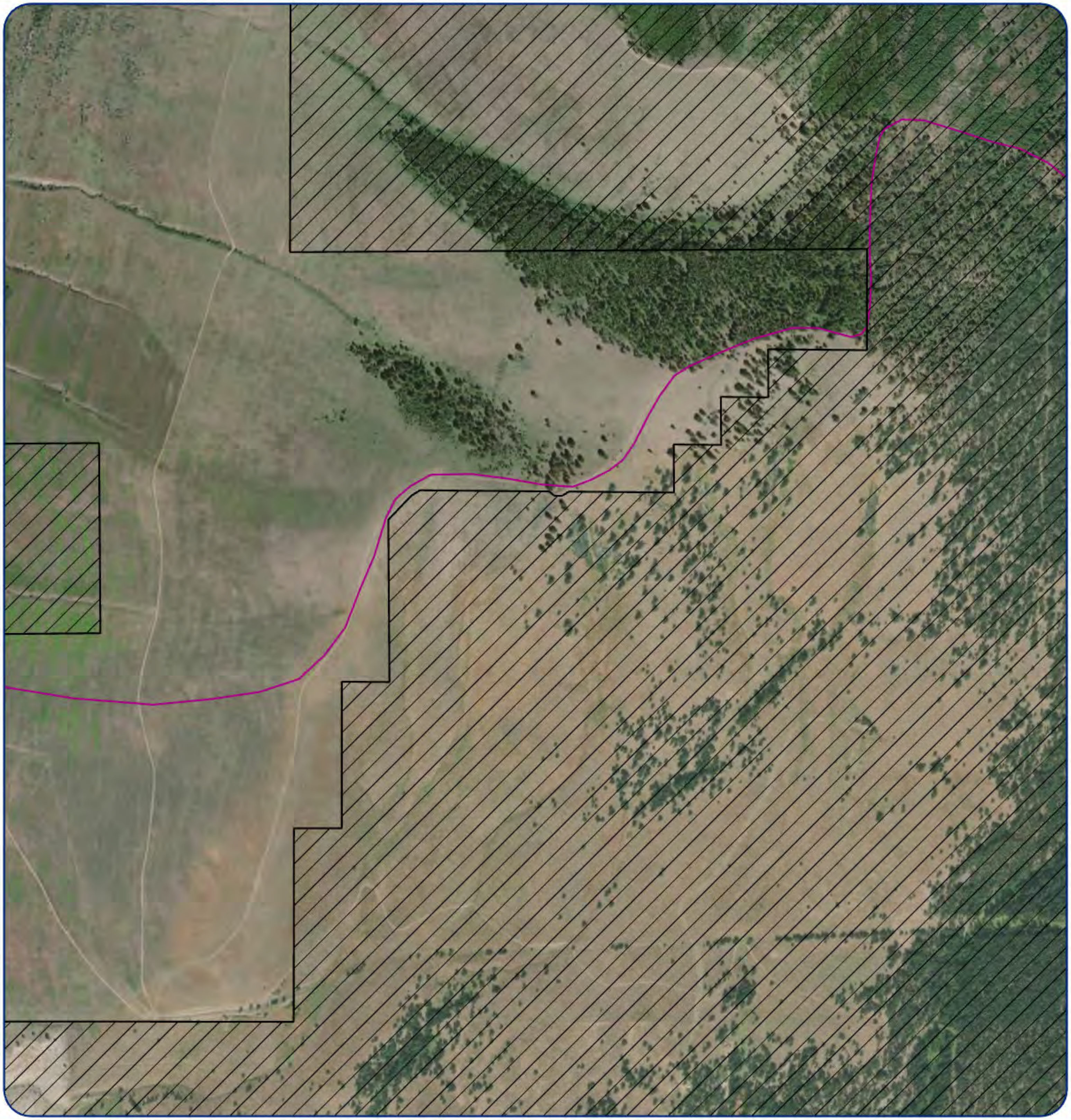

Sources: City of Missoula GIS, National Hydrography Dataset
Cartographer: Carver Butterfield - Date: 1/5/2023

STORM WATER

City of Missoula

0 1000 2000 Feet

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Infrastructure Map

City Infrastructure:
- Basin
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- Gravity Main
- Infiltration Chamber
- Inlet
- Mainhole
- Open Channel
- Outfall
- Treatment Structure

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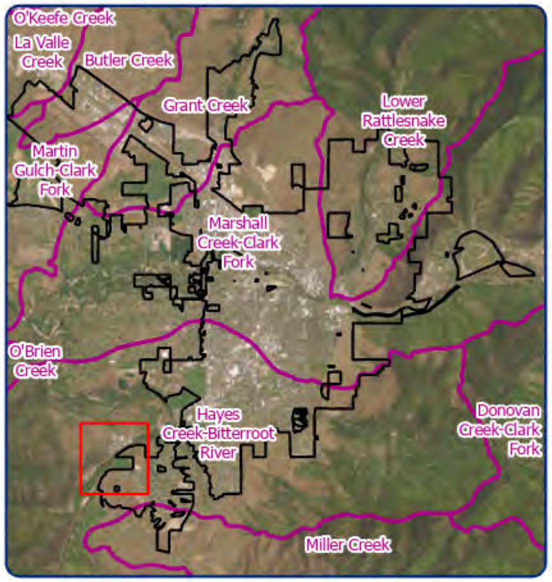
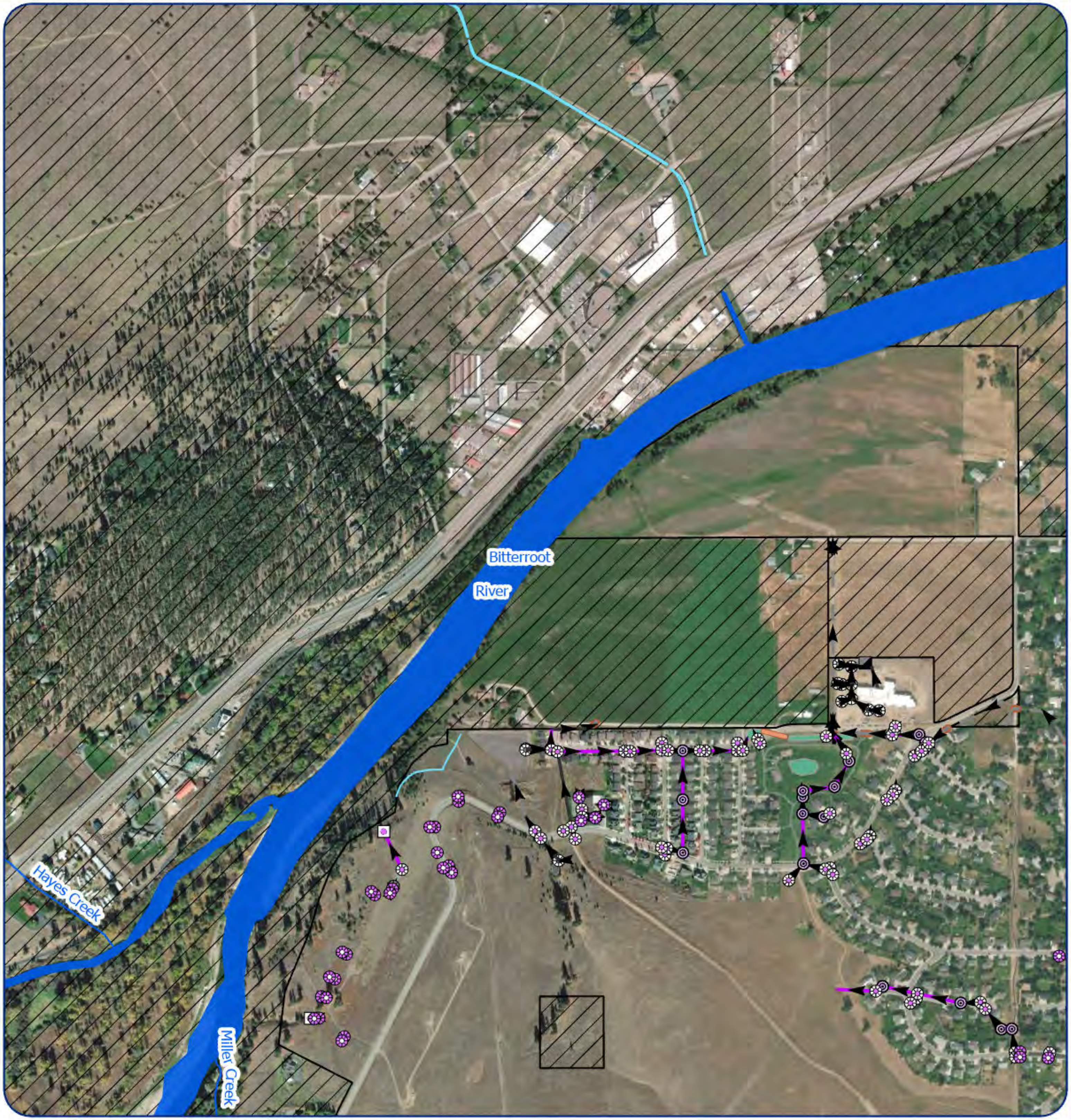
Reference Layers:
- City Limits
- HUC 12 Boundary
- Irrigation Ditches
- Non-City Land
- Rivers and Streams





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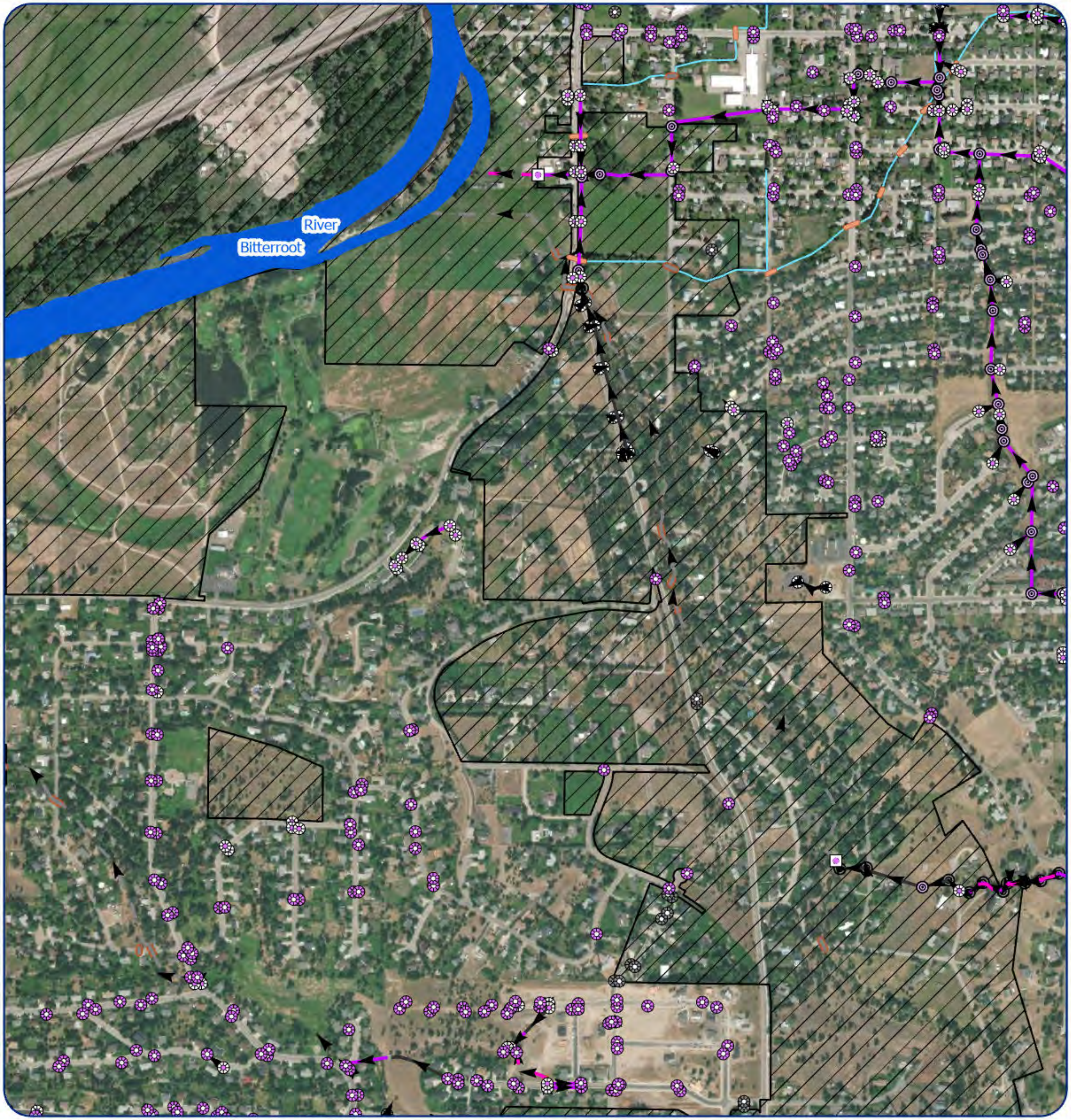

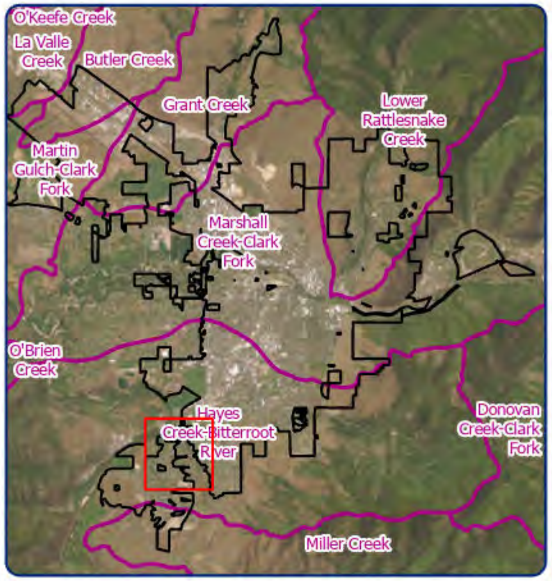

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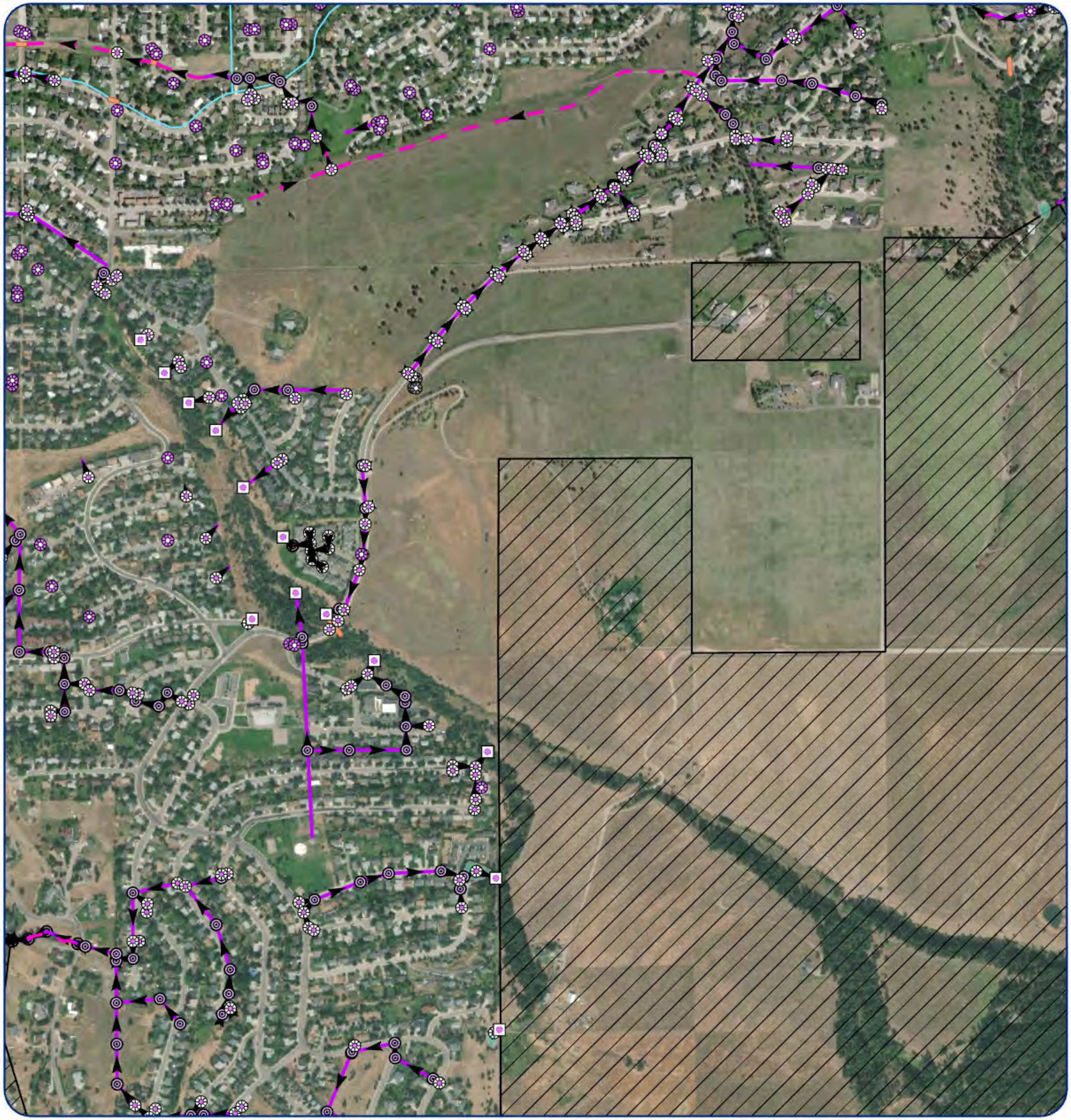

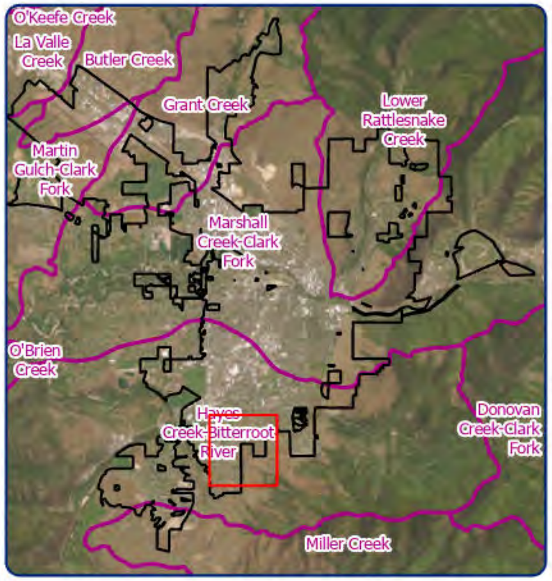

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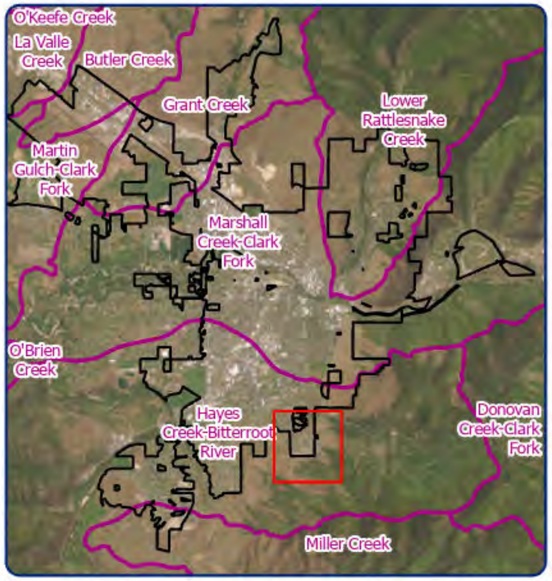

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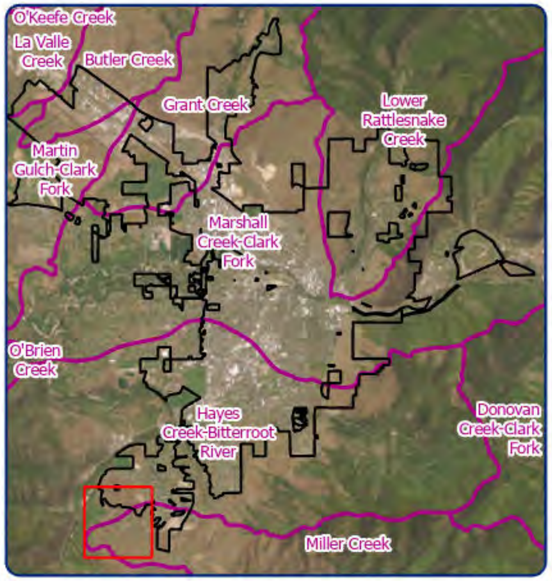

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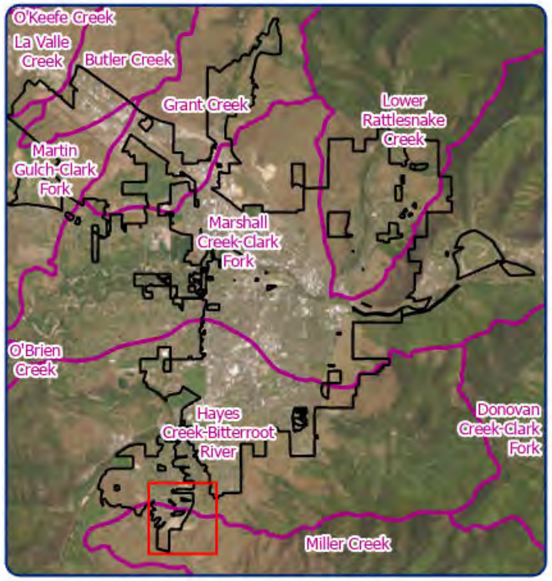

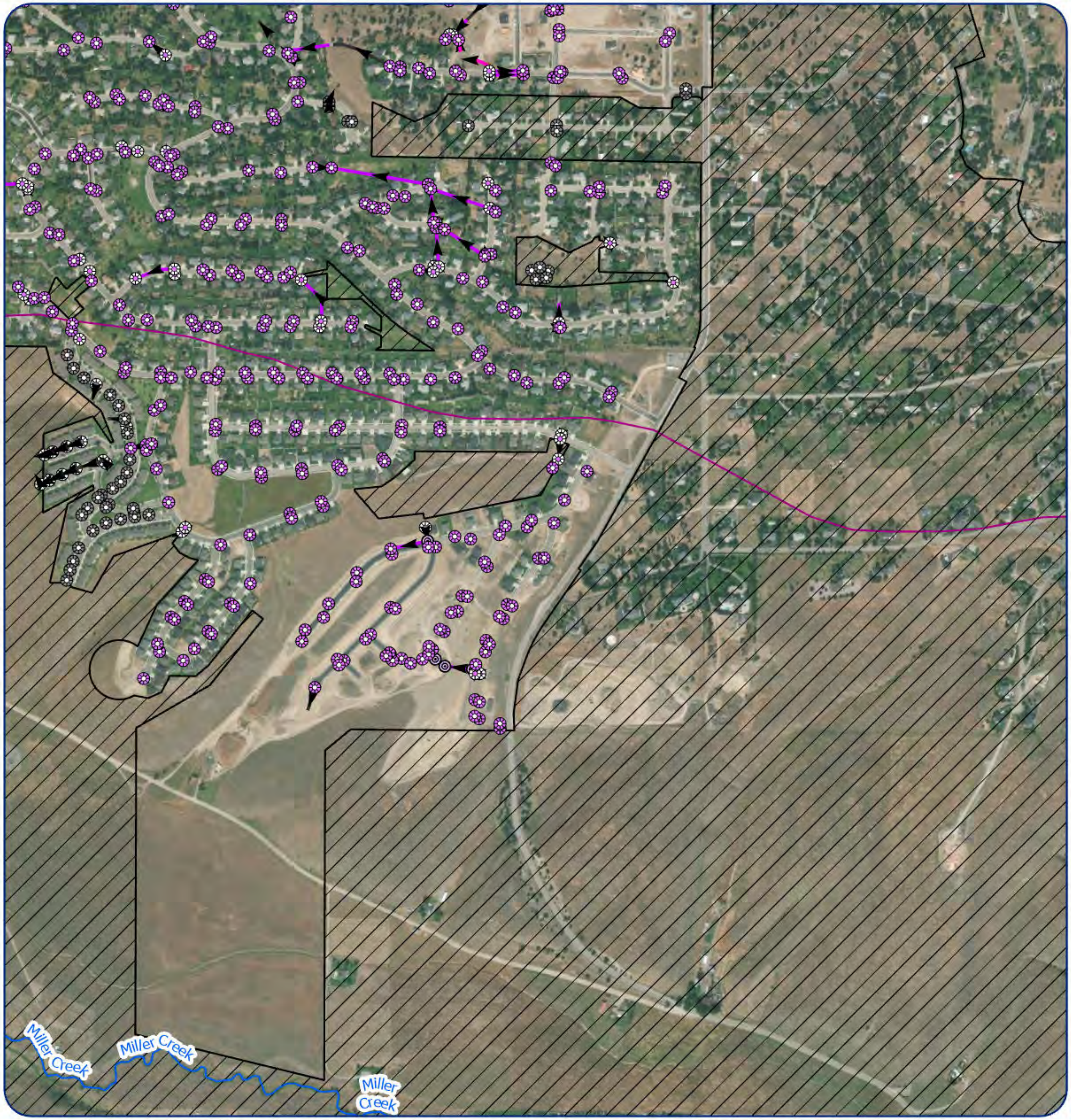

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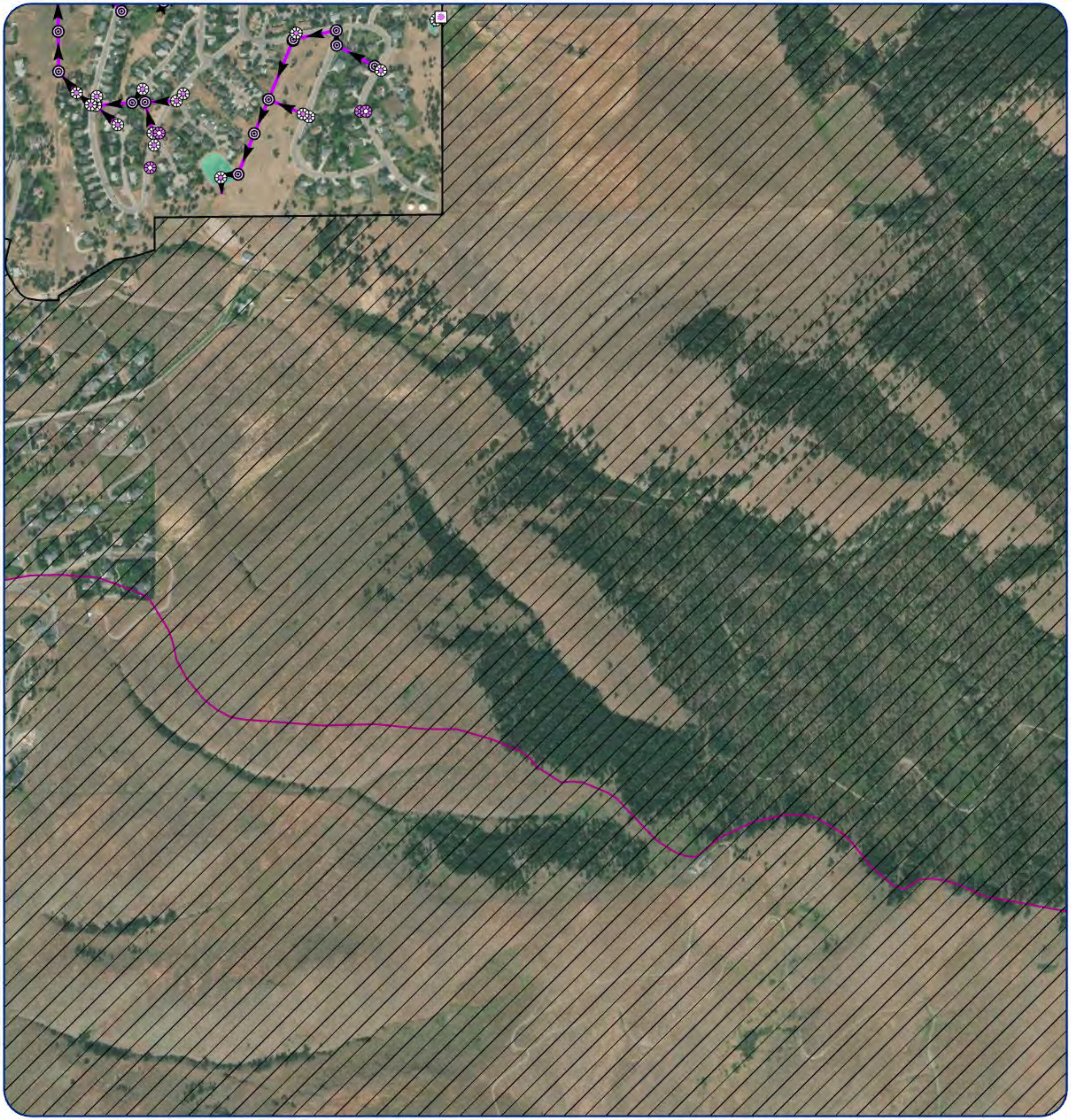

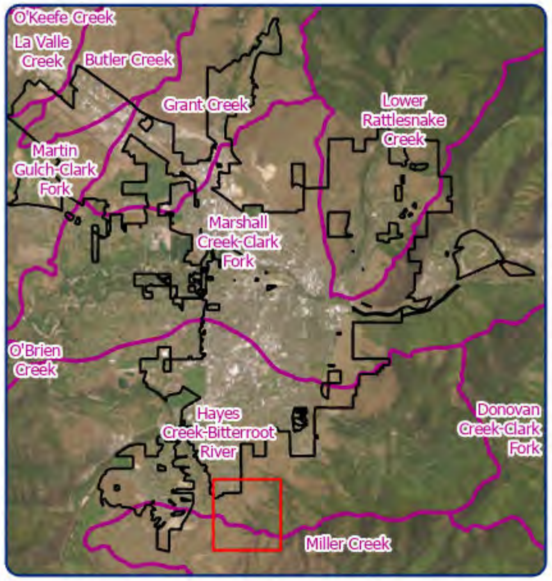

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Appendix B
Missoula Valley Water Quality District Documents

Title 13.26

MISSOULA VALLEY WATER QUALITY ORDINANCE

Sections:

13.26.010 Short title--Applicability--Authority. This code shall be known as the "Missoula Valley Water Quality Code." It is intended to protect the public health, safety and general welfare of those who depend on the Missoula Valley Aquifer and surface waters in the Missoula Valley for drinking water, recreation and other beneficial uses. This health-related code is adopted by the Missoula City Council for enforcement inside the city limits. If both the County Commissioners and the local health board approve enforcement of this chapter extraterritorially within five (5) miles of the city limits, this chapter is thereafter enforceable outside the city limits within five (5) miles of the city limits that are within the boundary of the Missoula Valley Water Quality District, a local water quality protection district authorized by §7-13-4504 MCA . This code establishes prohibitions and restrictions to prevent surface water and groundwater contamination, and to protect public health, safety and welfare. This code shall be broadly construed to affect its purposes. Nothing in this code shall relieve a person from the requirements of any other federal, state, or local law. If there is a discrepancy between this code and a local, state or federal statue or regulation, the more stringent shall govern (Ord. 3699, 2022; Ord. 3154, 2000; Ord. 2906 (part), 1994) .

13.26.011 Administrative Rules Authorized. The Department is authorized to develop Best Management Practices that implement, interpret, or prescribe city law or policy or describes city practice or procedure with respect to the subject matter found in Chapter 13.26 of the Missoula Municipal Code. Best Management Practices developed pursuant to this section must be adopted by the Mayor pursuant

to section 2.03.020, Missoula Municipal Code to be enforceable within the city limits.. If both the Board of County Commissioners and the local health board approve the BMP manual, this manual is thereafter enforceable outside the city limits within five (5) miles of the city limits that are within the boundary of the Missoula Valley Water Quality District. (Ord. 3699, 2022)

13.26.020 Purpose. In order to protect the Missoula valley's sole source of drinking water and surface waters and to secure and promote the general public health, safety and welfare, the Missoula City Council declares that:

A. The improper storage, handling, use, transport, production or disposal of certain substances in the Missoula Valley is potentially harmful to the quality of water in the Missoula Valley

B. Affirmative measures to prevent water pollution are the most effective means available to protect water quality.

C. Local authority is needed to require pollution prevention measures at facilities which handle significant quantities of certain substances, and to prohibit and deter activities which pose threats to the quality of the Missoula Valley Aquifer.

D. The construction, development and use of new public water supply system wells in proximity to existing sources of contamination is potentially harmful to the quality of drinking water obtained from such wells. The location of identified contaminant sources which pose serious threats of contamination will also be prohibited in proximity to public drinking water wells, in order to minimize the risk of contamination. (Ord. 3699, 2022; Ord. 3492, 2013; Ord. 3154, 2000; Ord. 2906 (part), 1994).

13.26.030 Definitions. For purposes of this code and associated Best Management Practices, the following terms have the following meanings unless the context clearly indicates otherwise:

Aboveground Storage Tank (AST) - A tank that is used to contain an accumulation of a Regulated Substance, and the volume of which is more than 90% above the surface of the ground.

Allowable Non-Stormwater Discharge - Any one of the water-generating activities listed in Missoula Municipal Code 13.27.200 (B).

Anti-Icing: The application of a deicer before or during a storm event for the purpose of preventing ice and snow accumulation on the roadway.

Aquifer - A water-bearing, subsurface formation capable of yielding sufficient quantities of water for beneficial use.

Aquifer Protection Area - The areas within the City of Missoula and within five miles outside the Missoula city limits which are within the boundaries of the Missoula Valley Water Quality District.

Best Management Practices (BMPs) - Control measures taken to mitigate potential contamination of soil, groundwater and surface water and described in detail in the Department's Best Management Practices for Pollution Prevention Manual. For businesses or activities for which local BMPs do not yet exist, national, regional, or appliable industry standard BMPs apply.

Board - The Missoula Valley Water Quality District Board.

Bulk Petroleum Storage - A facility used for storage of petroleum products for marketing or wholesale distribution that has a total bulk storage capacity of 50,000 gallons or more.

Carbon Absorption/Evaporation Technology: A treatment technology which removes chlorinated solvents from a water-solvent mixture .

Chemical Manufacturing Facility - A facility having a North American Industry Classification Code (NAICS Code) between 325180 and 325998 which handles Regulated Substances in an amount equal to or greater than threshold quantities.
Chlorinated Solvent - An organic solvent containing chlorine atoms within its molecular structure. Class II Landfill - An area of land or an excavation, as defined in Montana Administrative Rules A.R.M.
17.50.504 , where group II or group III wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile. Group II and III wastes are defined in Montana Administrative Rules , A.R.M. 17.50.503.

Class III Landfill - An area of land or an excavation, as defined in Montana Administrative Rules A.R.M. 17.50.504, where group III wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile. Group III wastes are defined in Montana Administrative Rules , A.R.M. 17.50.503.

Closure Permit - A permit issued by the Department in accordance with section 13.26.060 of this code when a facility is permanently closed or has been abandoned for one year.

Community Water System - Any public water supply system, as defined in A.R.M. 17.36.101, which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year round residents.

Component - Any constituent part of a unit or any group of constituent parts of a unit which are assembled to perform a specific function.

Containment Vault - A sealed tank that is limited to accepting and containing accidental spills. A tank that receives wastewater from a fixture is not a containment vault.

Contamination - The presence of any substance (chemical, radiological, or biological) or any condition (temperature, pH, taste, color, odor, turbidity) in soil or water which may create or threaten to create a hazard to human health or the environment, or impair the usefulness of the soil or water.

Deicer - A chemical substance used to melt ice or snow deposited on roads or other surfaces. Department - The Missoula City-County Health Department District - The Missoula Valley Water Quality District

Dry Cleaning Establishment - Any facility that uses a transfer machine, dry-to-dry vented unit, or dry-to dry closed loop unit that uses chlorinated solvents to clean textiles.

Dry Well - a USEPA-designated Class V stormwater injection well: a bored, drilled, or driven shaft or dug hole whose depth is greater than the opening width at the widest point, for the subsurface infiltration of stormwater.

Dry-to-Dry machine: A machine that washes and dries textiles without transferring them. EPA - United States Environmental Protection Agency.
Facility -An area that includes the real property, building or buildings, and appurtenant structures, or any subset of the proceeding elements, used by a person.

Fleet - More than 5 vehicles or locomotives.

Fueling Facility - A facility that dispenses petroleum products for commercial sale, public use, or for fleet vehicle operation, excluding bulk petroleum storage facilities and farm and residential tanks of 1100 gallons or less capacity used for storing motor fuel fo3r non-commercial purposes.

Fueling Pad - A concrete pad on which vehicles are refueled. Future Wellhead Reservation Area - The surface area overlying a portion of the Missoula Valley Aquifer which, because of aquifer recharge, groundwater flow and potential sources of contamination, should be protected against contamination to assure high quality groundwater for future drinking water source development. This area includes all land within township 13N, range 19W, sections 27 and 34, all land south of the Clark Fork River within township 13N, range 19W, section 22, and all land within the northwest and northeast quarter sections of township 13N, range 19W, section 34 of Montana Meridian, Missoula County, Missoula, Montana.

Groundwater - Water that fills the interconnected spaces of material below the water table (upper limit of saturation), or water which is held in the unsaturated zone by capillary action.

Handle - To use, generate, process, produce, package, treat, store, emit, discharge or dispose of a Regulated Substance, excluding (a) handling during continuous non-stop transit, (b) transit via pipeline, and (c) handling of parcels and packages by the United States Postal Service, motor freight companies, and private delivery services.

Hazardous Waste - A hazardous waste as defined pursuant to section 1004(5) of the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6903(5), as amended, including a substance listed or identified in 40 CFR 261.

Hazardous Waste Management Facility -All contiguous land, and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of a hazardous waste, as defined in
A.R.M 17.31.301 as a Major Hazardous Waste Management Facility. A Hazardous Waste Management Facility may consist of several treatment, storage, or disposal operational units.

Independent Certified Laboratory: A laboratory outside the control of the person requesting approval from the Department that is certified by the EPA or other appropriate certifying agency to complete testing.

Industrial or Commercial Injection Well -A well or septic system that receives industrial or commercial wastes from a public or private facility, excluding wells or septic systems used solely for stormwater discharge, sanitary waste discharge and/or discharge or extraction of non-contact heating and cooling system water.

Large Capacity Petroleum Storage Tanks - A tank greater than 50 feet tall or having diameter greater than 30 feet used for storage of petroleum products.

Missoula Valley Aquifer - The aquifer underlying the Missoula Valley which supplies the area with water. New - Constructed, installed or brought into operation after after September 7, 1994.
Noncomplying Activity - An activity involving the handling of a Regulated Substance in an amount equal to or greater than its threshold quantity within a Future Wellhead Reservation Area.

Non-transient Non-community water system -Any public water supply system as defined in A.R.M.
17.38.202 that is not a community water system and that regularly serves at least 25 of the same persons over six months per year.

Perchloroethylene (C_2CL_4) - A colorless liquid used as a dry-cleaning fluid; general degreaser of metals; solvent for waxes, fats, oils, and gums; constituent of printing inks and paint removers. Synonyms include: Tetrachloroethylene, Tetrachloroethene, PCE, PERC.

Person - Any person, individual, public or private corporation, firm, association, joint venture, partnership, municipality, governmental agency, political subdivision, public officer or any other entity whatsoever or any combination of such, jointly or severally.

Piping Manifold - The area(s) of a piping system fitted with apertures for making multiple connections.

Pollution Prevention Permit - A permit required of a person who owns, operates or controls a facility that handles any Regulated Substance in an amount equal to or greater than four times its threshold quantity. Pollution Prevention Permits are issued by the District in accordance with section 13.26.050 of this code.

Primary Container - A container which comes into immediate contact with a Regulated Substance.

Public Sewage Disposal System -A system, as defined in §75-6-102 MCA, for collection, transportation, treatment or disposal of sewage that is designed to serve or serves 15 or more families or 25 or more persons daily for a period of at least 60 days out of the calendar year.

Public Water Supply System - A system, as defined in §75-6-102 MCA, for the provision of water for human consumption from any community well, water hauler for cisterns, water bottling plant, water dispenser, or other water supply that is designed to serve or serves 15 or more families or 25 or more persons daily or has at least 10 service connections at least 60 days out of the calendar year.

Refrigerator Condenser: A vapor recovery system into which a chlorinated solvent vapor stream is routed and condensed to segregate the chlorinated solvent.

Regulated Substance - Any liquid substance, semi-liquid substance, or soluble solid on the most current Superfund Amendments and Reauthorization Act (SARA), Title III List of Lists published by the Office of Pollution Prevention and Toxic Substances, U.S. Environmental Protection Agency, Washington D.C., any petroleum product, any hazardous waste, or any other substance identified in this code..

Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of a Regulated Substance into the soil, groundwater or surface water (including the past release of a regulated substance), but excluding:

1. Releases contained in a secondary containment area or the indoor workplace, provided the release does not exit the indoor workplace.
2. The use of pesticides as defined in §80-8-102(30) MCA when they are applied in accordance with approved federal and state labels, and any discharge permitted by a local, state, or federal agency.

Replacement - replacement or replace shall mean:

1. Replacing , repairing, upgrading or improving a facility at a cost which equals or exceeds 50% of the value of the facility at the time of such act.
2. Replacing a component or more than 50% of a component of a facility.
3. Reoccupation of a facility, reuse of a component at a facility, or restarting an activity which has been out of service or not practiced for a period of one year.

Secondary Containment - Containment to and external from the primary container adequate to prevent the release of Regulated Substances to native soil, surface water, or groundwater.

Soluble Solid - A solid that exists in a powder form and has a particle size less than 100 microns, is handled in solution or molten form, or meets the criteria for a National Fire Protection Association (NFPA) rating of 2, 3, or 4 for reactivity.

Stormwater - as defined in 13.27.030

Tank - Stationary device designed to contain an accumulation of substances and constructed of non earthen materials (e.g. concrete, steel, plastic) that provide structural support.

Tank Fueling Area - The area surrounding underground storage tanks subject to releases of petroleum products during tank fueling, including the area surrounding the tanker truck during fueling.

Threshold Quantity - Quantities of Regulated Substances (excluding products in vehicle fuel tanks, aerosol spray cans, products used for research at educational institution laboratories, and substances sold for retail in a container equal to or less than 5 gallons capacity) handled at a facility at any one time, regardless of location, number of containers, or method of storage.

1. For those Regulated Substances specifically listed in the Superfund Amendments and Reauthorization Act (SARA) Title III List of Lists and for those Regulated Substances which are listed hazardous waste defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be the reportable quantity published in the Comprehensive Environmental Response , Compensation and Liability Act (CERCLA}, 40 CFR 302, Table 302.4 or the Superfund Amendments and Reauthorization Act (SARA) Section 355, Appendix A.

2. For those Regulated Substances that are characteristic hazardous wastes defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be based on the substance contained in the waste with the lowest threshold quantity.

3. For those Regulated Substances not listed in the Superfund Amendments and Reauthorization Act Title III List of Lists, and for those Regulated Substances that are not a hazardous waste, the following quantities of qualifying substances at a facility at any one time shall constitute a Threshold Quantity:

    a. Gasoline - 250 pounds or 25 gallons
    b. Diesel/Jet Fuel/Kerosene - 500 pounds or 50 gallons
    c. Used Motor Oil/Hydraulic Oil/Transmission Fluid - 1000 pounds or 100 gallons.
    d. Unused Motor Oil/Hydraulic Oil/Transmission Fluid - 2,000 pounds or 200 gallons
    e. Deicer - 1000 gallons or 10,000 pounds (New)

4. For those substances that are mixtures of one or more regulated substance, the threshold quantity shall be based on the amount of the substance contained in the mixture with the lowest threshold quantity. If the proportions of regulated substances in the mixture are unable to be determined, the threshold quantity of the component in the mixture with the lowest threshold quantity will apply to the entire quantity (volume or weight) of the mixture.

Transfer Dry Cleaning Machine: A machine unable to both wash and dry garments, which emits chlorinated solvent to the atmosphere during transfer.

Underground Storage Tank (UST) -Any one or combination of tanks as defined in MCA 75-11-503.

Used Oil - Oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.

Vegetated Swale - A vegetative-lined infiltration cell designed and constructed to collect and treat contaminants in stormwater runoff.

Vehicle Fueling Area - The area surrounding a fuel island or dispenser(s) subject to releases of petroleum products during vehicle fueling, including a 3-foot release collection buffer zone extending beyond the lanes of traffic next to the fuel islands or dispenser(s).

Well - A structure, pit or hole sunk into the earth to reach a resource supply such as water.

Wellhead - The physical structure or device at the land surface surrounding a well, from or through which groundwater flows or is pumped from an aquifer.

(Ord. 3699, 2022) Ord. 3492, 2013; Ord. 3154, 2000; Ord. 2906 (part), 1994)

13.26.032 Prohibited Activities
It is unlawful for any person to:

A. Cause contamination or to place, cause to be placed, or allow to remain in place any substance in a location where it is likely to cause contamination of soil, groundwater or surface water;

B. Distribute, sell, offer, or expose for sale products within the Aquifer Protection Area containing Perchloroethylene in any quantity. Those products containing Perchloroethylene used at dry cleaning establishments are exempt from this provision, provided the person who owns, operates, or controls such Facility obtains a Pollution Prevention Permit from the Department and complies with provisions of 13.26.050 and applicable BMPs

C. Discharge anything that does not meet the definition of stormwater or an Allowable Non Stormwater Discharge to a municipal separate storm sewer system.

D. Discharge stormwater from Tank Fueling Areas directly to storm drains (dry sumps or inlets piped to outfalls)

E. Discharge stormwater from Vehicle Fueling Areas to storm drains (dry sumps or inlets piped to outfalls).

F. Construct or operate an Industrial or Commercial Injection Well.

G. Construct or operate a new or Replacement Facility which handles a Regulated Substance in a quantity equal to or greater than its Threshold Quantity within the Future Wellhead Reservation Area.

H. Install a new private drinking water supply well if the primary structure is within 200 feet of a water main which is part of an existing Public Water Supply System regulated by the Montana Public Service Commission, or which is owned or operated by the City of Missoula, Missoula County, or any consolidated city and county water or sewer district as defined in Title 7, chapter 13, parts 22 and 23, and the property abuts the right-of-way in which the main is located, unless the owner of the existing Public Water Supply System denies connection. After January 1, 2023, connect any structure to a well if the structure is within 200 feet of an existing Public Water Supply System.

I. Construct or operate a new:

1. Hazardous Waste Management Facility, Class II Landfill, Large Capacity Petroleum Storage Tank, Chemical Manufacturing Facility, fuel pipeline, Fueling Facility not meeting design standard BMPs, or a Regulated Substance tank not meeting the requirements of section 13.26.036 of the Missoula Municipal Code (Awithin 1000 feet of a Community or Non-Transient Non-Community Water Supply System.

2. Class III Landfill, railroad track, or the discharge point of a Public Sewage Disposal System within 250 feet of a Community or Non-Transient Non-Community Water Supply System.

I. Violate any provision set forth in a permit issued pursuant to this chapter; violate any order issued pursuant to this chapter; or violate any provision of this chapter. (Ord. 3699, 2022)

13.26.034 Regulated Substances and Pollutions Prevention – General Requirements

A. A Person who owns or operates the following businesses, performs the following activities, or owns the property where the business or activities take place, including but not limited to:

- Auto Maintenance
- Bulk Petroleum Storage
- Carpet Cleaning
- Chlorinated Water Discharge
- Dry-Cleaning
- Fueling Facilities
- Livestock Housing
- Pressure Washing
- Restaurants and Food service
- Road Maintenance
- Vehicle washing
- Well development

must comply with minimum required Best Management Practices. Implementation of alternative BMPs that achieve the intent of minimum BMPs may be approved by the Department

B. A person who owns, operates or controls a Facility at which a Regulated Substance equal to or greater than the Threshold Quantity is handled must comply with the minimum required Best Management Practices and all provisions of this chapter. Implementation of alternative BMPs that achieve the intent of minimum BMPs may be approved by the Department.

C. A person who owns, operates or controls a Facility at which a Regulated Substance equal to or greater than the Threshold Quantity is handled shall clearly label the primary container with the name of the Regulated Substance and provide secondary containment for that substance. The minimum BMPs for secondary containment must be met. This rule does not apply to petroleum products in Underground Storage Tanks, vehicle fuel tanks, Large Capacity Petroleum Storage Tanks, and Regulated Substances sold for retail in a container equal to or less than 5 gallons capacity.

D. A person who owns, operates, or controls a New Facility at which a Regulated Substance equal to or greater than the Threshold Quantity is Handled must obtain Department approval of their plan for secondary containment prior to obtaining a building permit, business license or firsthandling a Regulated Substance in an amount equal to or greater than its Threshold Quantity, whichever occurs first. This rule does not apply to petroleum products in Underground Storage Tanks, vehicle fuel tanks, and Regulated Substances for retail sale in a container equal to or less than 5 gallons capacity.

E. A person who owns, operates or controls a Facility at which any Regulated Substance is Handled in an amount equal to or greater than four times its Threshold Quantity must have a current Pollution Prevention Permit from the Department and meet requirements of 13.26.050.

F. Facilities in existence as of the original date of this code (Ord. 2906, 1994) that handle Regulated Substances in an amount equal to or greater than four times its Threshold Quantity within the Future Wellhead Reservation Area may continue to operate, subject to all the conditions of section 13.26.50 and the following:

1. Any Noncomplying Activity that is discontinued, abandoned or ceases for a period of twelve consecutive months may not be resumed.

2. A Noncomplying Activity may not be enlarged, expanded, or altered so as to substantially increase the risk of soil or groundwater contamination. Any enlargement , expansion or increase in a Noncomplying Activity must be approved by the Department, in writing, prior to activity commencement. (Moved from Pollution Prevention Section) (Ord. 3699, 2022)

13.26.036 Fueling Facilities

A. Any New or Replacement Underground Storage Tank system at a Fueling Facility must be approved by the Department of Environmental Quality, if applicable, prior to obtaining a building permit.Existing facilities have until December 30, 2024 to meet BMPs or receive approval for alternative BMPs. (Ord. 3699, 2022)

13.26.038- Deicer Specifications for Public Roadways

A. Before any deicer is applied on streets and highways within the City of Missoula and all places within five miles outside the city limits, the product must be:

1. Approved by the Department, and;
2. Analytically tested to demonstrate that its quality meets the limits shown in Table 1. Analytical testing must be performed by the manufacturer or distributor at an independent certified laboratory using test methods approved by the Department.
3. All deicers may be subject to inspection and analysis as delivered.

Table 1: Constituent Limit for deicers

Parameter	Limit (mg/kg) [1]
Arsenic	.LQ
Barium	100
Cadmium	0.20
Chromium	0.50
Copper	0.20
Lead	.LQ
Mercury	0.005
Selenium	5.0
Zinc	10.0
Total Cyanide	0.20
Total Phosphorus	2,000
Total Nitrogen	1,000 / 500 [2]
PH	6.0- 9.0
Pesticides/herbicides	Based on DEQ-7 Standard [3]

Liquid products shall be analyzed in the concentration they are applied to the street and directly compared to Table 1. Solid products shall be liquefied at specifications approved by the Department prior to analysis. In general products will be analyzed in accordance with product category test protocols developed by the Pacific Northwest Snowfighter's Association (PNS) before being compared to Table 1. In most cases, the limit is based on the Montana drinking water quality or acute aquatic life standard (DEQ- 7 standards), whichever is lower. The limits for nitrogen and phosphorus are set lower. A 100 to 1 dilution factor is applied for most parameters. This factor accounts for the dilution and attenuation of deicer from the truck to the side of the road. It was determined by comparing the chloride concentration of deicers to the chloride concentration of stormwater samples collected during runoff.

2 The allowable amount of total nitrogen for a deicer is dependent on the form of nitrogen present in the deicer. Supplier must test for TKN, Nitrate+ Nitrite as N, and Ammonia Nitrogen using methods approved by the Department. Organic nitrogen shall equal the amount of Total Kjeldahl Nitrogen (TKN) minus Ammonia Nitrogen. If 50% or more of the nitrogen present in the deicer is of the organic form, a limit of 1,000 mg/kg shall apply. If less than 50% of the nitrogen is of the organic form, a limit of 500 mg/kg shall apply.

3 For a product that contains an agricultural by-product, the supplier shall test for any pesticide/herbicide possibly in the deicer using test methods approved by the Department. The limit will be based on DEQ-7 standard using a 100 to 1 dilution.

B. DEPARTMENT APPROVAL PROCESS

1. Persons seeking Department approval for applying a deicer on streets and highways within the City of Missoula and all places within five miles outside the city limits must submit a complete application to the Department on forms supplied by the Department. The complete application must include:

a. (REMOVED. Covered by remainder of requirements)Documentation of Pacific Northwest Snowfighter's Association (PNS) product approval;

b. Independent certified laboratory analytical results of testing required in section (A) (2); 10

c. Safety Data Sheet for the product;

d. Proprietary chemical and physical information on the product, which shall be held confidential;

e. Two one-liter samples of the product for Department quality control testing purposes; and

f. Other relevant information that the Department may require which is obtainable by the applicant.

2. The Department shall notify the applicant within 30 days of receipt of a complete application whether the product is approved or denied.

3. Following approval, any changes to deicer constituent limits or product formulations must be reviewed and approved prior to use.) (Ord. 3699, 2022)

13.26.040 Repealed (Ord. 3699, 2022; Ord. 3392, 2008; Ord. 3177, 2001; Ord. 3154, 2000; Ord. 2906 (part), 1994).

13.26.050 Pollution Prevention Permit Requirements

A. A person who owns, operates, or controls a New or Replacement facility which will Handle a Regulated Substance in an amount equal to or greater than four times its Threshold Quantity shall obtain a Pollution Prevention Permit prior to obtaining a building permit, business license, constructing the Facility, or commencing operation. The Department may order revisions in the permit application submitted by the regulated Facility to be completed within 30 days of receipt of an administrative order issued pursuant to 13.26.120 of this chapter.

B. In order to obtain or modify a Pollution Prevention Permit, an application, accompanied by a Pollution Prevention Plan, must be submitted to the Department for approval. The Department shall supply a form that can be used for the plan. The Pollution Prevention Plan must contain the following:

1. A chemical inventory that includes the identity, state (i.e. solid, liquid, or gas), quantity, toxicity, storage location (submit building and site plans), and type of storage container for each Regulated Substance Handled in an amount equal to or greater Threshold Quantity at the Facility.

2. How Regulated Substances listed in (1) are:
   a. transported and used (including physical and/or operational procedures in place to meet secondary containment requirements of this chapter); and,
   b. treated, recycled, or disposed

3. A discussion of the risks to water quality posed by the Regulated Substances at the Facility including but not limited to:
   a. The direction of surface drainage, distance to surface water, and estimated depths to groundwater;
   b. Potential consequences of any release, including potential conduits to groundwater and surface water such as storm sewers, swales, sumps, irrigation ditches, etc.

4. Specific steps that mitigate risks in (3) including but not limited to:
   a. Personnel training;
   b. Engineering controls (including secondary containment, leak detection, etc.);
   c. Preventative maintenance and inspections;
   d.
   e. Procedures to prevent a release of a Regulated Substance during onsite transport, transfer, use, storage, or disposal;
   f. Employee and position responsible for oversight of spill prevention mechanisms;
   g. Implementation of the applicable minimum BMPs for the business type or component;
      1. Evaluation of pollution prevention strategies including:
      2. Regulated Substance volume reduction;
      3. Process alterations;
      4. Product substitution; and,
      5. Waste reuse, recycling, or treatment
5. An Emergency Response Plan containing:
   a. Identification and emergency contact information for personnel responsible for responding to an accidental release;
   b. The skill and knowledge of the person or position responsible for actions in the event of a release;
   c. Steps taken in response to a small or large release;
   d. Spill reporting protocols consistent with requirements of this local code, state, and federal laws based on the size of the release;
   e. Protocols for maintaining sufficient absorbent materials and other emergency equipment available onsite to respond to small or large releases of a Regulated Substances;
   f. Written procedures describing how such equipment will be inspected and maintained;
   g. Any other procedures to control and remediate a release of any Regulated Substance.

C. If a Facility is required by State or Federal law (e.g. SPCC) to prepare a pollution prevention or release prevention plan, a copy of such plan, supplemented with such other information as required by this Section, shall suffice to meet the Pollution Prevention Plan requirement of this section.

D. For Facilities with Large Capacity Petroleum Storage Tanks, the Pollution Prevention Plan must be updated every five years and address the implementation of the following alternative technologies and measures:
1. installation of impermeable barriers or liners to prevent the vertical migration of released fuel to the Aquifer;
2. grading of the secondary containment area to common drainage channels or sumps equipped with dedicated pumps that can be activated to pump fuel from the containment area in the event of a large release;
3. installation of vapor monitoring devices at Piping Manifolds and valves to alert personnel of a release;
4. excavation of contaminated soils immediately after a release occurs.
5. The plan must be approved by the Department, and all physical or procedural changes required as a condition of the Department's approval of the plan, shall be completed or instituted within two years of the Department's approval;

E. Permitted facilities must follow the approved Pollution Prevention Plan

F. The Department shall issue a Pollution Prevention Permit within 30 days of determining that the applicant has submitted a complete permit application and the pollution prevention plan complies with the requirements of this code. The Department may include permit conditions necessary to prevent releases to surface water, groundwater and soil in accordance with13.26.032, 13.26.034, 13.26.036, 13.26.038 and applicable BMPs in the Best Management Practices manual.

G. Changes to a Facility's floorplan; wastewater system; stormwater management; regulated substance inventory ; quantity ; storage; use or disposal practices; emergency response plan; preventative maintenance practices; and training, must be pre-approved by the Department. Failure to obtain pre-approval is a violation of this chapter. Extensive changes require a modification request and application fee.

H. The applicant must pay an application fee in an amount determined by the Board prior to review and approval of a New or modified Pollution Prevention Permit application.

I. Department may require a Facility inspection to ensure compliance with the requirements of this chapter before a permit is issued.

J. The Pollution Prevention Permit shall be valid for two years . The applicant must apply for permit renewal at least 60 days prior to permit expiration.

K. A person who owns, operates or controls a permitted Facility must comply with all provisions of this section. (Ord 3699, 2022; Ord. 2906 (part), 1994).

13.26.060 Repealed (Ord. 3699, 2022; Ord. 2906 (part), 1994).

13.26.070 Reporting of releases.

A. A person who owns, operates or controls a Facility or a person responsible for a release must immediately report a release of a Regulated Substance to the Missoula 9-1-1 center by tele phone in the following cases:

1. A release of petroleum in an amount greater than twenty-five gallons or any amount that threatens surface water, groundwater, or enters a storm drain;

2. A release of a Regulated Substance other than petroleum in a quantity which exceeds the Threshold Quantity of this code

B. Exemption from the requirement to report a release is not intended to relieve, in whole or in part, a person's responsibility to remediate or eliminate contamination caused by a release, as may be required by this code or any other state, federal or local law or regulation. (Ord. 3699, 2022; Ord. 2906 (part), 1994).

13.26.080 Repealed (Ord. 3699, 2022; Ord. 2906 (part), 1994).

13.26.090 Protection of water supply wells.

A. New water supply wells shall comply with the following:

1. New and replacement public and private water supply wells must be installed within design standards established by the Montana Administrative Rules , A.R.M. 17.38.101 through 17.38.513.

2. Wells of new community and non-community non-transient water systems may not be constructed:

a. Within 1000 feet of any Hazardous Waste Management facility, Class II landfill, Bulk Petroleum Storage facility, fuel pipeline, Fueling Facility not meeting the design standards of section 13.26.036 of this code, chemical manufacturing facility, regulated substance tank not meeting the requirements of section 13.26.036 of this code, and any site where a release to groundwater has been reported to a state or federal agency.

B. Within 250 feet of a Class III landfill, railroad track, the edge of pavement of the principal north south or east-west hazardous substance transportation routes, or the subsurface discharge point of a public sewage disposal system.

C. ©Within 100 feet of a sewer lift station serving a publicly-owned or public sewage system, dry well, or wastewater absorption system, as defined in the Missoula City-County Health Board, Regulation No. 1.

(d) Within 50 feet of any sewer main or unlined irrigation ditch.

D. The siting requirements of subsection 13.26.090 (A)(2), may be waived by the Department if it is demonstrated to the Department through scientific and technical evidence that the proposed location of a new well is the only practical site available and the potential for contamination to the well or groundwater is reduced by such other measures as the Department may require.

E. The siting requirements of subsection 13.26.090 (A) (2) shall not be considered by any state or federal agency to provide an institutional control which would protect public health from contaminants at a site described in subsections 13.26.090 (A) (2) (a)-(d) in order to justify a decision not to clean up contamination at such sites or to not take action to limit releases of contaminants from such sites which may affect the quality of groundwater or surface water that may affect the quality of water obtained through community or non-community non-transient public water systems located within the distances described in subsections 13.26.090 (A) (2) (a)-(d).

F. A person who owns, operates or controls a facility on which a public or private water well or monitoring well is abandoned after September 8, 1994 shall ensure that the well is abandoned in compliance with the Montana District of Natural Resources and Conservation Board of Water Well Contractor Regulations, ARM §36.21.669 through §36.21.670 and §36.21.810. (Ord. 3699, 2022); Ord. 3661, 2020; Ord. 3177, 2001; Ord. 3154, 2000; Ord. 2906 (part), 1994).

13.26.091 Hazardous Substance Transport

A. U.S. Highway 93 and Interstate Highway 90 shall serve as the principal North-South and East West Hazardous Waste transportation routes in the Missoula Valley. The City of Missoula must provide adequate signing to indicate location of the routes to persons who transport Hazardous Waste through the valley. (Ord. 3699, 2022)

13.26.092 Revisions to Best Management Practices

Prior to submittal to the Mayor for adoption pursuant to Missoula Municipal Code 2.03.020, the Board shall conduct a public meeting to review proposed changes to the Department's Best Management Practices for Pollution Prevention Manual. © (Ord. 3699, 2022)

13.26.100 Repealed (Ord. 3699, 2022; Ord. 2906 (part), 1994).

13.26.110 Inspections.

A The Department may enter and inspect at reasonable hours (or at any time on evidence of a release), upon presentation of credentials , all facilities within the aquifer protection area which it reasonably believes may handle regulated substances, in order to determine that the provisions of this chapter are being followed.

B. If a person with authority over a facility will not permit an inspection, the city attorney's office may apply to the city municipal court for a search warrant, based on probable cause to issue a warrant to inspect, survey or examine the facility and the premises on which it is located for potential violations of this chapter or in the interest of public health, safety and general welfare.

C. If a facility appears vacant or abandoned, and the property owner cannot be readily contacted to obtain consent for an inspection, in the interest of public health, safety and general welfare an agent of the city may enter any open or unsecured portion of the facility to conduct an inspection.

D. Agents of the city or Department shall show their identification when making an inspection.

E. Law enforcement officers shall assist in making inspections when the Department requests their assistance, when necessary to provide for safe access and entry to the facility and at such time that law enforcement assistance can be reasonably scheduled or when a clear hazard to public health, safety or welfare exists pursuant to MCA 50-2-120. (Ord. 3699, 2022; Ord. 2906 (part), 1994) .

13.26.120 Enforcement.

A. The Department and the Missoula City Attorney's office shall have the power and authority to administer and enforce the provisions of this code.

B. Whenever the Department has knowledge or evidence that a violation of this code has occurred, the Department may issue a Notice of Violation to be served personally, by certified mail, or by email with read-receipt on the alleged violator or its agent. This Notice of Violation shall specify:

1. The provision of this code or permit alleged to be violated;
2. The plain statement of facts that constitute the violation; and
3. Potential penalties for non-compliance
4. What needs to be done to come into compliance.

C. This notice may also include an order for corrective action, which shall specify as applicable:

1. The specific nature of corrective action that the Department requires, which may include without limitation:
   a. Investigation, sampling and analysis to confirm a release or contamination;
   b. Containment, removal and remedial action to abate and reduce contamination or the threat of contamination;
   c. The submission of a corrective action plan and corrective action progress reports or any other information deemed appropriate to protect human health and the environment; and
2. The time within which the corrective action is to be implemented.
3. If a person who owns, operates or controls the facility fails to comply with investigation or sampling required in an order issued pursuant to this section, the Department may conduct said investigation or sampling and the person so ordered shall be responsible for paying for Department staff time, analytical costs, and any incidental costs associated with the investigation and/or sampling. Failure of said person to pay the Department staff time or

analytical costs shall be a violation of this code.

D. This order is final unless, five working days after the order is received, the offender submits a written request for an administrative review as provided for in Section (E), Upon good cause shown, the time frame for requesting a department administrative review may be extended if made within the time specified for compliance in the Notice of Violation and Order to Take Corrective Action. A request for administrative review does not stay the order.

E. Administrative review.

1. Any person subject to a Department Notice of Violation and Order to Take Corrective Action may request an administrative review by the Health Officer, or in the case of Health Officer absence, his or her designee (Hearing Officer).
2. The Hearing Officer shall schedule an administrative review hearing within ten days of receipt of the request but can be scheduled beyond the 10 days by mutual consent of the Department and the person requesting the hearing. The Hearing Officer shall provide written or verbal notice of the date, time and location of the scheduled hearing to the person requesting the hearing.
3. At the administrative hearing the Hearing Officer shall first hear the staff report, , on the Notice of Violation and Order to Take Corrective Action. Second, the person who requested the hearing may present relevant information to the hearing officer. Third, the Hearing Officer may hear any person who has relevant information regarding the Notice of Violation and Order to Take Corrective Action.
4. The Hearing Officer may continue its administrative review for a reasonable time period following the administrative review hearing in order to obtain information necessary to make a decision
5. The Hearing Officer shall affirm, modify or revoke the Notice of Violation and Order to Take Corrective Action, in writing, following_completion of the administrative review. The decision shall be final. A copy of this decision shall be sent by certified mail or delivered personally to the person who requested the administrative review. (Ord. 3699, 2022; Ord. 3154, 2000; Ord. 2906 (part), 1994).

13.26.130 Criminal penalties and Judicial Enforcement

A. Any person who violates any of the provisions of this chapter, or any order made pursuant to this chapter, shall be guilty of a misdemeanor and subject, upon conviction thereof, to a fine not to exceed $500 per day. Each day a violation exists shall constitute a separate offense.

B. Violations of this code, whether the violation occurs inside the city limits or within 5 miles of the city limits, are subject to the jurisdiction of the City of Missoula Municipal Court.

C. Action under this section shall not be a bar to enforcement of this chapter or orders made pursuant thereto, by injunction or other appropriate remedy.The department may institute and maintain any and all enforcement proceedings.

E. All fines collected shall be deposited in the city general fund.

F. Pollution prevention efforts made by the violator, the economic benefit of not complying with any section of this chapter and the gravity of the offense shall be considered in determining penalties of violations of this chapter.

G. The city may not enter into a vendor or construction contract, grant or loan with any person who has been convicted of an offense under this chapter. This prohibition shall:

1. Continue for a period of one year following the date of conviction, and more than one year if said person does not correct the conditions giving rise to the conviction; and

2. Affect each facility owned or operated by the person.

H. Notwithstanding any other provision of law, the municipal court may also order that the offender take action to enhance public health or the environment by restoring or otherwise improving the quality of the Missoula Valley Aquifer in a manner consistent with public health, safety and general welfare and these provisions of this chapter. (Ord. 3699, 2022; Ord. 2906 (part), 1994).

13.26.140 Repealed (Ord. 3699, 2022; Ord. 2906 (part), 1994).

Severability. If any section, subsection, sentence, clause, phrase or work of this chapter is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this chapter. The council declares that it would have passed the chapter and each section, subsection, sentence, clause, phrase and words thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, phrases or words have been declared invalid or unconstitutional, and if for any reason this chapter should be declared invalid or unconstitutional, then the remaining chapter provisions will be in full force and effect. (Ord. 2906 (part), 1994).

Administrative Rule #37
BEST MANAGEMENT PRACTICES FOR POLLUTION PREVENTION POLICY

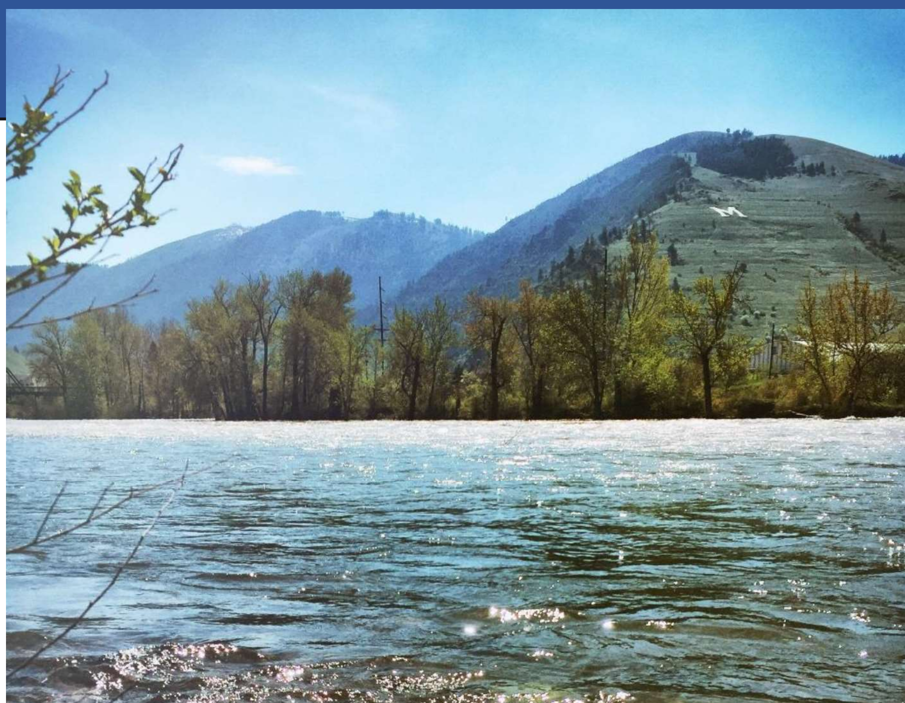
I hereby sign into effect Administrative Rule No. 37, Best Management Practices for Pollution Prevention, this 1st day September, 2022, pursuant to Ordinance 2232 which authorizes the Mayor to develop and approve administrative rules.

Gwen E. Jones, Acting Mayor

Gwen E. Jones, Acting Mayor
City of Missoula

Best Management Practices for Pollution Prevention

Administrative Rule 37



MISSOULA VALLEY
water quality district

Satisfies Missoula Valley Water Quality Ordinance Title 13.26

Effective Date September 1, 2022

TABLE OF CONTENTS

Part 1: Introduction

1.1. Background and Significance

The Missoula Valley aquifer is the primary source of drinking water for Missoula's residents. Because we all need and value clean water, we must protect our aquifer from contamination. This manual was developed under the authority of the Missoula Municipal Code, (Chapter 13.26.011) to assist businesses and facilities within the Aquifer Protection Area with operations that have the potential to contaminate groundwater and surface water. The methods described in this manual are commonly accepted as the best management practices (BMPs) that are protective of these water resources. BMPs can be processes performed by staff or structures designed to prevent the release of regulated substances into the environment. Examples of processes include sweeping a parking lot before pressure washing to reduce sediment load in the wash water or altering drilling air pressure to reduce water volume when developing a well. Secondary containment enclosures around waste oil tanks and oil-water separators that allow hydrocarbons to collect prior to discharge to a bioswale, are examples of structures.

1.2 How to use this manual

The Missoula Water Quality Code (Code) prohibits activities that may allow pollutants to contaminate our local water resources. In short, the BMP manual is a description of basic operational and equipment standards that help to *not* cause pollution. Instead of waiting until a complaint is received and pollution has occurred to communicate best management practices, minimally required BMPs that apply to certain activities, businesses, and components can be found in this manual. Oftentimes, a lack of BMPs at auto shops, gas stations, etc. results in chemical releases into the environment and stormwater systems. Stormwater systems can then collect and deliver pollutants to the nearest stream, wetland, or groundwater. Accordingly, sections 13.26.034(A) and (B) of the Code require the implementation of minimum BMPs by those who handle regulated substances or participate in activities that can lead to stormwater runoff and water contamination. The minimally required BMPs in this manual should be used in consultation with other federal, state, and local authorities to ensure compliance with applicable rules or codes (Fire, Building, OSHA, etc). For example, federal right-to-know laws may require that facilities handling regulated substances report to the Local Emergency Planning Committee (LEPC) every year.

While this manual does not cover every potential scenario for pollution prevention, it does address the most common situations we encounter. Those who perform activities not covered here are still required to prevent water pollution. With time and new application scenarios, occasionally a BMP may be found to be impracticable in the field, or a new BMP may be found to provide better protection for the resource. Alternative BMPs may be proposed and approved (see Appendix page 42) and this manual will be updated as needed. Contact the Missoula Valley Water Quality District to determine the most current BMP options for your activity or to suggest changes to this document. Terminology defined in the Code and used in this manual are included in the appendix for reference.

When rainwater enters the streets and alleys of Missoula, it can pick up pollutants and flow to nearby storm drains that discharge contaminated water directly to our local streams.

Part 2: Best Management Practices (BMPs)

2.1 BMPs by Business Type or Activity

2.1.1 Auto Maintenance

These BMPs apply to auto service shops, fleet vehicle maintenance, and trucking/construction vehicle maintenance shops.

Discussion of Risk: These businesses store oils, solvents, and engine coolants. When drums, buckets, and pans are left outside with open tops or without tight seals, stormwater can displace the fluids inside. Vehicle fluids can be released to the ground during the maintenance process or through leaks. Manual transfer of chemicals can lead to spills and overfills. Waste fluids that are stored and not shipped with a qualified hauler in a timely fashion increase the risk of release to the environment. Sludge from parts washers contains toxic heavy metals. Floor drains can lead to subsurface disposal wells or old septic systems.

Uncontained and leaking waste oil at a truck maintenance facility being displaced by stormwater to a nearby storm drain.

Minimum BMPs:

1. Containment:

- Label and provide secondary containment for all drums and tanks containing regulated substances at or above threshold quantities (see pages 26-30 for component requirements).
- Store portable containers (drums, buckets, etc.) of liquid or dry chemicals, waste fluids, solvents, etc. inside shop or other area protected from run-on and run-off precipitation (covered with a tarp on a pallet, under an eave with ground sloped to a swale, etc.)
- If stored outdoors, choose container storage locations where a spill would not flow to a storm conveyance, storm drain, surface waters, or ground water.
- Place tight-fitting lids on all containers when not in use.

2. Standard Operating Procedures:

- Inspect all incoming vehicles, parts, and equipment that are stored temporarily outside for leaks.
- Store vehicles needing repair in areas where leaking fluids will not reach the ground surface or stormwater conveyances. If stored outdoors, use drip pans or other catchment devices.
- If temporary work is being conducted outside, use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips. The collected drips and spills must be disposed of, reused, or recycled properly.
- Use drip pans or containers under parts or vehicles that drip or that are likely to drip liquids, such as during dismantling of liquid-containing parts or removal or transfer of liquids.
- Empty oil and fuel filters before disposal. Drain engine blocks and gear/transmission cases thoroughly and store inside or in covered/contained outside areas. Collect all used fluids including hydraulic oils and coolants generated from repair and maintenance processes and recycle or dispose of properly.
- Empty used-oil drain pans routinely to a contained bulk storage via a process that doesn't drip or spill outside of containment.

- Periodically inspect secondary containment (if applicable) for stormwater accumulation and leaks. Repair broken or cracked containment structures.
- Periodically inspect containers of regulated materials and waste fluids not placed in containment for leaks and replace when not in good condition, leaking, or otherwise deteriorating.
- Keep absorbent materials in sufficient quantity to address potential spills and in an easily accessible location.
- Wipe up/absorb small spills and dispose of absorbent materials appropriately.

3. Wastewater/Stormwater:

- Floor drains that discharge to the ground are considered to be industrial or commercial injection wells and are not permitted. Contact the local Wastewater Treatment Plant (Missoula or Lolo) for pre-treatment requirements (e.g. oil-water separator) and approval for floor drain discharge to the public sanitary sewer system.
- Provide for proper disposal of waste oil and fuel. Never pour waste into a storm drain.
- For wastewater generated from vehicle washing see Vehicle Washing section (pg. 23).

Additional BMPs:

- Secondarily contain small volumes of auto fluids to prevent spills.
- Store cracked batteries in a covered, nonleaking secondary containment system.
- Local Fire Code may apply for storage of flammables indoors, near buildings, under roofs, etc.

What about DIY Auto Maintenance?

When done improperly, working on a vehicle at home can pose risks to our water. Preventing water pollution is everyone's responsibility. To prevent contamination:

- While changing oil or doing other work on your vehicle, plan ahead, use absorbent materials (kitty-litter, cardboard, oil-dry, sweeping compound, etc.), and capture spills using properly-sized lidded leak-proof containers.

- Store containers of waste oil/fluid indoors or otherwise protected area (trunk of car, garage, etc.) until disposal.

- Containerized fluids (used oil, transmission fluid, coolant) can be properly disposed of through Republic Services and most auto repair and auto supply shops.

Always clean up drips and small spills immediately with absorbent materials. To clean up a spill, apply absorbent material to the spill area (kitty litter is fine), work the absorbent into the spill with a broom, sweep up kitty litter, and dispose of properly. Never wash a spill into a storm drain.

2.1.2 Carpet Cleaning

These BMPs apply to carpet cleaning and flood restoration businesses.

Discussion of Risk: Cleaning water may contain contaminants such as detergents, solvents, oils, sediment, and bacteria. This wastewater is typically collected in tanks during the cleaning process and is sometimes inappropriately discharged onto the ground or into storm sewers or dry wells. Missoula's storm drain system either discharges below ground (which drains to our drinking water supply) or it discharges to streams or rivers. Residential septic systems are not designed to receive regular discharges of carpet cleaning water. Disposal through septic systems may cause the septic system to fail prematurely.

Minimum BMPs:

Carpet cleaner illegally discharging wastewater to a swale. Photo credit: Panhandle Health District.

1. Wastewater:

- Dispose of water where the cleaning is being done. If the business or residence is connected to the municipal sewer system (check with building owner or call the Health Department to confirm), it is appropriate to dump down a mop sink or utility sink.
- Take to a car wash. Coordinate with the car wash owner/operator beforehand.
- The City of Missoula has a receiving station where tanks can be emptied. Contact the City of Missoula Wastewater Treatment Plant to make arrangements. If you live in or are doing work in Lolo, contact the Lolo Wastewater Treatment plant to arrange disposal.
- Do not put wash water into a drain connected to a septic system and never dump into a storm drain or apply onto the ground (including lawn, gravel or asphalt).

Additional BMPs:

- Secondarily contain cleaning solutions in the shop.
- Label equipment with a message similar to "No wastewater can be discharged to a storm drain, ditch, waterway, or ground surface".
- Recycle wash water. There are numerous products on the market that recycle wash water.

2.1.3 Chlorinated Water Handling, Hydrant and Water Line Flushing

These BMPs apply to persons that discharge chlorinated and dechlorinated water from swimming pools, spas, and other sources. Surface water discharges (through conveyances, irrigation ditches, or directly) may also require a Montana Pollutant Discharge Elimination System (MPDES) permit from DEQ.

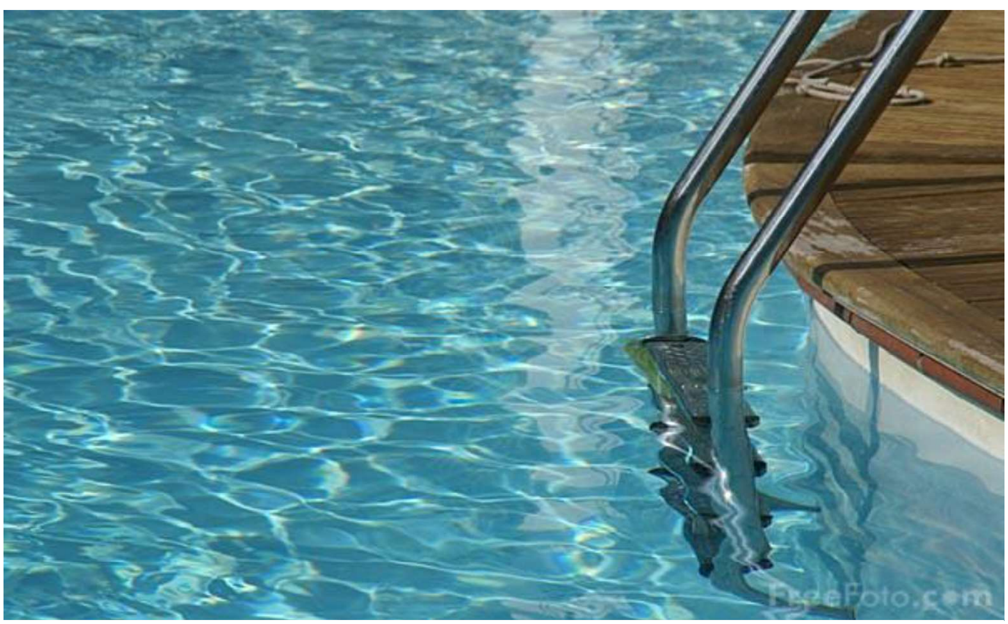
Discussion of Risk:

Chlorine acts as a disinfectant primarily through the oxidizing action of hypochlorous acid. However, because of it's reactivity, chlorine is also very toxic to fish and aquatic life. Sediment transfer to storm systems and surface water can also be a risk whenever water is released at high pressure or volume to the ground.

Minimum BMPs

1. Water discharge:

- Planned discharges to conveyances connected to surface waters must be dechlorinated to below 0.01 mg/L (ppm). Per the Montana DEQ-issued General Permit for De-chlorination Water and Hydrostatic Testing, the daily effluent limit for Total Residual Chlorine (TRC) is 0.011 mg/L and the limit of detection for TRC is 0.1 mg/L. Accordingly, analytical results showing concentrations less than or equal to 0.1 mg/L TRC are considered to be in compliance with this BMP.
- Chlorinated water can be discharged to the ground surface without de-chlorination if not in direct contact with groundwater.
- Use appropriate sediment trapping techniques for chlorinated or dechlorinated discharges. Discharge to swales, use end-of-pipe energy dissipators, employ lower discharge rates, or use other applicable BMPs to prevent water discharge from transporting sediment into stormwater conveyances or surface waters.



2.1.4 Dry-Cleaning

These BMPs apply to businesses that use perchloroethylene or other chlorinated solvents for laundry and dry-cleaning services.

Discussion of Risk: Chlorinated cleaning solvents are extremely toxic and mobile in the environment. Without strict containment, recovery, and waste disposal practices there is high risk for contamination of groundwater and surface water resources. There is a trend to replace the more hazardous chemicals, such as perchloroethylene, with safer aliphatic hydrocarbons and other alternatives.

Minimum BMPs:

1. Containment:

- Dry cleaning machines must be fully contained, typically over a steel drip pan that extends beyond the footprint of the entire machine. The pan must meet the full 110% capacity requirement.

2. Standard Operating Procedures:

- When obtaining new or replacement machines, obtain dry-to-dry machines equipped with integral Refrigerated Condensers or an equivalent.
- Lint and other wastes contaminated with dry cleaning solvent must be stored in covered, contained drums or buckets for pick-up by a hazardous waste hauler.

3. Wastewater:

- Treat wastewater from dry-cleaning machines and vacuum presses on-site using carbon absorption/evaporation technology or an equivalent technology, or properly dispose of the wastewater as a hazardous waste;
- Dispose of sludge as hazardous waste. All dry-cleaning operations must be connected to public sewer.

The use and improper disposal of perchloroethylene-containing degreasers from dry-cleaning and auto-body shops led to the discovery of drinking water contamination in Missoula in early 1990s.

2.1.5 Fueling and Petroleum Storage Facilities

These BMPs apply to any business engaged in the storage and/or dispensing of fuel for vehicles and machinery. These sites include those that are open to the public, private, temporary, or bulk storage facilities. The quantities of fuel stored at these facilities requires a Pollution Prevention Permit from the Missoula Valley Water Quality District. Provisions of the permit require identifying and addressing risks posed by fuel storage and dispensing, plans developed to prevent and respond to fuel releases, and management of stormwater.

Discussion of Risk: Fuel storage and transfer over the Missoula Valley Aquifer presents significant risk to the environment, groundwater and surface waters. A leak of only one drop per second can release about 400 gallons of fuel into the environment in one year. Some toxic components of fuel are highly mobile in the environment. A spill of 1 gallon of gasoline has the potential to contaminate 1 million gallons of groundwater. Large releases can occur during 'drive-offs' (a vehicle drives away with hoses still inserted into tanks) or during transfer of fuel from a fuel tanker to an underground storage tank (UST). Stormwater dry wells located nearby can deliver spilled fuel to the groundwater which is the sole source of Missoula's drinking water. Some storm drains are piped to outfalls in nearby surface waters (Rattlesnake Creek, Clark Fork River, etc.) and a spill can directly impact that water body.

Dry well located directly downgradient from tank fueling area. Another storm drain along the road curb is also downgradient and leads to an outfall on Rattlesnake Cr.

Minimum BMPs for Public Fueling Stations:

1. Containment:

- These sites are required to use underground storage tanks (USTs) and comply with all Montana Department of Environmental Quality (DEQ) UST requirements.

2. Vehicle Fueling Area:

- Design stormwater collection such that stormwater does not discharge directly to storm drains (dry wells or inlets piped to outfalls) from the vehicle fueling area.
- Provide fueling island(s) with a fueling pad (pg. 32). Drainage on the fueling pad must be directed to a containment vault or through an oil-water separator and into a properly maintained vegetated swale or retention pond. Design must prevent stormwater run-on and run-off on the fueling pad.
- Design stormwater collection system to allow containment vaults and oil-water separators to operate at full capacity during storm events (e.g. canopies, tank sizing, etc.).
- Install breakaway hoses and nozzles on fuel dispensers.
- Incorporate automatic pump shut-off thresholds to prevent fuel releases during drive-offs.

3. Tank Fueling Area:

- Design stormwater collection so that stormwater does not discharge directly to storm drains (dry wells or inlets piped to outfalls) from the tank fueling area.
- Drainage may be directed to a properly sized vegetated swale.
- When vegetated swales are not available, one option is to divert stormwater to a properly sized oil-water separator or catch chamber that is connected to a dry well. In this case, there must be at least 20 feet of separation from bottom of dry well to groundwater. See tank fueling area (pg. 35) and oil-water separators (pg. 33) for more design conditions.

4. Standard Operating Procedures/Maintenance:

- Keep sufficient absorbent materials (e.g. Oil-Dri, absorbent pads, absorbent booms, etc.) to address fuel spills on-site and in a location convenient for staff to access.
- When using granular absorbent to address small spills and overfills (Oil-Dri, kitty-litter, etc.), work the granules into the spill, allow spill to be absorbed, and then sweep them up and dispose of properly.
- Train staff and maintain protocols for responding to small and large spills.
- Provide an employee trained on how to respond to a release on site at all times during facility operation, or an automatic pump shutoff that is programmed so that no more than 50 gallons of gasoline or 250 gallons of diesel fuel are automatically dispensed.
- Self-inspect and maintain the oil-water separator in tank fueling area (if equipped). Evacuate fuel releases immediately to maintain spill capacity of the separator or chamber and disposed of properly.
- Self-inspect fueling pad to check for containment of stormwater brought onto the pad with vehicles or by wind. Also check for blockages to gutters and cove drains to allow unobstructed flow through the system. Periodically test for water tightness of all components, pipe perforations, and piping joints.

5. Wastewater/Stormwater:

- Follow all applicable drainage BMPs for oil-water separators, tank fueling areas, containment vaults, etc. Sites with a canopy and containment vault in the fueling pad must keep the vault evacuated and contents disposed of properly as described on page 27.

> Training, leak detection, record keeping, and other BMP's associated with underground storage tanks are part of the UST program administered by DEQ and are beyond the scope of this manual.

Minimum BMPs for Private/Fleet Fueling:

These sites typically represent smaller versions of a public fueling station for trucking companies or fleet vehicles. Some facilities in this category use aboveground storage tanks (ASTs) for fuel storage.

Private fueling site with triple-walled tank, catch basin, and separator (left background). Photo credit: Panhandle Health District

1. Containment:

- Above ground storage tanks must meet minimum BMPs described in secondary containment (pg. 26) and AST sections (pg. 12).
- Sites with underground storage tanks are required to comply with all DEQ UST requirements.

2. Fueling Area

- Design stormwater collection such that stormwater does not discharge directly to storm drains from the vehicle fueling area, AST filling area, or tank fueling area (if applicable).
- Provide fueling island(s) with a fueling pad (pg. 32). Drainage on the fueling pad must be directed to a sealed vault or through an oil-water separator and into a properly maintained vegetated swale or retention pond. Design must prevent stormwater run-on and run-off.
- Design stormwater collection system to allow vaults and oil-water separators to operate at full capacity during storm events (e.g. canopies, tank sizing, etc.).
- Install breakaway hoses and nozzles on fuel dispensers.
- Incorporate automatic pump shut-off thresholds to prevent fuel releases during drive-offs.

3. Standard Operating Procedures/Maintenance:

- Keep sufficient absorbent materials (e.g. Oil-Dri, absorbent pads, absorbent booms, etc.) to address fuel spills on-site and in a location convenient for staff access.
- When using granular absorbent to address small spills and overfills (Oil-Dri, kitty-litter, etc.), work the granules into the spill, allow spill to be absorbed, and then sweep them up and dispose of properly.
- Train staff and maintain protocols for responding to small and large spills.
- If equipped with a fueling pad, self-inspect the pad to check for containment of stormwater brought onto the pad with vehicles or by wind. Also check for blockages to gutters and cove drains to allow unobstructed flow through the system. Periodically test for water tightness of all components, pipe perforations, and piping joints.
- If equipped with ASTs, periodically self-inspect integrity of hoses and AST.

4. Wastewater/Stormwater:

- Follow all applicable drainage BMPs for oil-water separators, tank fueling areas, containment vaults, etc. Sites with a canopy and containment vault in the fueling pad or secondary containment must keep the containment evacuated and contents disposed of properly as described on page 27.

> Training, leak detection, record keeping, and other BMP's associated with underground storage tanks are part of the UST program administered by DEQ and are beyond the scope of this manual.

Minimum BMPs for Bulk Petroleum Storage:

These facilities are used for storage of petroleum products for marketing or wholesale distribution that typically have a total bulk storage capacity of 50,000 gallons or more.

1. Containment:

- Cathodically protect buried metal piping and the bottom of aboveground storage tanks in accordance with guidelines contained in American Petroleum Institute (API) 651;
- Install containment devices to prevent a surface release of fuel at the vehicle fueling area from discharging directly to a dry well, or surface waters.
- Secondarily contain tanks and above ground piping manifolds in facilities built or replaced after January 1, 2023.
- Install impermeable barriers or liners under bulk petroleum tanks installed or replaced after January 1, 2023.
- Install vapor monitoring devices at piping manifolds and valves to alert personnel of a release at bulk petroleum storage facilities built or replaced after January 1, 2023.

2. Standard Operating Procedures/Maintenance:

- Perform annual release response training exercises simulating the actions that will be taken during a release of fuel at the facility
- Train staff in the proper filling of aboveground storage tanks and ensure staff are present at the facility during tank filling operations, or,
  - Establish a monitoring system capable of detecting and alerting local emergency personnel of a release during tank filling operations. The monitoring system must include vapor monitors located at any valve and/or piping manifold that controls the flow of fuel to the tanks and from the tanks to the dispensers, overfill alarms on any aboveground fuel storage tanks, and be staffed during the tank-filling operations.
- Conduct annual integrity and leak testing of below grade metal fuel product piping to a pressure of one and a half times the operational pressure.

- Test the integrity of the shell and bottom of large capacity petroleum storage tanks (as defined in Ordinance 13.26.030) in accordance with standard schedules established by American Petroleum Institute (API) 653 5th edition. An inspection schedule and justification must be submitted to and approved by the District with a maximum inspection interval not to exceed 20 years.
- Designate and train a local responsible party in the use, maintenance, and inspection of the BMP components.

Critical SOPs for managing inventory and loading/off-loading are specific to the industry and beyond the scope of this BMP manual.

Minimum BMPs for Temporary Fueling Site:

This BMP applies to temporary fueling operations, typically two years or less, that are installed at construction sites, wood chipping operations, fire camps, or similar operations. Follow applicable BMPs for ASTs.

Temporary fueling site with liners under both storage and offload/onload lane (Note black inspection ports along lane). Photo credit: Panhandle Health District.

1. Containment:

- Install a poly liner under stationary tanker trailers and single walled tanks. The liner may be waived for double-walled tanks unless repeated coupling/uncoupling is occurring.
- Install a buried poly liner under the footprint of the vehicles that will be using the site.
- Inspection ports must be installed in a sump area of the liner. For other criteria on liner containment, see page 39.
- Store hoses and nozzles over containment at all times. For other AST BMPs, see page 13.

2. Standard Operating Procedures/Maintenance:

- Monitor the pad and main containment liners during precipitation events and do not allow to overflow with stormwater. If stormwater is not accumulating in a liner in a predictable manner based on current weather, liner is likely compromised and should be replaced.

3. Wastewater/Stormwater:

- Stormwater collected in the liners should be managed as described in stormwater section on page 27.

Minimum AST BMPs for Fuel*:*

Farms and businesses often choose to store petroleum products such as gasoline, diesel fuel, and biofuels in aboveground storage tanks (ASTs). Properly installed tanks can have advantages over underground storage such as easy visual inspection, more convenient leak detection and containment, and the ability to relocate tanks when business practices change. Poorly managed storage can lead to soil and water contamination, fire, high clean-up costs, and theft.

These ASTs are mounted on level impermeable ground with barriers to prevent vehicle collisions. Photo credit: Purdue Extension.

1. Design and Containment:

- Label and secondarily contain tanks or use double-walled tanks.
- Store hoses within secondary containment or off the ground for double walled tanks.
- Use tanks designed/rated for outdoor use.

2. Location/Siting:

- Locate tanks at least 100 ft from wells, surface water, and irrigation ditches.
- Place tanks on level impermeable material (concrete pad) to retain spills. Pavement or a concrete pad should be designed to hold the weight of a full fuel tank and resist shifting and frost-heaving.
- Raise and support tank to prevent ground contact for easy inspection and corrosion prevention. Tank supports should be manufactured to hold their weight when full (wood or hollow concrete blocks are not appropriate).
- Provide barriers to prevent vehicle collisions.

3. Standard Operating Procedures/Maintenance:

- Keep sufficient absorbent materials (e.g. Oil-Dri, absorbent pads, absorbent booms, etc.) to address fuel spills on-site and in a location convenient for staff access.
- When using granular absorbent to address small spills and overfills (Oil-Dri, kitty-litter, etc.), work the granules into the spill, allow spill to be absorbed, and then sweep them up and dispose of properly.
- Train staff and maintain protocols for responding to small and large spills
- Periodically self-inspect integrity of dispenser hoses and AST.

Inappropriately mounted tanks. Notice leaning tank in photo on left. Neither set up has secondary containment, gravel/soil can accept spills and make clean up difficult and soil or water contamination likely. Hoses are left on ground making degradation and releases more likely. No protection from vehicles (barriers) are provided. In photo on right one tank is gasoline and one is diesel but both tanks are labeled with 1203 (gasoline) placard. Photo credit: Purdue Extension (Left photo).

Additional BMPs

OSHA, local Fire Code and other agency requirements (see ARM 17.57.105) related to flammables storage may apply:

- Minimum placement distance standards from buildings, power lines, and ignition sources
- Minimum distances between tanks
- Specific labeling and signage requirements
- Venting, leak detection on double walled tanks, liquid level gauge, and overfill protection
- Fire guarding, explosion proof wiring and/or fittings, and grounding for tanks containing flammables
- Performing tank inspections and maintaining inspection logs
- Displaying the depth of fuel conversion from inches to gallons on the tank

2.1.6 Livestock and Animal Waste

These BMPs apply to owners of horses, cows, hogs, chickens, dog kennels, etc. to prevent manure run-off into stormwater conveyances and surface waters. These BMPs are not meant to address Concentrated Animal Feeding Operations covered under the Montana DEQ General Permit MTG01000.

Discussion of Risks:

Manure contains bacteria, nitrogen, phosphorous and other pollutants. Nutrients in surface water can lead to algal blooms, fish die-offs, and impair other beneficial uses. Groundwater contamination with manure and nutrients can lead to human health illness.

Minimum BMPs:

There are several ways to reduce animal waste problems and control run-off from livestock housing areas.

1. Standard Operating Procedures:

- Never deposit animal waste in a river, stream, irrigation ditch, dry well, or stormwater conveyance
- Clean up after your livestock. Remove manure frequently (also required by MMC 6.07.1010 and 6.07.430).
- Minimize overcrowding. Keep the number of animals proportional to the size of the confinement area so manure does not become unmanageable and accumulate.
- Relocate livestock to an area that is not sloped to drain to a stormwater conveyance or waterway.
- Provide vegetated buffers between confinement areas and the road.
- Divert water to swales or other areas where it will not enter a waterway.
- When walking or riding animals, remove waste promptly from any stormwater conveyance.

Additional BMPs

- The "On-site Guide for Livestock Operators", a collaboration of the Montana Association of Conservation Districts, USDA-NRCS, MTDEQ, and the Montana State University Extension contains additional information for reducing risk of livestock operations to surface and groundwater: https://store.msuextension.org/publications/AgandNaturalResources/EB0213.pdf

2.1.7 Pressure Washing

These requirements and BMPs apply to contractors who provide pressure washing services.

Discussion of risks:

Pressure washing surfaces can produce wastewater that can deliver contaminants into the storm system. Hot water, soaps, grease from restaurant dumpster areas, sediment from alleys, driveways, and sidewalks, and auto fluids from parking lots can be carried to storm drains which then flow into nearby surface waters like Rattlesnake Cr., the Clark Fork River, or the Bitterroot River, or into storm dry wells to groundwater.

Minimum BMPs:

1. Standard Operating Procedures:

- Operations will vary depending on the surface being washed (see Table 1 on pg. 16).
- Equipment (storm drain covers, absorbents, sediment filters, oil-booms) should be available and in working condition to allow for surfaces to be properly cleaned and drains to be sealed when applicable.

2. Wastewater:

- Discharge to sanitary sewer is the best practice for wash water.
- Pressure washing operations that use hot water, soaps, detergents, or cleaning agents must be conducted on solid surfaces and collected and discharged to sanitary sewer. Be sure to consult the City of Missoula Waste Water Treatment Plant prior to planning any sanitary discharge.
- As outlined on pg. 16, depending on the activity, method used, and the type of surface that is being cleaned, wash water can go to a storm drain, a vegetated area, or the sanitary sewer.

Pressure Washing. Attribution-ShareAlike 2.0 Generic (CC BY-SA 2.0) Image credit: www.housepressurecleaning.com

Table 1. Minimum Pressure Washing BMPs. Processes below assume no hot water, soap, detergents, or chemicals are used.

Type of Surface	Potential Pollutants	Cleaning Method and BMPs	Proper Disposal[1]
Sidewalks, walkways, flat roofs, pool decks	Sediment, debris, bird feces, mold, moss	1. Sweep loose dirt and debris. 2. Use absorbents to clean up any spills before washing. 3. Protect storm drains (filters required, absorbent devices as needed). 4. After washing, remove drain filter and absorbents.	Wash water: storm drain Debris: regular trash
Parking lots, parking garages, driveways, drive-throughs[1]	Sediment, auto fluids (engine oil, transmission fluid, antifreeze), debris	1. Sweep loose dirt and debris. 2. Use absorbents to clean up any spills before washing. 3. Protect storm drains (filters and oil-absorbent devices required) 4. After washing, remove drain filter and absorbents.	Wash water: storm drain or vegetated area[2] Debris: regular trash
Restaurant alleys/dumpster areas	Food grease	1. Sweep loose dirt and debris. 2. Block storm drains with covers. 3. Wash with hot water/soap as needed. 4. After washing, collect water with pump or vacuum.	Wash water: sanitary sewer connected to a grease interceptor Debris: regular trash
Buildings/Houses – unpainted or painted[3] with paint job in good condition	Sediment, debris, mold, moss	1. Place drop cloth below building to catch any paint chips. 2. Use absorbents to clean up any oil spots/spills before washing. 3. Protect storm drains (filters required, absorbent devices as needed). 4. After washing, remove debris caught in storm protection equipment.	Wash water: If contains paint residue: sanitary sewer. If no paint residue, may enter storm drain or vegetated area. Debris: regular trash

[1]If surfaces are heavily contaminated with engine oil or other hazardous chemical, these disposal guidelines do not apply. Contact the MVWQD for disposal guidance.
[2] Vegetated area must be large enough to prevent flooding of the area.
[3] These BMPs are not designed to address paint removal. If lead-based paint is suspected, contractors must be certified and adhere to the EPA Renovation, Repair, and Painting Rule. Contact the Region 8 EPA office for more information (https://www.epa.gov/mt/forms/contact-us-about-epa-montana).

2.1.8 Restaurants and Food Service

These BMPs apply to the outdoor storage of grease and cooking oils at food service establishments. Separate requirements may apply from the applicable Wastewater Treatment Plant for sanitary sewer grease disposal.

Cones were unable to prevent vehicle collisions and release of used cooking oil from these drums

Discussion of Risk: Grease is a contaminant that can enter stormwater and our local rivers and streams when improperly managed. Never wash the grease storage area or food service equipment (utensils, floor mats, or receptacles) into the alley, streets, or parking lots, or into a storm drain.

Minimum BMPs

1. Standard Operating Procedures/Maintenance:

- If stored in outdoor containers for recycling, prevent drips and overflow when transferring and emptying containers.
- Clean up spills promptly. Old grease can be loosened with a stiff brush. Spread absorbent material (e.g. cat litter) over the area to be cleaned to absorb the grease. Sweep up the absorbent and throw it away.
- Pressure washing may be used if operator follows appropriate pressure washing BMPs (pgs. 15-16) and collects and disposes of water properly.

Additional BMPs

- Label storage containers.
- Provide a canopy to prevent precipitation from entering storage area.
- Routinely inspect storage area.
- Train employees on spill prevention and response.
- Keep sufficient absorbent materials available.

2.1.9 ROAD MAINTENANCE

These BMPs apply to businesses or entities that provide road maintenance services including asphalt application and repair work, concrete application and repair work, de-icing, dust suppression, and street sweeping.

Discussion of Risk: Perceptions of risk for groundwater contamination in this industry are often skewed by the fact that asphalt/sealer, concrete, deicing fluids, sand/gravel, etc. are put on the ground in the normal course of their use and construction. However, there are proven risks from repeated release of these chemicals that should not be overlooked. Continual spills and leaks of asphalt and sealer during tank and truck filling can result in water-soluble asphalt product entering the soil, dry wells, and potentially groundwater. Concrete is a mixture of cement, water, and aggregate material. Portland cement is made by heating a mixture of limestone and clay containing oxides of calcium, aluminum, silicon and other metals in a kiln and then pulverizing the resulting clinker. The fine aggregate particles are usually sand. After concrete is poured at a construction site, the chutes of ready mixed concrete trucks, hoppers of concrete pump trucks, wheelbarrows, and tools must be washed out to remove the remaining concrete before it hardens. Concrete washout water is a caustic slurry (pH near 12) containing toxic metals that can harm water resources. Deicers contain salts ($MgCl_2$, NaCl, etc.) that when spilled or misapplied can lead to groundwater and surface water contamination. Street sweepings can contain metals, fuel and petroleum products, animal waste, glass, litter, etc. and these chemicals could impact water resources.

Minimum Road Maintenance (asphalt and concrete) BMPs:

1. Containment:

- Secondary containment is required for certain quantities (listed in MMC 13.26.034) of regulated substances and must follow applicable BMPs on pages 26-30.

2. Standard Operating Procedures/Maintenance:

- Do not spray out asphalt/sealer hoses onto a bare ground surface.
- Schedule painting, striping, marking, asphalt paving, concrete replacement and concrete cutting activities for dry weather. Do not conduct these activities during or immediately after a rainfall.
- Protect nearby storm drain inlets from maintenance work (e.g. preparing the surface for an asphalt cap, chip sealing, concrete breaking or saw cutting). Place appropriate covers, rock wattles, straw bales, sand bags, filter fabric, etc. (some examples on pg. 40) around or over inlets to protect them from entry of wastes, dusts, overspray or slurry.
- When saw cutting concrete, use the minimum amount of water. Let the waste slurry dry and then sweep or vacuum it up before leaving the location. Alternately, a wet vacuum may be used to pick up the wet slurry immediately after cutting is complete.
- Collect concrete washout in a lined pit, tank, or other container.

Filtering concrete washout water for reuse. Photo credit EPA.

3. Wastewater/Stormwater:

- Dispose of wastewater from asphalt tank wash-out and the cleaning of spray application to the local Wastewater Treatment Plant.
- Allow concrete washout water to evaporate or filter/treat water prior to reuse or disposal to the local Wastewater Treatment Plant.
- Dispose of or recycle concrete solids (they can be reused as fill or in new concrete mix) remaining after filtering or settling.
- Sweep up wastes and dispose of the wastes appropriately. Do not sweep or hose down wastes into storm drains.

Improper maintenance of asphalt tank and insufficient SOPs for preventing ground contamination

Additional BMPs

- Secondary containment for asphalt emulsions is recommended.
- Maintain training programs and checklists for loading/off-loading, cleaning apparatus and rinsing job truck tanks, as well as spill response protocol.
- When working on bridges, transport paint and liquid materials to and from the job site in containers with secure lids and tied down to the transport vehicle.

Minimum Deicing BMPs

These deicing BMPs apply to storage and application processes for deicers applied on Missoula city and county roads. Approval and testing requirements for deicers are required and these details are covered in the Missoula Valley Water Quality Code.

1. Containment:

- Deicers stored at or above Threshold Quantities must meet applicable secondary containment requirements detailed on pages 26-30.
- Remove stormwater from outdoor containment to maintain required containment volume. (Containment systems for ice/dust control salts are often designed and operated so that stormwater in the system can be re-used in application mix).

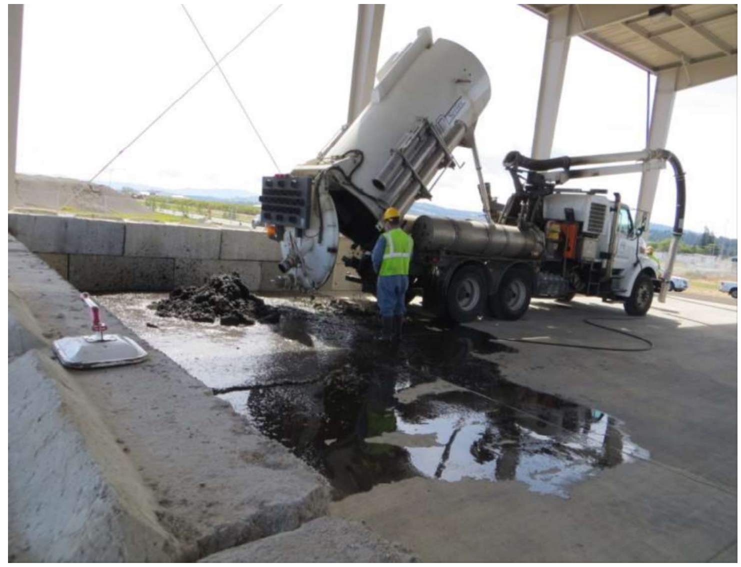
2. Standard Operating Procedures:

- Apply deicers in such a manner and at such a rate that pure product (liquid or solid) remains on the roadway.
- Apply deicers using trucks equipped with ground-speed controllers.
- When applying deicers for anti-icing purposes prior to or during a storm event, apply at a rate not to exceed 30 gallons per lane mile.
- Whenever snow accumulations on the road are equal to or greater than 2 inches, apply deicers after snow plowing to improve the effectiveness of a deicer and to reduce the amount applied.
- Keep daily records for locations and amounts of deicer applied.
- Maintain records for yearly volumes of deicer applied.
- Report any application of a non-approved deicer or a spill of deicer in an amount greater than 100 gallons or 1,000 pounds (solid) to the District within 24 hours of application or release.

Minimum Street Sweeping BMPs:

1. Containment:

- The entire sweeping storage area should be more than 100 feet from, and at a lower elevation than, any water body, creek, river, ditch, or storm drain inlet.
- Store waste on a paved surface sloped to drain to the water-holding basin.
- Provide berms to minimize run-on and run-off of stormwater.
- Protect the drying debris from wind re-entrainment (this can be done with operational protocols to not allow piles to accumulate and to remove quickly once dry).
- Waste does not need to be covered but tarping prior to rain event will reduce storage dry times.



Dewatered materials drain into adjacent settling pool. Water from pool then passes through an oil/water separator, followed by a sand filter bed, and then to a bio-infiltration pond. Photo credit: City of Spokane Decant Facility

2. Disposal

- Once dewatered, sweepings and catch basin sediment should be profiled for metals, VOC's, and extractable petroleum hydrocarbons prior to disposal at landfill.
- If screened, the grit can be re-used for road sanding or pothole fill without testing. These sweepings should be stored in an area that prevents precipitation from washing sediment into storm systems or surface water.
- Street sweepings are considered a Group II waste by MTDEQ and cannot be used as clean fill without appropriate testing.

3. Standard Operating Procedures/Maintenance

- Inspect and maintain any temporary debris storage areas. If debris is stored in containment or under cover, repair any cracks or splits that might allow debris to escape back into the environment.

2.1.10 Trade Contractors

These BMPs apply to painting contractors, drywall installers, and other trades that use or generate materials with the potential to contaminate water sources during onsite construction and remodeling activities of buildings and houses.

Discussion of Risks: These activities are most likely to present risk to groundwater and surface waters through the generation and improper disposal of waste fluids.

Minimum BMPs:

Storm drains are not to be used for disposal of paint-brush/tool rinse water, dry-wall mud, tile-saw waste, or any other construction-related waste.

1. Containment:

- Label and secondarily contain volumes of regulated substances at threshold levels or more as described on pages 26-30.
- Store portable containers (drums, buckets, etc.) of liquid or dry chemicals, waste fluids, solvents, etc. inside shop or other area protected from run-on and run-off precipitation (covered with a tarp on a pallet, under an eave with ground sloped to a swale, etc.)
- Place tight-fitting lids on all containers when not in use.
- If stored outdoors, choose container locations where a spill would not flow to a storm conveyance, storm drain, surface waters, or groundwater.

2. Standard Operating Procedures:

- Never dump paints, thinners, solvents, drywall mud, tile-cutting saw water, paintbrush/roller wash water, or any other construction-related activity waste onto the ground, stormwater conveyance, or into a storm drain.
- Do not conduct spraying, blasting, or sanding activities over open water without method to prevent paint and debris from entering water. Do not transfer or load paint over water.
- Utilize an enclosed cleaning device or other process that does not involve spraying on the ground when cleaning paint spray guns.
- Wipe up/absorb small spills and dispose of absorbent materials appropriately.

3. Wastewater

- Do not pour any type of paint (water or oil-based) or paint solids into sinks. This wastewater leads either to a septic system or a wastewater treatment plant.
- For small projects, clean paint brushes and tools covered with water-based paints in sinks connected to a Wastewater Treatment Plant. Filter out solids prior to disposal. When rinsing brushes in portable containers, let the solids settle and then filter or slowly dump the clean water down the drain or into a vegetated swale. Discard the remaining solids in the trash. Alternatively, allow the water to evaporate and discard the remaining solids. For projects that may generate large volumes of rinse water, contact the local Wastewater Treatment Plant.
- When cleaning brushes or tools covered in non-water-based paints (oil) or finishes, collect used solvents for recycling or proper disposal as hazardous waste.

- Leftover latex and water-based paint that cannot be reused can be dried (allow water to evaporate, add absorbents to the container) and disposed of in the trash.
- Leftover oil-based paints and thinners that cannot be re-used or recycled must be disposed of in a hazardous waste facility.

Additional BMPs

- Prior to cleaning brushes and rollers, remove as much paint as possible by squeezing and dry brushing onto cardboard or newspaper to work out remaining paint.
- Containment of other products such as solvents that are in containers of 5 gallons or less is encouraged especially if there is a frequent transfer of product into and out of the container.
- Local Fire Code may apply for storage of flammables indoors, near buildings, under roofs, etc.

2.1.11 VEHICLE WASHING

These BMPs apply to commercial establishments which routinely wash vehicles (e.g., car washes and facilities with wash bays), clean and degrease mechanical parts (including mobile steam cleaning operations), or rinse equipment (e.g. landscaping). Fleet and truck washing can be associated with virtually any of the business classes and other BMPs in this manual.

Discussion of Risk: During a car wash, dirty water containing soap and detergents, residue from exhaust gas, motor oils, paint, gasoline, sediment, and other debris washes off the cars and flows to nearby storm drains. Water that flows into dry wells flows though soil and into the Missoula Valley Aquifer. Car wash water that flows past the parking lot and into the road can enter storm drains that flow directly to our local rivers.

Minimum BMPs:

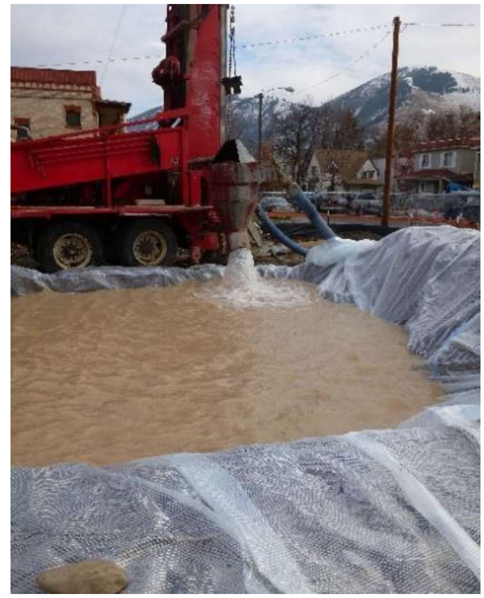
1. Wastewater/Stormwater:

- If a permanent facility, connect to public sewer and use an appropriate pretreatment system (e.g., an oil-water separator) as required by the Missoula and Lolo Wastewater Treatment Plants.
- Water generated from rinsing landscaping equipment typically contains grass and debris that requires filtration/separation prior to entry into the sanitary sewer. Consult the Wastewater Treatment Plant prior to planning any sanitary discharge. Landscaping equipment can also be rinsed over a vegetated/grassy area or where the rinse water drains to a vegetated/grassy area to allow for infiltration.
- Wash water from mobile steam machines should be disposed of through a sanitary sewer or licensed waste hauler. Use an appropriate pretreatment system (e.g., an oil-water separator) as required by the Missoula and Lolo Wastewater Treatment Plants. Consult the Wastewater Treatment Plant prior to planning any sanitary discharge.
- When public sanitary sewer is unavailable, collect and dispose of the wastewater in a lined lagoon.
  - The lagoon must be fenced to prevent access by the public and animals.
  - The system must be designed by a civil engineer licensed in Montana and the design must be approved by the Department prior to use.
  - The wastewater must be pre-treated through an oil/water separator prior to discharge to the lagoon.
  - The lagoon must be lined with an impermeable liner and must be capable of containing and treating the entire volume of wastewater produced at the facility.
  - The design life of the system must be specified by the engineer.
  - The system will not be allowed to operate beyond the design life specified by the Engineer, unless and until its performance is evaluated by a civil engineer and certified by the engineer as meeting the original performance criteria.
  - The lagoon and oil/water separator must be regularly maintained, which includes removal and proper disposal of all sediments, oils, and/ or sludge which accumulates in the system.
  - Records of any maintenance performed, as well as waste disposal manifests must be kept and be accessible to regulatory officials.
- Recycle wash water. There are numerous products on the market to recycle wash water.

Uncontaminated water generated from rinsing (no detergents) vehicles on display at vehicle dealerships is considered an allowable non-stormwater discharge and may be disposed of through on-site dry wells, swales or otherwise infiltrated onsite.

2.1.12 WELL DEVELOPMENT/UTILITY EXCAVATION

The construction of irrigation, water supply, geothermal, and other wells may produce large volumes of water during the drilling process. Utility work involving horizontal drilling can also produce drilling mud waste and sediment-laden water. BMPs will depend upon the quantity of water generated, soil types, proximity to stormwater inlets or surface water, time of year, terrain, etc.



Sediment basin during well development. The rate of filling of this basin exceeded sedimentation. Filtration was necessary prior to discharge to the stormwater system.

Discussion of Risk: The water produced from the well-drilling activity is often laden with rock cuttings, silts, clays, etc. referred to as suspended solids. The suspended solids can be substantially increased if drilling water is allowed to flow overland and erode the ground surface. The transport of suspended solids is considered a pollution source and may adversely impact surface water, wetlands, stormwater basins, etc. Sediment leaving the site can blanket the stream bottom and smother fish eggs, macroinvertebrates, and aquatic plants. The influx of turbid water may also lead to an increase in water temperature and decrease in dissolved oxygen which further stresses the aquatic community.

Minimum BMPs for sediment reduction:

1. Standard Operating Procedures/Maintenance:

- Adjust drilling processes to reduce sediment load to development water including using lowered drilling rig air pressure, drill phasing, and reducing drill bit size.
- Trap sediment laden water with a Geotech fabric lined trench, tanks or basin. This allows time for sediment to settle out before discharge.
- Utilize sediment filtration bags to remove fine sediment from the drill rig or settling pond as water flows through.
- Limit pressure of uncontaminated development water when discharging to a piped stormwater system to avoid scouring the pipes and displacing sediment.

2. Wastewater/Stormwater:

- Uncontaminated pumped groundwater may enter stormwater systems.
- Contaminated groundwater (with sediment or other contaminants) may require a MPDES permit prior to discharge to groundwater or surface water.
- Disposal of untreated well development water or drill slurries may be discharged to sanitary sewer with permission from the applicable Wastewater Treatment Plant.

2.1.13 Other Businesses

There are a number of businesses that handle fuels, oil-based paints, solvents, and other chemicals at levels below those requiring a pollution prevention permit or secondary containment or perform activities that generate waste (e.g. auto-body shops, small engine repair shops, full service equipment rental shops, recreational vehicle/boat maintenance, art studios, landscapers, etc.).

Discussion of Risks: Medium to small businesses in this class have been known to have difficulty getting waste hauler contracts due to economic inefficiencies for the hauler. Equipment/vehicle washing wastewater which carries oil, fuel, pesticide, and cleaning agents is often illegally discharged to the ground surface. Oil-water separators that serve wash pads frequently become overwhelmed with dirt and oil. Solvent, solvent wastes, and other low-volume chemicals can be highly toxic and mobile in the environment. Spills on shop floors or during transport can carry contaminants to the ground surface or nearby dry wells.

Minimum BMPs:

1. Containment:

- Label and secondarily contain volumes of regulated substances at threshold levels or more as described on pages 26-30.
- Store portable containers (drums, buckets, etc.) of liquid or dry chemicals, waste fluids, solvents, etc. inside shop or other area protected from run-on and run-off precipitation (covered with a tarp on a pallet, under an eave with ground sloped to a swale, etc.)
- Place tight-fitting lids on all containers when not in use.
- If stored outdoors, choose container storage locations where a spill would not flow to a storm conveyance, storm drain, surface waters, or ground water.

2. Standard Operating Procedures:

- Inspect all incoming vehicles, parts, and equipment that are stored temporarily outside for leaks, use drip pans, provide absorbent materials, clean up spills promptly, provide for proper disposal of waste oil, fuel, and hazardous waste, and do not pour/convey wash water, liquid waste, or other pollutants into stormwater systems, dry wells, or onto the ground.
- Transfer waste fluids to closed containers, drums, or tanks promptly and do leave in open buckets or pans outdoors.
- Collect antifreeze from RV/boat plumbing for waste disposal when flushing is necessary.
- Periodically inspect containers of regulated materials and waste fluids not placed in containment for leaks and replace when not in good condition, leaking, or otherwise deteriorating.
- Launder or dispose of rags properly.

3. Wastewater/Stormwater:

- All wastewater from vehicle/equipment washing must go to an approved wastewater disposal system (as described on pg 23).

Additional BMPs

- Secondary containment of other products such as solvents that are in containers of 5 gallons or less is encouraged especially if there is a frequent transfer of product into and out of the container.
- Local Fire Code may apply for storage of flammables indoors, near buildings, under roofs, etc.

2.2 BMP Components

2.2.1 Secondary Containment

Secondary containment systems provide an essential line of defense in the event of a failure of the primary containment, such as a bulk storage tote, portable containers, and piping. Proper secondary containment construction, sizing, siting, and maintenance are essential to preventing releases that could endanger our groundwater and surface water.

Minimum BMPs for all Secondary Containment systems:

- Construct secondary containment to be non-reactive and resistant to the materials contained.
- Design to prevent infiltration of contained substance into the ground in the event of a release from the primary storage container and associated piping and manifolds.
- Locate containment in an area that isolates the contained substance from soils, industrial or commercial injection wells, floor drains, or any other potential surface and groundwater entry point.
- Design to contain at least 110% of the volume of the largest container, or 10% of the aggregate volume of all containers, whichever is greater.
- If located out-of-doors, incorporate overhead protection or other BMPs to prevent overtopping of contained substance from the containment structure due to precipitation accumulation.

Construction: Materials used in the construction of secondary containment must be chemically compatible with the product being stored. Containers shall be constructed of materials of sufficient thickness and composition so as not to be weakened as a result of contact with accumulated stormwater or discharged product.

Siting and Capacity: Maintaining effective secondary containment outdoors is a challenge when uncovered. Water and debris can enter the area and allow a spill to crest the secondary containment berm. Water can also freeze which then reduces the volume of the secondary containment and can compromise/destabilize the berm. To reduce or eliminate the introduction of precipitation into a secondary containment system, design engineering and procedures should be in place to maintain capacity of the secondary containment (e.g. roof/canopy, draining, pumping, increased sizing and inspection schedule, etc). Roofing may not be effective if the footprint is small and the site is subject to wind. Runoff from the roof should not add to collected water in designated spill containment areas such as a fueling pad. Protecting the containment structure from collision by vehicles or vandalism are other considerations for outdoor storage.

When chemicals are stored indoors, the building may serve as the secondary containment if doorways/openings contain a berm/lip to prevent liquid from escaping, incompatible chemicals do not share the same containment area, and the total cubic volume meets the 110% capacity requirements of the Code. For storage of smaller volumes some buildings can still meet the secondary containment requirements if the floor does not slope to drain to a bay door or other opening.

Operation and Maintenance: Secondary containment systems require regular service and maintenance. To ensure the system continues to function as designed, it is important to regularly inspect and test the containment structure, manage the accumulation of spills, leaks, and stormwater and to pro-actively train employees in these systems.

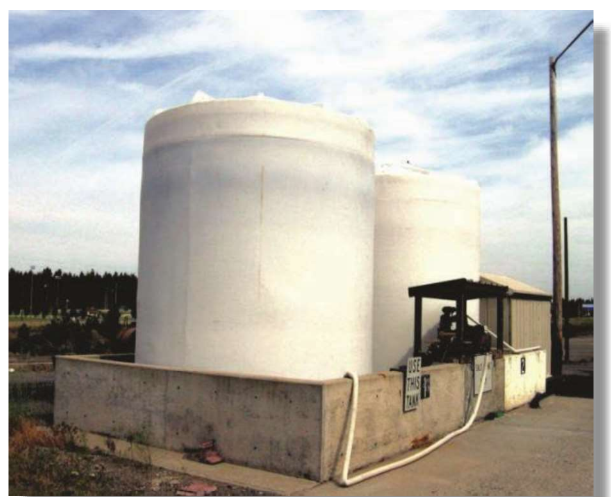
- Leaking Product and Accumulated Spills: Containment systems should be kept relatively free from releases. Accumulated product should be re-used if possible. In no case should any accumulation compromise the containment capacity. If the capacity is being compromised, the accumulation should be evacuated to buckets or drums and stored in containment pending shipment and disposal. Often it is convenient and practical to have your hazardous waste hauler evacuate your containment systems when they come to collect other waste streams and containers.

- Containment Integrity & Hydrostatic Testing : Hydrostatic testing of containment systems is necessary under certain circumstances. First, systems fabricated onsite without engineering design should be hydrostatically tested prior to use. This simply involves filling the containment to the required capacity with water and observing for leaks and change in the water level. Other systems that use liners or underground vaults also need occasional hydrostatic testing. The time of observation should be at least 24 hours for systems $\leq$ 600 gallons and 48 hours for larger systems. Contaminated water must be disposed of by a licensed s waste hauler approved for that particular waste type. Uncontaminated water may be disposed of onsite through stormwater management facilities, an approved wastewater treatment system connection or recycled.

- Stormwater Collected in Secondary Containment Systems : When stormwater is collected in containment systems, it must be evaluated for contaminants prior to on-site disposal. Visual evaluation may be sufficient for products that cause a sheen on the stormwater. Other contaminants such as inorganic ions can be measured with do-it-yourself colorimetric kits (like testing for chlorine in a pool). Otherwise, a sample may need to be submitted to a laboratory. When contaminants are present in a concentration greater than Montana state water quality standards (DEQ-7), water must be managed as wastewater or hazardous waste, as appropriate. This contaminated water may not be disposed of to the surface or subsurface of the ground

2.2.1.1 Concrete Box, Curb, or Recessed Slab

Description: An open box, basin, or recessed floor typically designed to contain large volumes of critical materials. Using recessed floors or stem-walls, this design concept can provide broad area containment for an entire room or building footprint.



Concrete box containment. Photo credit: Panhandle Health District

Design Criteria & Features: These components typically require an engineered design to consider specific criteria such as topographic grades, compressive strength, permeability, and other quality control measures for the concrete work. Other criteria include:

- Walls and curbs should be part of a mono-pour with the slab, or floor, whenever possible. If a cold joint is used instead, then chemical-resistant water stops must be used in the joint.
- Epoxies or other industrial sealants must be used when chemical resistance or additional sealing is needed.
- Drain outlets should be clearly marked with valve status obvious and consistent with a handle or flag direction.
- Containment vaults may be required to facilitate monitoring and recovery of chemical or stormwater.

Operation & Maintenance: Since many of these applications are outdoors, stormwater management considerations should be made. Diligent maintenance of cracks with appropriate chemical resistant caulk and grout prevents leaks and helps keep cracks from getting worse. Grinding and cleaning of the crack surface prior to sealing is critical. Self-leveling polyurethane caulks work best in horizontal applications. Drain valves should be kept closed and checked on a regular basis through a posted/recorded self-inspection process.

2.2.1.2 Double Walled Tank

Description: A tank within a tank, the inner tank being separated from the outer by a space, or interstice, that provides at least 110% containment for the inner tank.

Design Criteria & Features: The interstitial space must be easily monitored, preferably with a visible float gauge or electronic gauge. Dip sticking is acceptable on smaller tanks ($\leq$600 gallons). If the tank is double walled such that a breach of the internal layer is protected by the outer wall, the tank is in compliance. Keep in mind that double-walled tanks do not protect surrounding soil from overtopping, spills during filling or emptying, or from an outside breach. Therefore, a secondary containment area outside of an above ground double-walled tank is a better practice.

Operation & Maintenance: The interstitial space must be monitored as part of a regular self-inspection process. Associated piping joints, valves, and nozzles should be kept tight and weep-free.

2.2.1.3 Fabricated Steel Trough

Description: A welded steel box or pan into which drums or smaller tanks (usually < 600 gallons) are placed. For larger areas, an alternative design using angle-iron bolted and glued or gasketed to a concrete floor may be used.

Steel containment for motor oils. Photo credit: Panhandle Health District

Design Criteria & Features: The gauge of the steel must be sufficient to withstand the activities and abuse that the box or pan will receive. Prior to use, the welds, glue, or gasket must be tested by filling the containment with water and checking for leaks. An inspector may request to witness the test. Depending on the size and number of containers being stored, the walls on a box type of containment may need to be quite high in order to satisfy the 110% (or 10% aggregate) containment criterion. This should be considered carefully prior to construction especially if it will be necessary to move containers into and out of the containment. Glue or gaskets used in a bolted angle-iron application must be chemically compatible with the critical material stored.

Operation & Maintenance: These containment devices may need to be evacuated or pumped out periodically. If the facility is not equipped to perform pumping and cleaning of the containment, your hazardous waste hauler should be able to perform that service for you.

2.2.1.4 Piping, Coupling, & Valve Containment

Description: A trench, chase, pan, or second pipe wall designed to collect and contain release from pipes, couplings, or valves. Containment should be provided for these components whenever they are located outside of a main containment area or in the ground. (Does not apply to fuel piping compliant with UST rules regarding monitoring and cathodic protection.)

Design Criteria & Features: Whenever possible, piping and onload/off-load couplings should be located over the containment device used for containing the bulk material being conveyed. These applications are usually very site specific. General criteria are as follows:

Fabricated catch tray. Photo credit: Panhandle Health District

- Trenches, chases, pans and open second walls (non-pressurized double walls) should drain back to a main containment or a containment vault (this will increase the amount of stormwater collected, if exposed).
- The method used should account for and contain any feasible pressurized fluid trajectory.
- Closed second pipe walls (pressurized interstitial space) should be provided with a gauge, alarm, or other means of detecting a release.

Operation & Maintenance: Operation and maintenance will depend on the specific method used but may include visual inspection of races and vaults, checking leak detection devices, and repairing cracks. Releases should be put back into production or disposed of in accordance with law.

2.2.1.5 Prefabricated Containment

Description: Typically, a polyethylene, rectangular, shallow box covered with a grate on which drums sit. These devices are often referred to as a containment pallet. They are available in any number of sizes and volumes, usually with fork-lift access. Some have optional polyethylene covers to allow placement outside. Containment pallets are also available for tote containers.

Design Criteria & Features: These devices are not always designed to meet the 110% containment volume criterion. Most containment pallets have fork-lift entry slots for ease of relocation. Ramps can be purchased or constructed to allow access for wheeled drum trucks. Check the manufacturer's specifications on compatibility between the containment material and the chemical you are storing.

Operation and Maintenance: These containment devices need to be evacuated or pumped out periodically when product transfer in or out of the drums is common. If the facility is not equipped to perform pumping and cleaning of the containment, your hazardous waste hauler should be able to perform that service for you. Some devices offer integral drain plugs which simplify evacuation, but plugs are often known to leak or be left open inadvertently. Replace containment devices that have been damaged.

Prefabricated drum containment. Photo credit: Panhandle Health District

2.2.1.6 Temporary Systems

Description: Typically comprised of a prefabricated collapsible unit, or a geomembrane, these systems are usually approved only for construction projects or other temporary uses.

Design Criteria & Features: Prefabricated system application must meet the intended use as specified by the manufacturer. Geomembrane systems should meet all criteria described in the Membrane Liner component on page 39.

Operation and Maintenance: Establish protocols for handling spills and stormwater. Inspect systems regularly for damage and product or stormwater accumulation. Collapsible, drive-on containment systems will need immediate response protocol for a release within the containment.

Example of temporary storage. Photo credit: Panhandle Health District

2.2.2 Drainage and Treatment Systems

2.2.2.1 Storm Drains vs. Sanitary Sewers

Storm drains and sanitary sewers have two distinct functions. It is important to understand the difference:

Storm Drains are intended to collect and transport runoff from rainfall. Storm drain systems do not remove pollutants from water before it is discharged into ground water, rivers and streams. These are typically the drains found in streets and parking lots. Dry wells (also referred to as dry-sumps, stormwater injection wells, Class V wells, or storm sumps) are the most common, and deliver stormwater into a ~8' deep hole in the ground lined with concrete and composed of a gravel bottom. Some storm drains have identical looking inlets but are piped to an outfall which discharges into a water body like a river or stream.

Sanitary Sewers collect wastewater from indoor plumbing such as toilets, sinks, washing machines, and other drains and take it to a wastewater treatment plant. The treatment plant removes pollutants from wastewater before it is discharged to the river.

2.2.2.2 Containment Vault

Description: Containment vaults are watertight structures designed for spill containment. They are typically used at facilities where spills are not permitted to enter an oil-water separator for discharge to the wastewater treatment plant or where a connection to sanitary sewer is unavailable.

Design Criteria & Features:

- Vaults must be sized appropriately for the expected spill volumes.
- Containment vaults must be installed with an audible/visual alarm set at 75% capacity. Clean and test the alarms, floats and sensors at the time of pumping.
- Containment vaults located under a facility must be vented and have a water seal using a sanitary T to prevent vapors from entering the building.

Operation & Maintenance:

- Containment vaults must be inspected and maintained regularly to remain effective.
- At a minimum, perform annual hydrostatic testing of vault to ensure all seams are sealed and no leaks are present.
- Wastes must be hauled by a qualified hazardous waste hauler to an approved destination. Keep all receipts/records onsite for no less than 3 years.

2.2.2.3 Fueling Pad

Description: A concrete pad onto which vehicles park while refueling. The pad is sloped to one or more trench drains or catch basins. Trench drains and catch basins discharge to a containment vault or to an oil-water separator which then discharges to a properly maintained, irrigated vegetated swale or retention pond.

Fueling pad with elevated perimeter to exclude run-on of stormwater. Photo credit: Panhandle Health District

Design Criteria & Features: Fueling pads and canopies at fueling facilities must be designed in accordance with City of Missoula design standards and prevent stormwater run-on and run-off. Additionally:

- Covered fueling pads (canopies) minimize transport of petroleum products to stormwater. If a canopy is used, canopy roof drains must bypass the pad and any containment vaults or oil-water separators.
- Fueling hoses cannot extend past the canopy if a drive-off could allow fuel to exit the fueling pad and enter nearby storm drains.
- Fueling pads must incorporate trench drains or other drainage system to deliver fuel spills to containment vaults or oil-water separators. Proper grades are critical to ensure flows reach catch basins and separators.
- Containment vaults must be sized appropriately to contain potential spills. A 500-gallon minimum capacity applies to fueling islands.
- Grades, rolled curbs, or other drainage diversions must be used to exclude stormwater from outside the footprint of the pad.
- Catch basins and rolled curbs should be part of a mono-pour with the pad. If a cold joint is used, fuel resistant water stops must be used in the joint. Expansion cracks should be filled with a self-leveling polyurethane caulk.
- Outlets of catch basins should be significantly above the bottom of the basin to allow for sludge accumulation. A screen, inverted elbow, or 'T' should be placed on the outlet to minimize floating debris entering the separator. The gasket or grout seal around the outlet must be watertight.

Operation & Maintenance: Once the pad is constructed, its grade should be tested by pouring water in representative locations of the pad to verify that all flows go to collection. Maintain cracks with appropriate chemical-resistant caulk or grout as necessary to maintain the integrity of the containment. Self-leveling polyurethane caulks work best in horizontal crack sealing applications. Clean trench drains and catch basins frequently to keep them clear of sediment and debris. Sludge from catch basins should be handled as per the oil-water separator section in this manual (pg. 33).

2.2.2.4 Oil-Water Separator

Description: Oil-water separators are designed to remove and contain floatable contaminants such as oil, gasoline, and grease from a wastewater or stormwater stream. As the waste stream passes slowly through the separator, these lighter contaminants can float to the surface and become contained by the 'T' outlets and absorbent pillows. Most often separators are used in fuel island applications for pretreatment prior to swale discharge or pretreatment of floor-drain wastes prior to discharge to public sanitary sewer.

Design Criteria & Features:

- There are two basic types of oil-water separators, conventional and coalescing plate interceptors (CPIs). Conventional separators typically feature a two-chambered 1,000-gallon tank with inlet and outlet 'T's'. This design relies upon gravity, the physical characteristics of oil and sediments, and proper sizing and other design parameters to ensure effective pollutant removal. CPI separators contain closely-spaced plates to increase the removal efficiency of oils and grease. All separators must have watertight joints. Refer to the City of Missoula standard drawings for additional detail.
- The separation of oil from water is most effective under conditions of tranquil flow and sufficient retention times. Design the separator to minimize flow rate through the separator to avoid resuspension of oil, scouring and resuspension of sediment, and overwhelming the unit's ability to treat the water.
- Oil-water separators are not effective for treating stormwater at high flows. On sites where stormwater may enter the separator, use of other stormwater BMPs in series can decrease flows and improve efficiency. For example, in some situations a bypass manhole with baffle and trash rack can prevent larger storm events from overwhelming the separator (diagram on pg. 36)

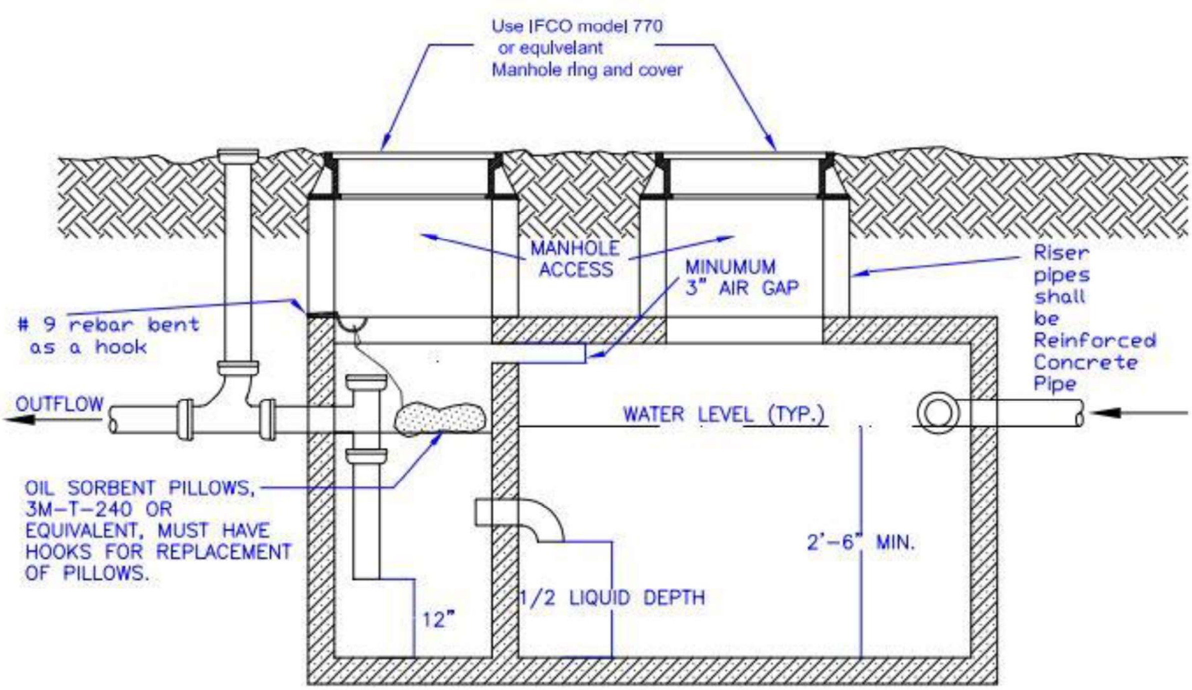


Diagram of a conventional oil-water separator

Operation & Maintenance:

- Oil-water separators must be inspected and maintained regularly to remain effective. Inspect the tank at a minimum of once every 3 months (quarterly). Keep all inspection, maintenance, and hauling receipts/records onsite for no less than 3 years.
- Absorbent pillows placed inside chambers reduce contaminated levels of hydrocarbons in water. These should be replaced as needed when saturated.
- Inspect the unit frequently to assess the oil and sludge layers. Determine the oil/water interface using a gauge stick and water finding paste. The separator should be pumped when ¼ inch or more of material (oil, fuel) can be detected on top of the water and/or when sludge accumulation is 25% of the total volume. Sludge depth can be determined by using a measuring stick and marking when contact is made with top layer of sludge and again when stick reaches the bottom of the tank. An oil level sensor can be used in place of manual detection.
- Any standing water removed should be replaced with clean water to prevent oil carry-over through the outlet.
- Wastes must be hauled by a qualified hazardous waste hauler to an approved destination. Petroleum products can adhere to suspended solids and sediment, but some sludges may not qualify as hazardous waste. Toxicity characteristic leaching procedure (TCLP) analysis, paint filter test, or total petroleum hydrocarbon (TPH) testing may be required prior to disposal at a solid waste management facility.
- The destination of discharges from oil-water separators are dependent on the business type, application, quantity and type of waste received. See applicable business type section for approved discharge information.

2.2.2.5 On/Offload Pad

Description: A concrete pad sloped to a drain that passes material spilled during bulk transfer into a containment area; usually a concrete box type containment or an approved containment vault.

Design Criteria & Features: This component typically requires an engineered design to consider critical site-specific criteria such as topographic grades, compressive strength, permeability, and other quality control measures for the concrete work. Other criteria include:

- Catch basins and curbs should be part of a mono-pour with the slab, or floor, whenever possible.
- If a cold joint is used instead, then chemical resistant water stops must be used in the joint.
- The footprint of the pad should accommodate any feasible fluid release trajectory.
- Epoxies or other industrial sealants must be used when chemical resistance or additional sealing is needed.
- Grades on the pad must be accurate to channel all spilled product to containment. Grades outside the pad footprint must preclude any surface stormwater from flowing onto the pad.
- A receiving containment area must be designed to accommodate the excess stormwater from this pad and still provide the containment volume required for the material stored; For design purposes, assume at least one week's accumulation during peak seasonal precipitation.

Operation & Maintenance: Since this application is typically outside, stormwater management considerations should be made. Most concrete work is subject to cracking over time. Diligent maintenance of cracks with appropriate chemical resistant caulk and grout is necessary in order to maintain the integrity of the containment. Cleaning and preparation of the crack surface prior to sealing is critical. Self-leveling polyurethane caulks work best in horizontal applications. Catch basins and drains should be checked/cleaned on a regular basis through a posted/recorded self-inspection process.

2.2.2.6 Tank Fueling Area

Description: The area surrounding petroleum underground storage tank filling ports is subject to releases of petroleum products during tank fueling. Protecting water resources down-gradient of these areas can be challenging due to existing grading, lack of vegetated swale options, and the presence of stormwater flows. Dry wells should not be located directly down-gradient of the tank ports.

Design Criteria & Features:

This tank fueling area is graded to drain to a vegetated swale that incorporates a curb cut and beehive grate.

- Drainage may be designed to direct stormwater and releases from tank fueling areas to vegetated swales.
- Spills may be directed to oil-water separators or catch chambers that discharge to vegetated swales or dry wells.
- If discharging to a dry well from the separator or catch chamber, a minimum separation of 20’ must exist between bottom of dry well and groundwater.
- Oil-water separators and catch chambers are not effective for treating stormwater at high flows. Design the separator or catch chamber to minimize the flow rate to avoid resuspension of oil, scouring and resuspension of sediment, and overwhelming the unit’s ability to treat the water and retain contaminants.
- Sizing an oil-water separator based on flow rate should be done using the Rational Method: Q = CiA (Q = flow rate in CFS, C = rational coefficient, i = rainfall intensity (in/hr), and A = area in acres). Intensity should be based on the 2-year 5-minute storm.
- On sites where stormwater may enter the separator, use of other stormwater BMPs in series can decrease flows and improve efficiency. For example, in some situations a bypass manhole with baffle and trash rack can prevent larger storm events from overwhelming the separator.

Operation & Maintenance:

- The tank fueling area release BMPs (swales, oil-water separators, etc.) must be inspected and maintained regularly to ensure effective function.

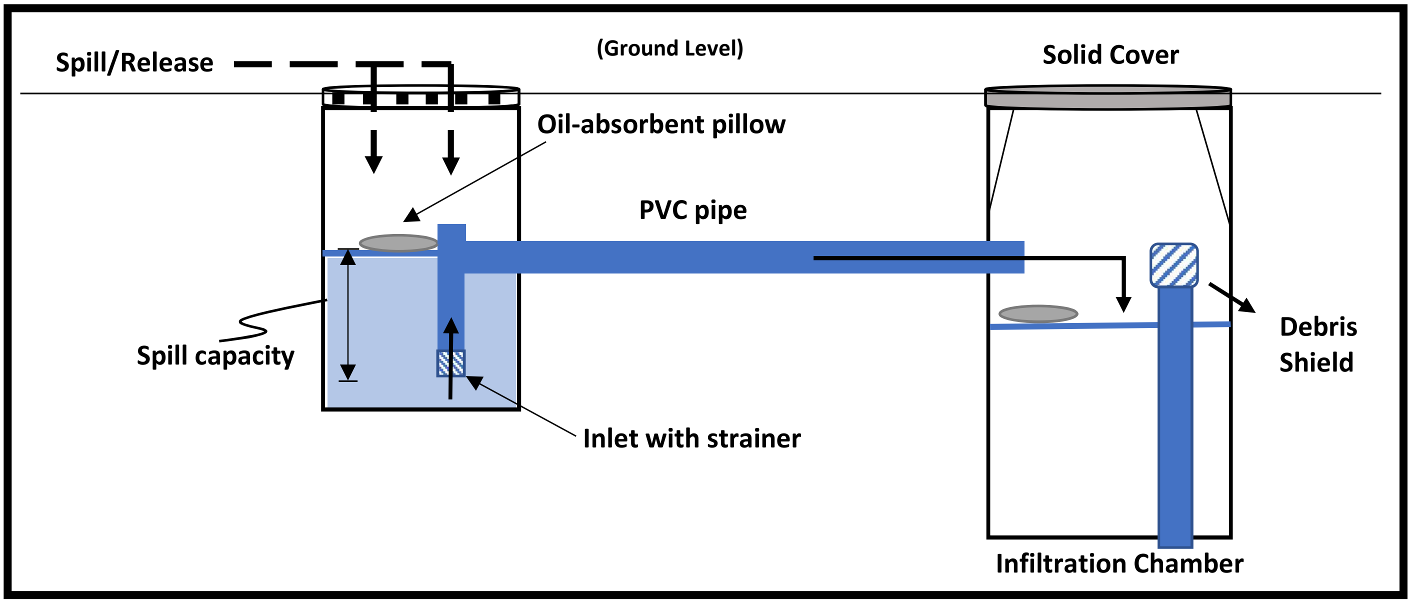
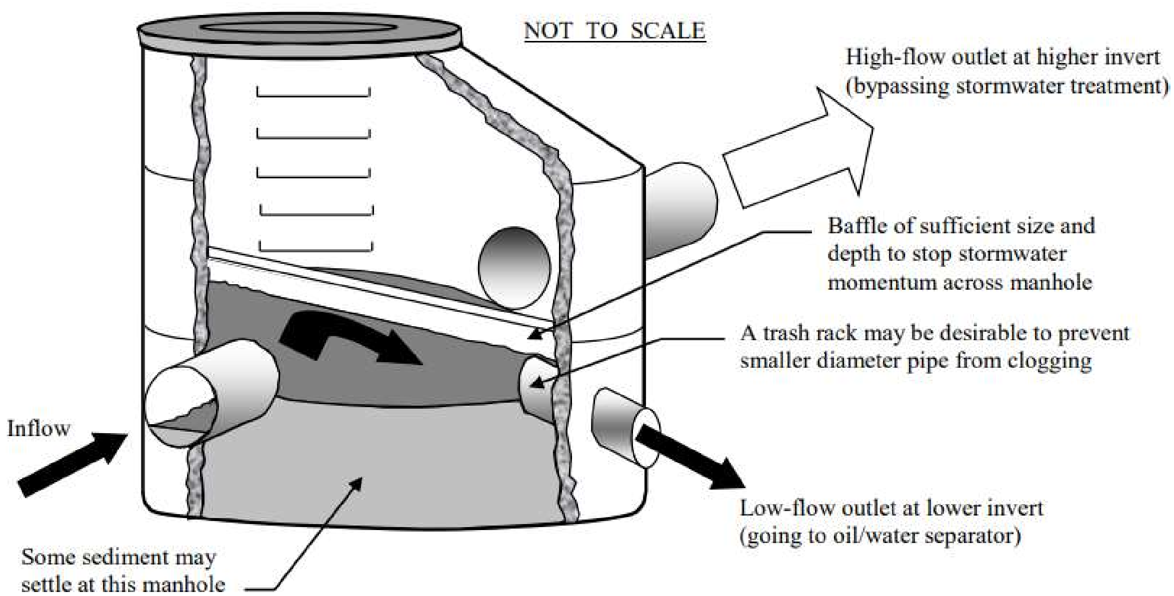


Diagram of a potential drainage system for a tank fueling area. An oil-water separator or appropriately sized concrete catch chamber connected to an infiltration chamber or dry well allows for increased retention time in chamber and settling of solids. Stormwater and fuel releases contained in chamber pass through oil-absorbent prior to entering infiltration chamber or dry well.



A stormwater bypass manhole with baffle. This BMP allows for stormwater from high-flow events to bypass the oil-water separator. Maintenance of this type of BMP is required to ensure effective function of the system (sludge removal, oil removed, clogs removed, etc.). Diagram credit: City of Knoxville BMP Manual.

2.2.2.7 Vegetated Filtration - Swales and other Low Impact Development systems

Description: A vegetated swale is a broad, shallow vegetative-lined area, depression, or channel designed to collect and treat contaminants in stormwater runoff through sedimentation, infiltration, and filtration. There are many subtypes of this BMP that differ in ability to filter or retain stormwater (biofiltration swales, infiltration basins, bioretention basins, etc.). For example, infiltration basins use the natural filtering ability of soils to remove pollutants in stormwater runoff. Stormwater runoff is retained in the basin with the only means of emptying being through evapotranspiration and infiltration. Infiltration basins have high pollutant removal efficiencies and can help recharge groundwater.

Design Criteria & Features: Flow-based treatment systems should be sized to address site-specific runoff treatment flow rates. Final stormwater treatment and disposal components, such as swales, are discussed in the Montana Post-Construction Stormwater BMP Design Guidance Manual.

Parking lot bio swale design. "Conservation Design Forum Project: Fountain View Recreation Center, Carol Stream, IL" by Center for Neighborhood Technology is licensed with CC BY-SA 2.0. To view a copy of this license, visit *https://creativecommons.org/licenses/by-sa/2.0/*

2.2.3 Equipment

2.2.3.1 Absorbents

Description: Floor-dry, kitty-litter, oil-absorbent pads, work well to absorb liquid hydrocarbons from surfaces. Kitty litter can be swept up with a stiff bristled broom prior to disposal. Absorbent pads can be lifted after oils have soaked into the fabric. Absorbents saturated with hydrocarbons must be disposed of properly.

2.2.3.2 Booms Or Oil-Socks

Description: Oil-socks and booms can be placed around storm drains and conveyances to selectively absorb hydrocarbons. They can also be effective at preventing debris from entering the storm drain. Oil-socks or booms saturated with hydrocarbons must be disposed of properly.

Oil-absorbent pads used on fuel spill in Missoula.

Spill kit containing absorbent pads and booms. Photo credit: awarehousefull.com

Example of granular/dry absorbent. Photo credit: Oildri.com

2.2.3.3 Membrane Liner

Description: A flexible polymeric geomembrane usually fabricated from polyethylene (HDPE or LDPE) or polyvinyl chloride (PVC). Typically lain in an excavated depression or the edges are placed over earthen berms or eco blocks to create a basin. Due to their shortcomings, liners are typically used to contain less hazardous materials. They are useful for covering extremely large areas, as containment under buildings, or as temporary containment.

Technician seaming a 'boot' in a liner perforation. Photo credit: Panhandle Health District

Design Criteria & Features:
Minimum accepted thickness for a geomembrane liner used for containment is 30 mils for PVC liners and 60 mils for HDPE liners, or must have engineered installation criteria that warrantee a minimum 10 year life for the particular application. Liners must be placed on a carefully prepared base material that will protect it from damage when weight is applied. Grades of the base should include a containment vault area that facilitates monitoring and recovery of stormwater or released chemical. Grades should be set to minimize standing fluid when the vault is empty.

Perforations and seams must be booted and sealed.
Covering a liner with a geotextile, sand, gravel, or soil may prolong its life (check with the manufacturer).
When covered with sand/gravel or soil, an inspection port must be inserted into the vault. The port must accommodate a suction hose for the evacuation of stormwater or released material. Prior to use, the rim elevation must be clearly marked in the inspection vault by filling the liner with water until a static level is reached.

Operation & Maintenance: Liners have limited lifespan, particularly if exposed to air and sun. Leaks may result from poor installation controls, physical wear & tear, and chemical degradation over time. The manufacturer should declare a useful or warranted life span in the specifications for the liner. If the liner has exceeded that lifespan, then it should be replaced or hydrostatically tested on an annual basis. Self-inspections should note if and how much stormwater is collected. A hydrostatic test should also be performed If stormwater is not accumulating as it should.

2.2.3.4 Oil-Stop Valve (Osv)

Description: This device consists of a passive float valve configuration where the float is more dense than oil/fuel but less dense than water. This allows water to pass through the system, but the float valve sinks and closes in the presence of a given amount of oil/fuel. This component is considered a necessary part of a BMP system for bulk fuel containment where stormwater is allowed to flow through the containment.

Design Criteria & Features: The full level of the tank or pit containing an OSV must be below the main containment level. Discharge from this device must pass through an oil-water separator and on to a vegetated swale.

Operation & Maintenance: Oil or fuel must be evacuated from the pit periodically and disposed of as hazardous waste.

2.2.3.5 Sediment Filters

Description: Sediment filter socks (e.g. bio-bags, rock socks) may be placed upgradient and around storm drains as a protective barrier against debris and sediment. A “Dandy Sack” placed under the storm drain grate can also filter out large sediment. To remove silt and sand use 200 mesh screen or smaller.

Dandy Sack placed within storm drain.

Filter sock for catching sediment.
Photo credit: newpig.com

A good candidate drain for an oil-absorbent sock.

2.2.3.6 Stormdrain Covers And Protection

Description: These devices are placed on top of a storm drain and create a seal to prevent water from entering. Because storm drains are in low lying areas, water will pool at the seal location. For sites with relatively smooth surfaces, manufactured berms may be placed around a storm drain to allow water to pool as well. Pooled water can then be collected with a sump-pump or shop vac.

Storm drain cover

Adhesive spill berm. Photo credit: newpig.com

APPENDIX

AGENCY CONTACTS

Missoula Valley Water Quality District
301 W Alder
Missoula MT 59802
406-258-4890
www.missoulacounty.us/wqd

Montana Department of Environmental Quality (DEQ)
Water Protection Bureau – MPDES permitting, groundwater discharge, non-point source pollution, TMDLs, technical assistance etc.
www.deq.nt.gov/Water
406 444-5546

City of Missoula Wastewater Treatment Plant
406-552-6600

City of Lolo Water and Sewer District
405-273-2733

City of Missoula Building Department – Building permits, standard design drawings, SWPPP compliance, etc.
552-6630

Missoula County Public Works – Building permits and stormwater infrastructure in Missoula County
406-258-3701

City of Missoula Stormwater Utility – Can help locate and identify types of storm drains near your facility
406-552-6364

Hazardous Waste/Oily Waste Haulers and Recycling
Tri State Waste Recyclers – 406-274-4080
Emerald Services – 406-543-7911
Safety Kleen – 509-928-8353
Nash Enterprises – 406-721-1773

ALTERNATIVE BEST MANAGEMENT PRACTICES (BMP) REQUEST

THIS FORM is to be used to request the use of an alternative BMP to one or more of the minimum BMP requirements or for a major modification to one of the required BMPs as stated in the MVWQD BMP Manual. It can be used by those who already have BMPs on their site that may differ from the requirements, or in cases where implementation of one or more of the required BMPs is not the best or preferred solution.

AFTER RECEIVING THIS REQUEST, the Department will: (1) Review the request; (2) Notify the applicant the request was received and when a decision will be made; and (3) Notify the applicant in writing of approval or denial, and an explanation of the decision.

INSTRUCTIONS:

1. Answer each question on this form as briefly as possible while still conveying relevant information.
2. Additional pages can be used if necessary.
3. Return this request to: Missoula Valley Water Quality District
   301 W Alder
   Missoula MT 59802

TO BE COMPLETED BY APPLICANT:

Applicant's name:___________________________ Date: __________________

Owner name: ______________________________

Facility name:______________________________

Facility address:____________________________

____

Email:_____________________________________

Phone number: ________________________

1. Type of business/facility (brief description)
2. Specific activity or component under consideration for BMP:
3. What the Manual requires:
4. Why this will not work at facility:
5. Proposed Alternative (feel free to attach additional information):

DEFINED TERMS

Aboveground Storage Tank (AST) - A tank that is used to contain an accumulation of a Regulated Substance, and the volume of which is more than 90% above the surface of the ground.

Allowable Non-Stormwater Discharge - Any one of the water-generating activities listed in Missoula Municipal Code 13.27.200 (B).

What are examples of allowable non-stormwater discharges?

Any one of the following water-generating activities (with conditions): Irrigation water; irrigation ditch return flows; landscape irrigation; permitted diverted stream flows; rising groundwater; rising natural floodwaters; uncontaminated groundwater infiltration to separate storm sewers; uncontaminated pumped groundwater; discharges from potable water sources; foundation drains; air-conditioning condensation; springs; water from crawl space or basement pumps; footing drains; lawn watering, residential car washing; residential dechlorinated swimming pool and hot tub discharges; residential street washing; charity or other non-commercial car washes, flows from riparian habitats and wetlands; uncontaminated water from irrigation system meter pits; flows from emergency firefighting activities; fire hydrant flushing; water line flushing; and residential gardening or landscaping activities, municipally owned dechlorinated swimming pool discharges, municipal water tank draining, and water from street washing (including sidewalks and medians) that is conducted by City staff or under contract with the City.

Aquifer - A water-bearing, subsurface formation capable of yielding sufficient quantities of water for beneficial use.

Aquifer Protection Area - The areas within the City of Missoula and within five miles outside the Missoula city limits which are within the boundaries of the Missoula Valley Water Quality District.

Best Management Practices (BMPs) – Control measures taken to mitigate potential contamination of soil, groundwater and surface water and described in detail in the Department's Best Management Practices for Pollution Prevention Manual. For businesses or activities for which local BMPs do not yet exist, national, regional, or appliable industry standard BMPs apply.

Board - The Missoula Valley Water Quality District Board.

Bulk Petroleum Storage - A facility used for storage of petroleum products for marketing or wholesale distribution that has a total bulk storage capacity of 50,000 gallons or more.

Carbon Absorption/Evaporation Technology: A treatment technology which removes chlorinated solvents from a water-solvent mixture.

Chemical Manufacturing Facility - A facility having a North American Industry Classification Code (NAICS Code) between 325180 and 325998 which handles Regulated Substances in an amount equal to or greater than threshold quantities.

Chlorinated Solvent – An organic solvent containing chlorine atoms within its molecular structure.

Class II Landfill - An area of land or an excavation, as defined in Montana Administrative Rules A.R.M. 17.50.504, where group II or group III wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile. Group II and III wastes are defined in Montana Administrative Rules, A.R.M. 17.50.503.

Class III Landfill - An area of land or an excavation, as defined in Montana Administrative Rules A.R.M. 17.50.504, where group III wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile. Group III wastes are defined in Montana Administrative Rules, A.R.M. 17.50.503.

Closure Permit - A permit issued by the Department in accordance with section 13.26.060 of this code when a facility is permanently closed or has been abandoned for one year.

Community Water System - Any public water supply system, as defined in A.R.M. 17.36.101, which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

Component - Any constituent part of a unit or any group of constituent parts of a unit which are assembled to perform a specific function.

Containment Vault – A sealed tank that is limited to accepting and containing accidental spills. A tank that receives wastewater from a fixture is not a containment vault.

Contamination - The presence of any substance (chemical, radiological, or biological) or any condition (temperature, pH, taste, color, odor, turbidity) in soil or water which may create or threaten to create a hazard to human health or the environment, or impair the usefulness of the soil or water.

Deicer - A chemical substance used to melt ice or snow deposited on roads or other surfaces.

Department – The Missoula City-County Health Department

District - The Missoula Valley Water Quality District

Dry Cleaning Establishment - Any facility that uses a transfer machine, dry-to-dry vented unit, or dry-to-dry closed loop unit that uses chlorinated solvents to clean textiles.

Dry Well - A USEPA-designated Class V stormwater injection well: a bored, drilled, or driven shaft or dug hole whose depth is greater than the opening width at the widest point, for the subsurface infiltration of stormwater.

Dry-to-Dry machine: A machine that washes and dries textiles without transferring them.

EPA - United States Environmental Protection Agency.

Facility - An area that includes the real property, building or buildings, and appurtenant structures, or any subset of the proceeding elements, used by a person.

Fleet - More than 5 vehicles or locomotives.

Fueling Facility - A facility that dispenses petroleum products for commercial sale, public use, or for fleet vehicle operation, excluding bulk petroleum storage facilities and farm and residential tanks of 1100 gallons or less capacity used for storing motor fuel for non-commercial purposes.

Fueling Pad – A concrete pad on which vehicles are refueled.

Future Wellhead Reservation Area - The surface area overlying a portion of the Missoula Valley Aquifer which, because of aquifer recharge, groundwater flow and potential sources of contamination, should be protected against contamination to assure high quality groundwater for future drinking water source development. This area includes all land within township 13N, range 19W, sections 27 and 34, all land south of the Clark Fork River within township 13N, range 19W, section 22, and all land within the northwest and northeast quarter sections of township 13N, range 19W, section 34 of Montana Meridian, Missoula County, Missoula, Montana.

Groundwater - Water that fills the interconnected spaces of material below the water table (upper limit of saturation), or water which is held in the unsaturated zone by capillary action.

Handle - To use, generate, process, produce, package, treat, store, emit, discharge or dispose of a Regulated Substance, excluding (a) handling during continuous non-stop transit, (b) transit via pipeline, and (c) handling of parcels and packages by the United States Postal Service, motor freight companies, and private delivery services.

Hazardous Waste - A hazardous waste as defined pursuant to section 1004(5) of the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6903(5), as amended, including a substance listed or identified in 40 CFR 261.

Hazardous Waste Management Facility - All contiguous land, and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of a hazardous waste, as defined in A.R.M 17.31.301 as a Major

Hazardous Waste Management Facility. A Hazardous Waste Management Facility may consist of several treatment, storage, or disposal operational units.

Independent Certified Laboratory: A laboratory outside the control of the person requesting approval from the Department that is certified by the EPA or other appropriate certifying agency to complete testing.

Industrial or Commercial Injection Well - A well or septic system that receives industrial or commercial wastes from a public or private facility, excluding wells or septic systems used solely for stormwater discharge, sanitary waste discharge and/or discharge or extraction of non-contact heating and cooling system water.

Large Capacity Petroleum Storage Tanks - A tank greater than 50 feet tall or having diameter greater than 30 feet used for storage of petroleum products.

Missoula Valley Aquifer - The aquifer underlying the Missoula Valley which supplies the area with water.

New - Constructed, installed or brought into operation after the original effective date of this code (Ord.2906, 1994).

Noncomplying Activity - An activity involving the handling of a Regulated Substance in an amount equal to or greater than its threshold quantity within a Future Wellhead Reservation Area.

Non-transient Non-community water system - Any public water supply system as defined in A.R.M. 17.38.202 that is not a community water system and that regularly serves at least 25 of the same persons over six months per year.

Perchloroethylene (C_2CL_4) - A colorless liquid used as a dry-cleaning fluid; general degreaser of metals; solvent for waxes, fats, oils, and gums; constituent of printing inks and paint removers. Synonyms include: Tetrachloroethylene, Tetrachloroethene, PCE, PERC.

Person - Any person, individual, public or private corporation, firm, association, joint venture, partnership, municipality, governmental agency, political subdivision, public officer or any other entity whatsoever or any combination of such, jointly or severally.

Piping Manifold - The area(s) of a piping system fitted with apertures for making multiple connections.

Pollution Prevention Permit - A permit required of a person who owns, operates or controls a facility that handles any Regulated Substance in an amount equal to or greater than four times its threshold quantity. Pollution Prevention Permits are issued by the District in accordance with section 13.26.050 of this code.

Primary Container - A container which comes into immediate contact with a Regulated Substance.

Public Sewage Disposal System - A system, as defined in §75-6-102 MCA, for collection, transportation, treatment or disposal of sewage that is designed to serve or serves 15 or more families or 25 or more persons daily for a period of at least 60 days out of the calendar year.

Public Water Supply System - A system, as defined in §75-6-102 MCA, for the provision of water for human consumption from any community well, water hauler for cisterns, water bottling plant, water dispenser, or other water supply that is designed to serve or serves 15 or more families or 25 or more persons daily or has at least 10 service connections at least 60 days out of the calendar year.

Refrigerator Condenser: A vapor recovery system into which a chlorinated solvent vapor stream is routed and condensed to segregate the chlorinated solvent.

Regulated Substance - Any liquid substance, semi-liquid substance, or soluble solid on the most current Superfund Amendments and Reauthorization Act (SARA), Title III List of Lists published by the Office of Pollution Prevention and Toxic Substances, U.S. Environmental Protection Agency, Washington D.C., any petroleum product, any hazardous waste, or any other substance identified in this code.

Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of a Regulated Substance into the soil, groundwater or surface water (including the past release of a regulated substance), but excluding:

1. Releases contained in a secondary containment area or the indoor workplace, provided the release does not exit the indoor workplace.
2. The use of pesticides as defined in §80-8-102(30) MCA when they are applied in accordance with approved federal and state labels, and any discharge permitted by a local, state, or federal agency.

Replacement - replacement or replace shall mean:

1. Replacing, repairing, upgrading or improving a facility at a cost which equals or exceeds 50% of the value of the facility at the time of such act.
2. Replacing a component or more than 50% of a component of a facility.
3. Reoccupation of a facility, reuse of a component at a facility, or restarting an activity which has been out of service or not practiced for a period of one year.

Secondary Containment – Containment to and external from the primary container adequate to prevent the release of Regulated Substances to native soil, surface water, or groundwater.

Soluble Solid - A solid that exists in a powder form and has a particle size less than 100 microns, is handled in solution or molten form, or meets the criteria for a National Fire Protection Association (NFPA) rating of 2, 3, or 4 for reactivity.

Stormwater - As defined in 13.27.030

Tank - Stationary device designed to contain an accumulation of substances and constructed of non-earthen materials (e.g. concrete, steel, plastic) that provide structural support.

Tank Fueling Area - The area surrounding underground storage tanks subject to releases of petroleum products during tank fueling, including the area surrounding the tanker truck during fueling.

Threshold Quantity - Quantities of Regulated Substances (excluding products in vehicle fuel tanks, aerosol spray cans, products used for research at educational institution laboratories, and substances sold for retail in a container equal to or less than 5 gallons capacity) handled at a facility at any one time, regardless of location, number of containers, or method of storage.

1. For those Regulated Substances specifically listed in the Superfund Amendments and Reauthorization Act (SARA) Title III List of Lists and for those Regulated Substances which are listed hazardous waste defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be the reportable quantity published in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 40 CFR 302, Table 302.4 or the Superfund Amendments and Reauthorization Act (SARA) Section 355, Appendix A.

2. For those Regulated Substances that are characteristic hazardous wastes defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be based on the substance contained in the waste with the lowest threshold quantity.

3. For those Regulated Substances not listed in the Superfund Amendments and Reauthorization Act Title III List of Lists, and for those Regulated Substances that are not a hazardous waste, the following quantities of qualifying substances at a facility at any one time shall constitute a Threshold Quantity:

    a. Gasoline - 250 pounds or 25 gallons
    b. Diesel/Jet Fuel/Kerosene - 500 pounds or 50 gallons
    c. Used Motor Oil/Hydraulic Oil/Transmission Fluid - 1000 pounds or 100 gallons.
    d. Unused Motor Oil/Hydraulic Oil/Transmission Fluid - 2,000 pounds or 200 gallons
    e. Deicer – 1000 gallons or 10,000 pounds

4. For those substances that are mixtures of one or more regulated substance, the threshold quantity shall be based on the amount of the substance contained in the mixture with the lowest threshold quantity. If the proportions of regulated substances in the mixture are unable to be determined, the threshold quantity of the component in the mixture with the lowest threshold quantity will apply to the entire quantity (volume or weight) of the mixture.

Transfer Dry Cleaning Machine: A machine unable to both wash and dry garments, which emits chlorinated solvent to the atmosphere during transfer.

Underground Storage Tank (UST) - Any one or combination of tanks as defined in MCA 75-11-503.

Used Oil - Oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.

Vegetated Swale - A vegetative-lined infiltration cell designed and constructed to collect and treat contaminants in stormwater runoff.

Vehicle Fueling Area - The area surrounding a fuel island or dispenser(s) subject to releases of petroleum products during vehicle fueling, including a 3-foot release collection buffer zone extending beyond the lanes of traffic next to the fuel islands or dispenser(s).

Well - A structure, pit or hole sunk into the earth to reach a resource supply such as water.

Wellhead - The physical structure or device at the land surface surrounding a well, from or through which groundwater flows or is pumped from an aquifer.

Missoula City-County Health Department
Water Quality District
301 W Alder|Missoula MT 59802-4123
www.missoulacounty.us/wqac
Phone|406.258.4890
Fax|406.258.4781

Missoula Valley Water Quality District – Enforcement Response Plan

Purpose: The Missoula Valley Water Quality District (District) is charged with protection of surface water and groundwater resources within the Missoula Valley. One method of accomplishing this is through enforcement of Municipal Codes, County Ordinances and State Law.

Application: The District commits to investigating all illicit discharge complaints within 3 business days of receiving them. If possible, the investigation will take place within 24 hours of receipt. Complaints may be filed by calling the District at 258-4890, on the website for the City-County Health Department or by calling 911. After-hours response is available depending on the severity of the complaint.

Applicable Regulations: This section of Municipal Code (Water Quality Ordinance) is a Health Ordinance pursuant to §7-4-4306 MCA, and the extraterritorial application of the ordinance has been agreed to in a Resolution of Concurrence by the Missoula Board of County Commissioners. This covers the majority of the MS4 including unincorporated areas.

> *Missoula Municipal Code*
> *Section 13.26.080 PROHIBITED ACTIVITY*
>
> *It is unlawful for any person to:*
> *(a) cause contamination or to place, cause to be placed, or allow to remain in place any substance in a location where it is likely to cause contamination;*
> *(b) violate any provision set forth in a permit for the facility issued pursuant to this Ordinance;*
> *(c) violate any order issued pursuant to this Ordinance; or*
> *(d) violate any provision of this Ordinance.*

Contamination is defined as:

> *Contamination - The presence of any substance (chemical, radiological, or biological) or any condition (temperature, pH, taste, color, odor, turbidity) in soil or water which may create or threaten to create a hazard to human health or the environment, or impair the usefulness of the soil or water.*

The Water Quality Ordinance contains enforcement procedures in Section 13.26.120, and provisions for criminal penalties in Section 13.26.130. The Enforcement section includes provisions for Notice of violation, Administrative Review, Board Hearings, and Judicial Review.

The Missoula City-County Health Code, Regulation 1 regulates discharge of wastewater and is applicable throughout the entire county including the city of Missoula. It states:

> *Regulation 1 (A)(3) A person may not discharge wastewater onto the surface of the ground except for a permitted system designed for surface application and licensed septic tank pumpers discharging septic wastes onto disposal sites approved by the Department*

And:

> *Regulation 1 (A)(4) Unless an Underground Injection Control (UIC) permit is obtained from the U.S. Environmental Protection Agency pursuant to 40 CFR 144, a person may not install or use any sump, dry well, or septic system from disposal of waste fluids from the washing, servicing, maintenance or storage of any vehicle, equipment or components that are associated with an internal combustion engine.*

Wastewater is defined in the Health Code, Regulation 1 as:

> *liquid waste which may include chemicals, household, commercial or industrial wastes, human excreta, animal and vegetable matter in suspension or solution, discharged from a dwelling, building, establishment, vehicle or container.*

Additionally, the City of Missoula Storm Water Utility also prohibits illicit discharges through Municipal Code (13.27.200). It states:

Prohibition of Illicit Discharges A. Except as authorized by a separate MPDES permit, it shall be unlawful to discharge or cause to be discharged into the storm water system any discharge that is not composed entirely of storm water, including but not limited to discharges containing pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards or that could cause the City to be in violation of its MPDES permit.

However, response to illicit discharges is conducted according to this ERP and as referenced in 13.27.320 Notification of Spills:

Notwithstanding other requirements of law, as soon as any owner or operator of a facility or operation has information of any known or suspected release of pollutants discharging into a storm water system from that facility, that person shall take all necessary steps to ensure the discovery, containment, cleanup, and documentation of the release. If a hazardous material is released, the owner or operator shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). If there is a release not requiring an emergency response, the owner or operator shall notify the Missoula Valley Water Quality District and the Public Works Department within 24 hours and provide a written notice thereto within five business days. If the discharge of a hazardous material emanates from a commercial or industrial establishment, the owner or operator shall make and keep an onsite written record of the circumstances of the discharge and the actions taken to prevent its recurrence. These records shall be retained for not less than five years. The Missoula Valley Water Quality District administers an Enforcement Response Plan and Illicit Discharge Investigation and Corrective Action Plan for spills within the City limits and all places within five miles outside the City limits (MMC 13.26), and spills in this area must comply with the requirements of those plans.

The Missoula City/County Health Code also includes detailed enforcement provisions, including administrative and judicial review and civil penalties.

The following chart references the regulations that would be applied to various sources of illicit discharges:

Source of Illicit Discharge	Applicable Regulation
Sanitary Wastewater	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Effluent from Septic Tanks	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Car Wash Wastewaters	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Improper Oil Disposal	Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Radiator flushing disposal	Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Laundry wastewaters	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Spills from Roadway accidents	Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Improper disposal of auto and household toxics	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200

Investigation: Once complaints are received, they are logged into the Complaint Management Software, *Paragon*. It is assigned to a staff member of the district who receives and immediate notification via email of the complaint. Staff then investigates the complaint, typically by an in-person field inspection. If the complaint is of an immediate nature and takes place after hours, staff are notified via pager and cell phone. Information obtained during a field visit may include; witness information, photos, property owner interview, soil and/or water samples. If the property owner is not cooperative and the need to inspect is justifiable, District staff may pursue an administrative warrant to investigate the property.

If an illicit discharge is discovered, staff will attempt to receive immediate voluntary compliance through ceasing the activity and using control measures to minimize spread of contamination (i.e. oil sorbent materials). If necessary, the department may secure contractors necessary to reduce the spread of contamination (i.e. vactor truck or excavator).

Typical enforcement procedure is as follows,

Complaint Receipt $\xrightarrow[\text{(1-3 days)}]{}$ Investigation $\xrightarrow[\text{(1-3 days)}]{}$ Notification to responsible party via Notice of Violation (NOV)

This process can be faster if warranted. The timeline for compliance which is outlined in the NOV is based on the circumstances of the illicit discharges. The discharge may be ordered to cease immediately but an extended timeline for investigation and clean-up may be longer.

If compliance is not achieved through the above procedures, the department will pursue compliance through the enforcement procedures outlined in Municipal Code and City-County Health Code.

The Water Quality Ordinance contains enforcement procedures in Section 13.26.120, and provisions for criminal penalties in Section 13.26.130. The Enforcement section includes provisions for Notice of Violation, Administrative Review, Board Hearings, and Judicial Review. The Missoula City-County Health Code also includes detailed enforcement provisions, including administrative and judicial review and civil penalties. The Missoula Municipal Code also contains detailed enforcement provisions.

Missoula Public Health
City-County Health Department

Missoula City-County Health Department
WATER QUALITY DISTRICT
301 West Alder Street | Missoula MT 59802-4123
www.co.missoula.mt.us/wq
Phone | 406.258.4890
Fax | 406.258.4781

Illicit Discharge Investigation and Corrective Action Plan

Reviewed 2/21/2019

Procedures

To report an illicit discharge in the City and County MS4, the public can contact Missoula Valley Water Quality District staff at (406-258-4890). Office hours are 8:00 AM to 5:00 PM Monday through Friday and messages can be reported to this number 24 hour a day. Calls can be made anonymously, and the hotline number can be found on the County's webpage, Missoula Valley Water Quality District's webpage, and Missoula Valley Water Quality District's education publications. Illicit discharges may also be reported through 911. Pursuant to the Water Quality Ordinance (13.26.070) a person who owns, operates or controls a facility or a person responsible for a release must immediately report a release of a regulated substance to the Missoula 9-1-1 center by telephone. Further, the District will field illicit discharge complaints/reports and route them to the appropriate staff. All illicit discharges will be investigated within 3 working days.

Once a problem area is located, the upstream system is evaluated, and various areas chosen to perform additional sampling. These locations are chosen so as to sample each branch of the system and various places along stretches with no branches in order to isolate the area of discharge. Once the source is identified, the process of removing the discharge will begin using various investigative and enforcement tools to include administrative warrants or use of public health and regulatory tools (Health Code, Water Quality Ordinance and Public Health Powers 50-2-116 and 50-2-118) as appropriate to compel clean-up and mitigation of the violations.

Corrective Action Selection Criteria:

Corrective Action requirements are based on two premises; violation of Missoula Health Code or violation of Missoula Water Quality Ordinance. The **speed** at which compliance is compelled and achieved is based on the threat to public health and the environment AND the willingness of the property owner or responsible party. If an on-going or eminent threat (release to soil, groundwater or surface water) is identified and can be reasonably controlled immediately, Water Quality District staff or designees will identify and document proper actions for the responsible party to take. For example, In the case of a fuel spill to an injection well, for instance, the owner or responsible party will place absorbent material on remaining fuel, investigate and remediate the injection well and, if prudent, the District will notify potential down-gradient users. If the spill is in surface water, sorbent materials and booms will be deployed in coordination with the Missoula Regional Hazardous Materials Team. If, in any circumstance, the responsible party is not immediately located AND the threat to public health or the environment is significant, the department will engage the services of contractors including excavators and environmental consultants to investigate and mitigate the threat. Selection criteria is a combination of these factors:

- Type and Quantity of Release
- Location of Release (proximity to surface water, groundwater, human and ecological receptors)
- Identification of a Responsible Party

- Means Available for Mitigation

In addition to these factors, one must consider the ramifications of using typical enforcement mechanisms (Notice of Violation, Order for Corrective Action) to achieve compliance. If these mechanisms are not timely enough to effectively mitigate the threat, additional tools including local government resources will be employed to protect public health and natural resources.

Receiving Report

- Gather information
    - Description of the Issue
    - Location of the suspicious discharge or connection (Address if available)
    - Description of the discharge
    - Contact information of the complainant
        - Reports may be anonymous,
- Responsible District personnel will respond as soon as possible to the court

Investigation

- The District commits to investigating all illicit discharge complaints within 3 business days of receiving them. If possible, the investigation will take place within 24 hours of receipt.

Enforcement

- Whenever the District has knowledge or evidence that a violation of this Ordinance has occurred, the District may issue a Notice of Violation and Order to Take Corrective Action to be served personally or by certified mail on the alleged violator or its agent. This Notice of Violation and Order to Take Corrective Action shall specify:
    - The provision of this Ordinance or permit alleged violated
    - The facts alleged to constitute the violation
    - Any penalties sought to be assessed pursuant to section 13.26.130.of the Water Quality Ordinance

Documentation and Tracking

- Resulting investigation action and result will be recorded in Paragon Complaint Management Software
- MS4 Committee will use findings to determine priority areas as well as key stakeholders in the MS4 that need to be address
- Reoccurring activity resulting in pollutants reaching waterways or entering the MS4 conveyance system will also be targeted for future public education and outreach

Appendix C

Outfall Priority and Reconnaissance

Outfall Priority and Reconnaissance
2022-2026

Montana Department of Environmental Quality
General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)
MPDES Permit No. MTR040007

City of Missoula
Public Works and Mobility Department
Stormwater Utility Division
1345 West Broadway
Missoula, Montana 59802

February 2024

Contents

TABLES

1. Introduction – Outfall Priority

The City Stormwater Utility maintains various infrastructure across the City, to manage runoff and water quality. Pursuant to the requirements in Administrative Rules of Montana §17.30 Subchapters 11, 12, and 13, the Montana Department of Environmental Quality (MDEQ) regulates stormwater discharges from the City's municipal separate storm sewer system (MS4). To comply with the U.S. Environmental Protection Agency National Pollutant Discharge Elimination System permit program—administered by MDEQ under the Montana Pollutant Discharge Elimination MS4 permit—the Stormwater Utility is responsible for maintaining and inspecting structural best management practices. Regular inspections are required to determine the structural integrity, proper function, and maintenance needs of stormwater infrastructure. These outfalls vary in importance; some have higher potential for illicit discharge than others. The MS4 permit also requires the City of Missoula to establish a ranking system that identifies the most important (high priority) outfalls. High-priority outfalls need to be inspected annually, according to the MS4 permit. Seven factors were observed that contributed to the importance of an outfall: pipe diameter, inlet count, land use, illicit discharge history, whether there were any septic systems in the drainage area, overflow potential, and whether the outfall drained into an impaired water body. This report documents how these seven factors were used to calculate a quantifiable ranking system for the importance of Missoula's 100 outfalls.

1.1 Methods

Step #1: Data Collection

The first step was to record the information needed to calculate the importance rank (Table 1). The values from each row in Table 1 were transformed to numerical values (Step #2) to quantify their importance. The outfall number is included as a reference to track quantity. The outfall-ID is a specific ID for that outfall, which will stay constant over time. For each outfall, the following information was gathered:

- Pipe Diameter: The diameter of each pipe in inches was recorded using the Stormwater Utility GIS.
- Inlet Count: This was gathered from the Stormwater Utility GIS using the "select by polygon" tool. The "inlet count" number represents how many inlet structures drain into the outfall. If an outfall had more than 80 inlets, it was given "80+".
- Land Use: Using an Orthophoto, the predominant land use for each outfall drainage area was identified and given one of the following categories: Road, Residential, Commercial, Urban, Industrial, Institutional, or Farming.

- Illicit Discharge History: This category was designed to differentiate outfalls that have had a history of illicit discharge. If an outfall had no such history, it was labeled as “unlikely”. If there had previously been signs of potential illicit discharge, it was labeled “possible”. Finally, if an outfall had previously shown signs of obvious illicit discharge, it was labeled “likely”.
- Septic Systems: Using GIS septic system data from the Missoula City-County Public Health Department, the number of septic systems within each outfall drainage area was recorded.
- Overflow Potential: If an outfall was at high risk of overflow or flooding, it was labeled “High”, if it had a moderate risk it was labeled “Medium” and if it had low risk it was labeled “Low”.
- Impaired Water Bodies: Impaired waterbodies are identified in the *Montana Department of Environmental Quality Water Quality Integrated Report* (MDEQ, 2020a and b).. If the receiving water of an outfall was an impaired waterway, designated by MDEQ, it was labeled “yes”. If the receiving water was not impaired, it was labeled as “no”.

Table 1. Stormwater outfalls within the City of Missoula*

Outfall-#	City Owned	Outfall-ID (SW-DC)	Pipe Diameter	Inlet Count	Land Use	Illicit Discharge History	Septic Count	Impaired Water Body	Overflow Potential
1	Yes	10006	18"	8	Road	Unlikely	0	No	Low
2	Yes	10007	18"	4	Road	Unlikely	0	No	Low
3	Yes	10008	18"	2	Residential	Unlikely	0	No	Low
4	Yes	10009	12"	4	Residential	Unlikely	0	No	High
5	Yes	10011	18"	1	Residential	Unlikely	0	No	Low
6	Yes	10014	12"	7	Residential	Unlikely	0	No	Low
7	Yes	10015	12"	2	Residential	Unlikely	0	No	Low
8	Yes	10016	12"	2	Residential	Unlikely	0	No	High
9	Yes	10017	12"	2	Residential	Unlikely	1	No	Low
10	Yes	10018	12"	2	Residential	Unlikely	0	No	Low
11	Yes	10019	12"	2	Residential	Unlikely	1	No	Low
12	Yes	10020	12"	2	Residential	Unlikely	0	No	Low
13	Yes	10021	12"	2	Residential	Unlikely	0	No	Low
14	Yes	10022	12"	2	Residential	Unlikely	0	No	Low
15	Yes	10023	12"	0	Road	Unlikely	0	No	Low
16	Yes	10024	12"	0	Road	Unlikely	0	No	Low
17	Yes	10025	14"	1	Residential	Unlikely	1	No	High
18	Yes	10027	27"	2	Residential	Unlikely	0	No	Low
19	Yes	10029	24"	19	Residential	Unlikely	10	No	Low
20	Yes	10032	14"	1	Road	Unlikely	0	No	Low
21	Yes	10033	12"	1	Residential	Unlikely	0	No	Low
22	Yes	10034	6"	1	Residential	Unlikely	0	No	Low
23	Yes	10044	12"	1	Road	Unlikely	0	No	Low
24	Yes	10047	18"	10	Road	Unlikely	0	Yes	Low
25	Yes	10048	36"	28	Residential	Unlikely	0	Yes	Low

26	Yes	10049	8"		1	Road	Unlikely		1	No	Low
27	Yes	10050	12"		2	Residential	Unlikely		0	Yes	Low
28	Yes	10051	16"		10	Urban	Unlikely		0	No	Low
29	Yes	10055	15"		14	Urban	Possible		0	No	Low
30	Yes	10056	18"		21	Urban	Unlikely		0	No	High
31	Yes	10059	30"		22	Residential	Unlikely		0	No	Low
32	Yes	10060	18"		1	Road	Unlikely		0	No	Low
33	Yes	10062	42"	80+		Residential	Unlikely		2	No	Low
34	Yes	10063	24"		6	Residential	Unlikely		0	No	Low
35	Yes	10064	12"		1	Residential	Unlikely		0	No	Low
36	Yes	10066	18"		7	Commercial	Unlikely		0	No	Low
37	Yes	10067	12"		3	Road	Unlikely		0	No	Low
38	Yes	10070	42"	80+		Residential	Unlikely	15+		Yes	Low
39	Yes	10077	6"		1	Road	Unlikely		0	No	Low
40	Yes	10081	12"		2	Residential	Unlikely		0	No	Low
41	Yes	10084	18"		5	Residential	Unlikely		0	No	Low
42	Yes	10086	10"		0	Residential	Unlikely		0	No	Low
43	Yes	10087	12"		3	Commercial	Unlikely		0	No	Low
44	Yes	10088	42"		64	Urban	Unlikely		0	No	Low
45	Yes	10090	12"		1	Road	Unlikely		0	No	Low
46	Yes	10095	30"	80+		Urban	Unlikely		1	No	Low
47	Yes	10098	24"		6	Urban	Unlikely		0	Yes	Low
48	Yes	10099	30"		30	Residential	Unlikely		0	No	Low
49	Yes	10100	18"		4	Residential	Unlikely		1	No	Low
50	Yes	10104	18"		6	Residential	Unlikely		0	No	Low
51	Yes	10105	24"		1	Residential	Unlikely		0	No	Low
52	Yes	10106	24"		6	Residential	Unlikely		0	No	Low
53	Yes	10107	24"		4	Residential	Unlikely		0	No	Low
54	No	10000	18"		1	road	unlikely		0	no	low
55	No	10001	12"		3	residential	unlikely		0	yes	low

56	No	10037	32"	1	road	unlikely	0	yes	low
57	No	10042	18"	2	residential	unlikely	1	yes	low
58	No	10043	18"	3	residential	unlikely	0	yes	low
59	No	10045	12"	1	road	unlikely	0	yes	low
60	No	10052	18"	3	road	unlikely	0	yes	low
61	No	10053	12"	1	road	unlikely	1	no	low
62	No	10057	36"	0	commercial	unlikely	0	yes	low
63	No	10058	12"	1	road	unlikely	0	yes	low
64	No	10061	42"	29	industrial	unlikely	1	yes	low
65	No	10065	16"	5	urban	unlikely	0	no	low
66	No	10069	12"	1	road	unlikely	0	no	low
67	No	10071	15"	1	road	unlikely	0	no	low
68	No	10072	8"	1	road	unlikely	0	no	low
69	No	10073	3"	0	residential	unlikely	0	yes	low
70	No	10075	18"	2	road	unlikely	18	yes	low
71	No	10076	18"	4	road	unlikely	0	yes	low
72	No	10079	27"	40	commercial	unlikely	0	yes	low
73	No	10080	48"	45	residential	unlikely	0	yes	low
74	No	10083	24"	3	road	unlikely	0	no	low
75	No	10091	24"	1	farming	unlikely	1	no	low
76	No	10096	28"	6	urban	unlikely	0	yes	low
77	No	10097	15"	9	residential	unlikely	0	no	low
78	No	10101	42"	56	commercial	unlikely	30	yes	low
79	No	10102	18"	4	urban	unlikely	0	no	low
80	No	10103	44"	28	commercial	unlikely	1	no	low
81	No	10108	24"	24	commercial	unlikely	4	yes	low
82	No	10117	12"	2	industrial	unlikely	0	no	low
83	No	10118	24"	29	industrial	unlikely	0	no	low
84	No	10122	12"	1	industrial	unlikely	0	no	low
85	No	10123	36"	23	industrial	unlikely	0	no	low

86	No	10125	12"	4	industrial	unlikely	0	no	low
87	No	10130	27"	17	industrial	unlikely	0	no	low
88	No	10131	8"	2	industrial	unlikely	0	no	low
89	No	10132	20"	5	industrial	unlikely	0	no	low
90	No	10133	12"	2	industrial	unlikely	0	no	low
91	No	10134	36"	19	industrial	unlikely	0	no	low
92	No	10135	48"	100	industrial	unlikely	0	no	low
93	No	10136	6"	2	industrial	unlikely	0	no	low
94	No	10137	60"	44	industrial	unlikely	0	no	low
95	No	10126	24"	17	industrial	unlikely	0	no	low
96	No	10129	24"	5	industrial	unlikely	0	no	low
97	No	10127	12"	1	industrial	unlikely	0	no	low
98	No	10128	12"	1	industrial	unlikely	0	no	low
99	No	10111	12"	4	industrial	unlikely	0	no	low
100	No	10054	36"	23	commercial	unlikely	5	yes	low
101	No	NULL	6"	2	urban	unlikely	0	yes	low

Step #2: Data Normalization

We used a scoring system to rank each outfall variable. Because all the variables carried different relevance in determining outfall importance, each variable had a unique scoring system. A description of the scoring system for each category is given below.

- Pipe Diameter: If an outfall pipe is large, it was designed to accommodate more discharge. Therefore, the pipes with a larger diameter were deemed more important. We assigned 22 categories for pipe sizes. These categories were broken up by two-inch increments. The smallest known stormwater pipe is 4 inches wide. Thus, the first category was 4-5 inches. The largest known stormwater pipe is 54 inches wide. The largest category was 42+. (Table 2) shows the corresponding importance score for each pipe size category.

Table 2. Pipe diameter importance scores

Pipe Diameter	Importance Score
4-5"	0
6-7"	1
8-9"	2
10-11"	3
12-13"	4
14-15"	5
16-17"	6
18-19"	7
20-21"	8
22-23"	9
24-25"	10
26-27"	11
28-29"	12
30-31"	13
32-33"	14
34-35"	15
36-37"	16
38-39"	17
40-41"	18
42+"	19

- Inlet Count: If an outfall has more inlets that drain to it, it has a higher potential for illicit discharge and is more important. The score for this category was the exact number of inlets the outfall had. If an outfall had 5 inlets draining to it, it was given a score of 5. If there were 20 inlets, it was given a score of 20. This method was used to guarantee that the outfalls with the most inlets were given the highest scores.

- Illicit Discharge History: If an outfall had no history of illicit discharge, it was given 0 points. If there was a low potential for illicit discharge, it was given 5 points. Outfalls received a “low potential” designation if there was evidence of suspected illicit discharge in the past, but no concrete evidence of illicit discharge occurring. If there was a high potential for illicit discharge, it was given 20 points.
- Land Use: Because illicit discharge potential changes depending on land use, each land use category was given a different importance score (Table 3). If an outfall only drains a road, with no buildings in the area, it has low potential for illicit discharge and thus has the lowest importance score. Residential neighborhoods are slightly more important to monitor because citizens could potentially be dumping paint or other household products. Commercial areas are more important than neighborhoods because businesses are consistently dealing with substances that would be harmful if disposed of improperly. Farming areas are important to monitor because regular pesticide and fertilizer runoff can occur. The second most important land use classification was urban; outfalls that drain urban downtown areas have the oldest infrastructure and they are at risk of illicit discharge from City activities. The most important land use was industrial because of the various pollutants associated with industrial activities.

Table 3. Land use importance score

Land Use Type	Importance Score
Road	1
Residential	5
Commercial	10
Farming	12
Urban	13
Industrial	15

- Septic Systems: If there are septic systems within the drainage area of an outfall, that outfall will be at a higher risk of contamination from bacteria such as *E. coli*. Therefore, outfalls with septic systems in their drainage areas were considered more important than those with sewer systems. If there were 1-5 septic systems within the drainage area for an outfall, the outfall was given a score of 5. If there were more than 15 septic systems in a drainage, the outfall was given a score of 20. **Error! Reference source not found.** shows the corresponding importance scores for the number of septic systems in an outfall area.

Table 4. Septic system importance score

Septic Systems	Importance Score
0	0
1 through 5	5
6 through 10	10
10 through 15	15
15+	20

- Overflow Potential: Some outfalls are more prone to flooding and overflow than others. There are multiple factors that can cause flood potential: (1) A clogged inlet or drywell can overload an outfall that was not designed to have all of the discharge it is receiving, (2) A flap gate on the end of an outfall pipe can be shut closed during high water which can backlog the system, (3) a pipe can be undersized for the amount of discharge it receives. These factors were all considered when deciding the overflow potential for each outfall. If the outfall had a low risk of overflow, it was given a score of 0. If it had a high risk, it was given a score of 5.
- Impaired Water Bodies: If a water body is already impaired, it is more important to protect and prevent further damage. Therefore, if an outfall drains into an impaired waterbody, it was given an extra 15 points. If it drains into an unimpaired water body, it was given no points. The four impaired water waterways within our system include: Bitterroot River, Clark Fork River, Grant Creek, and Miller Creek.

Step #3: Calculations

Once all the data was collected and manipulated, all the scores for each outfall were added together using an excel spreadsheet to calculate total scores for each outfall (Table 5). Table 5 shows the scores for each category. The numbers from each row in this table were added together to get the total score on the right most column. The outfall-ID is a specific ID for that outfall.

Table 5. Outfall Scores

Outfall-#	City Owned	Outfall-(SW-DC-)	Pipe Diameter Score	Inlet Score	Land Use Score	Illicit Discharge Score	Septic Score	Impaired Water Body Score	Overflow Potential Score	Total Score
1	Yes	10006	7	8	1	0	0	0	0	16
2	Yes	10007	7	4	1	0	0	0	0	12
3	Yes	10008	7	2	5	0	0	0	0	14
4	Yes	10009	4	4	5	0	0	0	5	18
5	Yes	10011	7	1	5	0	0	0	0	13
6	Yes	10014	4	7	5	0	0	0	0	16
7	Yes	10015	4	2	5	0	0	0	0	11
8	Yes	10016	4	2	5	0	0	0	5	16
9	Yes	10017	4	2	5	0	5	0	0	16
10	Yes	10018	4	2	5	0	0	0	0	11
11	Yes	10019	4	2	5	0	5	0	0	16
12	Yes	10020	4	2	5	0	0	0	0	11
13	Yes	10021	4	2	5	0	0	0	0	11
14	Yes	10022	4	2	5	0	0	0	0	11
15	Yes	10023	4	0	1	0	0	0	0	5
16	Yes	10024	4	0	1	0	0	0	0	5
17	Yes	10025	5	1	5	0	5	0	5	21
18	Yes	10027	11	2	5	0	0	0	0	18
19	Yes	10029	10	19	5	0	10	0	0	44
20	Yes	10032	5	1	1	0	0	0	0	7
21	Yes	10033	4	1	5	0	0	0	0	10
22	Yes	10034	1	1	5	0	0	0	0	7
23	Yes	10044	4	1	1	0	0	0	0	6
24	Yes	10047	7	10	1	0	0	15	0	33
25	Yes	10048	16	28	5	0	0	15	0	64
26	Yes	10049	2	1	1	0	5	0	0	9

27	Yes	10050	4	2	5	0	0	15	0	26
28	Yes	10051	6	10	13	0	0	0	0	29
29	Yes	10055	5	14	13	5	0	0	0	37
30	Yes	10056	7	21	13	0	0	0	5	46
31	Yes	10059	13	22	5	0	0	0	0	40
32	Yes	10060	7	1	1	0	0	0	0	9
33	Yes	10062	19	80	5	0	5	0	0	109
34	Yes	10063	10	6	5	0	0	0	0	21
35	Yes	10064	4	1	5	0	0	0	0	10
36	Yes	10066	7	7	10	0	0	0	0	24
37	Yes	10067	4	3	1	0	0	0	0	8
38	Yes	10070	19	80	5	0	20	15	0	139
39	Yes	10077	1	1	1	0	0	0	0	3
40	Yes	10081	4	2	5	0	0	0	0	11
41	Yes	10084	7	5	5	0	0	0	0	17
42	Yes	10086	3	0	5	0	0	0	0	8
43	Yes	10087	4	3	10	0	0	0	0	17
44	Yes	10088	19	64	13	0	0	0	0	96
45	Yes	10090	4	1	1	0	0	0	0	6
46	Yes	10095	13	80	13	0	5	0	0	111
47	Yes	10098	10	6	13	0	0	15	0	44
48	Yes	10099	13	30	5	0	0	0	0	48
49	Yes	10100	7	4	5	0	5	0	0	21
50	Yes	10104	7	6	5	0	0	0	0	18
51	Yes	10105	10	1	5	0	0	0	0	16
52	Yes	10106	10	6	5	0	0	0	0	21
53	Yes	10107	10	4	5	0	0	0	0	19
54	No	10000	7	1	1	0	0	0	0	9
55	No	10001	4	3	5	0	0	15	0	27
56	No	10037	14	1	1	0	0	15	0	31

57	No	10042	7	2	5	0	5	15	0	34
58	No	10043	7	3	5	0	0	15	0	30
59	No	10045	4	1	1	0	0	15	0	21
60	No	10052	7	3	1	0	0	15	0	26
61	No	10053	4	1	1	0	5	0	0	11
62	No	10057	16	0	10	0	0	15	0	41
63	No	10058	4	1	1	0	0	15	0	21
64	No	10061	19	29	15	0	5	15	0	83
65	No	10065	6	5	13	0	0	0	0	24
66	No	10069	4	1	1	0	0	0	0	6
67	No	10071	5	1	1	0	0	0	0	7
68	No	10072	2	1	1	0	0	0	0	4
69	No	10073	0	0	5	0	0	15	0	20
70	No	10075	7	2	1	0	20	15	0	45
71	No	10076	7	4	1	0	0	15	0	27
72	No	10079	11	40	10	0	0	15	0	76
73	No	10080	19	45	5	0	0	15	0	84
74	No	10083	10	3	1	0	0	0	0	14
75	No	10091	10	1	12	0	5	0	0	28
76	No	10096	12	6	13	0	0	15	0	46
77	No	10097	5	9	5	0	0	0	0	19
78	No	10101	19	56	10	0	20	15	0	120
79	No	10102	7	4	13	0	0	0	0	24
80	No	10103	19	28	10	0	5	0	0	62
81	No	10108	10	24	10	0	5	15	0	64
82	No	10111	4	4	15	0	0	0	0	23
83	No	10117	4	2	15	0	0	0	0	21
84	No	10118	10	29	15	0	0	0	0	54
85	No	10122	4	1	15	0	0	0	0	20
86	No	10123	16	23	15	0	0	0	0	54

87	No	10125	4	4	15	0	0	0	0	23
88	No	10126	10	17	15	0	0	0	0	42
89	No	10127	4	1	15	0	0	0	0	20
90	No	10128	4	1	15	0	0	0	0	20
91	No	10129	10	5	15	0	0	0	0	30
92	No	10130	11	17	15	0	0	0	0	43
93	No	10131	2	2	15	0	0	0	0	19
94	No	10132	8	5	15	0	0	0	0	28
95	No	10133	4	2	15	0	0	0	0	21
96	No	10134	16	19	15	0	0	0	0	50
97	No	10135	19	100	15	0	0	0	0	134
98	No	10136	1	2	15	0	0	0	0	18
99	No	10137	19	44	15	0	0	0	0	78
100	No	10054	16	23	10	0	5	15	0	69
101	No	NULL	1	2	13	0	0	15	0	31

1.2 Results

Table 6 shows the outfall priority score assigned to each of the 100 outfalls of Missoula. This table is organized with the highest priority outfalls at the top. The 10 highest-priority City owned outfalls are symbolized in red. The purpose of Figure 1 is to display the distribution of importance scores. There are 100 points on this graph. Each point represents an outfall. Most outfalls received a score below 50.

Table 6. Outfall priority

Outfall-ID	Location Description	City Owned	Total Score
SW-DC-10070	South Missoula Storm System outfall	Yes	139
SW-DC-10135	Butler Creek near Airport	No	134
SW-DC-10101	Bitterroot River near Brooks Street	No	120
SW-DC-10095	Brennan's Wave outfall	Yes	111
SW-DC-10062	44 Ranch outfall	Yes	109
SW-DC-10088	At Fox Site near Orange	Yes	96
SW-DC-10080	Clark Fork River near Hilda Avenue	No	84
SW-DC-10061	Grant Creek near Whipoorwill Drive	No	83
SW-DC-10137	Butler Creek near Airport	No	78
SW-DC-10079	Clark Fork River near UM Stadium	No	76
SW-DC-10054	Bitterroot River near Hamilton Way	No	69
SW-DC-10048	Prospect-Upper Detention	Yes	64
SW-DC-10108	Clark Fork River near Reserve Street	No	64
SW-DC-10103	Bancroft Pond near 34th Street	No	62
SW-DC-10118	Butler Creek near Airport	No	54
SW-DC-10123	Butler Creek near Airport	No	54
SW-DC-10134	Butler Creek near Airport	No	50
SW-DC-10099	Pattee Creek Outfall, above Grit Chamber	Yes	48
SW-DC-10056	Clay Street outfall	Yes	46
SW-DC-10096	Clark Fork River near Old Van Buren Street	No	46
SW-DC-10075	Clark Fork River near Montana Rail Link	No	45
SW-DC-10029	Gharrett Street drainage project outfall	Yes	44
SW-DC-10098	Behind Missoulian building	Yes	44
SW-DC-10130	Butler Creek near Airport	No	43
SW-DC-10126	Butler Creek near Airport	No	42
SW-DC-10057	Clark Fork River near Orange Street bridge	No	41
SW-DC-10059	To Takima Park and Pattee Creek	Yes	40
SW-DC-10055	West of railroad bridge off of Broadway	Yes	37
SW-DC-10042	Grant Creek near Starwood Drive	No	34
SW-DC-10047	For Silver Park parking lot	Yes	33
SW-DC-10037	Clark Fork River near Great Northern Loop	No	31
NULL	Clark Fork River near Riverside Apartments	No	31
SW-DC-10043	Behind Clark Fork Riverside Retirement Home	No	30
SW-DC-10129	Butler Creek near Airport	No	30

SW-DC-10051	Kim Williams trail near Hazel Street	Yes	29
SW-DC-10091	Rattlesnake Creek near Peas Farm	No	28
SW-DC-10132	Butler Creek near Airport	No	28
SW-DC-10001	Bitterroot River near Mornhinweg Loop	No	27
SW-DC-10076	Clark Fork River near Scott Street	No	27
SW-DC-10050	On Clark Fork River near Easy Street	Yes	26
SW-DC-10052	Clark Fork River near Reserve Street	No	26
SW-DC-10066	At Fox Site	Yes	24
SW-DC-10065	Rattlesnake Creek near Broadway Street	No	24
SW-DC-10102	Rattlesnake Creek under Broadway Street	No	24
SW-DC-10111	Butler Creek near Airport	No	23
SW-DC-10125	Butler Creek near Airport	No	23
SW-DC-10025	Rattlesnake Creek near Creeekwood Rd	Yes	21
SW-DC-10063	On Grant Creek from lower detention pond	Yes	21
SW-DC-10100	On Pattee Creek, in yard	Yes	21
SW-DC-10106	Moose Can Gully near Grandview	Yes	21
SW-DC-10045	Clark Fork River near Reserve Street	No	21
SW-DC-10058	Clark Fork River near Easy Street	No	21
SW-DC-10117	Butler Creek near Airport	No	21
SW-DC-10133	Butler Creek near Airport	No	21
SW-DC-10073	Clark Fork River near Old Van Buren Street	No	20
SW-DC-10122	Butler Creek near Airport	No	20
SW-DC-10127	Butler Creek near Airport	No	20
SW-DC-10128	Butler Creek near Airport	No	20
SW-DC-10107	Moose Can Gully near Missoula Alliance Church	Yes	19
SW-DC-10097	Irrigation Ditcuh near Madison Street Bridge	No	19
SW-DC-10131	Butler Creek near Airport	No	19
SW-DC-10009	Moose Can Gully	Yes	18
SW-DC-10027	Prospect Neighborhood near Jasper and Bonanza	Yes	18
SW-DC-10104	Moose Can Gully near Mainview	Yes	18
SW-DC-10136	Butler Creek near Airport	No	18
SW-DC-10084	North of freeway on Grant Creek Road	Yes	17
SW-DC-10087	Downtown behind the clinic	Yes	17
SW-DC-10006	Moose Can Gully	Yes	16
SW-DC-10014	Moose Can Gully	Yes	16
SW-DC-10016	To Takima Park and Pattee Creek	Yes	16
SW-DC-10017	Orchard Homes Irrigation Ditch	Yes	16
SW-DC-10019	Orchard Homes Irrigation Ditch	Yes	16
SW-DC-10105	Moose Can Gully near Ridge	Yes	16
SW-DC-10008	Moose Can Gully	Yes	14
SW-DC-10083	Rattlesnake Creek near Vine Street	No	14
SW-DC-10011	Moose Can Gully	Yes	13
SW-DC-10007	Moose Can Gully	Yes	12

SW-DC-10015	Moose Can Gully	Yes	11
SW-DC-10018	Orchard Homes Irrigation Ditch	Yes	11
SW-DC-10020	Orchard Homes Irrigation Ditch	Yes	11
SW-DC-10021	Orchard Homes Irrigation Ditch	Yes	11
SW-DC-10022	Orchard Homes Irrigation Ditch	Yes	11
SW-DC-10081	At Prospect and Grant Creek	Yes	11
SW-DC-10053	Irrigation Ditch near Metalworks of Montana Inc.	No	11
SW-DC-10033	Moose Can Gully near Oakhurst Street	Yes	10
SW-DC-10064	On Grant Creek from Comstock Court	Yes	10
SW-DC-10049	To Pattee Creek from inlet on Pattee Canyon Drive	Yes	9
SW-DC-10060	To Pattee Creek from inlet on Pattee Canyon Drive	Yes	9
SW-DC-10000	Rattlesnake Creek near Vine Street	No	9
SW-DC-10067	On Front at Rattlesnake Creek	Yes	8
SW-DC-10086	Northeast side/end of Lolo Street Bridge	Yes	8
SW-DC-10032	Moose Can Gully near 55th and Hillview	Yes	7
SW-DC-10034	Linda Vista 24th supplement outfall	Yes	7
SW-DC-10071	Rattlesnake Creek under I-90	No	7
SW-DC-10044	Rattlesnake Creek under Front Street bridge	Yes	6
SW-DC-10090	At Fox Site	Yes	6
SW-DC-10069	Irrigation Ditch near Metalworks of Montana Inc.	No	6
SW-DC-10023	Clark Fork River near Broadway and Front	Yes	5
SW-DC-10024	Clark Fork River near Broadway and Front	Yes	5
SW-DC-10072	Rattlesnake Creek under I-90	No	4
SW-DC-10077	On Rattlesnake Creek near school at ped bridge	Yes	3

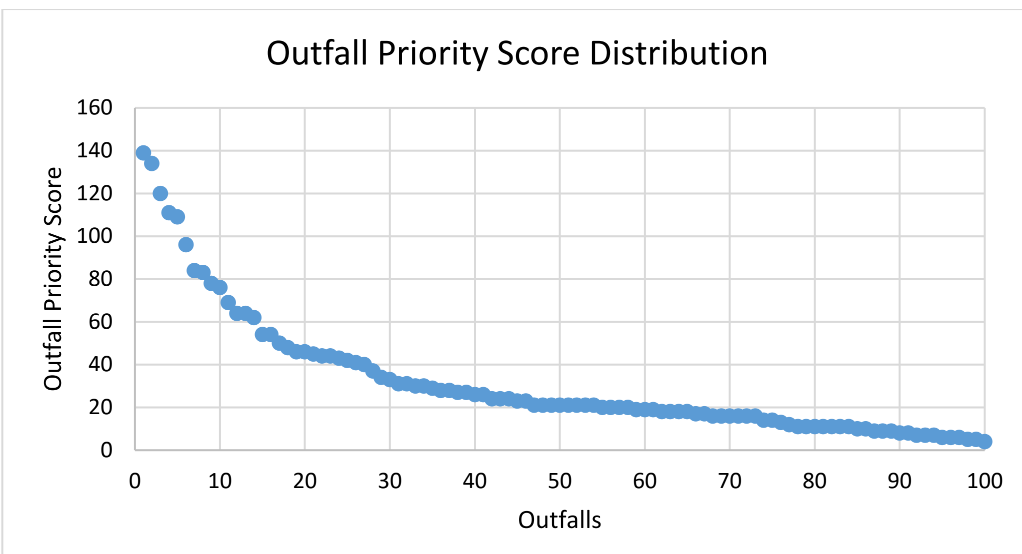


Figure 1. City outfall importance distribution

1.3 Conclusion and Discussion

It is crucial to monitor stormwater outfalls to prevent illicit discharge and protect freshwater systems. The high-priority outfalls will be prioritized over less important ones. The Stormwater Utility, using the methods presented above, has identified 10 City-owned high-priority outfalls (Table 6) and 10 high-priority outfalls that are not owned by the City (**Error! Reference source not found.**). The three most important City-owned outfalls in Missoula, according to this ranking system, are the Bitterroot outfall, Caras Park outfall, and the 44-Ranch outfall. There are some limitations to this method described above. First, there is a high degree of subjectivity used in this method. For example, choosing how much importance to place on pipe diameter or land use. Second, there are gaps in the Stormwater GIS data that cause some degree of uncertainty when calculating “inlet count” or recording “pipe diameter”.

2 Introduction – Outfall Reconnaissance

In compliance with MS4 General Permit Part II.A.3e, the City must conduct dry weather inspections of all outfalls by the end of the current permit cycle (2026). This report includes information from the outfall reconnaissance conducted during the previous permit term (2017-2021) and information from the outfall reconnaissance conducted during the first year of the current permit term (2022-2026). See the Dry Weather Inspection forms included in Appendix A.

2.1 1 Outfall Inspections

According to the City's geographic information system (GIS) database, there are 100 outfalls within the City's MS4 boundary, 52 are owned by the City and 48 are owned by other entities: private, Montana Department of Transportation, University of Montana, or unknown. All 10 City-owned high-priority outfalls were inspected in 2023. Outfall characteristics and relevant sampling data were documented on Outfall Reconnaissance/Sample Collection forms (Appendix A).

Table 7 summarizes the results from 28 outfall inspections. All 10 top priority outfalls were inspected in 2023. In addition, 15 outfalls that are owned by other entities were also inspected, and these are included in Table 7. This explains why there are 67 rows in

Table 7 while there are only 52 City-owned outfalls.

Table 7. Stormwater outfall reconnaissance summary

No.	Asset ID	City Owned High Priority	Date	Subwatershed	Characterization for Illicit Discharge
1	SW-DC-10099	Yes	7/31/2023	Hayes Creek-Bitterroot	Unlikely
2	SW-DC-10048	Yes	7/31/2023	Grant Creek	Unlikely
3	SW-DC-10081	No	9/20/2023	Grant Creek	Unlikely
4	SW-DC-10088	Yes	7/31/2023	Marshall Creek-Clark Fork	Unlikely
5	SW-DC-10095	Yes	7/31/2023	Marshall Creek-Clark Fork	Unlikely
6	SW-DC-10049	No	11/9/2023	Hayes Creek-Bitterroot	Unlikely
7	SW-DC-10060	No	11/9/2023	Hayes Creek-Bitterroot	Unlikely
8	SW-DC-10059	Yes	11/9/2023	Hayes Creek-Bitterroot	Unlikely
9	SW-DC-10070	Yes	7/31/2023	Hayes Creek-Bitterroot	Unlikely

10	SW-DC-10016	No	11/9/2023	Pattee Creek	Unlikely
11	SW-DC-10098	Yes	7/31/2023	Clark Fork River	Unlikely
12	SW-DC-10056	Yes	7/31/2023	Clark Fork River	Unlikely
13	SW-DC-10006	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
14	SW-DC-10007	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
15	SW-DC-10008	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
16	SW-DC-10009	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
17	SW-DC-10011	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
18	SW-DC-10014	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
19	SW-DC-10015	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
20	SW-DC-10029	Yes	6/28/2023	Hayes Creek-Bitterroot	Unlikely
21	SW-DC-10034	No	11/2/2023	Hayes Creek-Bitterroot	Unlikely
22	SW-DC-10062	Yes	7/31/2023	Grant Creek	Unlikely
23	SW-DC-10077	No	7/11/2023	Rattlesnake Creek	Unlikely
24	SW-DC-10104	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
25	SW-DC-10105	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
26	SW-DC-10106	No	7/19/2023	Hayes Creek-Bitterroot	Unlikely
27	SW-DC-10107	No	7/9/2023	Hayes Creek-Bitterroot	Unlikely

2.2 SW-DC-10099 Pattee Creek Outfall, above Grit Chamber ⑥

This site drains a suburban residential area at the base of Pattee Canyon and has historically had flow during dry weather (Photo **1** and Photo **2**). Out of all the city owned outfalls, this outfall has the 6th highest priority score (Table 6). The latest inspection occurred on July 31, 2023 and the flow rate was approximately 24.5 pgm. There were no signs of illicit discharge.

Photo 1. SW-DC-10099 (July 22, 2009)

Photo 2. SW-DC-10099 (August 28, 2019)

2.3 SW-DC-10048 Prospect-Upper Detention⑤

This site drains a suburban residential area and is connected to the upper detention basin in the Prospect neighborhood (Photo 3 and Photo 4). Out of all the city owned outfalls, this outfall has the 5th highest priority score (Table 6). The outfall is in good condition but is partially filled (approximately 50%) with sediment. The outfall goes under an unnamed ditch and daylights in the ditch-return to Grant Creek; the outfall was partially submerged in water. The most recent inspection occurred on July 31, 2023, and there were no signs of illicit discharge.

Photo 3. SW-DC-10048 (July 23, 2009)

Photo 4. W-DC-10048 (August 30, 2019)

2.4 SW-DC-10081 Old Quarry Road

This site drains a suburban residential area and terminates in a swale in the Prospect neighborhood. The swale extends approximately 225 feet until reaching Grant Creek. The outfall (Photo 5) was in poor condition and filled with sediment (approximately 100%). Line was jetted and sediment removed on September 20, 2023. There were no signs of illicit discharge.

Photo 5. SW-DC-10081 (August 30, 2019)

2.5 SW-DC-10088 Fox site near Orange Street ④

This site drains a commercial area in downtown Missoula and terminates in the Clark Fork River (Photo 6). This site has historically had flow during dry weather. Out of all the city owned outfalls, this outfall has the 4th highest priority score (Table 6). The outfall is connected to a hydrodynamic separator that was installed in 2005. There is significant erosion around and undercutting of this structure (Photo 7). The latest inspection of this outfall occurred on July 31. 2023 and no sample was taken. The flow was approximately 7.8 gpm and there were no signs of illicit discharge.

Photo 6. SW-DC-10088 (August 4, 2008)

Photo 7. SW-DC-10088 (September 4, 2019)

2.6 SW-DC-10095 Brennan's Wave ②

This site drains a commercial area in downtown Missoula and terminates in the Clark Fork River. Out of all the city owned outfalls, this outfall has the 2nd highest priority score (Table 6). It has historically had flow during dry weather (Photo 8 and Photo 9). The dry weather flow at this location originates from the Florence Building's heating and cooling system; the water is groundwater. The outfall is connected to a hydrodynamic separator that was installed in 2017. During the winter of 2022, an infiltration gallery, designed to handle the first flush of a storm event, was installed just upstream of this outfall. On March 1, 2022, a flap gate was installed at the end of the outfall to prevent backflow into the system (Photo 10). The outfall is in good condition. The most recent inspection occurred on July 31, 2023, and there were no signs of illicit discharge.

Photo 8. SW-DC-10095 (August 4, 2008)

Photo 9. SW-DC-10095 (September 5, 2019)

Photo 10. SW-DC-10095 (July 18, 2022)

2.7 SW-DC-10049 Pattee slope pipe

This site drains a suburban residential area in Pattee Canyon and terminates at Pattee Creek (Photo 11, Photo 12, and Photo 13). It consists of a high-density polyethylene (HDPE) pipe that has been placed down the hillside, from the inlet to the creek. There was no flow during the inspection (November 9, 2023). The outfall is in good condition, and there were no signs of illicit discharge.

Photo 11. SW-DC-10049 (July 22, 2009)

Photo 12. SW-DC-10049 (September 16, 2019)

Photo 13. SW-DC-10049, discharge to Pattee Creek (September 16, 2019)

2.8 SW-DC-10060 Takima East

This site drains a suburban residential area in Pattee Canyon and terminates at the Takima Park detention basin, adjacent to Pattee Creek (Photo 14, Photo 15, and Photo 16). There was no flow during the inspection (November 9, 2023). The outfall is partially filled with sediment and there is excessive vegetation (e.g., trees) in the flow path. There were no signs of illicit discharge.


Photo 14. SW-DC-10060 (July 22, 2009)


Photo 15. SW-DC-10060 (September 16, 2019)


Photo 16. SW-DC-10060, showing excessive vegetation (September 16, 2019)

2.9 SW-DC-10059 Takima West ⑩

This site drains a suburban residential area in Pattee Canyon and terminates at the Takima Park detention basin, adjacent to Pattee Creek. Out of all the city owned outfalls, this outfall has the 10th highest priority score (Table 6) Before the Fall of 2022, the outfall was partially filled with sediment (approximately 50%) and the downstream energy dissipator was half-buried (Photo 17). In the Fall of 2022, the area directly adjacent to the outfall was excavated to remove sediment (Photo 18). There was no flow or signs of illicit discharge during the latest inspection (7/31/2023).

Photo 17. SW-DC-10059 (September 16, 2019)

Photo 18. SW-DC-10059 (January 11, 2023)

2.10 SW-DC-10070 South Missoula Storm System Outfall ①

This site drains a large suburban residential area comprised of the South Hills, Pattee Canyon, and south Missoula Valley. It is the terminus of the South Hills Strom Drain System and includes the flow contributed by Pattee Creek (Photo 19 and Photo 20). Out of all the city owned outfalls, this outfall has the highest priority score (Table 6). The water is discharged into a vegetated swale for approximately 450 feet before reaching the Bitterroot River. During the most recent inspection (7/31/2023), there were no signs of illicit discharge.

Photo 19. SW-DC-10070 (September 19, 2019)

Photo 20. SW-DC-10070, routine maintenance (September 19, 2019)

2.11 SW-DC-10016 Pattee Creek near Takima Dr

This outfall is a 12” corrugated metal pipe that flows from inlets on Takima Drive into a wetland area that eventually goes into Pattee Creek. Before 6/8/2020, this outfall was completely buried under 2-3’ of thick soil. On 6/8/2020, this outfall was uncovered but a path still needs to be cleared so the discharge can get to Pattee Creek. Upon last inspection, (11/9/2023 the outlet was found to be completely buried again and partially uncovered. Improvements will be made to entire nearby stormwater infrastructure in upcoming capital improvement project. Once the end of the pipe was uncovered originally, trapped water flowed (Photo 21 and Photo 22). Currently, this outfall has a high potential of flooding. There was no sign of illicit discharge.

Photo 21. SW-DC-10016 (June 8, 2020)

Photo 22. SW-DC-10016 (June 8, 2020)

2.12 SW-DC-10098 Clark Fork River behind the Missoulian Building ⑨

This outfall is 24” (in diameter) reinforced concrete pipe (Photo 23 and Photo 24). Out of all the city owned outfalls, this outfall has the 9th highest priority score (Table 6). According to Stormwater Utility GIS, the map shows gravity mains connected to five inlets on South Higgins Avenue and 4th Street, which drains directly into the Clark Fork River. The source of stormwater is from the surrounding commercial area. No sediment is present within the pipe. The most recent inspection occurred on July 31st, 2023, and there were no signs of illicit discharge.

Photo 23. SW-DC-10098 (July 14, 2020)

Photo 24. SW-DC-10098 (July 14, 2020)

2.13 SW-DC-10056 Clark Fork River near Clay Street ⑦

This outfall is 18" wide and made of reinforced concrete (Photo 25, Photo 26, and Photo 27). Out of all the city owned outfalls, this outfall has the 7th highest priority score (Table 6). This pipe is connected to nine inlets (one inlet on Levasseur Street and Clay Street, two on Clay Street, three on Clay Street and E Front Street, and two on Washington Street and E Main Street), that drain directly into the Clark Fork River. The source of stormwater is from the surrounding ultra-urban residential and commercial area. There are no signs of illicit discharge. No sediment is present within the pipe. As of July 31, 2023, there are no signs of illicit discharge. Minor moss growth was observed.

Photo 25. SW-DC-10056 (July 14, 2020)

Photo 26. SW-DC-10056 (July 14, 2020)

Photo 27. SW-DC-10056 (July 14, 2020)

2.14 SW-DC-10006 Moose Can Gully near Hillview Way

This outfall is 18” wide and made of corrugated metal (Photo 28). The predominant land use type that drains to this outfall is residential. This pipe is connected to eight inlets on Hillview Way that drain to Moose Can Gully. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 28. SW-DC-10006 (July 19, 2023)

2.15 SW-DC-10007 Moose Can Gully near Hillview Way

This outfall is 18” wide and made of HDPE (Photo 29). The predominant land use type that drains to this outfall is residential. This pipe is connected to two inlets that drain to Moose Can Gully (one on Hillview Way and one on Foss Court). Upon inspection, on 7/19/2023, there were no signs of illicit discharge. However, the outfall was halfway filled with sediment.

Photo 29. SW-DC-10007 (7/19/2023)

2.16 SW-DC-10008 Moose Can Gully near Pinehurst Court

This outfall is 18” wide and made of reinforced concrete (Photo 30). The predominant land use type that drains to this outfall is residential. This pipe is connected to two inlets on Pinehurst Court that drain to Moose Can Gully. Upon inspection, on 7/19/2023, there were no signs of illicit discharge. However, the pipe was full of debris.

Photo 30. SW-DC-10006 (July 19, 2023)

2.17 SW-DC-10009 Moose Can Gully near Clearview Way

This outfall is 12” wide and made of PVC (Photo 31). The predominant land use type that drains to this outfall is residential. This pipe is connected to four inlets that drain to Moose Can Gully (two on Clearview Way, one on Elk View Court, and one on Elk Hills Court). Upon inspection, on 7/19/2023, there were no signs of illicit discharge. However, the pipe was full of debris.

Photo 31. SW-DC-10009 (July 19, 2023)

2.18 SW-DC-10011 Moose Can Gully near Elmhurst Court

This outfall is 18” wide and made of HDPE (Photo 32). The predominant land use type that drains to this outfall is residential. This pipe is connected to one inlet at the end of Elmhurst Court that drains to Moose Can Gully. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 32. SW-DC-10011 (July 19, 2023)

2.19 SW-DC-10014 Moose Can Gully near Village View Way

This outfall is 12” wide and made of corrugated plastic (Photo 33). The predominant land use type that drains to this outfall is suburban residential. This pipe is connected to seven inlets on Village View Way that drain to Moose Can Gully. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 33. SW-DC-10014 (July 19, 2023)

2.20 SW-DC-10015 Moose Can Gully near Clearview Way

This outfall is 12” wide and made of corrugated plastic (Photo 34). The predominant land use type that drains to this outfall is residential. This pipe is connected to two inlets on Clearview Way that drain to Moose Can Gully. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 34. SW-DC-10015 (July 19, 2023)

2.21 SW-DC-10029 Gharrett Street Drainage Outfall ⑧

This outfall is 24” wide and made of reinforced concrete. The predominant land use type that drains to this outfall is suburban residential. This pipe is connected to nineteen inlets throughout the upper

Gharrett Street area that drain to an unnamed channel which eventually connects with the Bitterroot River. Upon inspection, on 6/28/2023, there were no signs of illicit discharge.

2.22 SW-DC-10034 Bitterroot River near Mornhinweg Loop

This outfall is 6” wide and made of HDPE. The predominant land use type that drains to this outfall is suburban residential. This pipe is connected to one inlet on Mornhinweg Loop that drains to a grassy hill. During high flow, there is potential for the discharge to reach the Bitterroot River. Upon inspection, on 11/2/2023, there were no signs of illicit discharge.

2.23 SW-DC-10062 Grant Creek near 44 Ranch ③

This outfall is 42” wide and made of reinforced concrete. Out of all the city owned outfalls, this outfall has the 3rd highest priority score (Table 6)There are over 80 inlets that drain to this outfall from the 44 Ranch neighborhood. The surrounding land use type is predominately suburban residential. There was a no flow during the inspection on 7/31/2023. There were no obvious signs of illicit discharge during the inspection.

2.24 SW-DC-10077 Rattlesnake Creek near Mountain View Drive

This outfall is 6” wide and made of corrugated plastic. The pipe is connected to one inlet on Mountain View Drive. The surrounding land use type is predominately suburban residential. Upon inspection, on 7/11/2023, there were no signs of illicit discharge.

2.25 SW-DC-10104 Moose Can Gully near Mainview Drive

This outfall is 18" wide and made of corrugated metal (Photo 35). The pipe is connected to four inlets on Mainview Drive and two inlets on Skyview Drive. The surrounding land use type is predominately suburban residential. The condition of the pipe is poor. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 35. SW-DC-10104 (July 19, 2023)

2.26 SW-DC-10105 Moose Can Gully near Ridge Drive

This outfall is 24" wide and made of reinforced concrete (Photo 36). It is unknown how many inlets are connected to this outfall, but the surrounding land use type is predominately suburban residential. The pipe is almost entirely plugged with sediment. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 36. SW-DC-1010 (July 19, 2023)

2.27 SW-DC-10106 Moose Can Gully near Grandview Way

This outfall is 24” wide and made of corrugated metal (Photo 37). The pipe is connected to five inlets on Grandview Way and one inlet on Morning Side Court. The surrounding land use type is predominately suburban residential. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 37. SW-DC-10106 (July 19, 2023)

2.28 SW-DC-10107 Moose Can Gully near Alliance Way

This outfall is 24” wide and made of reinforced concrete (Photo 38). The pipe is connected to three inlets on Alliance Way and one inlet on Foss Court. The pipe is entirely filled with debris. The surrounding land use type is predominately suburban residential. Upon inspection, on 7/19/2023, there were no signs of illicit discharge.

Photo 38. SW-DC-10107 (July 19, 2023)

3 References

Montana Department of Environmental Quality. (2020a). Final 2020 Water Quality Integrated Report. https://deq.mt.gov/files/Water/WQPB/CWAIC/Reports/IRs/2020/MT_2020_IR_Final.pdf

Montana Department of Environmental Quality. (2020b). Final 2020 Water Quality Integrated Report. Appendix A–Impaired Waters. https://deq.mt.gov/files/Water/WQPB/CWAIC/Reports/IRs/2020/Appendix_A_Final.pdf

Appendix A- Dry Weather Inspection Forms

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Bitterroot		Outfall ID: SW-DC-10029	
Today's date: 7/31/2023		Time (Military): 1025	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 74	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46.9297877	Longitude: -114.0295176	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera: Samsung Galaxy		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Inlets in neighborhood

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☐ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 24	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

~~USGS Stream Gage 12340500 Clark Fork above Missoula~~
~~1930cfs = 866.184 gpm~~

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☒ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☒ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

None

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SW-DC-10048	
Today's date: 7/31/2023		Time (Military): 0845	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 69	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46.9297877	Longitude: -114.0295176	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera: Samsung Galaxy		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____________
- Known Industries: ____________

Notes (e.g.., origin of outfall, if known): Inlets in neighborhood

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☐ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 36	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ In-Stream					
Flow Present?	☐ Yes ☒ No	*If No, Skip to Section 5*			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

USGS Stream Gage 12340500 Clark Fork above Missoula
1930cfs = 866.184 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

None

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork		Outfall ID: SW-DC-10056	
Today's date: 7/31/2023		Time (Military): 1125	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 73	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude:	Longitude:	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera: Samsung Galaxy		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☒ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____________
- Known Industries: ____________

Notes (e.g.., origin of outfall, if known): Clay St outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 12	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

per 3 gallons:

2.04 sec
1.72 sec
1.9 sec
1.58 sec
1.72 sec

Avg = 3 gal/1.79 sec = 1.68 gal/sec x 60 sec
= 100.8 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Bitterroot		Outfall ID: SW-DC-10059	
Today's date: 7/31/2023		Time (Military): 1045	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 74	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 113.9915405	Longitude: 45.8373913	GPS Unit: Trimble R2	GPS LMK #:
Camera: Samsung Galaxy		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Takima outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☒ No ☐ Partially ☐ Fully; With Sediment: ☐ No ☒ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ In-Stream					
Flow Present?	☐ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	_____′ _____″	Ft, In	Tape measure
	Measured length	_____′ _____″	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

This outfall is approximately half full of sediment. Dirt and sediment need to be removed from this pipe for it to function properly.

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: GRANT CREEK			Outfall ID: Sw-DC-10062	
Today's date: 7/31/2023			Time (Military): 0930	
Investigators: Lyndsey Holloway			Form completed by: Lyndsey Holloway	
Temperature (°F): 62	Rainfall (in.): Last 24 hours: 0		Last 48 hours: 0	
Latitude: 46.8950089		Longitude: -114.0915269	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera: Samsung Galaxy			Photo #s: I:\PublicWorks\DIVISION - Storm Water\MONTANA DEQ + MS4 Info\MCM3 - Illicit Discharge Detect and Elimination\Outfalls\P	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ■ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Drains the 44 ranch subdivision

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
■ **Pipe**	☐ RCP ☐ CMP ☐ PVC ■ HDPE ☐ Steel ☐ Other: ______	■ Circular ☐ Elliptical ☐ Box ☐ Other: ______	■ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 42	In Water: ☐ No ■ Partially ☐ Fully With Sediment: ■ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ **In-Stream**					
Flow Present?	☐ Yes ■ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

USGS Stream Gage 12340500 Clark Fork above Missoula
1930cfs = 866.184 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Minor amounts of trash, HDS needs cleaning. Sediment deposition from active construction

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek - Bitterroot		Outfall ID: SW-DC-10070	
Today's date: 7/31/2023		Time (Military): 1005	
Investigators: Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 68	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitude: 114.0534123	Longitude: 46.8279040	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Bitterroot Outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 54"	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ In-Stream					
Flow Present?	☒ Yes ☐ No *If No, Skip to Section 5*				
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	_____' _____"	Ft, In	Tape measure
	Measured length	_____' _____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork River		Outfall ID: SW-DC-10088	
Today's date: 7/31/2023		Time (Military): 1145	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 73	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46.8719310	Longitude: -114.0004217	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera: Samsung Galaxy		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☒ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Fox Site

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 42	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ **In-Stream**					
Flow Present?	☒ Yes	☐ No	***If No, Skip to Section 5***		
Flow Description (If present)	☐ Trickle	☒ Moderate	☐ Substantial		

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

was only able to capture about 1/3 of the flow, used 2.5 multiplier measured 5 gallons

14.18 sec x 2.5 mult = 35.45

13.68 sec x 2.5 = 34.2

19.7 sec x 2.5 = 49.25

average = 39.63 seconds

Avg 5 gal/39.63 = 0.13 gal per sec x 60 = 7.8 gallons per minute

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork River		Outfall ID: SW DC 10095	
Today's date: 7/31/2023		Time (Military): 10:10	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 76	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 113.9971847	Longitude: 46.868976	GPS Unit: Trimble R2	GPS LMK #:
Camera: Samsung Galaxy		Photo #s: I:\PublicWorks\DIVISION - Storm Water\MONTANA DEQ + MS4 Info\MCM3 - Illicit Discharge Detect and Elimination\Outfalls\P	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☒ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Brennan's wave outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

measured 2 gallons

11.07 sec
~~6.69 sec~~
6.24 sec
6.62sec
6.63 sec

average = 7.45 seconds
2 gal/7.45 sec = .27 gal per sec x 60 = 16.11 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork		Outfall ID: SW-DC-10098	
Today's date: 7/31/2023		Time (Military): 1110	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F): 75	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46.8672470	Longitude: -113.9962723	GPS Unit: Samsung Galaxy	GPS LMK #:
Camera: Samsung Galaxy		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☒ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Drains urban area near the Higgins Ave "hip strip"

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 24	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ In-Stream					
Flow Present?	☐ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

USGS Stream Gage 12340500 Clark Fork above Missoula
1930cfs = 866.184 gpm

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Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Outlet structure is detached from pipe

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek - Bitterroot		Outfall ID: SW-DC-10099	
Today's date: 7/31/2023		Time (Military): 10:50	
Investigators: Lyndsey Holloway		Form completed by: Lyndsey Holloway	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitude: 46.842	Longitude: -113.996	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): outfall above Grit Chamber

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30"	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ **In-Stream**					
Flow Present?	☒ Yes	☐ No	***If No, Skip to Section 5***		
Flow Description (If present)	☐ Trickle	☒ Moderate	☐ Substantial		

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☑ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☑ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Appendix D
Illicit Discharge Detection and Elimination

Date	Location Description	Complaint Type	Complaint	Action Taken
1/19/2023	821 Burlington Ave	Water Pollution - Petroleum	Complaint was received through website. Complainant states "LARGE QUANITY OF USED MOTOR OIL SPILLED INTO ROAD AND STORM DRAIN, LARGE AMOUNT STILL POOLED ON CURBING NEXT TO STORM DRAIN ON HOLBORN BETWEEN BURLINGTON AND STRAND AVENUE. . FOUND AND REPORTED TO CITY ROAD DEPT AT 6:50AM ON 7/5.:	This was addressed through an Environmental Health on-call page. Ben Schmidt showed up on scene and City Public Works was already vacuuming out the sump and putting down sand. Petroleum did go down to storm drains but was vacuumed out quickly. There was around 200 gallons spilled but it was estimated less than 30 gallons went down the storm drains. Eleana Evans contacted DES/DEQ and reported the incident. 7/7/22 - Eleana took pictures for DEQ of the cleanup. You were still able to see the extent of the spill on the pavement and stormwater still had the dry wells covered. DES is taking it from here, so I am closing it out. Pictures in Environmental Health on-call and GIS.
1/17/2023	2610 Radio Way	Water Pollution - Detergent	Received from Webform: Washing cars into storm drains that are in front and at the end of the wash bay.	Todd Seib started by looking up the sewer record for the facility and they have two sand-oil interceptors onsite, but it is not clear what drains are connected to them. The drain that receives wash water at the entrance of the wash bay would be required to be connected to sewer or other alternative drain options as outlined in our BMP manual. The drain along Radio way appears to be a city storm drain, would only receive clean rinse water dripping off vehicles after exiting the car wash. Because this would be uncontaminated ground water and/or cleaner than stormwater it would not be considered an allowable non-stormwater discharge and therefore not be in violation of the WQD Code. Todd contacted Dazzlers

				today and general manager (Sean) is out-of-town for the next few days. January 20, 2023 Checked out the Dazzlers drain today since manager Sean was out of town earlier in the week. Drain was draining slowly since line keeps freezing so couldn't pull lid. Was able to see the cut in pavement where line travels to building and the pipe leading into trough drain inside the wash bay. According to Sean, this then intersects with other settling basins and drains from the car wash and all then drain to an oil-water separator prior to discharge to city sewer. After being washed the vehicles are rinsed with potable water. Most of this also enters drains inside the bay. Any rinse water that drips off the vehicles after the dry step and lands into the city storm drain on Radio Way would be considered an allowable non-stormwater discharge and not a violation of our Code. Closing complaint, no further action necessary.
3/7/2023	5840 Expressway	Water Pollution - Sewage/Manure	Received phone call: Owner is dumping septic from truck down a manhole just west of business. If you go to the building west of his shop you will see the manhole where he's dumping. The owner of Standard Sewer & Septic (previously Standard Drain	03/07/2023: Craig Beebe visited the site and inspected storm drains at property with business. No sign of sewage in the eight on site or two in the road. When leaving two septic pump trucks were observed parked on a currently vacant lot with a for lease sign. The gates were open and there was no signage posted for no trespassing. Craig walked through the parking lot and did not observe any storm drains or sign of improper dumping. Returned to Health Department to see if there are any storm drains on

			Cleaning) is waiting for permits from DEQ.	the lot (one exists at the base of truck ramp). Confirmed with management that it is ok to walk back and inspect that storm drain (~300 feet from gate). 3/17/2023: CAB returned to the site. No signs of dumping on soil near vac trucks. No signs of dumping in the storm drain on the property or near the properties entrance. No further action required.
3/24/2023	100 Hickory Street	Water Pollution - Solid Waste	Paint chips being pressure washed off of lockers or cabinet near/around dry well in shop yard.	Craig and Todd Seib visited site and confirmed presence of paint chips in storm dry well. Lincoln wasn't at the site, but they left a message for him. On 3/28/23, Todd contacted the office and spoke with Mike Nonemacher. He confirmed that staff had pressure washed the equipment and we discussed next steps in term of clean-up. As this is now the third time we've responded to improper dry-well use by the Parks and Rec department, and educational intervention has taken place, he explained that an NOV would be sent. The NOV was sent on 3/30/23. Will follow up to ensure dry well is cleaned out and further discuss/aid in developing future protocols for their staff to prevent this from happening.
2/17/2023	Latimer	Water Pollution - Solid Waste	Received through Webform: Trailer Removal - Possible contamination and dumping near trailers on Latimer.	Complaint reassigned to land team for solid waste disposal.
5/17/2023	2121 S 4th St W	Water Pollution - Petroleum	Trenchless Solutions sprayed oil & hydraulic fluid all over the road 2 weeks ago and still has not cleaned it up, even after	Todd Seib visited the location based on description and observed staining in road. It had recently rained and the curbline contained leaves, but it didn't appear that any hydraulic oil had stained the curbline

			assuring the complainant that they would.	or entered the nearest storm drain (approx. 100' away). Contacted Kurt at Trenchless (406-830-4728 and 830-5084) and explained that a clean-up of the remaining fluid was needed. He said he was planning on going back out there. On 5/23 Kurt called and said he had cleaned it up the best he could over the weekend using granular absorbent and sweeping it up. Visited the site and it looked better.
5/30/2023	1844 S 8th St W	Water Pollution - Solid Waste	Received via webform: Improperly stored and spilling hazardous waste, oil. Noticeable smell from all of them at my back gate. Anyone ever gonna do something about this? Original complaint came in 5/11/23 - see complaint 2023-0511-8695, given to Sanitarian Reed Traynor.	Todd Seib visited the alley and did not smell any volatile or noxious chemicals/odors. Observed a bucket holding rainwater, an oil-storage container, and a couple other items in the alley right-of-way adjacent to the backside of 1844 fence. He did not handle the container to see if it contained liquid, called owner of property to notify him of the complaint and he indicated he will clean up the property as soon as he can. He estimates that based on tenant/court issues it could be within the next two weeks. Todd asked him to let him know when he removes these items for proper disposal. Given the quantity of items and since container did not appear to be leaking this is a reasonable correction plan.
5/30/2023	134 W Front St	Water Pollution - Detergent	From web form: Walking by after the farmers market and noticed a river of suds coming from Top Hat. Complainant talked to the employee about why they can't dump mop bucket water down the alley,	Todd Seib talked to manager,Lilly, about complaint. She was unaware of any dumping of mop water and explained that they have a designated mop sink inside the facility. She said she would talk to staff. Todd also talked through some other common restaurant stormwater-related issues like power washing garbage bins and outdoor grease storage and gave her BMPs for those.

			but is concerned that this is the business's policy for gray water.	
5/31/2023	1636 S 9th St W	Water Pollution - Pesticide/Herbicide	Neighbor called to report that property owner has a landscaping business that dumps chemicals such as roundup on the ground in the alley at the end of the workday. Refer to complaint # 2023-0531-6442 for Sanitarian Riley Koch.	(Todd Seib) Visited with owner (Jake) onsite. Did not observe any containers of herbicides or fluids and didn't see any staining in alley. Jake explained that he and his crew have never dumped liquids there and do not use herbicides in their business. We discussed the aquifer and they understood why it would not be a good practice to dump chemicals into our soils.
6/12/2023	300 E Broadway	Water Pollution – Pesticide/Herbicide	Complainant called, stating that the storm grate in front of the Bel Aire Motel used to have a poison crate. That was removed, but there are pellets in the grate that they suspect to be rat poison.	On June 19th, the Water Quality District (WQD) staff visited the motel, and it was vacant and under remodel. They did not observe any rat poison in the storm drains onsite, but the grates were very small and there has been rain in the area for the past week. A white staining on pavement was observed leading to one of the storm drains, possible drywall wash water. One truck was onsite with Tudahl Contracting label. They attempted to contact Tudahl, but the phone was not associated with a voicemail. The Bel Aire number listed in our file, but the voicemail was full. WQD found the owner's number (Rohit Patel) and explained the situation to him. I explained that the drain should be cleaned out and to discontinue disposal of contracting waste through the storm drain. He said that he would rectify the situation with the current partner involved in the lease (Valerie McCollum).

				WQD spoke with Valerie and explained the situation and she emailed on June 22nd with follow up information. They pulled the grates of the drains and did not find any pellets or construction debris, and they had been cleaned out recently (within the past year during sale). WQD provided BMPs for trade contracting and pressure washing.
4/19/2023	<Null>	Water Pollution – Solid Waste	Received phone call: (also given to Sanitarian, Reed Traynor - Complaint 2023-0419-9908) Homeless living along bank; tents and hand-made structures, garbage, bikes, etc. In about a week when the water rises, it's all going to be washed down the river. It's not just one or two tents, it's substantial. Not on University property. If you go along the river trail, just west of Missoula College there's a break in the fence, they are directly down from there.	Complaint transferred to Reed Traynor. Clark Fork Coalition cleaned up the camp sites during Clark Fork Days.
4/19/2023	City of Missoula sewer line near the Clark Fork River on Fort Missoula. Sewer line on both Board of	Water Pollution – Sewage/Manure	Sewer line is leaking, overgrown and roots are likely puncturing the clay line. Could smell strong H2S odor.	4/21/2023: Craig Beebe walked the sewer line and observed no leaking septage. He did smell sewage near the pump house. Observed a missing manhole that potentially is with the sewer line. 4/24/2023: Had a voicemail from Dave stating he filed a complaint with the state about the sewer line. CAB emailed and spoke with Pat Brook about the sewer line. He confirmed it is normal to have a

Regents and US Army property.

sewage smell around pumphouses. He said the lines are inspected with a camera and maintained on an annual basis. He is going to look at the manhole with a missing lid to see if it is connected to the city's infrastructure and repair/replace it if it is.

4/24/2023: Dave called to check in and then came to show pictures Craig pictures of sewer risers with holes. Discussed the pump station, sewer main capacity and condition.

4/26/2023: CAB looked at riser in question. Sewer lid/monument was slid forward a little creating a gap. Did not observe holes in brick. Spoke with Pat Brook, he investigated the missing manhole. It is not part of the sewer, not sure what it is but he requested property access from the owner to fill the remainder with sand. It was previously filled but settled over time creating a tripping hazard.

5/3/2023: CAB and TS walked the sewer line. Observed that Pat Brook had filled in the settled manhole. Collected three water samples for TC/EC and Nitrates.

	TC	EC	Nitrate
West of Pumphouse:	1986.3 cfu	36.4 cfu	0.376 mg/L
East of 1st Manhole:	2419.5 cfu	20.1 cfu	0.693 mg/L
Between Manhole 2 &3:	>2419.5 cfu	90.1 cfu	1.14 mg/L

				Sample results not indicative of a sewage leak. No further action required.
6/6/2023	Intersection of 2nd St W and Cottonwood	Water Pollution - Sediment	From Web Form: "There are no storm water protection over any of the nearby drywells. The drywells close to the apartment building on 2nd Street (next to Cottonwood Street Intersection) are filled in. Throughout the duration of this project they've not contained the materials to the site itself. We've had several large rains and the construction dirt has made the drywells temporarily flood into neighboring property and spread the pollution/debris."	06/06/2023: Craig Beebe visited observed storm drains had silt fencing/barriers in place preventing sediment from entering. The drain on the southwest corner of the intersection appeared silted in. CAB spoke with Knife River worker and he said it had the filter. He removed a good portion of the silt from the storm drain to confirm it was in place and help it drain. CAB observed silt fencing/barriers in storm drains throughout the project area. No further action required.
6/28/2023	House and parking area near the east end of S 8th St W off of Reserve St.	Water Pollution – Petroleum	Continuation of complaint 2023-0413-4591. Oil stains throughout parking area. Suspected oil in the storm drain.	6/28/2023: Craig Beebe visited the site and observed petroleum-stained soil with a petroleum sheen adjacent to the storm drain grate and a puddle with a petroleum sheen touching the soil. It was unclear if petroleum staining is present in storm drain due to recent rain event. Additionally, in the parking area there was an approximate four-foot by five-foot fresh oil stain with some liquid still present and a second fresh approximate two-foot by two-foot stain. Cragi wrote joint letter with Jim Biondich. 7/13/2023: CAB visited the site again to investigate potential storm drain staining. Staining present in

				storm drain towards southeast quadrant of drain. Soil surrounding southeast quadrant of grate had hydrocarbon odor. 7/31/2023: CAB spoke with Steve Stevens on the phone. He understood it needed to be cleaned up. He stated the tenant moved a vehicle over the storm drain and he was unable to get it cleaned. He was previously sued by tenants for not paying their power bill, so he is gun shy to have this tenants car towed. Inquired about transferring the NOV to the tenant as he was the one responsible.
5/19/2023	Unleashed Doggy Daycare	Water Pollution – Sewage/Manure	Staff spray dog waste away with water. It drains to street and has nowhere to drain.	6/2/2023: Craig Beebe (CAB) and Officer Christiano visited the site, who spoke with the owner (Jennifer) and inspected the back room/porch/fenced area along with the berm around the fenced area. Jennifer stated that they pick up all solids, use a wet vac on all wet and runny waste and then spray with a biodegradable cleaner that they wipe up with paper towels when dogs use the restroom. After all of that is done, they spray the fenced in area once or twice a week with water. The berm was observed to have compacted D1 gravel and sand surrounding the down gradient side of the fence line with a small break in the southeast corner. The break had some weeds and grass growing in it. No solids or drag off observed in the stormwater conveyance. 6/27/2023: CAB emailed Jennifer to follow up about on our visit stating some sort of physical barrier needed to be in place while actively spraying to

				prevent drag off through the channel. 7/7/2023: Jennifer Reached out to see if the grass and weeds would be sufficient for summer months. CAB visited the site to look at weeds. Substantial growth had occurred. Responded to Jennifer stating that it would be sufficient during the summer, but something needed to be in place when they die off for the season.
6/1/2023	Storm drain on Dixon to the east of the property.	Water Pollution - Paint	Complainant called, stating that the contractor working on the home at 1905 Dixon Ave has been disposing of a large amount of a white substance down the storm drain in front of 3305 Grant St.	6/6/2023: Craig Beebe visited site and inspected the storm drain. Conveyance and storm grate had white residual staining present and appeared to be several paint solids at the bottom of the storm drain. Craig spoke with contractor on site, he stated it was latex paint wash water. Craig explained how it was not the best practice and could pollute the groundwater which is our drinking water in Missoula. He was given an informational flyer and Craig highlighted the contractor portion of BMP manual. Requested he use a long-hosed shop vac to suck up the residual out of the drain.
7/13/2023	2500 S Higgins Ave	Water Pollution – Petroleum	From phone call: there is a pickup that has been parked next to the east storm drain in the parking lot. It has a bucket underneath catching transmission fluid, but it is draining into the storm drain.	07/14/2023: Craig Beebe visited site. No truck with bucket of automotive fluids present in parking lot. Middle storm drain of five in north parking lot had hydrocarbon staining on northwest side of drain. No free fluids present on asphalt. Unable to observe inside storm drain due to non-leaking car parked over it. Staining appears consistent vehicle arriving or leaving the site with while still leaking. Additional *potential* staining present near furthest east storm drain. Unable to observe inside storm drain due to

				non-leaking car parked over it. No vehicle was observed leaking in this location. Will follow up next week to inspect both storm drains. 7/20/2023: Eastern most storm drain has minor staining nearby consistent with minor car leaks. No staining observed in drain. Vehicle over middle storm drain. 8/10/2023: Staining appears to end at the storm grate. No visible staining on drain rock or sidewall of drywell. No further action required.
7/5/2023	Storm drains at northeast corner of 6th St W and Ivy.	Water Pollution - Other	From phone call: the storm drain on the NE corner of 6th and Ivy is not draining when it rains.	07/05/2023: Craig Beebe visited intersection and observed storm drain. Drain rock appeared to be in good shape but fairly close to the grate (~1.5 - 2 feet). Lid is nonstandard drain cover, and the shoulder appears to have been cleaned by the street sweeper since the last rain. Possibly covered with leaves prior to street sweeper. Referring to Tracy Campbell, Storm Water Superintendent.
7/17/2023	Driveway and along western fence line of 1905 Alvina Dr.	Water Pollution – Other	Received phone call: House at the end of the cul-de-sac on Alvina Drive (1905?) - they own a fire truck and have dug a trench around the outside of their fence line to drain the hose from the fire truck. The water drains into Greenough Park. They have sandbags piled along the trench, so the water doesn't go into their garage? or house?	Appears that the storm drains in the above-mentioned property is being pumped out and not the fire truck. Both situations considered allowable discharge. Complaint transferred to City Parks via email to Betsy Willet and Corena Maurer.

			Unsure of what they are draining or why.	
7/27/2023	Drywell in the north parking/staging area of Jerry's Transmission.	Water Pollution - Petroleum	Received from webform: The employee's at Jerry's Transmission on South are sweeping/pouring chemical into the storm drain in their back lot. I cannot understand why we would have a storm drain in a parking lit of a place that has so many toxic fluids and spills."	7/27/2023: Craig Beebe (CAB) visited the site. Performed a pollution prevention inspection. Kurt Johnson gave a quick tour, directed CAB to the rear storm drain and explained a vehicle being dropped off broke its crank case while being lowered. They place oil dry on it and did the best they could to keep it out of the storm drain. CAB observed liquid in the storm drain that appeared to be water. After reviewing photos, the liquid had a sheen on it and what appears to be oil dry is submerged in the center. 8/9/2010: CAB spoke with Bret (shop manager) about what was seen in the photos and instructed them to have it cleaned out. An email with detailed instructions and an NOV would follow shortly. 8/10/2023: NOV emailed and sent via certified mail. 8/15/2023: CAB met Kurt on site at his request. Inspected the storm drain again and discussed what needed to happen. He stated they would also get their floor drain sump and the oil water separator cleaned out. 8/22/2023: Kurt came to the Health Department to let me know Nash Enterprises had vacuumed out the drywell, his O/W separator, and the sump in the

				shop. He stated he would send a copy of all the paperwork when he received it from Nash.
8/4/2023	Southeast corner of detached garage at above address.	Water Pollution - Other	Receive phone call: There's a 2" pipe coming from the interior of the house coming out to a T-pipe to the gutter. There seems to be water running through the pipe into the storm drain. Not sure what would be draining through to the drain but seems concerning. The pipe is on the front left of the house; you'll see the t-pipe going to the gutter.”	8/7/2023: Craig Beebe visited site. No pipes exiting roof or building at 4693 Adalaide as reported in the complaint. The garage of 4693 Montrose Dr has a 2" rain catchment pipe coming off the outfall of the gutter system with a 3/4" bypass/overflow directed down the original gutter downspout. See picture. No audible running water was leaving the system. No further action required.
10/16/2023	Higgins Ave Car Wash	Water Pollution - Paint	Officer Vreeland (Missoula PD) stopped by the office, stating that yesterday (10/15) he received a dispatch that there was a man washing out large cans of paint down the car wash drains. Went to the car wash and spoke with person who was washing out the paint cans. They thought it was about 10 gallons of paint they'd dumped. It was yellow road paint; Officer Vreeland has photos on a camera of the paint label. The fire department was called to determine if it was a hazmat situation, and they didn't think it	10/16/2023: Craig Beebe visited the site. No paint residue observed in the sand oil separator or the catch basin prior to the S/O separator. View obscured in the wash bay catch basins by soapy bubbles. Emailed Nate Gordon at the City Wastewater Treatment Plant inquiring if they would like to be notified about releases of this nature to their sewer system and if they wanted the responsible parties information for enforcement action.

			was an immediate hazmat spill. They recommended this be filed with EnvHealth.	
11/2/2023	Mullin and Mary Jane round about to 1995 Belleauwood Rd	Water Pollution - Petroleum	Oil slick on Mullan Rd from one of the roundabouts to Hellgate Station	Todd Seib notified City streets (Brian Hensel) and City Stormwater (Tracy Campbell) in case the reported release involved their infrastructure and/or involvement. The sheen started in westbound lane as I went through the Mary Jane roundabout. It appeared to taper off after the George Elmer roundabout. Craig Beebe was dispatched with hazmat supply vehicle. After tracking the sheen, it was determined that the release was used oil and mainly pooled in the Mary Jane roundabout, some on the shoulder that someone put kitty litter on, and various deposits along Tippary Way and extended to George Elmer. All told the sheen along Mullan extended ¾ of a mile. The sheen was traced to a house off Tippary Way (1995 Belleauwood) where oil and sheen was upgradient which indicated it came from a vehicle at that house. Rang the bell but no one was home, left our card at the door. We put out ~50 oil-absorbent pads in the roundabout and in other locations where we could see actual oil product. Craig and Todd came back on 11/3/23 and most pads had already been removed from the roadway. We noticed some downgradient storm drains that we didn't see yesterday. Kitty litter was still there and most of the other sheened areas were not as evident.

STORMWATER
City of Missoula

2023 Illicit Discharge Complaints

Missoula Valley Water Quality District

Date: 2/8/202s , Cartographer: Lyndsey Holloway
Coordinate System: NAD 1983 Montana Stateplane
Sources: ESRI, Missoula Water Quality District, City of Missoula GIS

NOV type
- ★ other
- ★ petroleum

None type
- ● other
- ● petroleum
- ● sediment

Warning type
- ▲ other
- ▲ petroleum

City Limits

N

Appendix E

Public Works Standards and Specifications Manual - Excerpts

2024 PUBLIC WORKS MANUAL – SUMMARY OF CHANGES FROM 2023 VERSION

Changes to Appendix 2-A Mods to MPWSS

- Section 02600
  - Removed the service line repair section and included that language in Chapter 4.
  - Added Kennedy valves as an approved valve for gate valves and butterfly valves.

Changes to Appendix 2-A Mods to MPWSS

- Section 02600
  - Removed the service line repair section and included that language in Chapter 4.
  - Added Kennedy valves as an approved valve for gate valves and butterfly valves.

Changes to Appendix 2-B – Standard Drawings

- STD-408 – Added requirement for hydrant bonnet to be painted blue.
- STD-412 – Added a composite lid requirement.
- STD-417 – Updated references to manual.
- STD-614 – Added requirement to have mastic between grade rings and frame.
- STD-616 – Added requirement to have mastic between grade rings and frame and a note that dry wells are not allowed in commercial approaches.
- STD-650 – Updated the requirement for gravel material.
- STD-653 – Updated notes for consistency.

Chapter 3 Summary of Changes

- 3.1.3.C Expanded explanation on Stage submittal and approval deadlines.
- 3.2.2.A.7 Specified street lights must be highlighted on demo plans.
- 3.3.5 Specified that a meeting with City Engineer is required prior to determining Traffic Impact study scope.
- Appendix 3-E Clarified Improvement Agreement fee must be paid prior to filing of the IA.
- Appendix 3-B
  - Stage 1
    - Checklist is removed.
  - Stage 2
    - Updated what projects need a Stage 2 submittal.
    - Updated submittal and communication is via Accela system.
    - Removed most items from the Checklist.
  - Stage 3
    - Reinforced requirement to have project number.

        - Specified all infrastructure submitted in one pre-construction plan submittal.
        - Specified all projects will use the City's Accela system's PWI record.
        - Removed design requirements from Checklist as they are detailed in the Missoula City Public Works Standards & Specifications manual.
    - Stage 4
        - Reinforced that Stage 4 submittal must fully address Stage 3 comments.
        - Updated submittal requirements.
        - Reinforced requirement for a pre-construction meeting.
        - Updated checklist, removed most items.
        - Updated Applicants Certification.
    - Stage 5 Reinforced that a Stage 5 full submittal required prior to inspection/walkthrough.
        - Updated Conditional Acceptance requirements and warranty period.
        - Updated checklist.
        - Specified all easements need to be notarized and stamp/signature of surveyor.
    - Stage 6
        - Summarized the purpose of Stage 6
        - Detailed City's Conditional Acceptance requirements
        - Specified all projects will use the City's Accela system's PWI record.
        - Specified all easements need to be notarized and stamp/signature of surveyor.
        - Updated Developer Representative's Acceptance Certificate – Utilities.
    - Stage 7
        - Updated Inspection Results sheets, removed most checklist items.

Changes to Chapter 4

- Section 4.2.5 – Clarified in Wet Utility Main Best Practices that stormwater mains can be under the curb and closer to trees.
- Section 4.2.11.C – Added a note about adding dimensions to ditch cards so curb stop can be located in the field.
- Section 4.2.13 – Updated requirements for service line abandonment which will now require sectioning out the tee for services greater than 2 inches and removing the corp and installing a repair band or a re-tapping band for services 2 inches and smaller.
- Section 4.3.8 – Clarified that service stubs need to stop within 5 feet of an easement (not just a property line like currently written).

Changes to Chapter 5

- Section 5.3.3.A - Clarified that service stubs need to stop within 5 feet of an easement (not just a property line like currently written).
- Section 5.3.4.B – Clarified that manholes with "less than" 45 degree change have a 0.1-foot drop and "greater than" 45 degrees have a 0.2-foot drop.

Changes to Chapter 6

- Section 6.2.3.A – Added section about using software for stormwater routing and providing a node diagram from the stormwater routing.
- Section 6.2.3.B.4 – Added a requirement to include photos of infiltration testing equipment and clarified the maximum infiltration rate that can be used when head is not achieved during a test.
- Section 6.2.3.B.7 – Clarified when pretreatment is required.
- Section 6.2.3.B.10 – Modified groundwater testing to match proposed DEQ-8 language.
- Section 6.3.5.E and 6.3.7. E – Modified flow velocities to match proposed DEQ-8 language.
- Section 6.3.11.A – Added a classification of infiltration facilities.
- Section 6.3.11.E – Added a section on shallow infiltration facilities.
- Section 6.3.11.H – Clarified that dry well volume shall not be counted toward overall site detention volume.
- Appendix 6-C – Added clarification that *Montana Post-Construction Storm Water BMP Design Guidance Manual* calculations need to be provided.

Summary of Change to Chapter 7 – Transportation System

The following list summarizes the proposed changes for 2024, organized by section. This summary does not include minor changes associated with spelling/syntax, list clean up, etc.

- 7.1.1.U – Updated "NCHRP Report 672, Roundabouts: An Informational Guide" to "NCHRP Report 1043, Guide for Roundabouts," adopting the latest guidelines for modern roundabouts.
- 7.1.1.W – Added "NCHRP Report 1036, Roadway Cross-Section Reallocation: A Guide" as a forthcoming reference for potential new TIS requirements regarding 24-hour capacity analyses.
- 7.2.2.E.10.d – Added clarification for the need to separate photometric calculation areas for specific elements within the right-of-way (i.e., requiring separate calcs between curbs and/or within traveled way, adjacent ped/bike facilities, and crosswalks).
- 7.2.3.A – Added content giving the City Engineer the ability to require counts and analyses for 24-hour capacity performance measures in traffic impact studies.
- 7.4.6 – Added standards for alleys related to necessary fire truck access and the requirement for alleys in new subdivisions unless lots are of a sufficient width to meet the needs of City's Complete Streets Policy without alley access (suggested minimum lot widths are provided).
- 7.4.7.B – Added clarifying language related to development requirement to install half street improvements as well as the City Engineer's ability to require opposite side curb and gutter.
- 7.4.10.D.3-5 – Added street lighting design priorities to clarify and aid lighting designers in how to approach street lighting photometric needs within the City's competing and sometimes contradicting illumination standards.
- 7.4.11.J.3 – Removed asphalt patch seam sealant "spec" and referenced the updated City of Missoula Standard Modifications to MPWSS Section 02510, which now contains clearer asphalt patch seam sealing specifications.

Missoula City Public Works
Standards and Specifications Manual

CHAPTER 6 – STORMWATER SYSTEM

CHAPTER 6 – STORMWATER SYSTEM

Table of Contents

CHAPTER 6 – STORMWATER SYSTEM

6.1 Introduction

6.1.1 References

A. *Montana Public Works Standard Specifications* (MPWSS), Seventh Edition, 2021 – by purchase only
B. US DOT FHA Hydraulic Engineering Circular-14– Hydraulic Design of Energy Dissipators for Culverts and Channels
C. US DOT FHA Hydraulic Engineering Circular-15 – Design of Roadside Channels with Flexible Linings
D. US DOT FHA Hydraulic Engineering Circular-22 – Urban Drainage Design Manual
E. US DOT FHA Hydraulic Design Series-5, Hydraulic Design of Highway Culverts
F. Montana Department of Environmental Quality Circular-8: Montana Standards for Subdivision Stormwater Drainage (DEQ-8)
G. Montana Department of Environmental Quality General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)
H. Montana Department of Transportation *Hydraulics Manual*, Chapter 9, Hydrology
I. Montana Department of Transportation *Hydraulics Manual*, Chapter 11, Culverts
J. Montana Department of Transportation *Hydraulics Manual*, Chapter 17, Bridges
K. Montana Department of Transportation *Hydraulics Manual*, Chapter 14, Storm Drain Systems
L. *Montana Post-Construction Stormwater BMP Design Guidance Manual*
M. Montana Department of Transportation's *Erosion and Sediment Control Best Management Practices Manual*
N. Montana Department of Transportation's *Hydraulics Manual*, Update Memo
O. Minnesota Pollution Control Agency' *Minnesota's Stormwater Manual*

6.1.2 Appendices

A. Appendix 6-A – Post-Construction Stormwater Management Site Plan Review Checklist
B. Appendix 6-B – Stormwater Site Evaluation Form
C. Appendix 6-C – Stormwater Drainage Report Content
D. Appendix 6-D – Private Stormwater Facility Maintenance Covenant and Right to Access
E. Appendix 6-E – Operation and Maintenance Requirements
F. Appendix 6-F – Test Pit Infiltration Test Method
G. Appendix 6-G – Infiltration Testing Exemption Exhibit

6.1.3 Standard Modifications to MPWSS

A. Specifications not specifically contained herein related to stormwater improvements shall be in conformance with the *Montana Public Works Standard Specifications* (MPWSS), Seventh Edition, 2021 and the following City of Missoula Modifications to the MPWSS, which are located in Appendix 2-A:

1. SECTION 01400 Contractor Quality Control and Owner Quality Assurance
2. SECTION 02221 Trench Excavation and Backfill for Pipelines and Appurtenant Structures

3. SECTION 02724 Insulation
4. SECTION 02720 Storm Drain Systems
5. SECTION 02740 Pipe Casings

6.1.4 Standard Drawings

A. Standard drawings related to stormwater system improvements shall be in conformance with the *Montana Public Works Standard Specifications* (MPWSS), Seventh Edition, 2021 Standard Drawings and the 600-series of the City of Missoula Standard Drawings contained in Appendix 2-B.

6.1.5 Design Criteria

A. The stormwater design criteria presented in this Chapter are based on standard engineering practice for stormwater management, modified to suit the needs of the City of Missoula. The design of stormwater facilities may need to exceed minimum standards presented here in order to provide adequate protection from flooding. The City will conduct review of drainage plans and reports for compliance with requirements set forth in this Chapter. The City's review is not an endorsement of the plan or approval or verification of the engineering data and plans. The Applicant is exclusively responsible for ensuring that the design, construction drawings, constructions, and record drawings comply with acceptable engineering practices and this Manual.

6.1.6 Deviations from these standards

A. Any requests for deviations for the standards outline in this chapter shall follow requirements in Section 3.6.1 (Improvement Plans) of this Manual.

6.2 General Requirements

6.2.1 Design Requirements

A. Minimum stormwater controls are required for developments with land disturbance $\geq$ 2500 square feet (0.05 acre).

B. Using the Stormwater Site Evaluation Form found in Appendix 6-B, projects are classified as low, medium, and high priority and must meet minimum standards set for each priority level. Medium and high priority developments must provide a Stormwater Management Site Plan and report for permanent water quality treatment facilities to manage runoff from the post-developed site conditions.

C. A Stormwater Management Site Plan Review Checklist is provided in Appendix 6-A.

D. The minimum design standards stated in this chapter apply to the management of stormwater in a post-construction environment.

E. Facilities shall meet the "Wet Utility Main Best Practices" outlined in Section 4.2.5 (Water System) of this Manual.

F. General Grading and Drainage Requirements

1. Grading shall incorporate elements to protect drainage systems. Natural drainage ways shall be preserved.

2. Finished grade slopes shall not exceed a slope of 50%, unless all the following requirements are met and satisfied:
    a. It is necessary to protect/preserve significant environmental characteristics or substantially reduce the need for extensive cut and fill.
    b. Certification by a licensed professional geotechnical or soils engineer is included.
3. Within public right-of-way, private use of soil retaining structures shall be allowed only if approved by City Engineering. Slope ratios within the public right-of-way require approval by City Engineering.
4. Use of retaining structures outside of the right-of-way may be allowed, if approved by City Engineering per a grading plan.
5. All roadway cut and fill shall be confined to stated right-of-way widths or roadway easement widths.

G. Requirements for stormwater erosion and sediment control during construction is covered in Chapter 8 (Erosion Control) of this Manual.

H. **Low Impact Development (LID)/Green Infrastructure**
1. LID/Green Infrastructure is highly prioritized by the City of Missoula. While it is currently not required, in the future credits or incentives may be implemented.
2. LID practices are intended to manage stormwater as close to its source as practicable by preserving and recreating natural landscape features; minimizing effective imperviousness; creating functional and aesthetically appealing site drainage; and treating stormwater as a resource rather than a waste product.
3. Examples include bioretention facilities, green roofs, vegetative biofilters, and permeable pavements. Permeable pavers that have vehicular traffic should be *PaveDrain*, *TRUEGRID*, or Public Works-approved equivalent. *PerkEpave* or Public Works-approved equivalent may be used in areas with no vehicular traffic. All permeable pavers shall be installed per the manufacturer's direction and require Public Works approval.
4. LID/green infrastructure practices aim to preserve, restore, and create green space using soils, vegetation, and rainwater harvest techniques.
5. Additional information is found in the *Montana Post-Construction Stormwater BMP Design Guidance Manual* and in *Minnesota's Stormwater Manual* from the Minnesota Pollution Control Agency.
6. Successful implementation of LID/green infrastructure is accomplished using strategies and standards that meet two or more of the following major objectives:
    a. Flood and peak discharge control.
    b. Water quality control.
    c. Multi-parameter controls, including aquifer recharge and channel protection.
    d. Habitat protection and ecological sustainability.

I. **Low Priority Sites**. The requirements in this section apply to those projects classified as low priority using the Stormwater Evaluation Form.
1. Improvement plans shall include a grading and drainage plan sheet addressing requirements listed in Section 6.2.2 of this chapter.

2. Projects that disturb 1-acre or greater during construction shall adhere to water quality treatment requirements in Section 6.2.6 of this chapter.
3. The following minimum requirements apply to this classification:
    a. Site grading shall follow specific requirements established in/on the plat, subdivision conditions of acceptance or any covenants that apply.
    b. The finished grade of the ground shall slope away from the house.
    c. Roof drainage facilities shall be installed to divert stormwater away from the foundation of the structure.
    d. Roof drainage facilities directed toward unfinished landscaping shall be equipped with sediment bags and/or energy dissipaters until landscaping is established.
    e. Stormwater shall not be concentrated onto an adjacent property. Stormwater from impervious surfaces shall be routed over a minimum length of 15 feet of pervious surfaces before flowing off site or must follow mitigation techniques approved by Missoula Stormwater Utility. These techniques may include the use of swales, dry wells, or piped connections to dry wells or French drains. The slope of the pervious surfaces shall be no greater than 8% for lawns and 2% for other surfaces.
    f. The finished grade shall be contoured to move stormwater away from both on- and off-site structures. This includes consideration of:
        1) Stormwater from impermeable surfaces such as roofs, driveways, and sidewalks on the subject property; and
        2) Stormwater coming onto the site from adjacent properties.
    g. Stormwater shall not affect structures on adjacent parcels and shall be configured to direct stormwater to vegetated areas.
    h. Stormwater to or from the site shall not be impeded or accelerated.
    i. Irrigation shall be installed and used in a manner that does not affect adjacent properties.
    j. Developers are encouraged to utilize LID and green infrastructure methods for managing stormwater.
4. The elevation of residential dwellings and other lot features shall be established to ensure stormwater runoff from the 100-year storm does not inundate buildings.
5. Erosion and sediment controls shall be installed per requirements in Chapter 8.
6. Finished grade slopes may not exceed 50% unless the requirements Section 6.2.1.F.2 in this chapter are met.
7. Use of LID/green infrastructure techniques is encouraged.

J. **Medium and High Priority Sites**. The requirements in this section apply to those projects classified as medium and high priority per the Stormwater Site Evaluation Form (Appendix 6-B). The stormwater management systems for these projects shall be designed, signed, and sealed by a registered professional engineer in the State of Montana. These projects shall adhere to the minimum requirements listed for low priority projects, as well as the following:
    1. Post-Development Runoff Control Requirements

a. Post-development stormwater from the project shall be completely retained and infiltrated on site for the 100-year storm event; or
b. Post-development stormwater from the project shall be released from the site at pre-developed peak flow rates for the 100-year storm event; or
c. Post-development stormwater shall be routed through an adequate stormwater conveyance to a regional stormwater facility for which it was designed. This requires prior approval by City Engineering and only allowed when a. and b. above cannot be met.

2. Projects shall meet post-construction water quality control requirements in Section 6.2.6 of this chapter.
3. The Stormwater Management Site Plan shall meet the requirements in Section 6.2.2 of this chapter, and a design report shall be provided in accordance with Section 6.2.3 of this chapter.
4. Projects shall include a Private Stormwater Facilities Maintenance Covenant and Right to Access (Appendix 6-D) filed with the Missoula County Clerk and Recorder, along with an Operations and Maintenance (O&M) Manual (Appendix 6-E). The O&M Manual, recorded covenant for maintenance and easements, and accurate record drawings shall be included in the final project closeout before the City will approve the facilities.
   a. Projects that propose to infiltrate, evapotranspire, and/or capture for reuse all post-development stormwater on-site—without the use of piped conveyance—shall be exempt from the requirements of a Private Stormwater Facilities Maintenance Covenant and Right to Access and O&M Manual. Roof drains and piping from catch basins to dry wells are not considered piped conveyance for this requirement. The owner will still be responsible for all maintenance required to ensure facilities are operating as designed.
5. Natural drainage patterns shall remain unaltered where applicable.
6. Use of LID/green infrastructure techniques is encouraged.

6.2.2 Plan Requirements

A. Stormwater Management Site Plan. Stormwater system improvement plans shall comply with the general requirements in Section 3.2 (Improvement Plans) of this Manual and shall at a minimum include:

1. The area of each lot;
2. Locations of existing and proposed driveways, buildings, wells and drainfields;
3. Locations, sizes, and design details of existing and proposed stormwater facilities;
4. Locations of natural and constructed drainage way and streams;
5. Floodplains as delineated by FEMA or local floodplain authorities;
6. Existing and proposed contours at 1-foot intervals;
7. Direction of drainage flow adjacent and across the site, along each street, and at each intersection;
8. Drainage basin and sub-basin limits with analysis points used for design;
9. Existing stormwater management facilities including irrigation ditches, roadside swales, open channels, storm sewers, culverts, detention ponds, etc.;

10. Location and design details of any proposed detention facilities, retention facilities, infiltration facilities, and erosion control measures;
    a. Where dry wells are proposed, they shall be labeled with the total drainage area and total impervious area draining to the structure.
11. Profile sheets of proposed conveyance structures and storm drain systems shall be required;
12. Drainage easements, both on and off site, proposed and existing;
13. Details for outfalls, BMPs, other drainage structures and access streets;
14. Spot elevations and grades of features - back of curb, sidewalk, driveway (at garage door), finished floor at threshold of structure, street intersection monuments, bench marks, temporary bench marks, location of existing and proposed stormwater structures;
15. Cross-hatching indicating spill curb/gutter differentiating it from catch curb/gutter;
16. Curb/gutter alignment;
17. Flow grades on asphalt (street) surface and curb/gutter sections;
18. Directional flow arrows and % grade; and
19. Grade is shown as absolute percent slope and flow arrows shall point in the downhill direction.

6.2.3 Design Report

A. Stormwater Drainage Report. The report shall use the report format in Appendix 6-C and include the following:

1. Peak flow attenuation requirements and a description of how they are met.
2. Water quality treatment description.
3. Description of existing drainage facilities function (natural or constructed).
4. Acceptable methods for calculating runoff. Preferred software to use for analysis include *Hydraflow Hydrographs Extension for Autodesk Civil 3D* and *Autodesk Storm and Sanitary Analysis*.
5. Stormwater routing. Use of software to perform routing calculations is strongly encouraged. Stormwater routing calculations performed using software shall utilize a dynamic routing method. Stormwater routing and conveyance calculation performed manually shall account for tailwater conditions.
6. Pre-development basin conditions exhibit, including flow patterns, off-site runoff contributions, land cover assumptions, curve numbers and/or runoff coefficients, soil types, time of concentration paths, and analysis points.
7. Post-development basin conditions exhibit, including proposed development, drainage infrastructure locations, flow patterns, off-site runoff contributions, land cover assumptions, curve numbers and/or runoff coefficients, soil types, time of concentration paths, and analysis points.
8. Model Node diagram exhibit including all on- and off-site subbasins, nodes, links, and labels. Projects that propose to infiltrate, evapotranspire, and/or capture for reuse all post-development stormwater on-site—without the use of piped conveyance—are not required to provide a node diagram. Roof drains and piping from catch basins to dry wells are not considered piped conveyance for this requirement.
9. Identification of potential existing wetlands, nearby waterbodies, and depth to groundwater (if applicable).

10. Soil information including soils maps, soil descriptions, and hydrologic soil group.
11. Infiltration Facilities. Soil profiles and infiltration testing data per Section 6.2.4 of this chapter.
12. Supporting Information & Calculations. Includes site photos, design graphs, charts, Nomograph, maps, figures, time of concentration calculations, software input/output, hydraulic grade line calculations for storm drain systems, inlet spread width and bypass flow calculations, and all related hydrologic and hydraulic calculations.
13. Down Gradient Impact Analysis. Analysis and discussion of any existing downstream drainage issues and potential impacts to adjoining parcels and/or existing stormwater infrastructure. Analysis shall adhere to Section 6.2.7 of this chapter.
14. Inlet capacity and spread-width calculations.
15. The report shall be based on the outline in Appendix 6-B.
16. If a design report requires revisions, all changes to the original document shall be documented in a visually obvious manner. This may include a different text color for any changed or added language, revision clouds, or similar method.

B. **Geotechnical Report**. A geotechnical report shall be provided for projects meeting the requirements in Section 6.2.4 of this chapter. The report shall include the following:
   1. A minimum of one test pit (or boring) and one infiltration test shall be provided for every USDA soil classification type that will be used for infiltration. Subsurface infiltration facilities shall not be used where fines exceed 12%.
   2. A minimum of one soil test pit (or boring) and one infiltration test shall be provided within 300 LF of each infiltration facility.
   3. Soil profiles showing thickness of soil layers and designation of USDA soil classifications must be provided for each pit/boring.
   4. Soil infiltration tests shall be performed per the technique in Appendix 6-F; DEQ-8, Appendix C; or the *Montana Post-Construction Stormwater BMP Design Guidance Manual*, Appendix C. In some areas, the City has unusually high soil infiltration rates relative to other locations around the State, therefore test procedures may need to be adapted. Methods other than those listed may be acceptable if approved by the City Engineer.
      a. Infiltration testing shall be conducted at a depth representative of the proposed infiltration facility
      b. Water depth during infiltration testing should not exceed the design head of the proposed infiltration facility.
      c. Report shall include photos of infiltration testing and a list of equipment used for testing including size of water tank and size of hose used for the test.
      d. If the tester is unable to maintain water head during the test, a maximum infiltration rate equal to the rate of flow used during the pre-soak period shall be used in the design.
   5. If dry wells are proposed for stormwater management, field testing the infiltration rate of a nearby existing dry well may be used in place of test pits (or borings) and infiltration tests. The tested dry well must be within 300 LF of the proposed dry well. Dry wells shall be tested at their expected operational water level. Dry wells shall be pre-soaked for an appropriate amount of time

before infiltration testing. Pre-soaking shall achieve a constant infiltration rate if possible. Two methods are acceptable for performing the dry well infiltration test after the pre-soak period:

- **a.** Falling Head Test. The dry well shall be presoaked by filling the dry well with a minimum one-foot depth of water and continuously kept at that level for a minimum of two hours or until infiltration rates stabilize to within 10% over a 30-minute interval. The dry well shall then be filled to the top of the slotted barrel or a minimum of 2 feet. The water level shall be allowed to drop a minimum of 2 feet and the time recorded. This procedure shall be repeated until four consecutive readings do not vary more than 10%. An average of the four readings will be used as the infiltration rate.
- **b.** Average Constant Rate. The dry well shall be filled to the expected operational water level and continuously kept within $\pm$ 2 feet of that level for 2 hours or until infiltration rates stabilize to within 10% over a 30-minute interval, while water levels are recorded. After water levels have stabilized, measurements shall be taken at intervals no greater than 10 minutes for a minimum of 1 hour. The average of the measurements taken over this 1-hour period shall be the infiltration rate.

6. Regardless of the method used to determine infiltration rates, a safety factor shall be applied in order to account for long-term degradation of infiltration rates as the dry wells accumulate sediment. The safety factors below are a minimum. The engineer performing the site analysis and infiltration tests may recommend a safety factor greater than those shown based on-site specific conditions.

- **a.** Where pretreatment is provided before the infiltration facility the minimum factor of safety shall be 2.0. Pretreatment shall be a catch basin piped to a solid-lid dry well, a vegetated swale with a minimum of 8 feet of travel distance along the swale before discharge into a dry well, or other methods approved by the Utility Engineer.
- **b.** Where no pretreatment is provided before the infiltration facility the minimum factor of safety shall be 3.0.

7. Infiltration facilities for drainage for newly constructed arterial and collector streets shall include pretreatment. Infiltration facilities that utilize only surface infiltration, such as bioswales and rain gardens, are exempt from this requirement. Roof drainage is exempt from this requirement.

8. Where stormwater infiltration is proposed in areas of known or suspected soil contamination, the Geotech report shall address the susceptibility of groundwater contamination from infiltrating stormwater. If contamination is possible, then permanent BMPs that address the contamination shall be installed or infiltration facilities shall not be constructed.

9. Where stormwater infiltration is proposed in areas where it is suspected by the Public Works & Mobility Department that the infiltrated stormwater will have an impact on groundwater elevation which may affect facilities or structures, a groundwater assessment shall be included in the report. This shall include an assessment of the potential stormwater impact to on- or off-site facilities or structures. The assessment will also demonstrate that impacts to groundwater elevation or flow, resulting from the proposed infiltration system will be confined to the property.

10. Groundwater monitoring may be required based on the surrounding hydrological and hydrogeological data and/or if there is evidence of groundwater in test pits. Sufficient perforated pipes shall be installed to adequately define the groundwater conditions in the proposed infiltration area(s). The perforated pipes shall be installed at a depth at least 5 feet below the proposed bottom of infiltration facility. For a dry well this is the bottom of the sump rock. These test wells shall be monitored at a frequency which will establish the peak seasonal groundwater depth, at a minimum, observations must be performed weekly and must include at least two weeks of observation prior to and after the groundwater peak. Results may not be accepted when precipitation or snowpack water equivalent is more than 20% below historical average.

6.2.4 Stormwater Infiltration

A. If infiltration facilities (including dry wells) are proposed for stormwater management, the design infiltration rate shall be determined by an on-site soil investigation which includes infiltration testing per Section 6.2.3.B. A signed and sealed geotechnical report must be provided by a registered professional engineer with relevant experience in infiltration and soils testing and licensed in the State of Montana. The report shall meet the requirements in Section 6.2.3.B of this chapter.

1. Projects that meet all the following criteria are exempt from the need to provide on-site soils investigations and infiltration testing:
    - **a.** The City of Missoula Standard 8-foot Precast Dry Well is the proposed method of stormwater disposal;
    - **b.** Pretreatment, as defined in Section 6.2.3.B.6.a of this chapter, is provided;
    - **c.** Project is wholly located within the boundary shown in the Infiltration Testing Exemption Exhibit (Appendix 6-G);
    - **d.** Total project disturbance is less than 1 acre;
    - **e.** Impervious area is limited to no more than 8,000 square feet per dry well;
    - **f.** Project proposes two or fewer dry wells within the public right-of-way;
    - **g.** Area soils data (geotechnical report, nearby well logs) show soils conducive for infiltration;
    - **h.** Seasonal high groundwater is 20 feet or more below proposed finished grade; and
    - **i.** There has been a long-standing record of satisfactory performance of dry wells, and no drainage problems are known to exist.
2. If projects meet the above exemption criteria, they shall submit a simplified stormwater design memo in lieu of the long-form stormwater report. This simplified memo shall include the following:
    - **a.** Name of Project;
    - **b.** Address;
    - **c.** Owner/Developer;
    - **d.** Design Engineer;
    - **e.** Submittal date and revision dates (if applicable);

   f. Stamp and signature of Design Engineer;
   g. General Project Description;
   h. Total project area in acres;
   i. Total disturbed area in acres;
   j. Maximum impervious area and maximum total drainage area for the dry wells;
   k. Description of the soils;
   l. Statement that the proposed system can safely handle runoff from the 100-year storm without inundating structures and drainfields, overtopping roadways, or interrupting traffic and emergency services;
   m. Grading and Drainage plan sheet(s) addressing requirements listed in Section 6.2.2 of this chapter; and
   n. Supplemental soils data demonstrating soils are conducive for infiltration.

3. If the project is within the Infiltration Testing Exemption Area (Appendix 6-G) but in an area where groundwater is less than 20 feet, a deviation request will be required. This deviation request shall include a statement stamped by an engineer stating that the minimum 4-foot separation from seasonal high groundwater and the bottom of the dry well sump rock can be met, and it shall include supporting evidence from pits, borings, or other physical substantiation.

6.2.5 Regional Stormwater Facilities

A. Some areas within the City are served by existing regional stormwater facilities that help provide conveyance, peak flow attenuation, and/or water quality treatment. Developments that propose to use existing regional facilities must be treated on a case-by-case basis in consultation with the City Engineer. In general, to utilize regional facilities, the capacity of the facility and the capacity of the conveyance to the facility must be examined. Depending on the capacity and function of the regional facility, projects may be responsible for providing supplementary conveyance, capacity, and/or water quality treatment meeting requirements in Section 6.2.6 of this chapter.

6.2.6 Stormwater Quality Control

A. Using the Stormwater Site Evaluation Form (Appendix 6-B), all medium and high priority developments must provide plans for permanent water quality treatment facilities to manage runoff from the post-developed site conditions.

B. Stormwater management controls shall be designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff volume generated from the first 0.5 inch of rainfall from a 24- hour storm preceded by 48 hours of no measurable precipitation. Design guidance is provided in the *Montana Post-Construction Stormwater BMP Design Guidance Manual* (MDEQ, 2017). If dry wells are used to meet this requirement, each dry well contributes a volume of 160 ft^3 of storage to the Runoff Reduction Volume. If the volume of the sump is not adequate to contain the Runoff Reduction Volume (RRV), then the Runoff Treatment Flow Rate (RTF) can be calculated using the formula in the *Montana Post-Construction Stormwater BMP Design Guidance Manual*. The bottom area of the dry well, 61.23 ft^2 (based on a dry well installed per City standards with a diameter of 8.83 ft) shall be used in the calculation. The dry well shall be considered adequate if the infiltration rate is larger than the RRF.

C. Developments that cannot meet 100% of this runoff reduction requirement must

   1. Treat onsite using controls expected to remove 80% TSS; or

2. Manage off site within the same sub-watershed with controls designed to infiltrate, evapotranspire, and/or capture for reuse; or
3. Treat off site within the same sub-watershed using controls expected to remove 80% TSS.

D. All new stormwater outfalls to a named waterbody shall be approved by the City Utility Engineer. Any new stormwater outfall to a named waterbody will be required to implement BMPs to the maximum extent practicable to reduce pollutant discharges as approved by the City Utility Engineer.

E. Compliance with stormwater requirements does not necessarily result in compliance with the Missoula Valley Water Quality Ordinance 13.26.092, which prohibits activities that may allow pollutants to contaminate our local water resources.

6.2.7 Hydrology

A. **Drainage System.** The City stormwater system is composed of two elements: The Minor Drainage System and the Major Drainage System. The Minor Drainage System consists of the components that have been historically considered as part of the stormwater system such as pipes, inlets, dry wells, etc. The Major Drainage System provides overland relief for stormwater flows exceeding the capacity of the Minor Drainage System, to minimize health and life hazards, damage to structures, and interruption to traffic and services.
1. Minor Drainage System. The Minor Drainage System consists of curbs, gutters, ditches, culverts, storm drains (and other conduits), open channels, pumps, detention/retention basins, infiltration facilities, and outfalls. The Minor Drainage System shall be designed to carry runoff from the peak flow rate from the 10-year storm event.
2. Major Drainage System. The Major Drainage System consists of pathways that are provided for runoff to safely flow to natural or engineered channels. The Major Drainage System shall be designed to safely carry runoff from the 100-year storm, without inundating structures and drainfields, overtopping roadways, or interrupting traffic and emergency services. Flows from the 100-year storm event can be carried in the urban street system (within acceptable depth criteria), open channels, storm pipes, and other conveyance facilities.

B. **Design Storm Depth.** The design storm depths in Table 6-2 are based on the 24-hour storm duration at the Missoula Montana Airport as published in MDT *Hydraulics Manual* Chapter 9, Hydrology, Appendix B.

Table 6-2 – Design Storm Depths

	2-yr, 24-hr storm (in)	10-yr, 24-hr storm (in)	100-yr, 24-hr storm (in)
Missoula Airport	1.17	1.66	2.28

C. **Design Storm Intensity.** Design storm intensities shall be based on the time of concentration used for the drainage basin. Design storm intensities shall be referenced from the Missoula Montana Airport as published by the MDT Hydraulics Manual, Chapter 9, Hydrology, Appendix B.

D. **Hydrologic Methods.** Acceptable hydrologic methods for calculating runoff rates and storage requirements are below. Procedures for use of these methods can be found in HEC-22, Chapter 3.

1. Rational Method. May be used to determine runoff peak flow for the design of conveyance systems for contributing areas less than 5 acres. Rational Method may not be used for volume-based calculations or routing.
2. SCS Curve Number Method. May be used to determine runoff volume and peak flow for the design of conveyance systems, storage facilities, and routing effects for contributing areas less than 1,920 acres. The SCS Type II rainfall distribution shall be used for the analysis.
3. EPA SWMM. Consult the City Utility Engineer for approval for use of this method.

E. Time of Concentration. Time of concentration shall be calculated using the TR-55 Method to determine the time is takes for stormwater to travel from the most distant point of a drainage basin to a specific point of interest.

1. The minimum time of concentration shall be 5 minutes.
2. Sheet flow length shall be limited to a maximum of 300 feet in undeveloped areas and 150 feet in developed areas.
3. For multiple drainage areas, the longest time of concentration must be selected.

F. Drainage Basin Delineation. The total area, including off-site or up-gradient areas that contribute to the stormwater on a site, must be included in the analysis. Large drainage basins shall be divided into sub-basins and evaluated separately based on contributions to individual facilities. Include all elements of off-site drainage basins, such as undeveloped sites, developed sites, and off-site drainage facilities. A final analysis shall always be conducted at the point where runoff finally discharges from a site.

G. Pre- and Post-Development Conditions. Pre-development runoff shall be calculated based on conditions prior to any development. Post-development runoff shall be calculated based on proposed developed conditions. When the extent of impervious areas is unknown (such as on individual residential lots), an assumed estimate must be provided.

H. Allowable Off-Site Release Rates. A project shall not release runoff off site at a rate more than the peak pre-development runoff rate, unless the site is contained within a comprehensive drainage plan designed to allow off-site discharge to a regional collection facility. Runoff from a developed site shall leave the site in the same manner and location as in the pre-development condition. Flow may not be concentrated onto down-gradient properties where sheet flow previously existed.

I. Up-Gradient Analysis. Design of conveyance structures for a project must account for any up-gradient flows passing through the site.

J. Down-Gradient Analysis. A down-gradient analysis shall be conducted to identify and evaluate potential adverse impacts to downstream properties due to increased runoff from the proposed development. Adverse impacts may include receiving more runoff than pre-developed conditions, increased erosion, increased flooding, or change in historical runoff patterns such that pre-development runoff conditions concentrated at a single discharge location may cause increased erosion. This analysis shall continue through down-gradient areas to the point where the adverse impacts are deemed negligible, or to a point where the contributing drainage area is 1% (or less) of the total drainage area. The analysis shall include the following minimum requirements:

1. Visual inspection of the site and down-gradient areas.

2. A site map that clearly identifies the project boundaries, study area boundaries, down-gradient flow path, and any existing or potential areas identified as problematic.
3. Pre- and post-development hydraulic capacities (flow rate and volume) for the 10-year and 100-year storm events.
4. Existing or potential off-site drainage problems that may be aggravated by the project.
5. The condition and capacity of the conveyance route, including existing and proposed elements, potential backwater conditions on open channels, constrictions or low-capacity zones, surcharging of enclosed systems, and localized flooding.
6. The presence of existing natural or constructed land features dependent upon pre-developed surface or subsurface drainage patterns.
7. Existing or potential erosive conditions such as scour or unstable slopes onsite or downgradient of the project.
8. Flood areas identified on FEMA maps.
9. If there are existing or potential off-site drainage problems down gradient of the project, the project must demonstrate that the proposed stormwater system has been designed to meet the following conditions:
    a. The stormwater runoff (volume and flow rate) leaves the site in the same manner as that of the pre-developed condition.
    b. The proposed design does not influence existing drainage problems or create a new drainage problem.
10. If down-gradient release of runoff is at a rate or volume greater than the pre-developed condition, then potential adverse impacts on down-gradient property and drainage infrastructure (due to an increase in stormwater rate, volume, velocity, and flow duration) shall be addressed and mitigated.

6.2.8 Private Connections

A. Private stormwater system connections to the public stormwater system may be approved by the City.
B. Connections shall be entirely owned and maintained by the owner of the development in which the connection was installed. A Private Stormwater Facility Maintenance Covenant and Right to Access form (Appendix 6-D) shall accompany the Stormwater Management Site Plan.
C. Connection must include backflow prevention or other accommodations on site to prevent stormwater from the City stormwater system from surcharging onto private property and causing damage and/or flooding.
D. The maximum pipe diameter allowed will depend on an evaluation of the capacity of the City stormwater system and approval from the City Utility Engineer.
E. Pumped connections to the City stormwater system are not allowed.
F. Lateral connections within the right-of-way and public easements shall be made at right angles.
G. Core-drill or appropriate fitting directly on the main line. Connection to adjacent catch-basins/manhole shall only be made with approval from the City Utility Engineer.

6.3 Design Standards

6.3.1 General

A. Stormwater facilities shall be designed to control the conveyance, storage, and flow rate of stormwater runoff. Facilities include conveyance systems such as channels, pipes, gutters, and culverts that are designed to deliver stormwater from a receiving point to a discharge location without surcharging or causing surface flooding for a specified design storm.

B. Conveyance systems shall generally be designed to convey the expected post-development peak flow without overtopping curbs during a 10-year storm event and without inundating buildings or drainfields during a 100-year event. See Section 6.3.5 for specific requirements for storm drains.

C. The use of green infrastructure/LID is highly encouraged as discussed in Section 6.2.1 of this chapter and the *Montana Post-Construction Stormwater BMP Design Guidance Manual (MDEQ, 2017)*.

6.3.2 Streets

A. Design standards for streets are contained in Section 7.4.1 (Transportation System) of this Manual. Specific stormwater design standards for streets are contained in Table 6-3 and Table 6-4.

Table 6-3 – Maximum Street Spread Width for 10-year Storm Event

Street Classification	Design Standard
Local	No curb overtopping. Flow may spread to crown of street.
Collectors	No curb overtopping. Flow spread must leave at least one, 11-foot lane free of water, 5 feet either side of the street crown.
Arterials	No curb overtopping. Flow spread must leave at least two, 11-foot lanes free of water, 10 feet each side of the street crown or median.

Table 6-4 – Maximum Depth for 100-year Storm Event

Street Classification	Design Standard
Local and Collectors	The depth of water at the gutter flow line shall not exceed 18 inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.
Arterials	To allow for emergency vehicles, the depth of flow at the street crown shall be no more than six inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.

B. Where no curbing exists, stormwater encroachment shall not extend beyond the right of way during the 100-year storm event, unless accommodated by a drainage easement.

6.3.3 Gutters

A. Design standards for streets are contained in Section 7.4.11 (Transportation System) of this Manual.

B. Standard gutter designs are published in City of Missoula Standard Drawing 740, 741, 742, 743, 744, 745, and 746.

C. Runoff shall not overtop the curb during the 10-year rainfall event.

D. Gutter flow calculations shall be performed using methods in the HEC-22 Manual.

6.3.4 Inlets

A. Standard inlet design is published in City of Missoula Standard Drawing 600 and 601. Other inlet types may be approved by the City Utility Engineer if additional inlet interception capacity is necessary.

B. Inlets shall be located at grade low points, prior to pedestrian crossings, and/or at street intersections. Additional inlet spacing is based on interception capacity of the inlets, gutter geometry, flow bypass, and allowable spread.

C. Where installed in roadways, inlet grates shall be sloped to match the running slope and cross slope. Where curbing exists inlets shall be installed in the curb and shall be City of Missoula Standard combination curb inlet frame and grate.

D. Curb cuts may be used to convey stormwater into boulevards and swales. Curb cuts shall be sized to intercept the design flow.

E. Maximum inlet spacing shall be 400 feet. Additional inlets shall be included to meet flow depth and spread width requirements for the 10-year storm.
F. Bypass flow at inlets shall be less than 0.1 cfs at intersections and at project boundaries.
G. Inlets placed in sag locations shall use a 50% clogging factor for sizing and placement.
H. The interception capacity, spread widths, and required spacing shall be determined in accordance with the procedures described in Section 4.3 and 4.4 of the HEC-22 Manual.
I. Design deviations from standards shall be evaluated using Section 4.4.6.2 of the HEC-22 Manual.

6.3.5 Storm Drains

A. Storm drainage infrastructure shall comply with the City's best practices for wet utility construction, as listed in Chapter 4 of this Manual.
B. Manhole lids and rings shall comply with City of Missoula Standard Drawings 604A, 604B, and 605. Manholes shall comply with City of Missoula Standard Drawing 612-1, 612-2, or 612-3.
C. Trench, bedding, and backfill shall be in conformance with City of Missoula Modification to MPWSS Section 02221 and City of Missoula Modification to MPWSS Section 01400.
D. Storm drains shall operate in a non-pressurized flow conditions during the 10-year storm event. Storm drains may be designed to surcharge during the 100-year storm event as long as the requirements of Section 6.3.2 of this chapter regarding street flow depths are not violated.
E. Slopes must maintain a flow velocity of at least 3 ft/sec but not more than 10 ft/sec during the 10- year storm event. A minimum slope of 1% is preferred unless the minimum flow velocity can be achieved.
F. Minimum diameter of pipes shall be 12 inches for public main lines and laterals, and 6 inches for private connections. Pipe sizes shall only increase in the downstream direction.
G. Materials for storm drains shall comply with City of Missoula Modification to MPWSS Section 02720.
H. Design deviations from standards shall be evaluated using Chapter 6 and 7 of the HEC-22 Manual.
I. The minimum clearance distances from other utilities shall be in accordance with MDEQ regulations as well as the best utility practices outlined in Section 4.2.5 (Water System) of this Manual.
J. Manholes are required where two or more storm drains converge, pipe sizes change, changes in alignment, or changes in grade and shall be sized according to with City of Missoula Standard Drawing 612-1, 612-2, or 612-3. Maximum manhole spacing along storm drains is 400 feet for storm drain diameters up to 36 inches and 500 feet for storm drain diameters up to 60 inches. Stormwater main stub-outs are limited to a 2-foot maximum length.
K. Catch basins with a 30-inch diameter are allowed if depths do not exceed 6 feet.
L. Maximum manhole depth shall be 20 feet without special safety provisions, such as intermediate platforms and minimum diameter rises of 48 inches.
M. Water and sewer mains and services shall be designed to prevent freezing due to minimal clearance from stormwater mains, inlets, manholes, and dry wells. Insulation shall be installed per Sections 4.3.1.C and 4.3.1.E (Water System), Section 5.3.1.C (Sanitary Sewer System), and City of Missoula Modification to MPWSS Section 02724 of this Manual.
N. Avoid crossing other utilities at highly acute angles. The angle measure between utilities shall be between 45 degrees and 90 degrees.

O. Energy dissipation or erosion protection measures shall be required when outfall velocities exceed the permissible velocity of the soil or channel lining during the 2-year storm event. Design energy dissipation measures in accordance with FHWA HEC-14, Hydraulic Design of Energy Dissipaters for Culverts and Channels. See Section 6.3.8 of this chapter for outfall requirements.

P. Where required by City Utility Engineering or the jurisdictional authority (i.e., railroad, Montana Department of Transportation (interstate), etc.), storm drains shall be installed through a casing. Casing requirements shall conform with City of Missoula Modification to MPWSS Section 02740 or jurisdictional standards.

6.3.6 Open Channels

A. Procedures for designing open channel conveyance systems including Manning's roughness factors (n), are contained in Chapter 5 of the HEC- 22 Manual.

B. Channels shall be located no closer than 10 feet from any structural foundation measured from the edge of the channel at the top of the freeboard elevation.

C. Shear stresses on channel side slopes shall be evaluated during the 2-year storm event to ensure adequate erosion protection and slope stability. This analysis shall include the bare soil condition immediately after construction as well as the final vegetation or lining of the channel. Temporary lining may be required until final vegetated conditions are achieved.

D. Channels must be designed with a full-flow capacity to safely convey the 100-year storm event with a minimum of 0.5 feet of freeboard.

E. Design of a low-flow channel shall be required to account for sustained low flows.

A. Side slopes shall be no steeper than 4H:1V for irrigated grass-lined channels requiring maintenance by mowing, 3H:1V for unmaintained native grass-lined channels and 2H:1V for all other stabilized channels. Safety benches should be installed for facilities 3 feet or deeper so that people and animals who inadvertently enter the channel can get out.

F. Vegetated channels shall be maintained to ensure that vegetation does not limit the conveyance capacity of the facility.

6.3.7 Drainage Culverts

A. Culverts shall be designed using the procedures contained in HDS-5, Hydraulic Design of Highway Culverts.

B. Culverts shall be designed with capacity to allow the safe passage of peak flows without overtopping roadways during the Minor Storm event or inundating buildings and drainfields during the Major Storm event. The roadway flow depth restrictions in Section 6.3.3 of this chapter apply during roadway overtopping conditions.

C. Sizing must account for all upstream flow contributions.

D. The minimum culvert diameter is 12 inches.

E. A minimum velocity of 3 feet per second and a minimum slope of 0.5% during the Minor Storm event is required to prevent sediment accumulation through the culvert.

F. Minimum and maximum cover shall be in accordance with the pipe manufacturer recommendations.

G. Energy dissipation or erosion protection measures shall be required when outfall velocities exceed the permissible velocity of the soil or channel lining during the 2-year storm event. Design energy dissipation measures in accordance with FHWA HEC-14, Hydraulic Design of Energy Dissipaters for Culverts and Channels. See Section 6.3.8 of this chapter for outfall requirements.

H. Flared end treatments for culverts and inlets shall be required inside the right-of-way for the purpose of enhancing crash safety.

I. A safety grate or trash rack with maximum clear spacing of 4 inches for child safety is required for all culverts over 30 inches in diameter.

6.3.8 Outfalls

A. Use the methods of Chapter 7.1.5 of the HEC-22 Manual as well as HEC-14 to address stormwater discharge and erosion protection at outlet points. Design considerations include backflow, erosion protection, and energy dissipation methods.

B. The adequacy of the receiving channel must be analyzed for capacity and stability against erosion during the 10-year storm event.

6.3.9 Bridges

Hydraulic sizing for bridges across major drainages shall conform to the requirements of Montana Department of Transportation *Hydraulics Manual*, Chapter 17, Bridges.

6.3.10 Detention Facilities

B. Detention facilities shall discharge a peak flow rate equal to or less than the pre-development peak flow rate for the 2-year, 10-year, and 100-year 24-hour storm events. Outlet facilities must safely accommodate the peak flow from the 100-year storm event with a minimum of 1 foot of freeboard, without damage to the facility from erosion, and without damaging adjacent or downgradient structures.

C. Stormwater shall not be held in a storage facility for more than 72 hours, unless designed for the purposeful creation of wetland and wildlife habitat.

D. Outlet structures must take into account exit velocities and erosion control requirements contained in Section 6.3.8 of this chapter and Chapter 8 of the HEC-22 Manual. Minimum orifice diameter without screening in 6 inches. The minimum diameter for outlet conduits shall be 12 inches. The HEC-22 Manual shall be used for additional design requirements, such as anti-seep collars placed on outlet conduits through embankments.

E. All detention facilities with constructed berms 2 feet or greater in height shall include a provision for non-erosive control of emergency overflows. This overflow spillway shall be designed to have the capacity to pass the 100-year post-developed peak flow with a freeboard of 1.0 foot minimum and shall be designed per Section 6.3.8 of this chapter. Overflows shall be directed to a safe discharge path to protect adjacent and downstream properties from damage.

   1. The full width of the spillway shall be armored with riprap and extended downstream to where emergency overflows enter the conveyance system. The armoring may have 4 inches of topsoil and grass cover.

2. Designers may choose to design the outflow structure with an emergency bypass that can route the 100-year post-developed peak flow through the structure and out to the conveyance system in which case an emergency spillway is not required.

F. If storage facilities are used in conjunction with water quality facilities, designs must follow recommendations in the *Montana Post-Construction Stormwater BMP Design Guidance Manual*.

G. Storage facilities shall be at least 3 feet above the seasonally high groundwater table.

H. Embankments more than 4 feet in height shall be constructed as recommended by a geotechnical engineer. Depending upon the site, geotechnical recommendations may be necessary for lesser embankment heights. The height of an embankment is measured from the top of the berm to the catch point of the native soil at the lowest upstream or downstream elevation.

I. Maximum water depth shall not exceed 6 feet during the 100-year event.

J. Designers are encouraged to design detention facilities with irregular and curved shape to look natural. Avoid straight lines and regular shapes where possible.

K. Side slopes shall be no steeper than 4H:1V, preferably flatter, for vegetated basins requiring maintenance by mowing, and 3H:1V, preferably flatter, for unmaintained native grass-lined basins. Safety benches should be installed for large facilities to provide a method for people and animals that inadvertently enter, to exit the basin.

L. Bottom slopes shall be no less than 1% to promote drainage across vegetated surfaces and shall include the design of a low-flow channel where runoff enters in a concentrated manner.

M. The maximum water surface elevation during the 100-year storm event shall be at least 1 foot below adjacent ground, finished floors, top of foundation, or any other entry point vulnerable to flooding.

N. Detention facilities shall be located such that adequate access, maintenance, and operation needs are met. Maintenance access easements shall be provided where appropriate for full access.

O. Fencing is generally required on drainage facilities with the first overflow at 2 or more feet above the pond bottom, drainage facilities with retaining walls 2.5 feet high or taller, or drainage facilities located adjacent to schools, daycares, or similar facilities. Fencing shall be a minimum of 4 feet tall and provide visual access to the facility.

P. Detention facilities shall be landscaped to provide for slope stability, erosion control, and low maintenance. Landscape materials shall be compatible with stormwater quality treatment and the function of the drainage facility. Utilize plant species native to the Missoula area to the maximum extent possible. Vegetation on embankments shall be limited to shallow-rooted varieties. Points of inflow to the facility shall be armored to prevent erosion.

Q. Maintenance shall be performed by the HOA or commercial site owner, unless this responsibility is accepted by the City. Maintenance will be required to remove invasive plants and debris.

R. Storage facilities may be designed with multi-purpose use, such as athletic fields, parks, play areas, and picnic areas with written approval of the Director of Missoula Parks and Recreation. Measures must be taken to ensure amenities are anchored and maintained and access to the site must comply with Americans with Disabilities Act (ADA) requirements. Runoff from the 2-year event shall be stored away from multiple use areas.

S. Setback and clearance requirements to surrounding existing conditions contained in Table 6-5 shall be maintained.

Table 6-5 – Minimum Clearance Requirements for Placement of Detention Facilities

Element	Minimum Distance Required
Floodplains	50 feet from the bed & banks of intermittent and perennial waterbodies. Work inside floodplain may require floodplain development permit
Buildings	50 feet horizontal up-gradient, 10 feet from outfalls
Top of 15% Slopes	50 feet horizontal
Septic Tanks/Drainfields	30 feet horizontal up-gradient, 10 feet down-gradient
Shallow Water Wells	100 feet horizontal
Easements, Property Lines	20 feet horizontal
Schools, Nursing Home, Day Care	200 feet horizontal

6.3.11 Infiltration Facilities

A. Infiltration facilities include any features that use soil infiltration as the primary stormwater management method. Infiltration Facilities are divided into three classes: Surface Infiltration, Shallow Infiltration, and Deep Infiltration. Classification is based on the maximum depth of the infiltration structure beneath the ground surface. Drain or sump rock shall not count toward maxim infiltration structure depth.

1. Surface Infiltration Facilities infiltrate stormwater at the ground surface. Examples include retention basins, infiltration trenches, and bioretention/bioinfiltration basins.
2. Shallow Infiltration Facilities infiltrate stormwater at depths less than eight feet below the ground surface. Examples include: half depth sumps, infiltration galleries, boulder pits, and swale underdrains.
3. Deep Infiltration Facilities infiltrate stormwater at depths equal to or greater than eight feet below the ground surface. Examples include full depth dry wells and extra-depth dry wells.

B. If storage facilities are used in conjunction with water quality facilities, designs must follow recommendations in the *Montana Post-Construction Stormwater BMP Design Guidance Manual*.

C. These facilities are not appropriate for use with tight clays or other soils with low infiltration rates or in areas with a shallow water table.

D. There shall be a minimum 4-foot separation between the bottom of the infiltration facility or dry well and the seasonally high groundwater table. See Section 6.2.3.B of this chapter for requirements.

E. If shallow infiltration facilities are proposed they shall meet the following standards:

1. Pre-treatment is required
2. Facilities located within public right-of-way require City Engineering approval and shall be built with perforated CMP pipe with appropriate pipe coatings for the soil conditions to minimize corrosion.

F. Stormwater shall not be held in an infiltration facility for more than 72 hours, unless pre-approved by the City Utility Engineer.

G. Infiltration facilities shall be designed according to the expected infiltration rate of the surrounding soils. Soil profiles and infiltration testing shall be performed per Section 6.2.4 of this chapter.

H. Dry Wells

1. Dry wells shall be designed using a minimum 8-foot depth as shown on City of Missoula Standard Drawing 616.
2. Dry well volume shall not be counted toward overall site detention volume.
3. Dry wells shall be designed, at a minimum, to infiltrate the anticipated peak flow and volume from the 10-year storm event and drain within 72 hours.
4. The bottom of the sump rock of a dry well shall be installed at the depth that infiltration rate was tested. This depth is generally 10 feet and shall always be in a highly infiltrative gravel layer. Deeper dry wells can be utilized with prior permission from the City Utility Engineer.
5. Dry wells are classified as Class V underground injection wells. An inventory form for each well must be submitted to the EPA. This form must be included with the design report.
6. A dry well approval is required under a City of Missoula excavation permit.

I. Setback and clearance requirements to surrounding existing conditions contained in Table 6-6 shall be maintained.

Table 6-6 – Minimum Clearance Requirements for Placement of Infiltration Facilities

Element	Minimum Distance Required
Floodplains	50 feet from the bed & banks of intermittent and perennial waterbodies. Work inside floodplain may require floodplain development permit
Seasonal High Water Table	4 feet vertical
First Limiting Layer (bedrock, clay lens)	5 feet vertical
Buildings	10 feet up- and down-gradient
Top of 15% Slopes	50 feet horizontal
Springs	25 feet horizontal
Septic Tanks/Drainfields	25 feet horizontal
Domestic Wells	25 feet horizontal
Public Wells	100 feet horizontal

rev. Oct. 13, 2021

____
DATE RECEIVED

POST-CONSTRUCTION STORMWATER MANAGEMENT SITE PLAN REVIEW CHECKLIST

PROJECT NAME	**Permit Number**	**ADDRESS**
TOTAL PROJECT AREA		**TOTAL DISTURBED AREA**
Latitude:	**Longitude:**	

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: ________________ ________________

TECHNICAL REVIEW

____ The Post-Construction Stormwater Management Plan **includes** the necessary post-construction components, to comply with the State and local post-construction stormwater requirements (identified in the attached checklist).

____ The Post-Construction Stormwater Management Plan **does not include** the necessary components (identified in the attached checklist), to comply with State and local post-construction stormwater requirements through failure to include the following:

Reviewed by: ______________________________

Signature: ______________________________ **Date:** ______________

Project Name: Applicant:

General Information	Complete	Incomplete	N/A
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	☐	☐	☐
Drainage Plan Content			
1. Topographic map of existing and finished grade contours at 2-foot max intervals	☐	☐	☐
2. Location of each permanent storm water 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	☐	☐	☐
Calculations and Design Documentation			
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	☐	☐	☐
e. Existing and post-development peak runoff rate for each design storm	☐	☐	☐
f. Existing and post-development runoff volume for each design storm	☐	☐	☐

Project Name: Applicant

Calculations and Design Documentation (Continued)		Complete	Incomplete	N/A
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	☐	☐	☐
Additional Information				
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	☐	☐	☐

rev. Feb. 06, 2023

Stormwater Site Evaluation Form

This form is used for the Construction Site Inspection Frequency Determination and is completed by the applicant/owner.

Date:__________________

Project Name:____**Permit No.:**__________________

Address:____**Zip Code:**___________________

Project Area (acres):________________________**Disturbance Area (acres):**_________________________

Applicant/Owner Representative:________________________**Phone number:**_____________________

Owner Name:____**Phone Number:**_____________________

Owner Address:____

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—the City of Missoula must inspect construction sites based upon their priority ranking.

If your site is in a subdivision that has been approved per current standards, then it is automatically LOW priority and you do not need to complete the worksheet on page 2. If you are unsure, then contact the Engineering Desk at (406)552-6636 or engpermitdesk@ci.missoula.mt.us.

Site Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 2.

Score	Priority	Inspection Frequency	Project Priority
6 to 11	Low	1. Once at commencement of construction after BMPs have been implemented	
12 to 30	Medium	1. Once at commencement of construction after BMPs have been implemented 2. Once at the conclusion of the project prior to finalization	
31 to 67	High	1. Once at commencement of construction after BMPs have been implemented 2. Once within 48 hours, after one rain event of 0.25 inches or greater 3. Once within 48 hours, after runoff from snowmelt due to thawing conditions that cause visible surface erosion at the project site 4. Once at the conclusion of the project prior to finalization	

rev. Aug. 10, 2022

Site Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Project type	Subdivision with 5 or more units	7	
	TED with 5 or more units	7	
	Commercial site ≥ 0.5 acres	7	
	None of the above	0	
Proximity to surface water	≥ 1,500 feet	1	
	200 to 1,499 feet	5	
	< 200 feet	7	
	Discharge to waterbody	10	
Depth to groundwater	> 20 feet	1	
	≤ 20 feet	10	
Discharge to an impaired waterbody	No (dry well/groundwater, Butler Creek, LaValle Creek, Pattee Creek, or Rattlesnake Creek)	1	
	Yes (Bitterroot River, Clark Fork River, Grant Creek, or Miller Creek)	10	
Maximum proposed slope	Slopes < 20:1 (H:V) Slopes < 5%	1	
	20:1 ≤ Slopes < 10:1 (H:V) 5% ≤ Slopes < 10%	5	
	Slopes ≥10:1 (H:V) Slopes ≥ 10%	10	
History of non-compliance (applicant and/or owner)	No history of non-compliance	1	
	1 time non-compliant	5	
	2+ times non-compliant	10	
Risk of hazardous material spills/leaks	No hazardous materials stored on site	1	
	Non-liquid hazardous materials stored on site	5	
	Liquid hazardous materials stored on site	10	
		Total Score	
6 to 11 = Low	12 to 30 = Medium	31 to 67 = High	

Permittees found to be habitually non-compliant may be subject to one or more disciplinary actions: compliance through the Missoula Valley Water Quality District Enforcement Response Plan; increased inspection frequency; formal Notice of Violation (NOV), including stop work order; fine(s); and/or suspension/revocation of City Business License.

Stormwater Drainage Report Content

The following is the minimum Stormwater Drainage Report requirements.

Cover Page

1. Name of Project
2. Address
3. Owner/Developer
4. Design Engineer
5. Submittal date and revision dates (if applicable)
6. Stamp and signature of Design Engineer

Introduction

1. Location
    a. Existing and proposed streets, roadways, and highways within and adjacent to the site or the area to be served by the drainage improvements
    b. Names of surrounding developments or properties including land use or zoning information
2. Description of Property
    a. Area in acres
    b. Ground cover (type of ground cover, vegetation, and condition)
    c. Existing land uses and known foreseeable future land uses
    d. Topographic features, steepness of slopes
    e. Drainage ways and receiving channels
    f. Existing drainage facilities
    g. Flood Hazard Zones
    h. Existing irrigation ditches
    i. Geologic Features (if applicable)
3. Previous drainage studies for the property (if any)
4. General Project Description
5. State or Federal Regulations (if applicable)
6. Geotechnical Report (attach if required)

Existing Site Conditions

1. Major Basin Description
    a. Reference to major drainage way planning studies such as flood hazard delineation report, major drainage way planning reports, and FEMA flood areas and flood hazards
    b. Major basin drainage characteristics and structures, existing and planned land uses within the basin
    c. Summary of off-site and on-site basin characteristics and runoff rates.
2. Sub-Basin Description
    a. Discussions of historic drainage patterns of the property.
    b. Discussions of off-site drainage flows and flow patterns and impact on development under existing and fully developed basin conditions.
    c. Summary of off-site and on-site basin characteristics and runoff rates.
3. Groundwater
    a. Identify potential groundwater issues

  b. Discuss groundwater investigations and results
  c. Discuss methods to manage groundwater impacts
4. Waterways and Wetlands
  a. Discuss any waterway and wetlands adjacent to or on the site
  b. Discuss methods to protect, preserve, and mitigate impacts to waterways and wetlands

Stormwater Design Criteria

1. Design Concepts
2. Drainage Criteria
    a. Application standards or exceptions
    b. Minor and Major Storm Frequencies
    c. Hydrologic Methods
        i. Rainfall
        ii. Design Storms
        iii. Stormwater Quality storm and treatment methods
        iv. Runoff methods and computer models
        v. Detention/infiltration calculation methods
        vi. Detention storage release rate calculation method
    d. Hydraulic Methods
        i. Design standards
        ii. Hydraulic models
        iii. Methods used to determine channel and storm sewer capacities
        iv. Methods used for design of hydraulic structures, outlet protection and erosion control
        v. Methods used for designing stormwater pond outlet structures
3. Down-Gradient Analysis
    a. A down-gradient analysis shall be conducted to identify and evaluate potential adverse impacts to downstream properties due to increased runoff from the proposed development.
    b. This analysis shall continue through down-gradient areas to the point where the adverse impacts are deemed negligible, or to a point where the contributing drainage area is 1% (or less) of the total drainage area. The analysis shall include at a minimum:
        i. Visual inspection of the site and down-gradient areas.
        ii. A site map that clearly identifies the project boundaries, study area boundaries, down-gradient flow path, and any existing or potential areas identified as problematic.
        iii. Existing or potential off-site drainage problems that may be aggravated by the project.
        iv. The condition and capacity of the conveyance route, including existing and proposed elements, potential backwater conditions on open channels, constrictions or low capacity zones, surcharging of enclosed systems, and localized flooding.
        v. The presence of existing natural or constructed land features dependent upon pre-developed surface or subsurface drainage

patterns.

vi. Existing or potential erosive conditions such as scour or unstable slopes onsite or downgradient of the project.

vii. Flood areas identified on FEMA maps.

viii. If there are existing or potential off-site drainage problems down gradient of the project, the project must demonstrate that the proposed stormwater system has been designed to meet the following conditions:

1. The stormwater runoff (volume and flow rate) leaves the site in the same manner as that of the pre-developed condition.
2. The proposed design does not influence existing drainage problems or create a new drainage problem.

ix. If down-gradient release of runoff is at a rate or volume greater than the pre-developed condition, then potential adverse impacts on down-gradient property and drainage infrastructure (due to an increase in stormwater rate, volume, velocity, and flow duration) shall be addressed and mitigated.

4. Analysis Point(s) where pre- and post-development flows are calculated

Proposed Design

1. Discussion of general conveyance concepts
2. Discussion of proposed drainage paths and patterns
3. Discussion of storm sewer design, including inlet and pipe locations and sizes, peak flow rates at analysis points, hydraulic grade lines, groundwater impacts, etc.
4. Discussion of street capacities, spread widths, and inlet bypass flow
5. Discussion of storm sewer outfall locations and design, including method of energy dissipation
6. Discussion of how the Stormwater Quality Control storm is addressed. Include Montana Post-Construction Storm Water BMP Design Guidance Manual calculations for RRV, RTV and RTF as required.
7. Discussion of how runoff is conveyed from all outfall to the nearest public stormwater system
8. Discussion of open channel and swale designs, including dimensions, alignments, tributary basins, peak flow rates, stabilization, water surface elevations, groundwater impacts, etc.
9. Discussion of easements, maintenance, and access aspects of the design
10. Discussion of facilities proposed offsite for the conveyance to a public storm drainage system.
11. Discussion of flooding hazards and describe minimum building elevations
12. Detention Ponds
    a. Discussion of detention pond designs, including tributary area, release rates, storage volumes, and water surface elevations, emergency overflow conditions, outlet structure design, etc.
    b. Discussion of the design of all water quality treatment BMPs
    c. Discussion of pond outfall locations and designs, including method of energy dissipation
    d. Discussion of easements, maintenance, and access aspects of the design
13. Infiltration Facilities
    a. Discussion of infiltration facility designs, including tributary area, infiltration rates, storage volumes, water surface elevations, emergency overflow conditions, groundwater impacts, etc.
    b. Discussion of the design of all water quality treatment BMPs

   c. Discussion of easements, maintenance, and access aspects of the design

Summary

1. Summary of proposed improvements
   a. Pre- and post-development flow rates
   b. Storm Sewer
   c. Culverts
   d. Open channels
   e. Detention storage
   f. Infiltration facilities
   g. Geotechnical/groundwater impacts
   h. On and off-site impacts and mitigation measures
2. Floodplain impacts
3. Compliance with applicable regulations and standards

References

1. Reference all criteria, reports, or other technical information used in development of the drainage report, calculations, and plan

Appendices

1. Background Data
   a. Applicable reports or report excerpts
   b. Floodplain maps
2. Hydrologic Computations
   a. Land uses, soil types, coverages
   b. Proposed land uses for project by basin
   c. Time of concentration and runoff coefficients for each basin
   d. Basin parameters used for modeling including basin area, length, slope, distance, and routing elements
   e. Minor and Major storm event peak runoff at analysis points for off-site and on-site flows
   f. Off-site historic and fully developed runoff computations at specific analysis points
   g. Hydrographs at critical analysis points
   h. Schematic diagram of hydrology model showing basins and routing elements and combinations of elements.
3. Hydraulic Computations
   a. Culvert capacities and inlet/outlet protection
   b. Storm sewer capacity, including energy grade line (EGL) and hydraulic grade line (HGL) elevations
   c. Gutter capacity as compared to allowable spread width
   d. Storm inlet capacity
   e. Open channel or swale capacities
   f. Detention area volume capacity and outlet capacity calculations, depths of detention basins, outlet configuration, emergency spillway sizing calculations
   g. Downstream capacity for the Major Storm.
4. Detention/Infiltration Facility Computations
   a. Facility sizing calculations including discussion of infiltration capacity
   b. Stage-storage calculations

   c. Stormwater Quality Control calculations per Montana Post-Construction Storm Water BMP Design Guidance Manual.

5. Operations and Maintenance Manual and Private Stormwater Facility Maintenance Covenant and Right to Access.
   a.

After recording, return to:
City Clerk, City of Missoula
435 Ryman
Missoula, MT 59802

Private Stormwater Facility Maintenance Covenant and Right to Access

Geocode _______________________

This Maintenance Covenant and Right to Access ("Agreement") is made this [INSERT DAY] day of [INSERT MONTH], [INSERT YEAR], between [INSERT OWNER NAME HER] ("Owner") whose address is [INSERT OWNER ADDRESS HERE] and the City of Missoula, 435 Ryman, Missoula, Montana 59802, a municipal corporation under the laws of the state of Montana (the "City").

RECITALS

A. Owner is the owner and developer of certain real property located in the City of Missoula, Missoula County, Montana, legally described as follows, and commonly known as (the "Development"):

B. Owner has developed or will develop at the Development, private stormwater management facilities as further described below:

List the type, quantity, and location of all private stormwater facilities proposed and constructed within the development.

____
____
____
____
____

C. The City has approved construction plans submitted by Owner for the Development, including the on-site stormwater facilities as described above (together with any other stormwater facilities that may hereafter be constructed on the Development, the "Stormwater Facilities").

D. To protect future lot owners in the Development, as well as owners of neighboring property, the City requires Owner to enter into this Agreement as a condition to the City's approval of construction plans, building permit(s), if applicable, and the final plat, if applicable, for the Development.

E. The Stormwater Facilities enable development of property while mitigating the adverse impacts of additional surface water and pollutants associated with stormwater runoff prior to discharge from the property to the public stormwater system. The consideration for this Agreement is connection to the City's stormwater system.

F. The Stormwater Facilities are designed by a registered professional engineer to accommodate the anticipated volume of runoff and to detain and treat runoff in accordance with the City's regulations, engineering standards, administrative rules, and amendments.

G. Failure to inspect and maintain the Stormwater Facilities can result in an unacceptable impact to the public stormwater system.

AGREEMENT

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the City and Owner agree as follows:

1. Covenant to Maintain and Repair

Owner shall, at its sole expense, itself or through qualified independent contractors, at all times maintain the Stormwater Facilities in good working order, condition and repair, clear of all debris, and in compliance with all applicable state and local rules, regulations, and guidelines (including those adopted from time to time by the City and including the City's engineering standards).

2. Covenant to Inspect

The Owner shall perform annual inspections of all Stormwater Facilities covered by this agreement annually. Any work necessary to repair or maintain the facilities in good working order that is discovered during the annual inspection shall be completed by the Owner within a reasonable period of time after the annual inspection. Owner shall apply for renewed coverage under the City stormwater permit as required by City Code.

3. Right to Access

Owner hereby grants the City, its employees, independent contractors, and designees, a nonexclusive easement for ingress and egress over, across, and under the Development from time to time at the City's sole discretion to inspect, sample, and monitor components of the Stormwater Facilities and discharges therefrom, as well as allow the City to take the actions described in Sections 4 and 5 of the Agreement. Owner understands and agrees that this easement limits the ability of Owner, its successors, and assigns from constructing any permanent buildings, structures, landscaping, or other improvements that would interfere with the functioning of the Stormwater Facilities or the City's access to perform the inspection and maintenance required under this Agreement.

4. Failure to Perform Covenant

If the City, in its sole discretion, determines that the Owner is not in compliance with the covenant described in Sections 1 and 2, except in the case of an emergency, the City or its designee shall give the Owner written notice to perform the maintenance and/or repair work specified in the notice. If such work is not performed to the City's satisfaction within twenty (20) days after the date of such notice, or such other time as the City may, in its sole discretion, determine, the City, its employees, independent contractors, and designees may exercise their right under the Easement described in Section 3 of this Agreement to enter the Development to perform any and all work required bringing the Stormwater Facilities into compliance with this Agreement.

5. Emergency

If the City, in its sole discretion, determines that there exists or will likely exist an emergency on or about the Development with respect to the Stormwater Facilities, the City, its employees, independent contractors, and designees may immediately exercise their rights under the Easement described in Section 3 of this Agreement to immediately enter the Development to perform any and all work required to bring the Stormwater Facilities into compliance with the Agreement, and in such case the City shall use reasonable efforts to notify the Owner prior to entering the Development. Notwithstanding the above, the work performed may consist only of avoiding or mitigating the emergency and/or cleaning and repairing the Stormwater Facilities to their original condition and standards.

6. City Under No Obligation

Owner, for itself or its successors and assigns (including all owners of lots in the Development), agrees that the City, as well as its department, employees, independent contractors, and/or designees shall have no obligation to exercise its rights under this Agreement, including the right under Sections 4 and 5 of this Agreement to perform the work required of the Owner, or to perform any other maintenance or repair of the Stormwater Facilities. Owner also agrees that none of the City, as well as its departments, employees, independent contractors, and/or designees shall have any liability to Owner or any of Owner's successors or assigns (including owners of lots in the Development) in connection with the exercise or non-exercise of such rights, the maintenance or repair of the Stormwater Facilities, or the failure to perform the same.

7. Owner Obligation

In addition to the covenants and easement described above, Owner agrees to the following additional obligation:

a. Owner shall construct the Stormwater Facilities as shown on City-approved construction plans.

b. Prior to the sale of any portion of the Development, Owner shall provide to the City's Development Services Department, a copy of the Operations and Maintenance Manual for the Stormwater Facilities, which shall include detailed diagrams and descriptions identifying the components and operations of the Stormwater Facilities.

c. Prior to final approval of the Development, Owner shall record this document in the deed records of Missoula County and provide a copy of the recorded documents to the City.

d. Owner shall notify the City's Public Works Director in writing of the person responsible for compliance with Owner's obligations under this covenant ("Owner Designee"), and of any change in the Owner Designee. Owner expressly agrees that the Owner Designee shall have the authority to bind Owner, its successors, and assigns with respect to the matters described in this Agreement.

e. Upon sale or transfer of the Development, or any portion thereof, including any lots in a subdivision, the Owner shall inform the purchaser of the obligations required under this Agreement.

8. Reimbursement

If the City exercises its right to enter the Development pursuant to the Easement described in Section 3 of this Agreement, Owner shall reimburse the City for all of its costs and expenses incurred in connection with any work performed pursuant to Section 4 or 5 of this Agreement within thirty (30) days after receipt of an invoice. If Owner fails to pay the invoiced amount within such period, such amount shall thereafter accrue interest at the statutory rate. The City may pursue any available means to collect such amount, together with interest, including placing a lien on the Development (and each of the lots contained therein). If the Development is owned by more than one person (i.e., multiple lot owners), each such owner shall be jointly and severally liable for payment of the amounts provided for in this Section.

9. Indemnification

Owner agrees to indemnify, defend (with legal counsel acceptable to the City), and hold harmless the City, its employees, independent contractors, and designees from and against any liability, losses, costs, expenses (including reasonable attorney fees), claims, or suits arising from: (1) Owner's failure to perform its obligations under this Agreement, including among other things its obligation to properly design, construct, operate, and maintain the Stormwater Facilities, and (2) the exercise of the City's rights under this Agreement.

10. Run with the Land

The parties' rights and obligations contained herein touch and concern the land, and shall run with the land and be binding upon Owner and its successors and assigns (including, without limitation, subsequent owners of lots in the Development and any homeowner's association owning common areas in the Development). Those rights and obligations shall inure to the benefit of the City, as well as its successors and assigns.

11. Assignment

The obligations of Owner (and subsequent owners of lots in the Development) under this Agreement may not be assigned except (a) in connection with the sale of the property owned by such person (in which case the transferee will be deemed to assume such obligations), or (b) with the prior written consent of the City, to a homeowner's association that owns and maintains the common areas of the Development.

12. Authority

If Owner is an entity, the individual executing this Agreement on behalf of Owner represents and warrants to the City that he or she has the full powers and authority to do so and that the Owner has full right and authority to enter into this Agreement and perform its obligations under this Agreement.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement as of the date below.

By: ___________________________________
Owner

____
Title

STATE OF MONTANA)
) ss.
County of ______________________)

This instrument was acknowledged before me on ______________________________, 20_____ ,
by __________________________________, as ______________________________ of
_____________________________________, an_______________________________.

____
Notary Public—State of Montana
My commission expires: ________________

REVIEWED:

By:__________________________________
City Engineering

APPROVED:

By:__________________________________
Jeremy Keene, PE, Public Works Director

CITY OF MISSOULA, MONTANA:

By: ___________________________________
Andrea Davis, Mayor

ATTEST:

By: ___________________________________
Claire Trimble, City Clerk

(Seal)

Operation and Maintenance Requirements

The Operation and Maintenance (O&M) Manual summarizes the tasks required for perpetual maintenance to ensure the proper operation of stormwater facilities. The following is the minimum requirements for an O&M Manual:

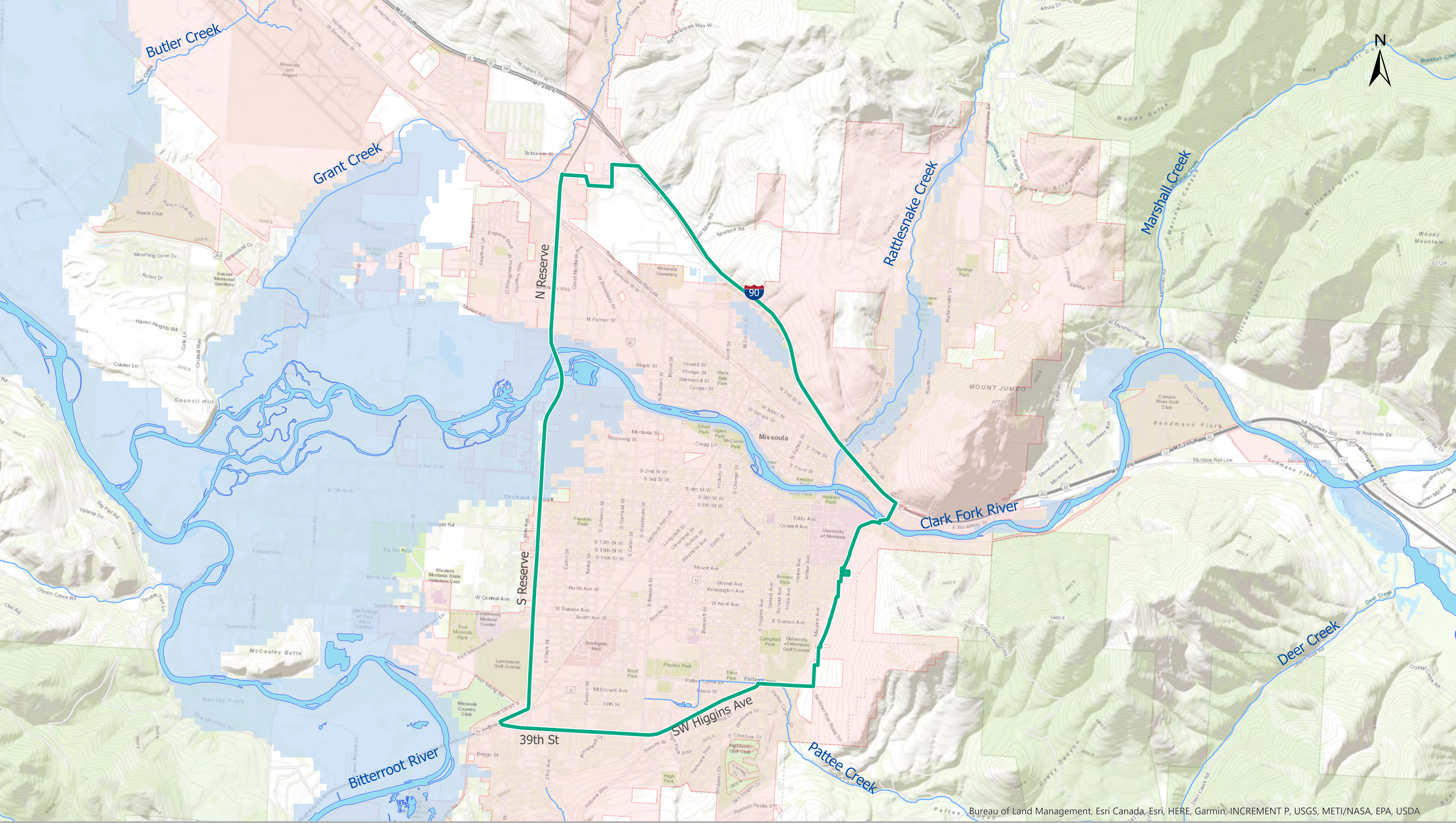
1. Contact Information for the party responsible for O&M
2. Description of the maintenance tasks to be performed and their frequency
3. Inspection checklist to be used for annual maintenance
4. List of the expected design life and replacement schedule of each component
5. Site plan showing the overall layout of the development
6. Copy of recorded HOA Agreement, if applicable
7. Other information as necessary

The O&M Manual shall first be submitted to the City Utility Engineering Department for review and comment. A final copy shall be submitted to the City for their records prior to final closeout.

Test Pit Infiltration Test Method

The following infiltration test method is modified version of the percolation test procedure in Appendix A of DEQ Circular-4, which better simulates the higher head seen in typical underground stormwater infiltration facilities in Missoula.

1. Dig or bore holes a minimum of 6 inches in diameter with vertical sides. Abide by all OSHA regulations for open trenches. The depth of the test holes must coincide with the elevation of the infiltrative surface for the proposed infiltration facility (10 feet from finished grade to bottom of drain rock for a standard dry well). Place 4 inches of clean 3/4-inch gravel in the bottom of the hole for splash protection and install a 4- to 8-inch diameter pipe. If using an open pit without pipe, ensure bottom of pit is scarified and splash protection is provided. If pipe is perforated then backfill void space between the pipe and the walls with the clean gravel or drain rock.
2. Presoak the hole by maintaining at least 1-foot depth of water in the pipe for a minimum of 60 minutes. Alternatively, add the expected volume of water from the 2-year, 24-hour storm for the largest drainage area the test results will be used for. Provide the calculations used to determine this volume with the test results.
3. Immediately after presoaking begin the infiltration test by filling the pipe to the top of the operational height of the proposed infiltration facility. Water depth should not exceed the design head for the facility. For a standard 8-foot dry well, water should be kept between 5 to 7 feet from the bottom of the pipe, or as close to 6 feet as possible. A head depth of 6 feet coincides with the top of the slotted barrel. The water level shall be allowed to drop for one hour or until 2 feet of headloss occurs. Record the time required for the 2-foot headloss. Use of a water level meter tape is recommended.
    a. If it takes longer than one hour for the water level to drop 2 feet, the test shall be repeated until two consecutive readings do not vary by more than 10%. The final reading shall be used as the infiltration rate.
    b. If it takes less than one hour for the water level to drop 2 feet, the test shall be repeated until four consecutive readings do not vary by more than 10%. An average of the four readings will be used as the infiltration rate.
4. Variations in the test procedure may be allowed upon prior approval by the City of Missoula.



Infiltration Testing Exemption

City of Missoula Public Works Standards and Specifications Manual (Appendix 6-G)

Adopted: 11-15-2021 Revised: 10-15-2021

Feet

0 4,000 8,000

- City Limits/MS4 Boundary
- Infiltration Testing Exemption Area
- Depth to groundwater < 20 feet

Areas with a depth to groundwater less than 20 feet or within 200 feet of the Clark Fork River or Rattlesnake Creek are NOT exempt from infiltration testing. Projects in these areas must complete a geotechnical investigation to determine the depth to seasonally high groundwater. The depth to groundwater is depicted for informational use and may not accurately reflect conditions on your site.

STORM WATER

City of Missoula

Missoula City Public Works
Standards and Specifications Manual

CHAPTER 8 – EROSION CONTROL

CHAPTER 8 – EROSION CONTROL

Table of Contents

CHAPTER 8 - EROSION CONTROL

8.1 Introduction

8.1.1 References

A. *Montana Public Works Standard Specifications* (MPWSS), Seventh Edition, 2021 – by purchase only

B. Montana Department of Environmental Quality (MDEQ) General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)

C. MDEQ General Permit For Storm Water Discharges Associated With Construction Activity MDEQ *Stormwater Management During Construction Field Guide for Best Management Practices*

D. Montana Department of Transportation - *Erosion and Sediment Control Best Management Practices Manual*

E. *Missoula Parks and Recreation Design Manual* – Appendix E

F. Missoula County Noxious Weed Management Plan – Appendix B

8.1.2 Appendices

A. Appendix 8-A – City Stormwater Compliance Permits Flow Chart

B. Appendix 8-B – Stormwater Permit

C. Appendix 8-C – Erosion Control Site Plan Checklist

D. Appendix 8-D – Landscape Agreement Form

E. Appendix 8-E – Construction Site Inspection Form

8.1.3 Standard Modifications to MPWSS

Specifications not specifically contained herein related to transportation improvements shall be in conformance with the *Montana Public Works Standard Specifications* (MPWSS), Seventh Edition, 2021.

8.1.4 Standard Drawings

Standard drawings related to erosion control shall be in conformance with the MPWSS, 6th Edition, 2010 Standard Drawings; the MDEQ Stormwater Management, *Construction Field Guide for Best Management Practices*; the MDT Erosion and Sediment Control BMP Manual Standard Drawings; and the 600-series of the City of Missoula Standard Drawings on the *Missoula City Public Works Standards and Specifications Manual* web page.

8.2 General Requirements

8.2.1 Design Standards

A. The best management practices (BMPs) described in this chapter apply to the management of stormwater, erosion, and sediment during construction. Post-construction storm water management controls are addressed in Chapter 6 of this Manual.

B. A disturbance area greater than or equal to 2,500 square feet (0.05 acre) requires a City Stormwater Permit (Appendix 8-A and Appendix 8-B).

   1. Disturbance area is any area that is subject to clearing, excavating, grading, and/or placement of earth materials and includes utility installation, utility maintenance work, and boring operations.

   2. Land disturbance activities related to agricultural practices or improvements are exempt from this requirement.

   3. Emergency repairs by a public utility or any other governmental agency are exempt from this requirement.

C. A disturbance area greater than or equal to 1 acre requires a City Stormwater Permit and a Montana Pollutant Discharge Elimination System (MPDES) General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit). The Construction General Permit shall be obtained from MDEQ, per the eligibility requirements defined in the Construction General Permit.

D. City Stormwater Permit applicants shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to manage stormwater runoff during construction. An Erosion Control Site Plan is required as part of the Stormwater Permit application.

   1. The applicant shall use the Erosion Control Site Plan Checklist (Appendix 8-C) to ensure their plan meets City requirements.

   2. The applicant shall complete the Stormwater Site Evaluation Form (Appendix 6-B) to identify the priority ranking of the project.

      a. The priority ranking determines the construction inspection frequency and whether a Stormwater Management Site Plan is required for post-construction stormwater management controls.

   3. For projects that are required to obtain coverage under a Construction General Permit, the City requires the following be submitted to them before a City Stormwater Permit will be issued: Stormwater Pollution Prevention Plan (SWPPP), Notice of Intent (NOI), and MDEQ confirmation letter.

      a. Specific requirements for this plan and the Construction General Permit can be found on the MDEQ website.

   4. The City requires notification that City Stormwater Permit coverage should be terminated. This will usually occur upon project closeout and/or upon request for a Certificate of Occupancy.

   a. Once permanent erosion control has been established on 70% or greater of the disturbed areas (i.e., final stabilization), the City Stormwater Permit may be closed.
   b. All temporary BMPs shall be removed, all construction equipment and vehicles shall be removed, and all potential pollutant-generating actives due to construction activity shall be complete.
   c. On low priority sites, a Landscape Agreement (Appendix 8-D) may be submitted prior to final stabilization, to close the City Stormwater Permit and issue a Certificate of Occupancy.
   d. For post-construction stormwater management (Chapter 6 of this Manual), a recorded covenant for maintenance, a utility easement, and an accurate post-construction (as-built) plan of the system, signed and sealed by a Montana-licensed professional engineer shall be submitted to the City.
   e. An NOT for Stormwater Construction (NOT-SWC) is required by MDEQ for activities covered under the Construction General Permit, and a copy shall be submitted to the City to close the City Stormwater Permit.

8.2.2 Plan Requirements

A. Erosion Control Site Plan. For any site disturbance greater than or equal to 2,500 square feet (0.05 acre), an Erosion Control Site Plan shall be submitted with the Stormwater Permit application. The plan shall show which BMPs are proposed to be used—when and where, specific to the project scope—along with the total disturbance area and installation details and notes for the proposed BMPs. Measures include those necessary to delineate areas of work, prevent erosion of unstable or bare soil, plan for construction staging and storage logistics, construction of stabilized access points, and proper containment measures for construction materials and waste. An Erosion Control Site Plan Checklist is provided in Appendix 8-C.

B. The following minimum requirements apply to the Erosion Control Site Plan:

1. Anticipated construction schedule and construction duration (in weeks or months).
2. Point of contact. Include name and contact information for the person responsible for maintaining erosion prevention and sediment control measures.
3. Boundary lines of the site.
4. Vicinity map of the site, showing relation to the surrounding adjacent area.
5. North arrow and legend.
6. Sufficient scale and size to clearly display site conditions.
7. Outfall location(s).
8. Locations and details of all BMPs.
9. State waters and other water bodies.
   a. Width, direction of flow, and approximate location of top and toe of banks of water bodies, if applicable.
10. Accurate contours showing the topography of the existing ground extending at least 10 feet outside all boundary lines of the project site. The contour lines shall be at intervals sufficient to show the configuration of the ground before disturbance.

11. All existing buildings, structures, public easements, or underground utilities.
12. Existing vegetation, location, and type. Within 25 feet of any cut or fill, the plan shall identify the location, diameter, species, and appropriate elevation at the base of all trees over 12 inches in diameter measured at 4.5 feet above ground level.
13. Revegetation plan.
14. Existing drainage patterns and direction of flow.
15. Limits of disturbed areas.
16. Areas not to be disturbed and off-limits to construction activity.
17. Location of proposed vegetative erosion control measures (e.g., seeding and landscaping), including type, quantity, planting schedule, and irrigation.
18. Location and details of all proposed drainage systems, walls, cribbing, or other erosion protection devices to be constructed in connection with, or as a part of, the proposed work.
19. Projects with site disturbance greater than or equal to 1 acre shall include phased Erosion Control Site Plans that address each major construction activity. A major construction activity is defined as any distinct construction-related disturbance or distinct pollutant-generating activity that occurs within the schedule of activities associated with the construction project.

8.3 Design Requirements

8.3.1 Best Management Practices

A. BMPs are used to minimize or eliminate the potential for pollutants to reach state waters in stormwater runoff. Construction-related pollutants include, but are not limited to, trash, paint, masonry, drywall, and dust. Emphasis is placed on managing erosion through preventative practices and control measures, including planning, project phasing, minimizing disturbance, vegetative cover, and grading controls. Sediment control BMPs are designed to prevent soil particles already being carried in stormwater and discharging from the construction site. Sediment control BMPs are not as effective as erosion prevention BMPs and are typically considered secondary practices, installed after all opportunities for erosion prevention have been implemented. Examples of sediment control BMPs include inlet protection, silt fence, rock wattles, sediment traps, and other perimeter control devices.

B. The BMPs described in *Stormwater Management During Construction, Field Guide for Best Management Practices* published by MDEQ, *Erosion and Sediment Control Best Management Practices Manual* published by the Montana Department of Transportation, and City standard drawings (Appendix 2-B) shall be used for compliance with the City Stormwater Permit.

C. All BMPs require regular maintenance to function properly. The construction inspection frequency is determined per the Stormwater Site Evaluation Form that is filled out by the applicant for City approval with the Stormwater Permit application. The City will inspect the site per the site priority.

Project erosion and sediment control measures shall be maintained as necessary—throughout the duration of the permit—to be effective.

8.3.2 Erosion Prevention BMPs

A. Conserving the existing natural vegetation is the most effective erosion prevention BMP, thus it is a critical consideration in project planning and phasing. Once these conservation areas have been identified, geotextile mats, surface roughening, drainage structures, check dams, and temporary slope drains are some examples of BMPs that can be implemented to prevent erosion. It is not practicable to provide an exhaustive list in this chapter, so the City suggests also consulting the BMP information found in the References section of this chapter. Temporary construction BMPs shall be properly installed, regularly maintained, and removed after construction is complete.

1. **Natural Vegetation**. The identification and planned protection of existing natural vegetation (e.g., trees, shrubs, grasses, and forbs) within the construction area is the most effective and least expensive BMP for soil stabilization. Its purpose is to minimize erosion; reduce the velocity of stormwater runoff; reduce sediment transport and tracking; provide an area for runoff to permeate the soil; provide buffers, screens, and aesthetic value; provide bio filtration (capture/process of pollutants); and provide habitat for wildlife. Thus, natural vegetation and vegetated buffers should be conserved to the maximum extent practicable.
2. **Geotextile Mats**. Geotextile mats, or other rolled erosion prevention materials, are used when disturbed soils are difficult to stabilize. They reduce rainfall impact and improve infiltration; provide a microclimate to promote seed establishment; minimize erosion caused by concentrated flows; and hold mulch, seed, fertilizer, and topsoil in place. A wide range of materials and combination of materials are used to produce geotextile mats, including straw, jute, wood fiber, and coir (coconut fiber). Correct installation is critical, as good ground contact prevents runoff concentrating under the mat, causing significant unplanned erosion.
3. **Surface Roughening**. Surface roughening creates a series of ridges and depressions that run horizontal across the slope and parallel to the contour. Notably, it is important not to create vertical ridges down the slope, as this facilitates channeling and erosion. Surface roughening increases infiltration, reduces erosion, and traps sediment.
4. **Drainage Structures**. A drainage structure is a ridge of compacted soil or a lined swale with vegetative lining located at the top, base, or somewhere along a sloping disturbed area. The dike or swale intercepts and conveys smaller flows along low-gradient drainage ways to larger conveyances, such as piped slope drains, or to a stabilized outlet. Dikes and swales may be used individually or in combination with each other.
5. **Check Dams**. Check dams are small dams (6 to 12 inches high) constructed across a swale or ditch to reduce velocities of concentrated flows, thereby reducing erosion in the swale or ditch. Check dams not only prevent gully erosion from occurring before vegetation is established, but also allow a significant amount of suspended sediment to settle out. Steep slopes may also be managed using a series of check dams to terrace the swale and reduce

the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.

6. **Temporary Slope Drains.** A temporary pipe or lined chute may be used to intercept run-on/runoff and carry concentrated flows from the top of a slope into a stabilized swale, sediment trapping device, or large stabilized area at the toe of the slope. Slope drains are often used with dikes and lined ditches to intercept and direct surface flow. Their primary purpose is to prevent run-on/runoff from flowing over slopes that are at high risk of erosion or slope failure. Velocity dissipation is an important component of temporary slope drains. These temporary devices are placed at conveyance outlets to prevent scour and reduce the velocity and/or energy of stormwater flows and discharges. This BMP is temporary and shall not be confused with permanent outlet protection and velocity dissipation devices.

8.3.3 Sediment Control BMPs

A. The purpose of sediment control BMPs is to ensure that sediments or other contaminants do not leave the construction site. Some common sediment control measures include BMPs related to the construction entrance, inlet protection, sediment fencing, concrete washout, and portable toilets. Like the erosion prevention BMPs, it is not practicable to provide an exhaustive list in this chapter. The City suggests consulting the additional information provided in the References section of this chapter during the site planning and design phase of a project. Temporary construction BMPs shall be properly installed, regularly maintained, and removed after construction is complete.

1. **Construction Entrance/Exit**. Sediment tracking from vehicular traffic on construction sites can be a major challenge, as well as an early BMP failure and violation, for contractors. A defined point of entrance/exit to a construction site should be stabilized to reduce the tracking of mud and dirt onto public streets by construction vehicles. Once sediment is tracked onto impervious surfaces, it is extremely difficult to manage and is readily transported with runoff. Evaluating soil conditions, site access, traffic patterns, seasonal weather, and appropriate BMP alternatives all factor into implementing an environmentally responsible construction entrance. An effective construction entrance/exit will include numerous administrative and structural BMPs to minimize and control sediment tracking. These other BMPs may include limiting site access, stabilized parking areas, project scheduling changes, halting work, wheel wash stations, subcontractor training, and vehicle track pads.
2. **Inlet Protection**. Inlet protection is installed to prevent sediment-laden runoff from entering a storm drain inlet; this is the last line of defense and the final opportunity to prevent illicit discharge. It is used at storm drain dry wells and inlets that are subject to runoff from construction activities. The purpose is to detain runoff and allow sediment to settle/filter out prior to discharging into the storm drain system or water bodies. These are most effective when the appropriate material and method are chosen for the location based on the anticipated flow velocity. These BMPs are least effective when they are not regularly

maintained. Thus, regular maintenance is critical to their success. Landscape fabric shall not be used for inlet protection.

3. **Sediment Fencing**. A sediment fence is a temporary linear sediment barrier of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff. Silt fences allow sediment to settle from runoff before water leaves the construction site. Silt fences should be used between the edge of construction disturbance and a critical resource or right of way line that is adjacent to the construction activity. These BMPs are not effective unless they are trenched and keyed in, and they must be regularly maintained.
4. **Compacted Earthen Berms**. Temporary earthen berms can be implemented in coordination with grading. Compaction is critical for these BMPs to function as designed, to prevent seepage and by-pass. Berms are usually located along a contour with a relatively gentle slope. They may serve various functions, such as creating a barrier, retaining flow, infiltration, or directing flow. Compacted earthen berms must be vegetated with an approved seed mix, if in place for more than 14 calendar days.
5. **Concrete Washout**. Liquid and solid waste from concrete operations is a significant pollutant source due to its high pH and chemical constituents. Thus, concrete washout and slurry must be properly contained. A designated concrete washout area needs to be large enough to completely contain all liquid wastes generated from concrete operations. Procedures and practices shall be implemented to prevent pollutants from concrete waste materials from entering the storm drain system.
   a. Secondary containment is required for certain quantities of regulated substances and must comply with the Missoula Valley Water Quality Ordinance. Please contact the Missoula Valley Water Quality District for more information.

8.3.4 Vegetation Management BMPs

A. To the maximum extent practicable, existing native vegetation should be conserved and protected from disturbance. This has been shown to be the most effective and least expensive BMP. Disturbed areas are especially susceptible to invasion by noxious weeds, which are a major threat to Montana's economy and environment. During the past century, weeds have expanded to infest over 8.2 million acres, degrading ecosystem productivity and diversity. Further, the County Weed Management Act (MCA §7-22-2102 to 2104) states that it is unlawful to permit noxious weeds to propagate. When a property is offered for sale, the person who owns the property shall notify the owner's agent and the purchaser of: (a) the existence of noxious weed infestations on the property offered for sale; and (b) the existence of a noxious weed management program or a noxious weed management agreement. Please refer to the Montana Dept. of Agriculture's current Montana State Noxious Weed List to prioritize management.

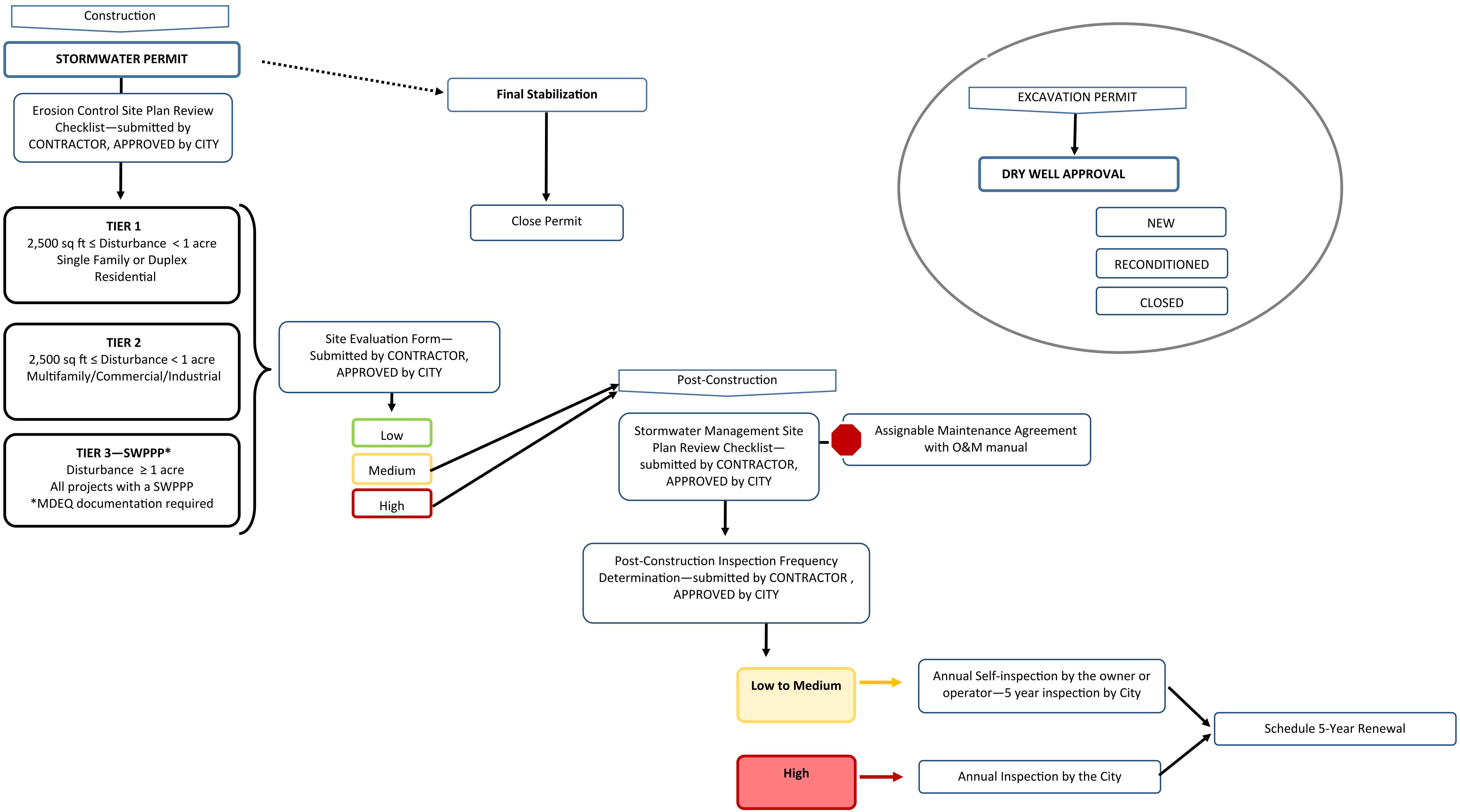
1. **Revegetation Plan.** Appendix E of the *Missoula Parks and Recreation Design Manual* provides revegetation guidelines that should be followed in the Erosion Control Site Plan. Further, Appendix B of the Missoula County Noxious Weed Management Plan provides methods to control weeds and revegetate disturbed areas. The City encourages owners or operators to consult with the Missoula County Weed District at any point, from initial planning to

monitoring and evaluation. To prevent noxious weed establishment, the City requires the submittal of a revegetation plan with the Stormwater Permit application (Appendix 8-B). A revegetation plan shall describe the time and method of seeding/planting, fertilization, and watering practices; recommended native plant species; use of weed-free seed; weed management procedures; monitoring and evaluation guidelines; and the final objective. It should also note the size of the overall disturbed area, size of common areas and parks, who will be responsible for management, and the responsibilities of the owner/developer in managing non-native species.

2. **Long-term Success.** Revegetation is a long-term process. Maintaining stable, native plant communities on adjacent lands will help support revegetation efforts on disturbed areas by providing a seed bank and supporting the appropriate pollinators. To ensure successful revegetation, an environmental scientist should perform long-term monitoring and evaluation. Some sites may take several years to become established enough to outcompete noxious weeds. Monitoring may cease once the final objective, per the revegetation plan, has been met.

MISSOULA
THE GARDEN CITY · HUB OF FIVE VALLEYS
PUBLIC WORKS & MOBILITY DEPARTMENT — STORMWATER
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

Stormwater Compliance Permits



rev. Feb 10, 2023

Stormwater Permit Application

Construction activities that result in a total land disturbance of 2,500 square feet or greater, or which propose to alter the grade of a lot by 3 feet or more, must apply for coverage under a City Stormwater Permit. This permit application shall be submitted to Development Services, along with the relevant fee, no greater than 180 days and no less than 60 days from the start date of construction. Submittal and approval of this application is required before initiating construction activities, pursuant to §13.27, Missoula Municipal Code (MMC). Once permanent erosion control has been established on 70% or greater of the disturbed areas, the permittee shall contact Development Services to close their permit.

Date:____________________________

Name of Applicant:_____________________________________

Mailing Address:____

City:____________________________State:_____________________Zip Code:_____________

Owner (if different than applicant):____

Cell number:____________________ Email:_______________________________________

Contractor Name (if applicable):______________________ Company Name:___________________________

Cell number:____________________ Email:_____________________________________

Project Name:____

Total Disturbed Area (indicate units):____________________________

Project Address:____

Latitude:____________________________________ Longitude:

Project Type (e.g., subdivision, multifamily, commercial):____

Start Date:________________________ Anticipated End Date:___________________

Erosion Control Site Plan

Please refer to the City's Erosion Control Site Plan Review Checklist, to ensure the plan has all the necessary information. Using the Storm Water Site Evaluation Form, if your project is a medium or high priority, please submit a Stormwater Management Site Plan.

☐Erosion Control Site Plan ☐ Stormwater Site Evaluation Form: ☐ low ☐ medium ☐ high

Stormwater Management Site Plan

Please refer to the City's *Stormwater Management Site Plan Review Checklist* to ensure the plan has all the necessary information. City staff will rely on this checklist in their review.

☐Stormwater Management Site Plan ☐ NA, no further information required; skip to page 3 and sign

Additional Required Attachments for Stormwater Management Site Plan

☐Approved plat showing utility easement for inspection, maintenance, and repair
☐Maintenance Agreement (please use the template that accompanies this permit application)
☐As-Built plan of the system, signed and sealed by a Professional Engineer licensed in Montana

For guidance on this application, please refer to most current version of the *Montana Post-Construction Storm Water BMP Design Guidance Manual* produced for Montana's MS4 Municipalities.

1. **Your project must implement post-construction stormwater management controls that are designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation. Does your project comply with this requirement?**

   ☐Yes ☐No (if no, stop and reassess your plans for compliance)

   Does your project capture 100% of runoff on site?

   ☐Yes ☐No

   If no, is the remainder of the runoff:

   ☐Treated onsite using post-construction stormwater management control(s) expected to remove 80% total suspended solids;

   ☐Managed offsite within the same subwatershed using post-construction stormwater management control(s) that are designed to infiltrate, evapotranspire, and/or capture for reuse; or

   ☐Treated offsite within the same subwatershed using post-construction stormwater management control(s) expected to remove 80% total suspended solids

   If offsite treatment is chosen, why is it required? Explain. Determinations may not be based solely on the difficulty and/or cost of implementation.

   ☐Technical or logistic infeasibility ☐High groundwater ☐Poorly infiltrating soils

   ☐Prohibitive costs ☐ Land use that is inconsistent with capture and reuse or infiltration of stormwater

   ☐Other:____

2. **What low-impact development principles does your project implement?** Check all that apply.

   ☐Preserve natural site features ☐Minimize and disconnect impervious areas ☐Project phasing

   ☐Disperse small-scale integrated BMPs throughout the site ☐Create multifunctional landscapes

   ☐Control stormwater as close to the source as possible

   ☐Other:____

3. **What types of green infrastructure have you incorporated into the site plan?** Check all that apply.

   ☐Downspout disconnection ☐Rainwater harvest ☐Rain garden(s) ☐Bioswales ☐Land conservation

   ☐Permeable pavers ☐Green roof ☐Green parking ☐Bioretention basin(s) ☐Urban tree canopy

   ☐Other:____

4. **Describe the revegetation and weed management methods, using the *Missoula Parks and Recreation Design Manual*, as periodically updated, for guidance.** Please submit as supporting documentation with this permit application.

I certify that I am the contractor/owner or an authorized agent. If acting as an authorized agent, I certify that I am authorized to act as the contractor/owner agent regarding the property at the above-referenced address for the purpose of filing applications for decisions, plans, or review under §13.27, MMC, and have full power and authority to perform, on behalf of the contractor/owner, all acts required to enable the City to process and review such applications. I certify that the information on this application is true, will be implemented, and maintained throughout the life of the project.

☐ By checking this box, I acknowledge that non-compliance with this Permit and §13.27, MMC may result in a stop work order, city withholding a certificate of occupancy, or a lien filed against the project for unpaid costs of abatement of violations.

Signature of Legally Responsible Person	Date
Printed Name	Title

Rev. Feb. 6, 2023

Erosion Control Site Plan Checklist

Date: __________________________

Project Name: ____

Address: __________________________Zip Code:____________________

Project Area (square feet):_________Disturbance Area (square feet):___________________

Owner Name:____________________Phone Number:_____________________

Owner Address:____

Disturbance Area is any area that is subject to clearing, excavating, grading, and/or placement/removal of earth materials.

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—the City of Missoula is required to regulate runoff and the treatment of stormwater into drainage systems and water bodies, including the Missoula aquifer. The regulation of stormwater includes construction stormwater from project sites (Montana Code Annotated 75-5-401). Projects that involve 1 acre or more of land disturbance, or less than one acre but are part of a larger common plan of development, are required to demonstrate coverage under the Montana Pollutant Discharge and Elimination System General Permit for Stormwater Discharges Associated with Construction Activity.

Clearly show each item below on the Erosion Control Site Plan and fill in the corresponding check box. Best management practices (BMPs) are structural, vegetative, or managerial practices used to treat, prevent, or reduce water pollution. Help us protect our waterways and sole-source aquifer with BMPs. For guidance, please refer to the Public Works Manual Chapter 8, MDT BMP Manual, and/or MDEQ Construction Field Guide.

Project Area	
☐	All areas of construction, including but not limited to: areas to be graded as shown on a grading plan, areas to be cleared, as well as structures, retaining walls, roads, drives, utilities, trenches, scaffolds, catch basins, etc. These areas should be consolidated and located outside steep or sensitive areas.
☐	Location of all existing buildings, structures, easements, or underground utilities.
☐	Accurate contours showing the topography OR drainage arrows showing existing drainage patterns and direction of flow
☐	Surface water location(s) within 200 feet of the project boundary
☐	Inlet locations within 200 feet of the project boundary and protection measure details
☐	Perimeter controls (e.g., **vegetative buffer**, compacted berm, silt fencing, and/or fiber rolls). On slopes greater than 10%, the measures must be installed along contour lines.
☐	All areas that will be used for stockpiling earth and storing construction materials
☐	For slopes less than 3:1, provide sediment control along contour lines. For slopes greater than 3:1, slope stabilization BMPs are required.

Construction Access	
☐	Stabilized, designated access points for entrance onto the property. If using an existing paved driveway, identify it.
☐	Designated area(s) for parking of construction vehicles.
Construction Materials and Waste	
☐	Location, installation, and maintenance of a concrete mixer, washout, and pits. No concrete, mortar, or stucco washout shall be placed directly on the soil/ground. Specify the method used to contain the washout.
☐	Location(s) of portable toilets away from surface water locations and storm drain inlets.
☐	Show storage location and containment of construction materials or stockpiles during work, as well as afterhours/weekends. No materials shall be stored or stockpiled on the street.
Add these Standard Comments on the Site Plan	
☐	Locations of temporary stockpiles must be covered when not being actively worked in dry weather. Alternatively, in wet weather, or for longer storage, use seeding and mulching, soil blankets, or mats.
☐	Perform clearing and earth-moving activities only during dry weather; when necessary, use dust control measures to comply with air quality ordinances. Measures to ensure adequate erosion prevention and sediment control shall be installed prior to earth-moving activities and construction.
☐	Measures to ensure adequate erosion prevention and sediment control are required year-round. Stabilize all disturbed areas and maintain erosion prevention measures continuously between from April 30 through October 1.
☐	Maximize and protect areas to be undisturbed (including sensitive areas and buffer zones), using a vegetative buffer or 6-foot fence/barrier. Do not disturb riparian areas.
☐	Inlet protection shall be cleaned out after each rain event, or as needed, to function properly. Do not use sand bags, as these tear and can result in sand entering the storm drains.
☐	Store, handle, and dispose of construction materials and wastes properly, to prevent their contact with storm water. No materials shall be stored or stockpiled on the street.
☐	Stockpiles must be covered when left overnight; if not being worked within 14 days, they must be stabilized with seed, covered with mulch, soil blankets, or mats.
☐	Control and prevent the discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, wash water, or sediments, and non-storm water discharges to storm drains and watercourses.
☐	Avoid cleaning, fueling, or maintaining vehicles on site, except in a designated area where wash water is contained and treated. Limit and time applications of pesticides and fertilizers to prevent polluted runoff.
☐	Limit construction access routes to stabilized, designated access points.
☐	Avoid tracking dirt or other materials off site; clean off-site paved areas and sidewalks using dry sweeping methods.
☐	The areas delineated on the plans for parking, grubbing, storage, etc., shall not be enlarged or "run over."
☐	Erosion prevention and sediment control materials shall be stored on site.
☐	Tree protection shall be in place before any demolition, grading, excavating, or grubbing is started.

rev. Feb 27, 2023

Landscape Agreement
Low Priority Sites (All) and Medium Priority Sites (SFR)
per the Stormwater Site Evaluation Form

Date:_____________________________

Applicant Name:______________________________________**Stormwater Permit No.:**________________

Applicant Address: ____**Zip Code:**________________

Applicant Email: ____**Phone:** ____________________________

Subject Property Address:_______________________________________**Zip Code:**___________________

Owner Name (if applicable):_____________________________**Phone Number:**_______________________

To close out the City Stormwater Permit, permanent erosion control must be established on 70% or greater of the disturbed areas. Low priority sites and single-family residential medium priority sites, per the Stormwater Site Evaluation Form, may close out their Stormwater Permits prior to reaching this condition, if permanent stabilization (e.g., landscaping) is installed on 70% or more of the disturbed areas within 6 months of closing the permit. Temporary best management practices (BMPs) must remain in place to prevent sediment-laden discharge from leaving the site until permanent erosion control is established.

Contractor/Landscaper Name/Company:_______________________________________

Phone:_________________________ Email: ______________________________

Estimated Start date: ____________________ Estimated completion date: _______________________

The Applicant hereby agrees to meet the conditions in this Landscape Agreement by installing permanent erosion control on 70% or more of the disturbed areas within 6 months of closing the permit. Failure to comply this this condition will be considered a violation of Missoula Municipal Code Chapter 13.27 Stormwater Management and subject to penalties therein.

_______________________________ ______________________

Applicant Signature Date

rev. 2/6/2023

Construction Site Inspection Form

☐ Pass ☐ Fail

Project Name:____ **Permit No**.:_______________

Address or Latitude/Longitude:____

Date of Inspection:________________________ **Start/End Time:**____________________________________

Inspected by:________________________________ **Title:**__________________________________

City Department/Division:____

Describe Present Phase of Construction:____

Type of Inspection:

❑ Beginning of Construction ❑ Pre-storm event ❑ During rain event

❑ Post-rain event ❑ Conclusion of Project ❑ Response to violation or complaint

Weather Information

Has it rained since the last inspection? ❑Yes ❑No

If yes, provide:

Storm Start Date & Time: Storm Duration (hrs): Approximate Rainfall (in):

Weather at time of this inspection:

❑ Clear ❑ Cloudy ❑ Raining ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds

❑ Other: Temperature:

Do you suspect that discharges may have occurred since the last inspection?

❑Yes ❑No

Are there any stormwater discharges at the time of inspection? ❑Yes ❑No

If yes, provide location(s) and a description of stormwater discharged from the site (presence of suspended sediment, turbid water, discoloration, and/or oil sheen:

Prohibited Discharges

Are there any prohibited discharges at the time of inspection? ❑Yes ❑No

If yes, provide location(s) and a description:

Photos? ☐ Yes ☐ No

If yes, please attach and/or provide filepath:

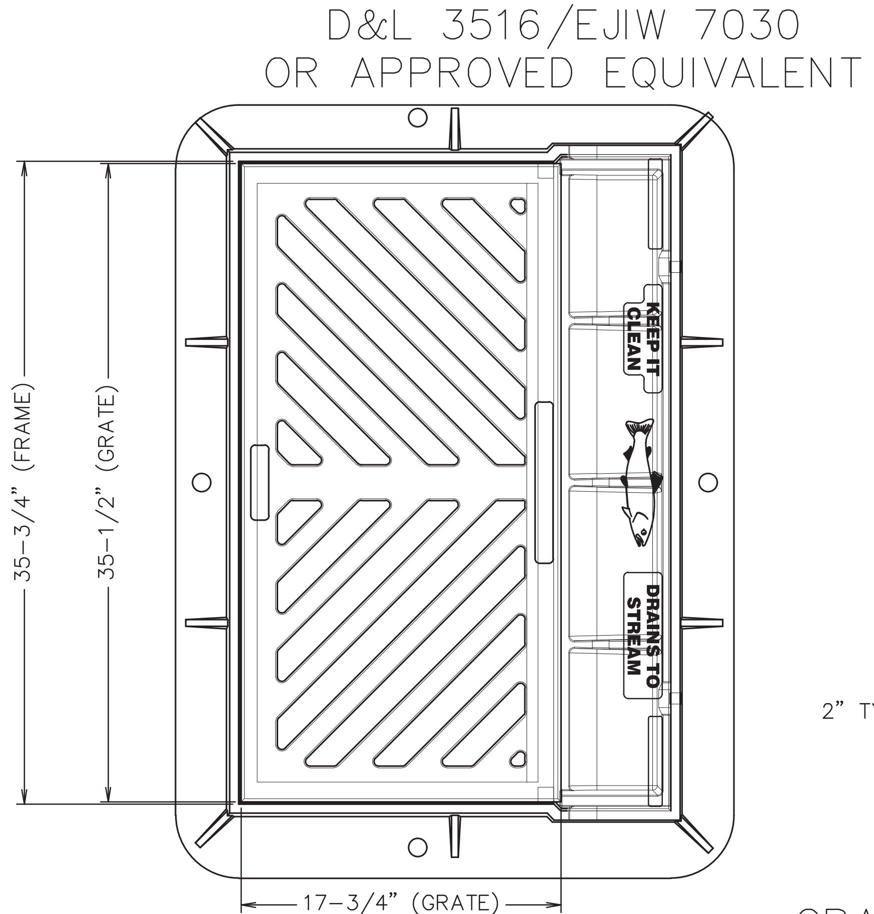
	BMP/Activity	Implemented	Maintained	Corrective Action & Notes
Erosion Prevention and Sediment Control				
1	Are stormwater volume and velocity controls being used to minimize soil erosion within the site? (e.g., check dams and fiber rolls)	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
2	Are stormwater volume and velocity controls being used to minimize soil erosion at discharge locations? (e.g., stilling basins and fiber rolls)	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
3	Are efforts being made to minimize the amount of soil exposed throughout the site?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
4	Are efforts being made to minimize the disturbance of steep slopes?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
5	Are perimeter controls and sediment barriers (e.g., silt fence) adequately installed (keyed into substrate) and maintained?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
6	Are storm drain inlets properly protected?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
7	Are discharge points and receiving waters free of sediment deposits? If no, provide locations.	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
8	Is there evidence of sediment being tracked into the street?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
9	Are natural resource areas (e.g., streams, wetlands, and mature trees) protected by natural buffers, barriers, or similar BMPs?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
10	Are efforts being made to minimize soil compaction and preserve topsoil?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	

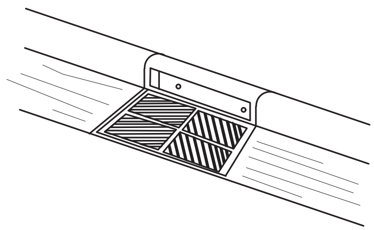
	BMP/Activity	Implemented	Maintained	Corrective Action & Notes
Soil Stabilization				
11	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Dewatering				
12	Are discharges from dewatering activities being managed by appropriate controls?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Pollution Prevention Measures				
13	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
14	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
15	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
16	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
17	Are vehicle and equipment fueling, cleaning, material storage, and maintenance areas free of spills, leaks, or other harmful materials?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Surface Outlets and Miscellaneous				
18	When discharging from basins and impoundments, are outlet structures that withdraw water from the surface being used?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
19	Are there locations where additional BMPs appear to be necessary?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Describe any incidents of non-compliance not described above:				

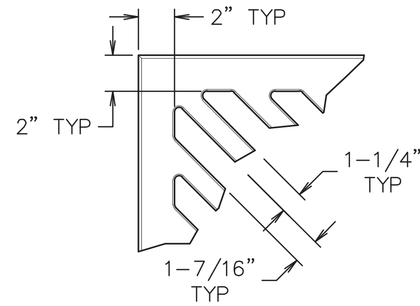
Inspector's Signature

Date

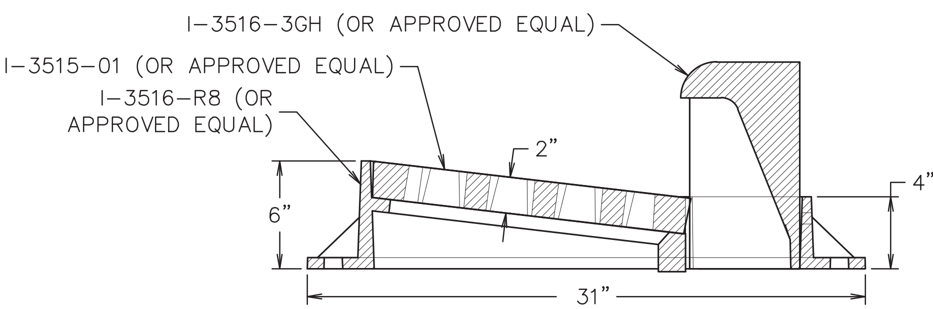
Appendix F
City of Missoula Standard Drawings







GRATE OPENING DETAIL



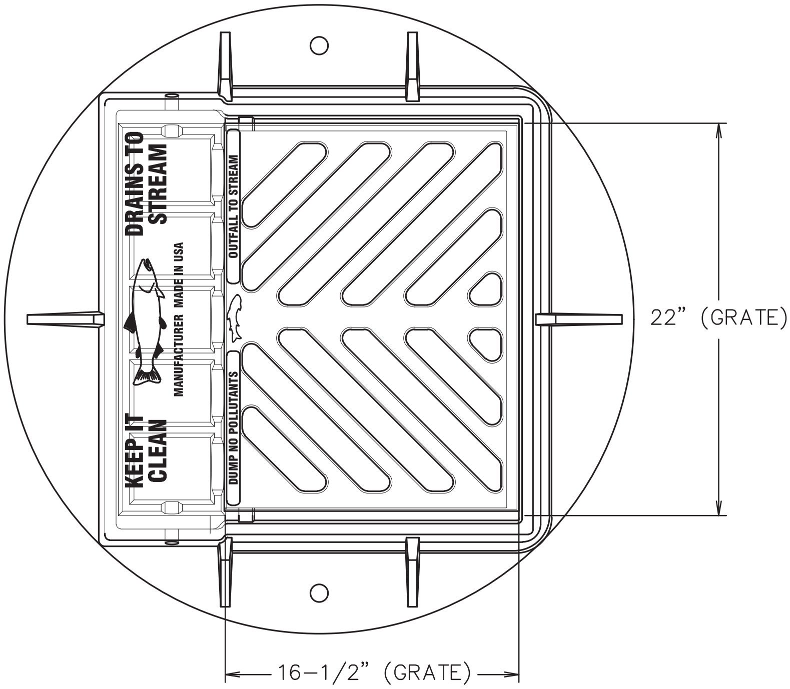
SECTION

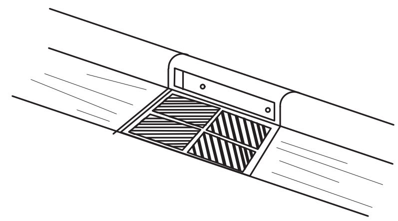
GENERAL NOTES:

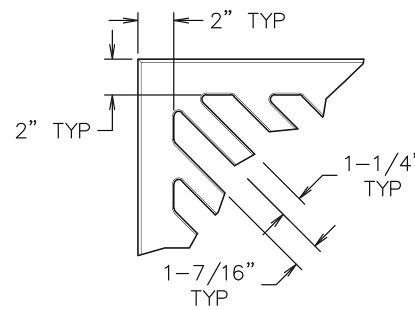
1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. COMBINATION CURB INLET FRAME AND GRATE SHALL BE USED WHERE INLET OR DRY WELL IS LOCATED IN TYPICAL "L" TYPE CURB & GUTTER (STD-740).
3. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
4. VANED GRATE (D&L I-3517-02 OR APPROVED EQUAL) SHALL BE USED WHEN SLOPE EXCEEDS 5%.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. COMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE RUNNING SLOPE OF THE CURB.
5. GRATE SHALL MATCH RUNNING SLOPE OF STREET.
6. GROUT BOLT SLOTS LOCATED IN THE CURB LINE AND ALL OTHER OPENINGS TO BASE COURSE AND BACKFILL MATERIAL.

MISSOULA Engineering Division	36" COMBINATION CURB INLET FRAME & GRATE		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 600

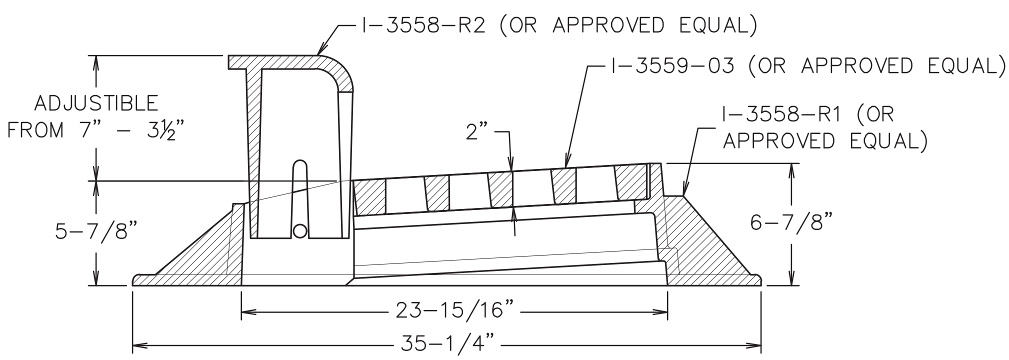
D&L 3558/EJIW 7222
OR APPROVED EQUIVALENT







GRATE OPENING DETAIL



SECTION

GENERAL NOTES:

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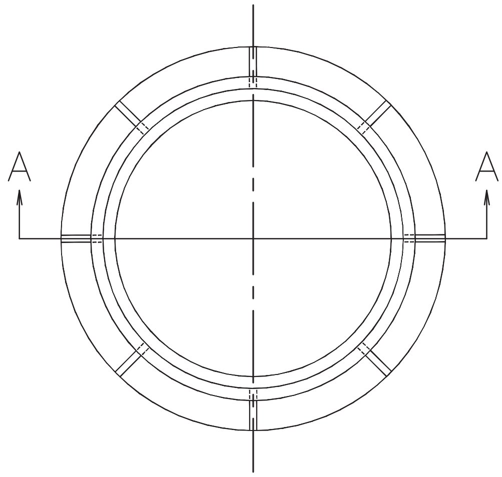
2. COMBINATION CURB INLET FRAME AND GRATE SHALL BE USED WHERE INLET OR DRY WELL IS LOCATED IN TYPICAL "L" TYPE CURB & GUTTER (STD-740).
3. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
4. VANED GRATE (D&L I-3559-04 OR APPROVED EQUAL) SHALL BE USED WHEN SLOPE EXCEEDS 5%.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. COMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE RUNNING SLOPE OF THE CURB.
5. GRATE SHALL MATCH RUNNING SLOPE OF STREET.
6. GROUT BOLT SLOTS LOCATED IN THE CURB LINE AND ALL OTHER OPENINGS TO BASE COURSE AND BACKFILL MATERIAL.

MISSOULA Engineering Division	24" COMBINATION CURB INLET FRAME & GRATE		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 601

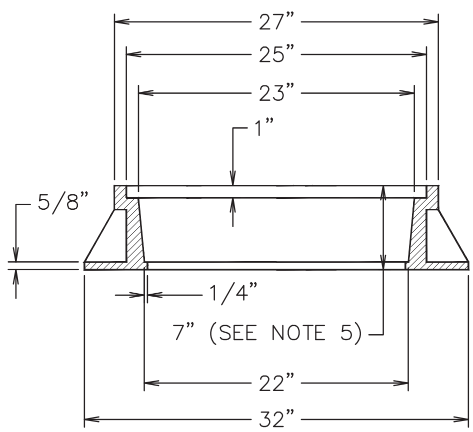
EJIW / 3777
OR APPROVED EQUIVALENT

MANHOLE RING



TOP VIEW

USE ONLY APPROVED COVERS:
STD-604B STORMWATER SOLID LID MANHOLE COVER
STD-604C AREA DRAIN GRATE
STD-604D ADA AREA DRAIN GRATE



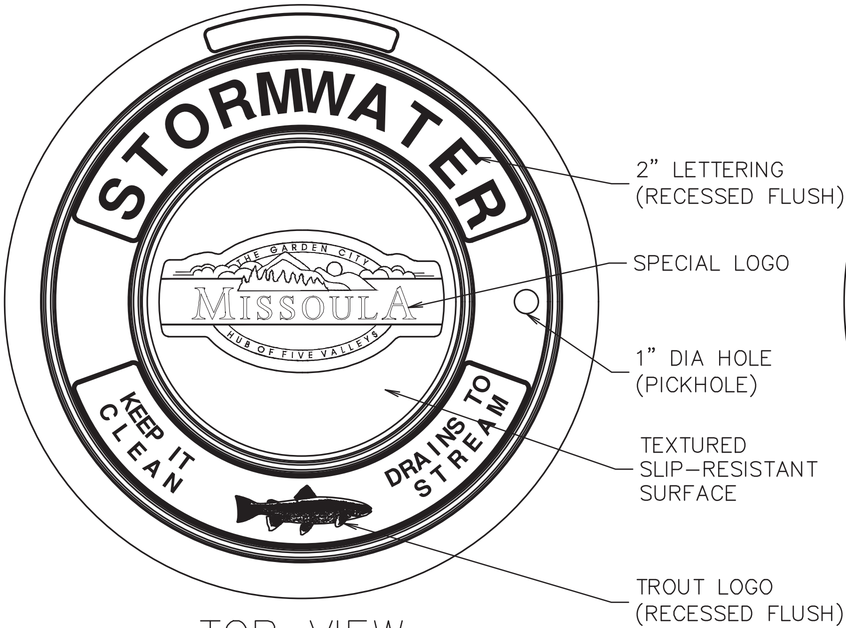
SECTION A-A

GENERAL NOTES:

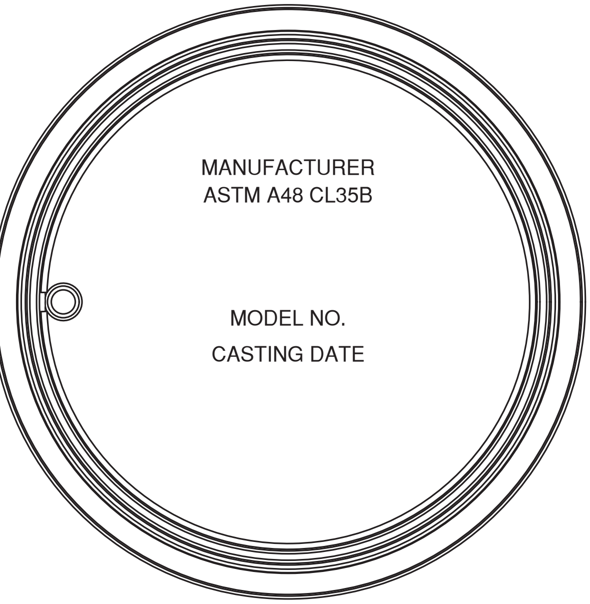
1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. COMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE CURB LINE CROSS SLOPE AND RUNNING SLOPE OR STREET CROSS SLOPE AND RUNNING SLOPE WHERE NOT IN CONCRETE.
5. 4-INCH MANHOLE RING MAY BE USED IN LIEU OF A 7" RING ONLY WITH PRIOR APPROVAL FROM CITY ENGINEERING.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Stormwater Ring		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2021 Revised: 01/01/2023	STD - 604A

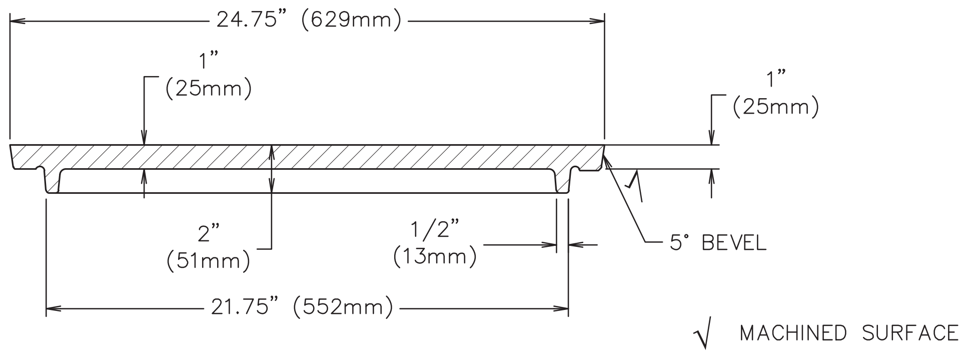
EJIW 3777-M / D&L A-1171
OR APPROVED EQUIVALENT



TOP VIEW



BOTTOM VIEW



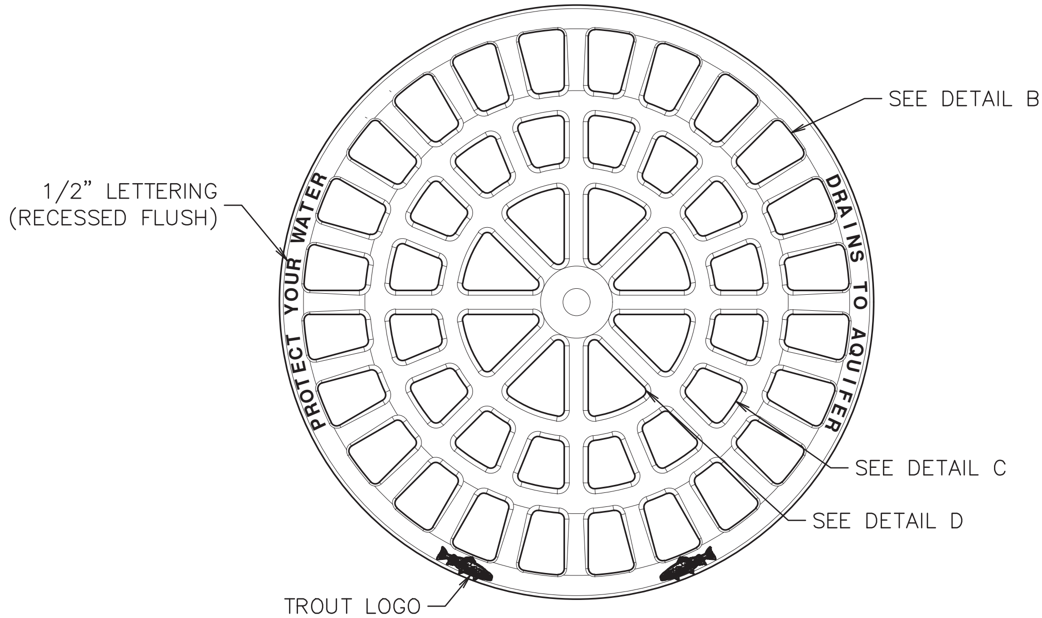
SECTION

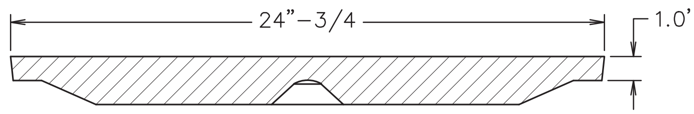
GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. FOR CITY-OWNED INFRASTRUCTURE ONLY. FOR PRIVATE STRUCTURES WITHIN THE RIGHT-OF-WAY PROVIDE A TEXTURED SLIP RESISTANT LID WITHOUT CITY LOGO - MUST HAVE "STORMWATER" ON LID.
3. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
4. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
5. COMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE CURB LINE CROSS SLOPE AND RUNNING SLOPE OR STREET CROSS SLOPE AND RUNNING SLOPE WHERE NOT IN CONCRETE.
6. SEE STD-604A FOR STANDARD MANHOLE RING SPECIFICATIONS.
7. WHEN LOCATED WHERE MANHOLE MAY BECOME PRESSURIZED USE STD-605, "STORMWATER LOCKABLE LID AND FRAME".

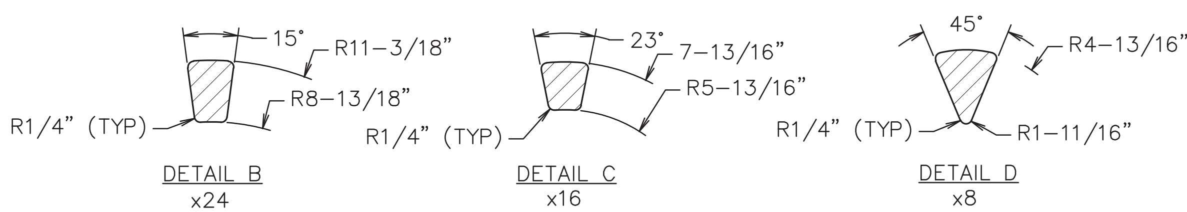
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Stormwater Solid Lid Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 604B

D&L C-1171-03
OR APPROVED EQUIVALENT





SECTION

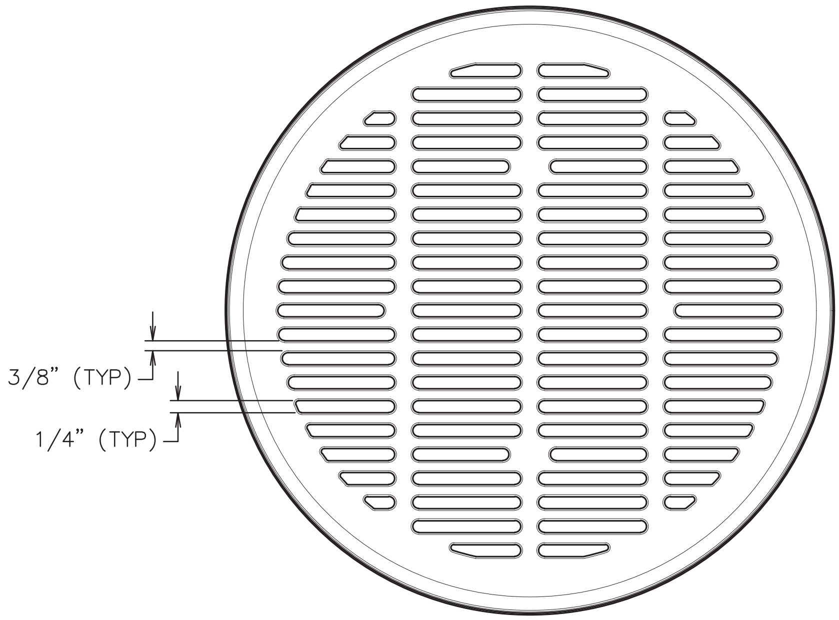


GENERAL NOTES:

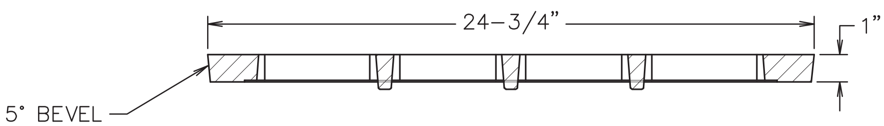
1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HICOMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE CURB LINE CROSS SLOPE AND RUNNING SLOPE OR STREET CROSS SLOPE AND RUNNING SLOPE WHERE NOT IN CONCRETE.
4. SEE STD-604A FOR STANDARD MANHOLE RING SPECIFICATIONS.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Area Drain Grate			
		Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 604C

D&L C-2670
OR APPROVED EQUIVALENT



TOP VIEW



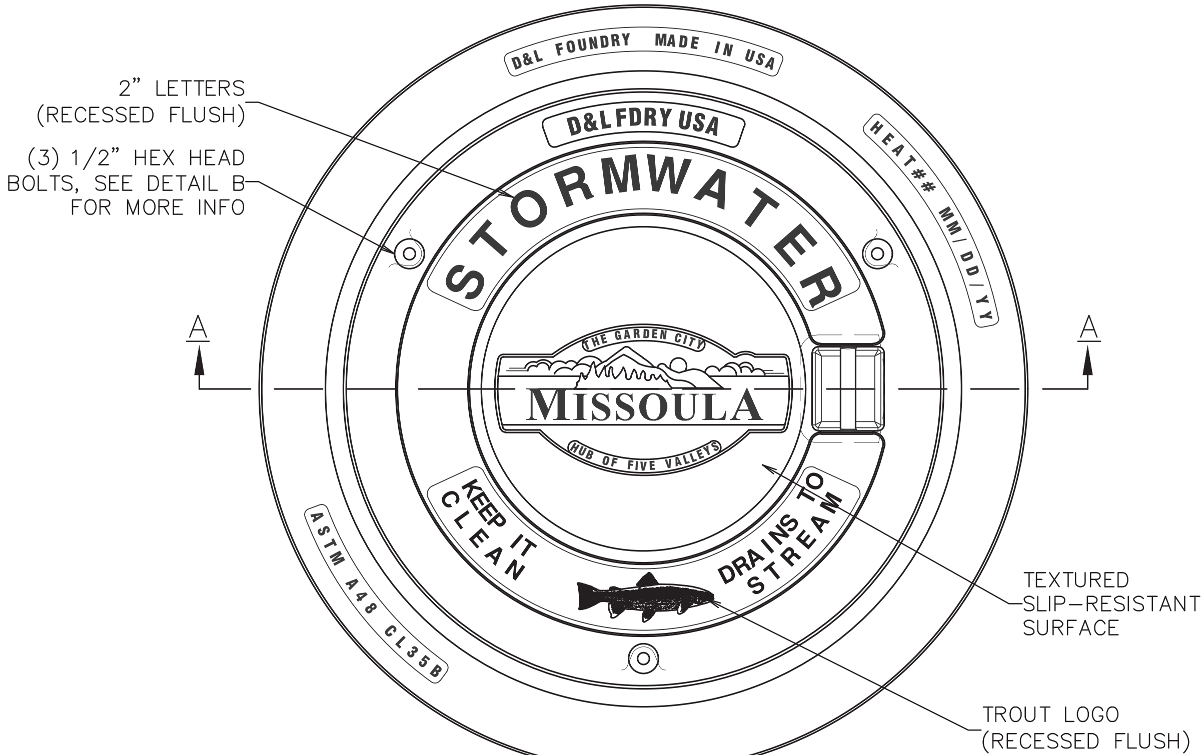
SECTION

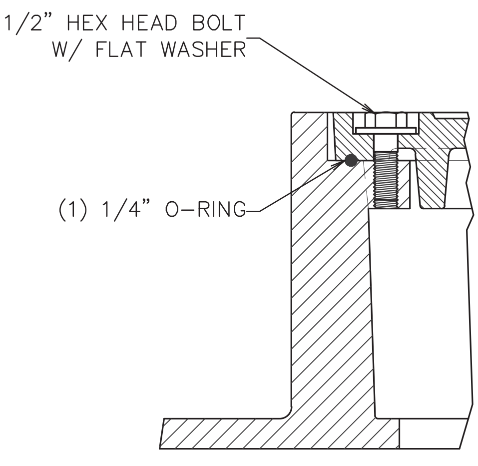
GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. COMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE CURB LINE CROSS SLOPE AND RUNNING SLOPE OR STREET CROSS SLOPE AND RUNNING SLOPE WHERE NOT IN CONCRETE.SEE STD-604A FOR STANDARD MANHOLE RING SPECIFICATIONS.
5. GRATE SHALL BE USED WHEN GRATE IS LOCATED IN ADA TRAVEL PATH. GRATE MAY BE USED ONLY WITH PRIOR CITY ENGINEER APPROVAL

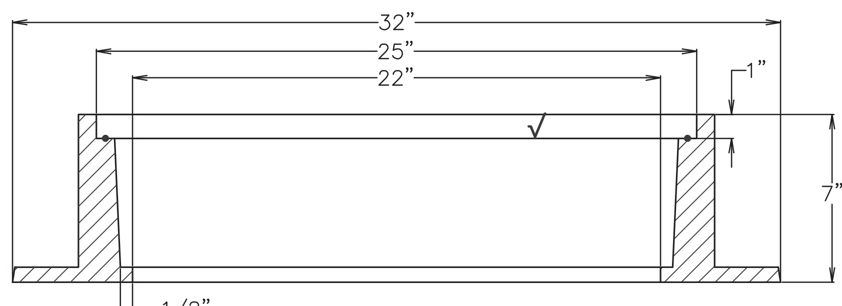
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	ADA Area Drain Grate		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 604D

EJCO 3777Z1/AGS, D&L A-1171 LOCKABLE OR APPROVED EQUIVALENT

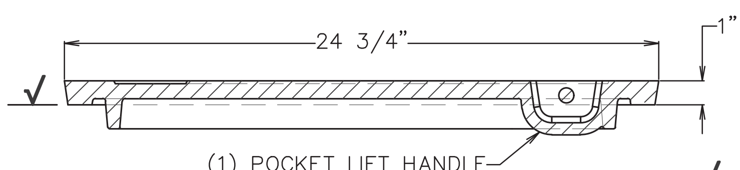




DETAIL B



SECTION A-A

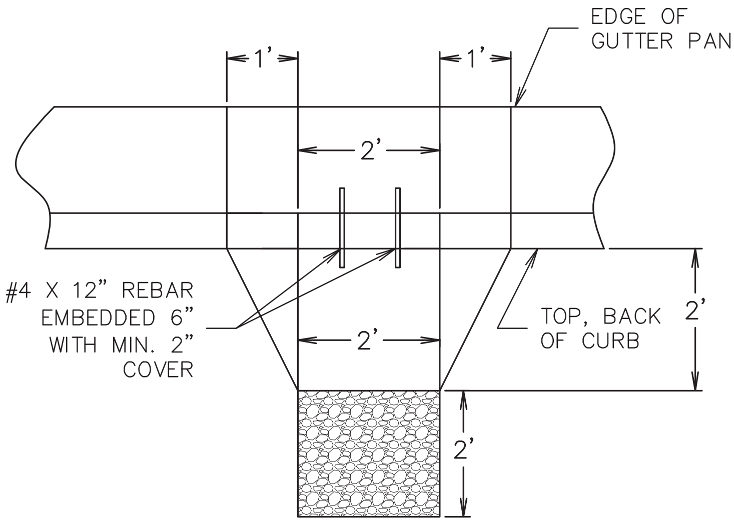


√ MACHINED SURFACE

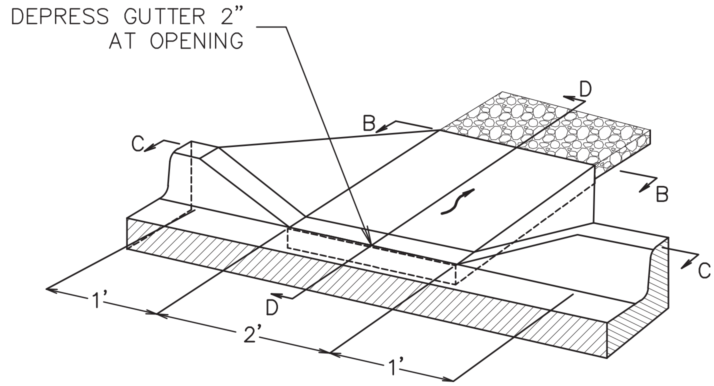
GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. FOR USE WHEN THE MANHOLE CAN BECOME PRESSURIZED.
3. FOR CITY-OWNED INFRASTRUCTURE ONLY. FOR PRIVATE STRUCTURES WITHIN THE RIGHT-OF-WAY PROVIDE A TEXTURED SLIP RESISTANT LID WITHOUT CITY LOGO - MUST HAVE "STORMWATER" ON LID.
4. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 HS20 LOADING RATING OR HIGHER.
5. COMPOSITE TAPERED GRADE RINGS SHALL BE USED TO MATCH FRAME & GRATE TO THE CURB LINE CROSS SLOPE AND RUNNING SLOPE OR STREET CROSS SLOPE AND RUNNING SLOPE WHERE NOT IN CONCRETE.
6. 4-INCH MANHOLE RING MAY BE USED IN LIEU OF A 7" RING ONLY WITH PRIOR APPROVAL FROM CITY ENGINEERING.

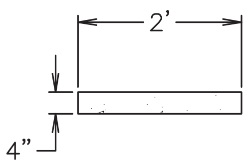
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Stormwater Lockable Lid and Frame		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 605



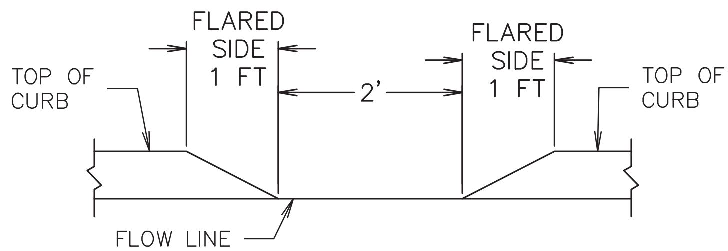
PLAN VIEW



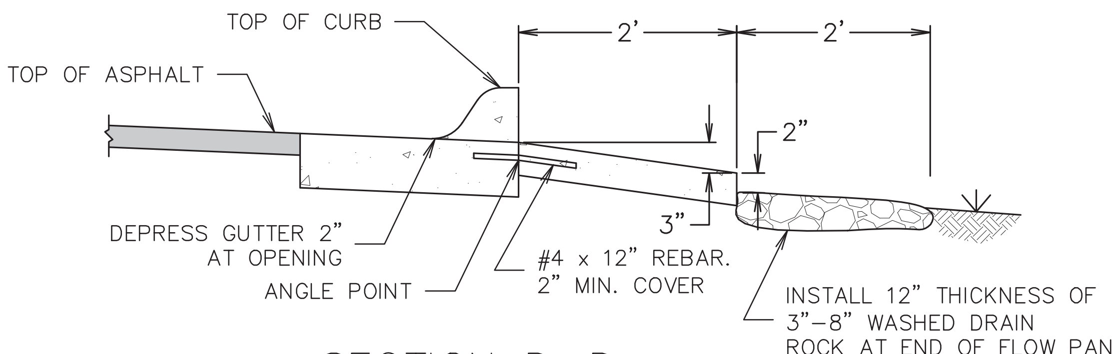
ISOMETRIC VIEW



SECTION B–B



SECTION C–C

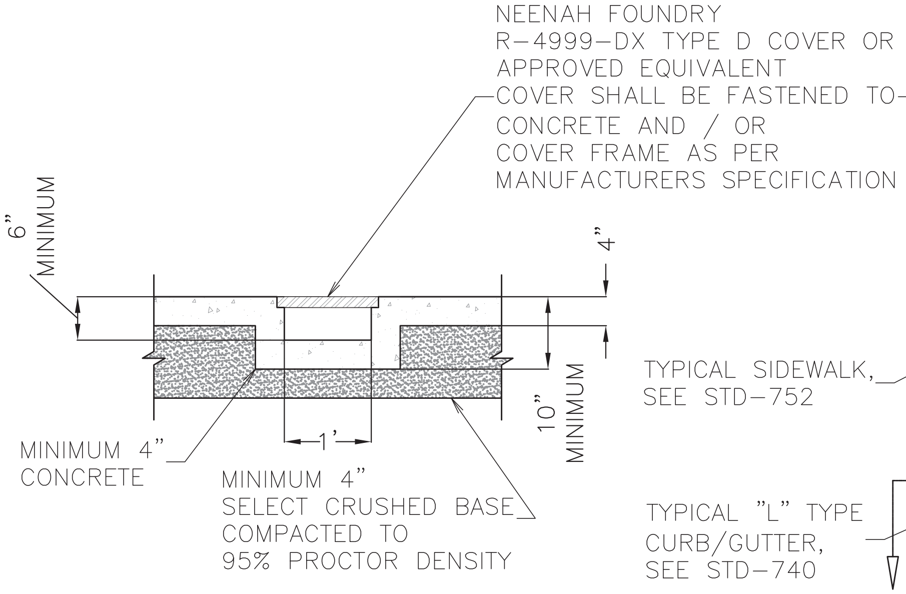


SECTION D–D

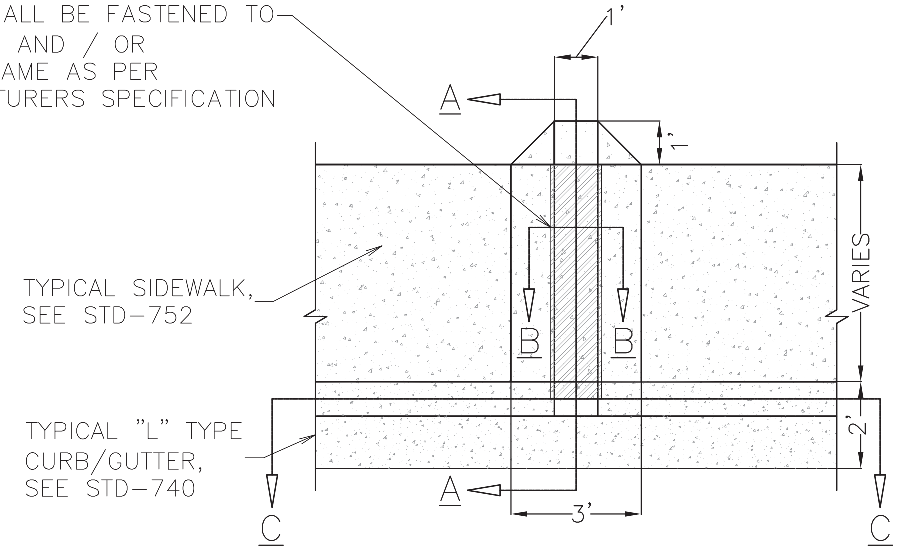
GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2–A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. POUR ENTIRE CURB OPENING SECTION AS MONOLITHIC SLAB
3. PROVIDE FLOW CHANNEL FOR ALL OPENINGS ON GRADE
4. SEE STANDARD DRAWING STD–740 'TYPICAL "L" CURB/GUTTER SECTION' FOR CURB/GUTTER SPECIFICATIONS

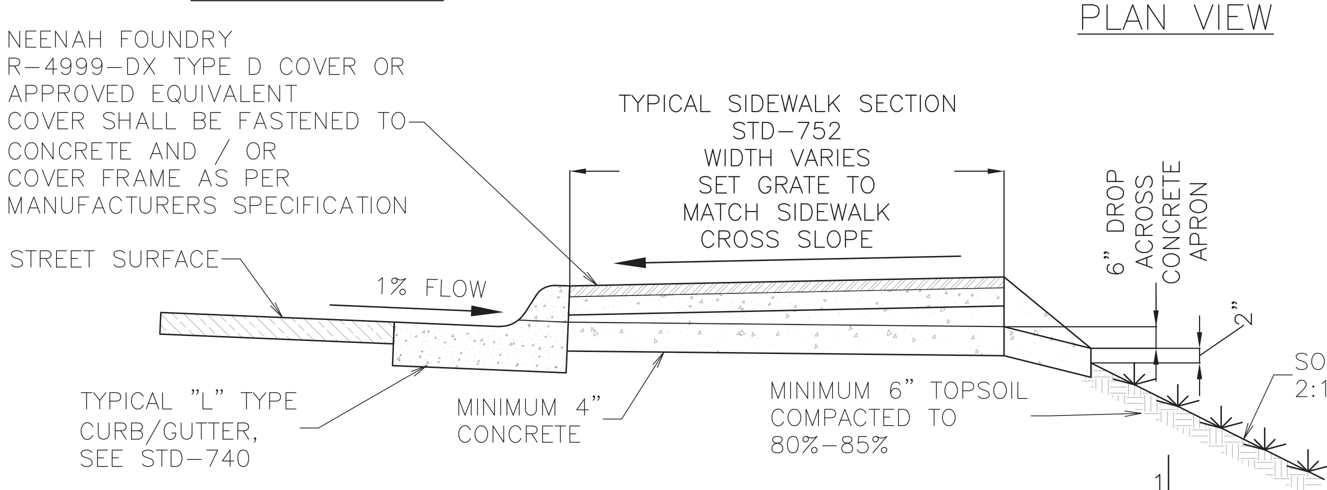
MISSOULA Engineering Division	Curb Opening		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 01/01/2023	STD - 607



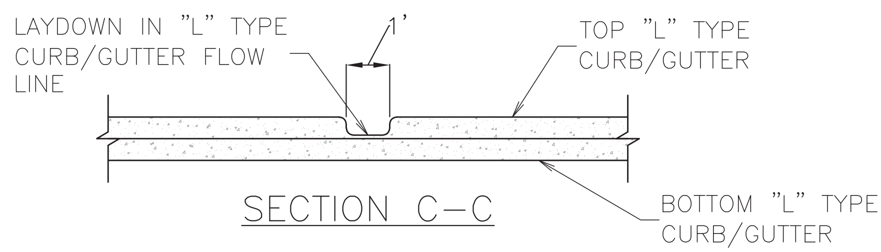
SECTION B-B



PLAN VIEW



SECTION A-A

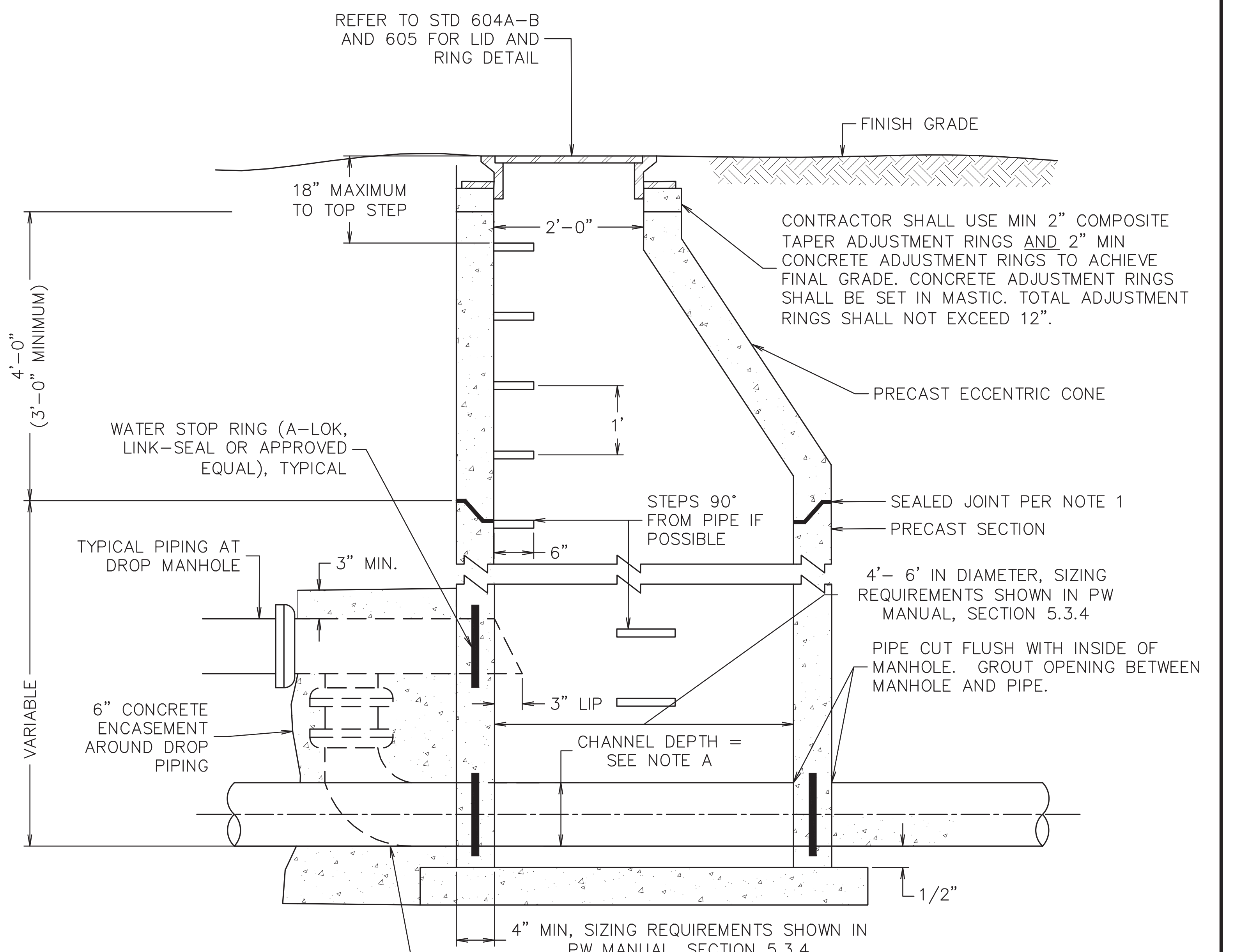


SECTION C-C

GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. SUBSTITUTION OF 'EQUIVALENT' MATERIALS / PRODUCTS SHALL BE SUBMITTED TO AND APPROVED BY CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK
3. ALL MATERIALS / PRODUCTS SHALL BE PLACED / INSTALLED AS PER MANUFACTURER SPECIFICATIONS FOR WARRANTY INSTALLATION
4. POUR ENTIRE CURB OPENING SECTION AND SPILLWAY MONOLITHICALLY

MISSOULA Engineering Division	Curb Opening Through Sidewalk Section to Landscape		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 01/01/2023	STD - 608



NOTE:

A. 8–INCH DIAMETER MAINS AND SMALLER SHALL HAVE A FLOW CHANNEL FORMED AT LEAST TO THE SPRING LINE OF THE PIPE. PIPES GREATER THAN 8" IN DIAMETER SHALL HAVE FLOW CHANNELS FORMED TO THE FULL HEIGHT OF THE CROWN OF THE OUTLET.

MANHOLE–TO–PIPE DATA TABLE			
MANHOLE DIA.	WALL THICKNESS	PIPE DIA >	PIPE DIA ≤
4'–0"	0'–5"	–––	24"
5'–0"	0'–6"	24"	36"
6'–0"	0'–7"	36"	48"
JUNCTION BOX	–––	48"	–––

*MINIMUM PIPE DIAMETER FOR PUBLIC MAINS/LATERALS = 12 INCHES

GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2–A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "CONSEAL" OR EQUAL.
3. CONCRETE FOR DROP STRUCTURES SHALL BE FORMED.
4. FLAT–TOP BARREL SHALL BE USED WHEN DISTANCE FROM TOP OF PIPE TO RIM IS LESS THAN 5–FEET.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS

Engineering Division

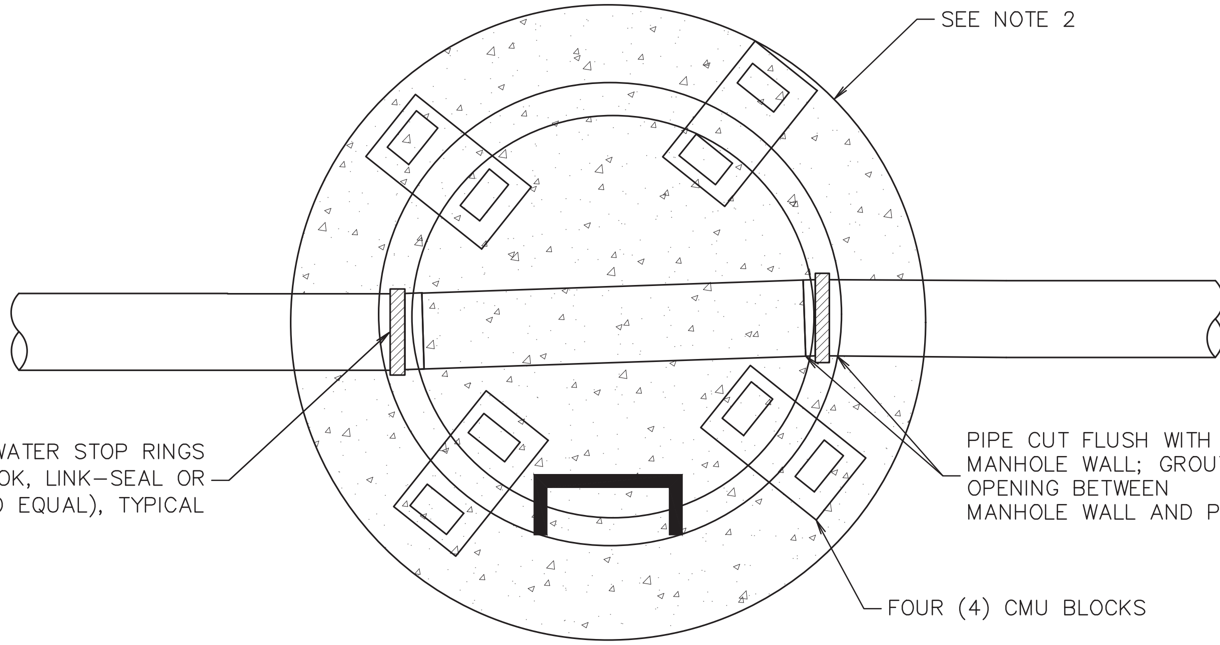
Stormwater Manhole (Sheet 1 of 3)

Approved By Utility Engineer Andy Schultz, PE

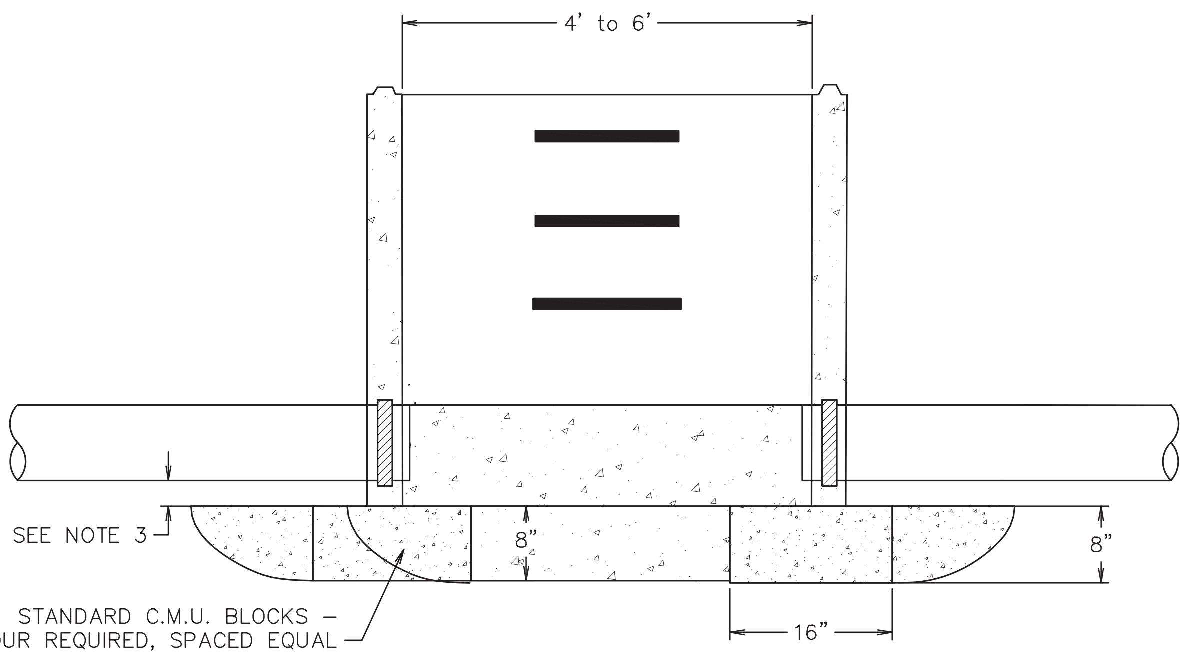
Adopted: 09/28/2020

Revised: 01/01/2023

STD - 612-1



PLAN VIEW

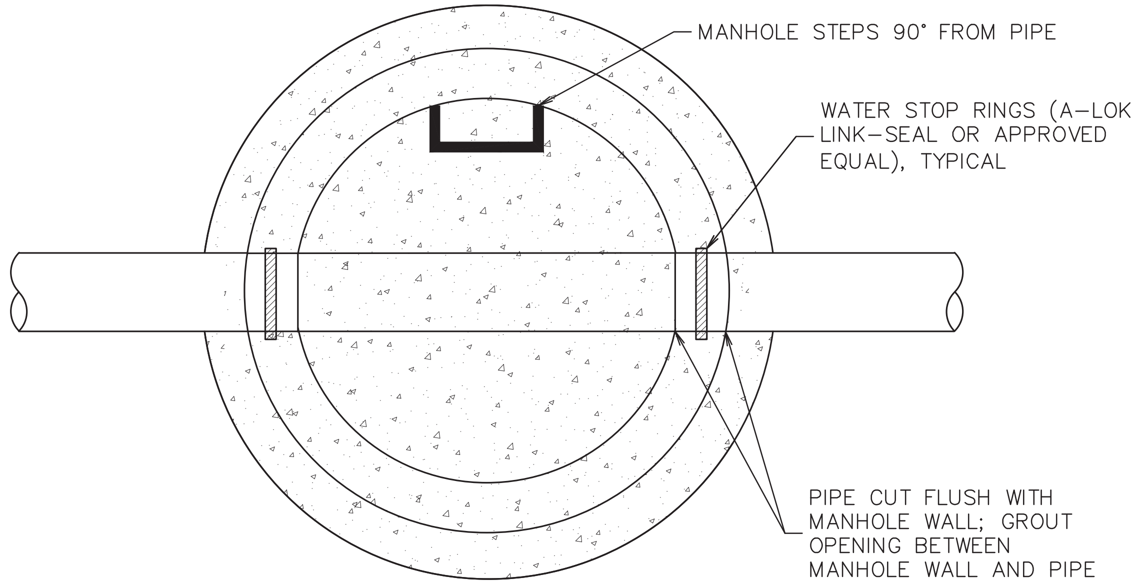


SECTION VIEW

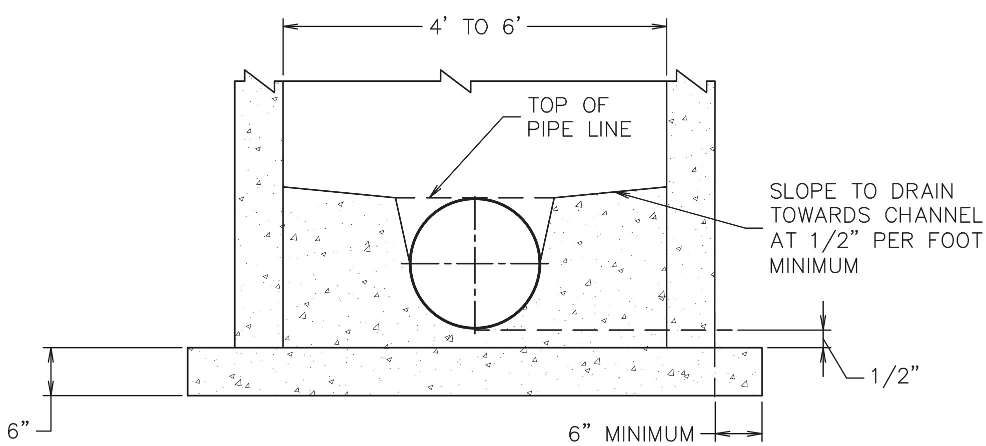
GENERAL NOTES

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. BASE AND FILL CONCRETE MAY BE POURED MONOLITHICALLY.
3. ONE-HALF (1/2") INCH SPACING MAY BE OMITTED WHEN BASE AND FILL CONCRETE ARE POURED MONOLITHICALLY.

Engineering Division	Stormwater Manhole - Dog House Base (Sheet 2 of 3)		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 612-2



PLAN VIEW

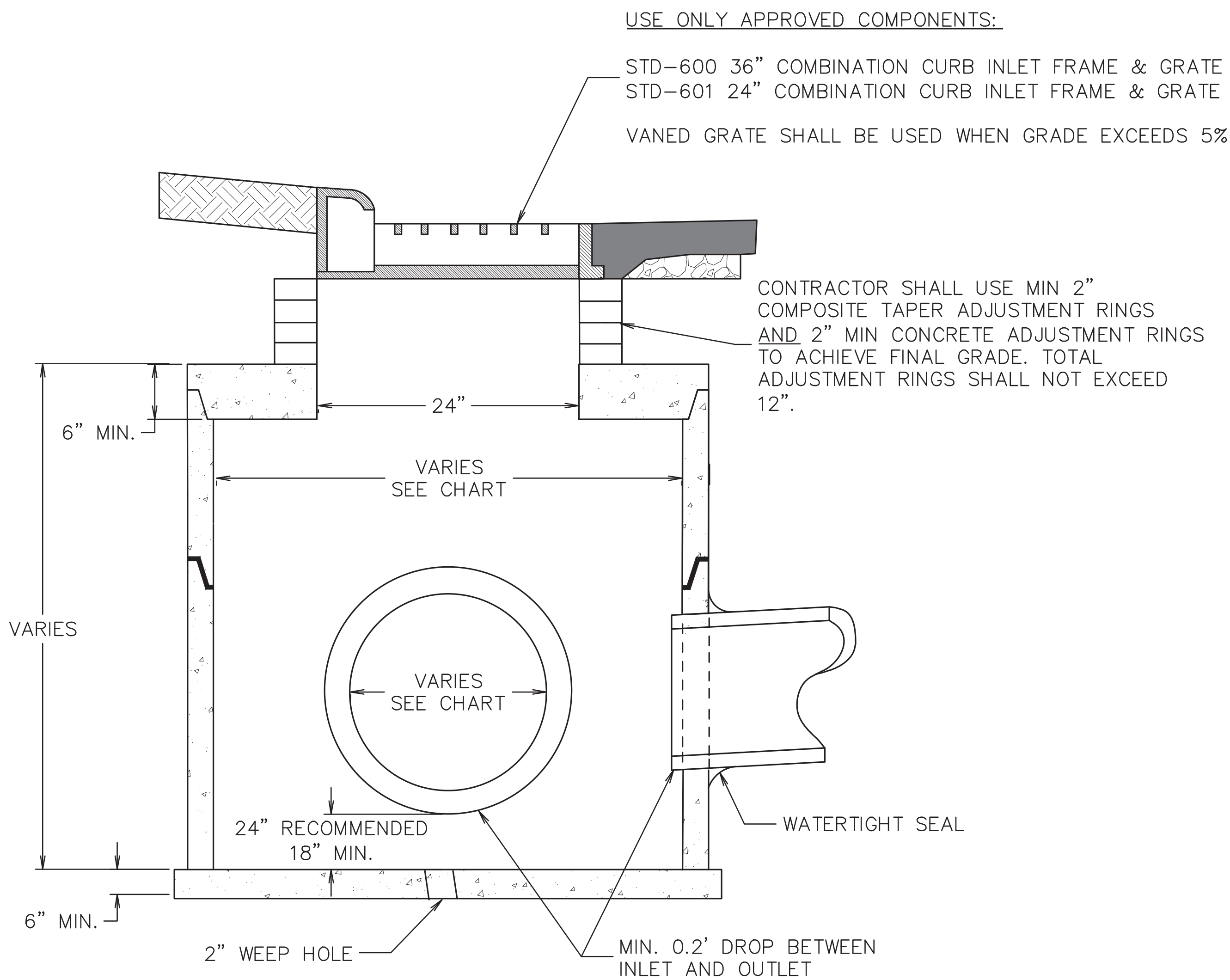


SECTION VIEW

GENERAL NOTES

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.

MISSOULA Engineering Division	Stormwater Manhole - Precast Base (Sheet 3 of 3)		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 612-3



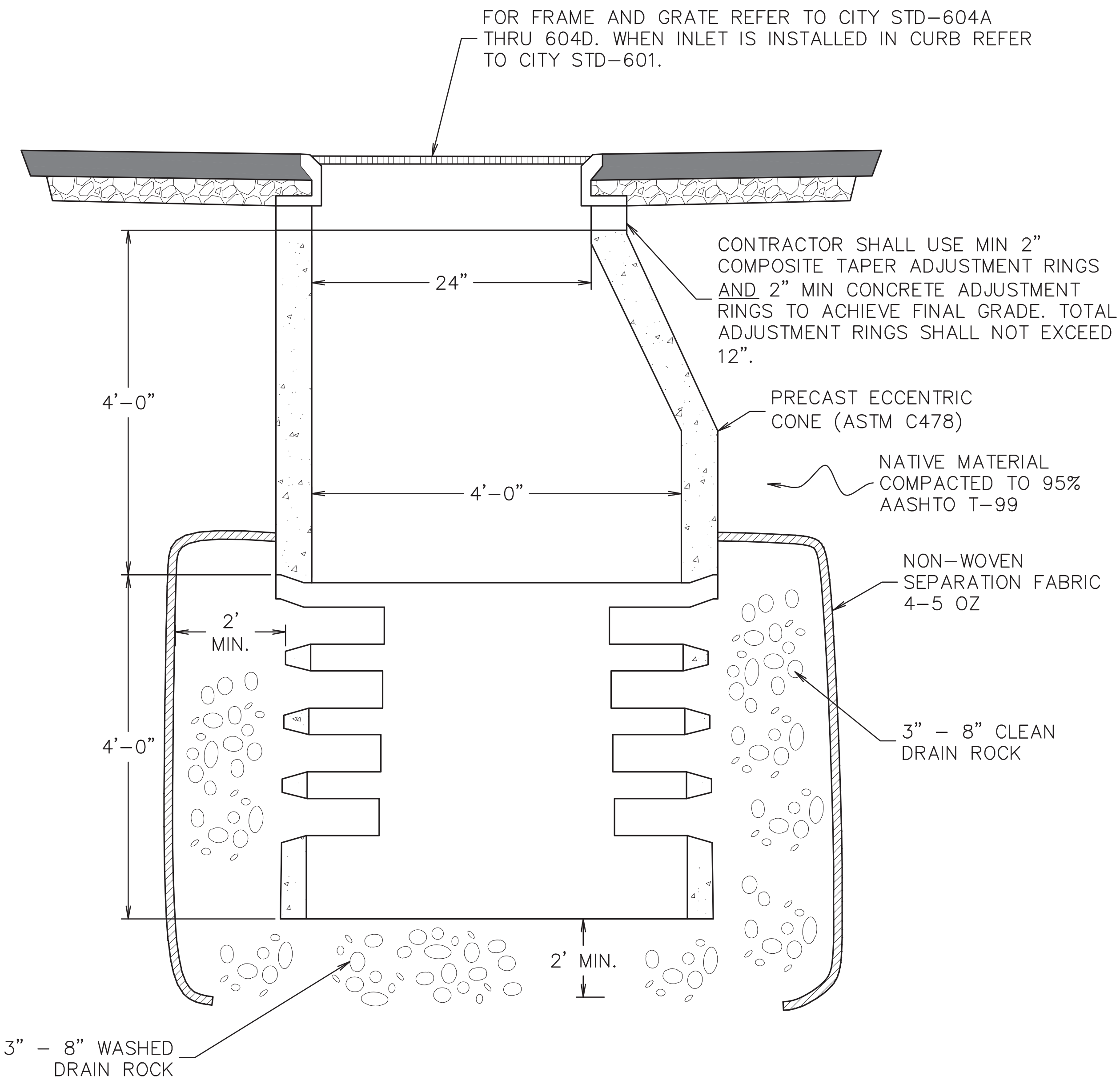
PIPE-TO-MANHOLE DATA TABLE			
PIPE DIA ≤	PIPE DIA >	WALL THICKNESS	MANHOLE DIA
12"*	---	0'-3 ½"	2'-6"
24"	---	0'-5"	4'-0"
36"	24"	0'-6"	5'-0"
48"	36"	0'-7"	6'-0"
---	48"	---	JUNCTION BOX

*SINGLE PIPE ONLY. MAXIMUM DEPTH 6 FT.
MINIMUM PIPE SIZE FOR PUBLIC MAINS/LATERALS = 12"

GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. CATCH BASINS PIPED TO DRY WELLS (STD-616) ARE ENCOURAGED AS A PRE-TREATMENT METHOD OR TO AVOID UTILITY CONFLICTS.

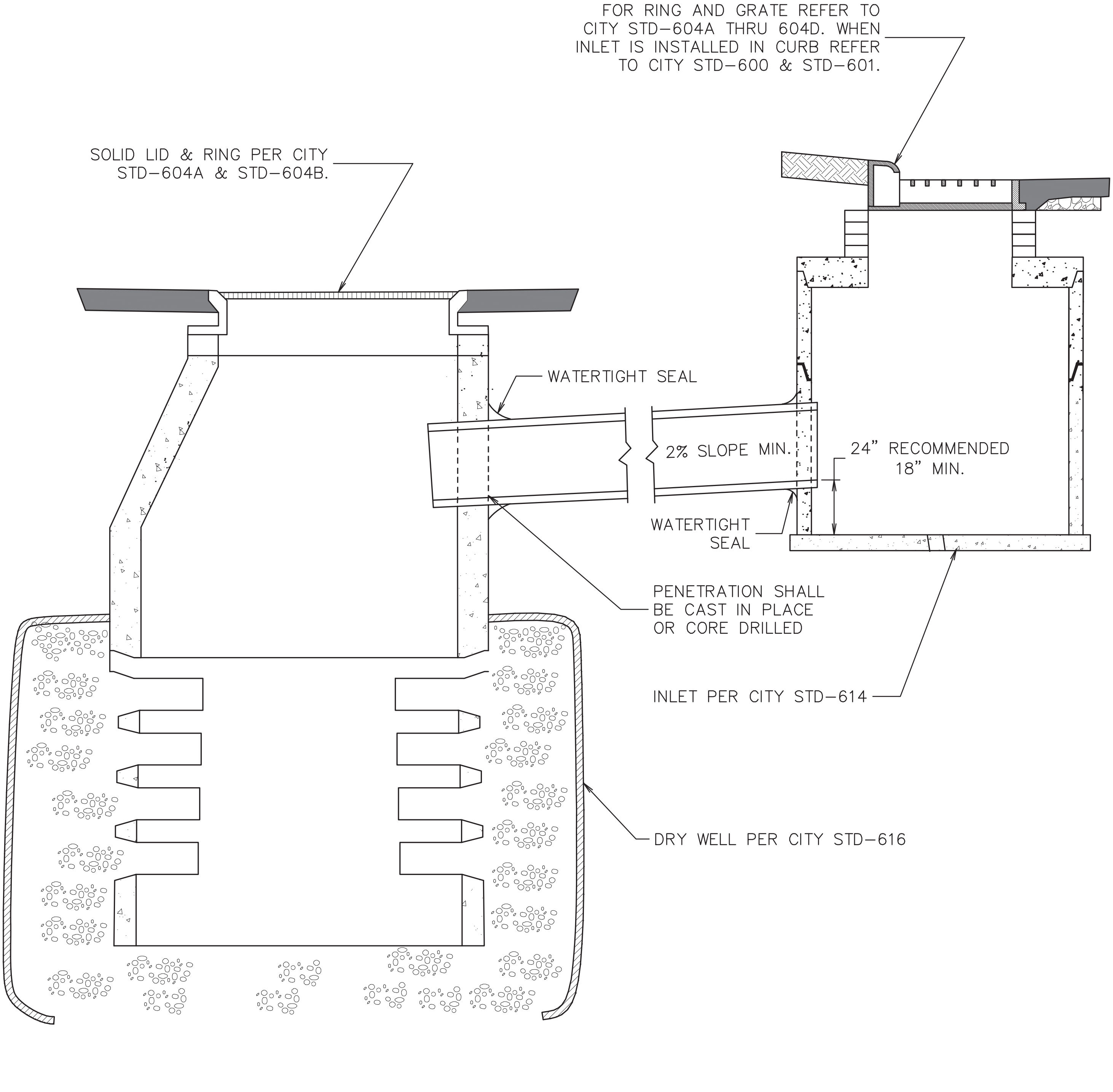
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Standard Catch Basin		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 614



GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. OVER-EXCAVATE WHERE REQUIRED TO ENSURE BOTTOM OF EXCAVATION IS A MIN. 2-FT INTO GRAVELLY SOIL.
3. CATCH BASINS (STD-614) PIPED TO DRY WELLS ARE ENCOURAGED AS A PRE-TREATMENT METHOD OR TO AVOID UTILITY CONFLICTS.
4. NO GRADE RING TO BE OFFSET MORE THAN 2" AND TOTAL OFFSET NOT TO EXCEED WALL THICKNESS OF CONE.
5. GRADE RINGS SHALL BE 2" THICKNESS MINIMUM.
6. NO WEDGES ALLOWED BETWEEN GRADE RINGS AND FRAME MUST BE SET FLUSH WITH TOP GRADE RING.

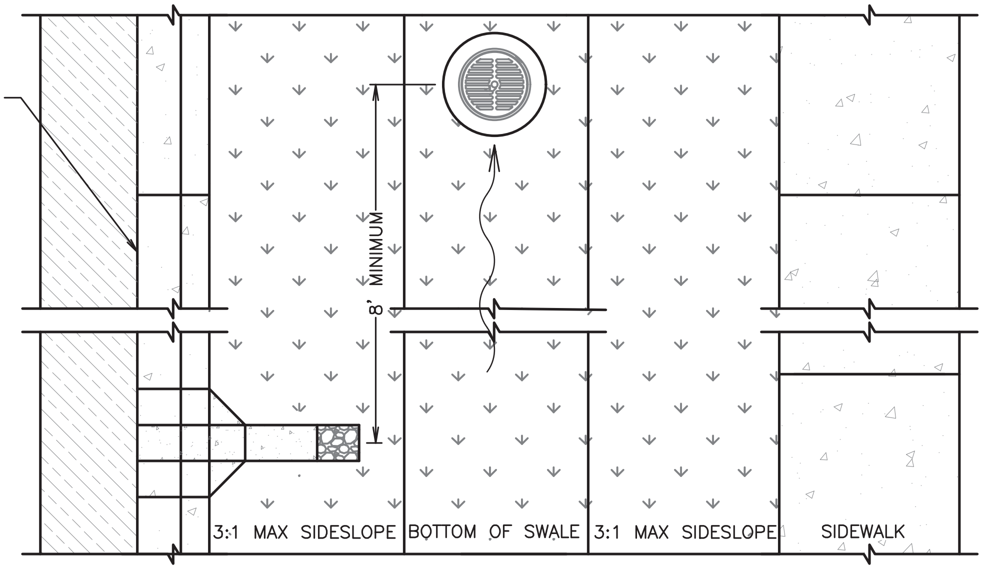
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Standard 8' Precast Dry Well		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 09/28/2020 Revised: 01/01/2023	STD - 616

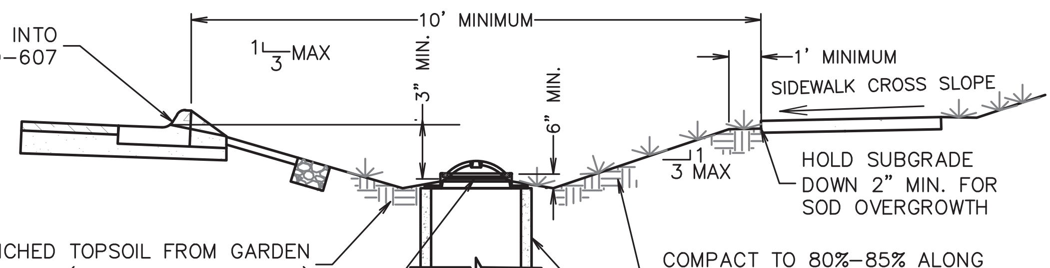


GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION..

MISSOULA Engineering Division	Standard Remote Dry Well		
	Approved By Utility Engineer Andy Schultz, PE	Adopted: 11/15/2021 Revised: 01/01/2023	STD - 617

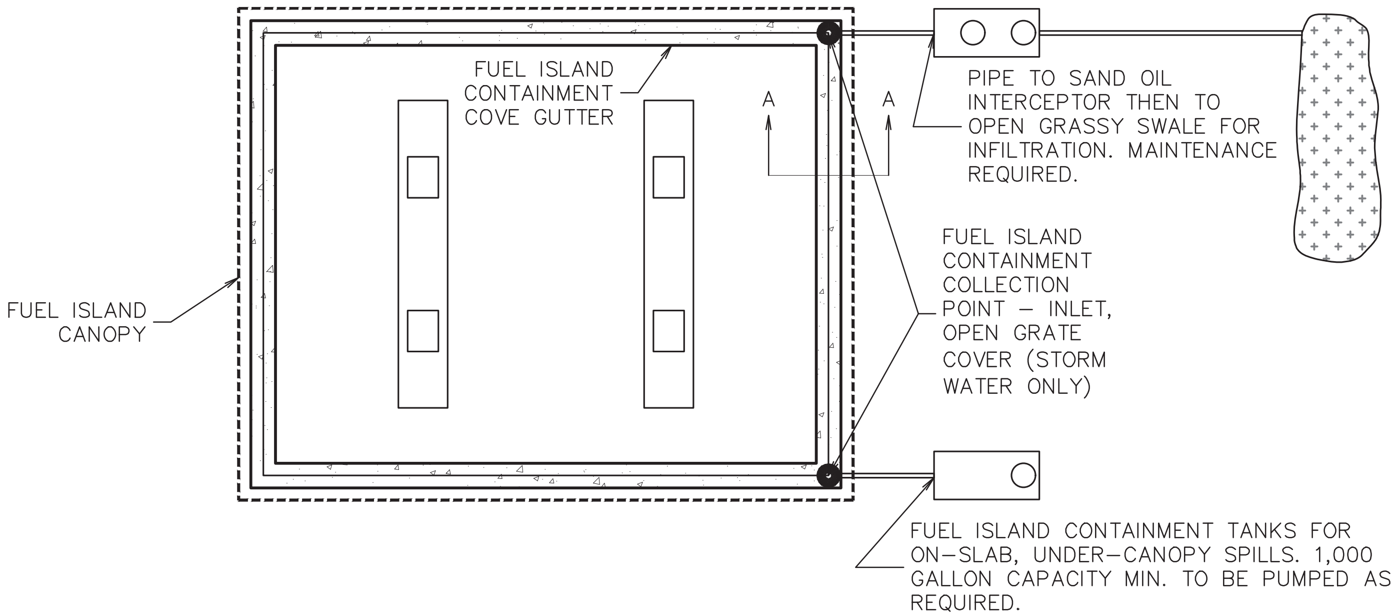


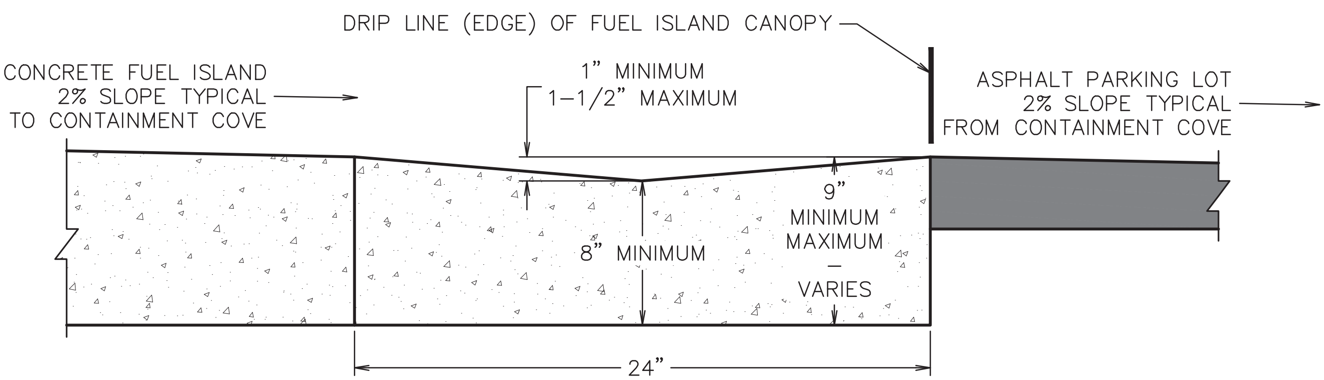


GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2-A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. SWALE DESIGN WIDTH, LENGTH AND DEPTH WILL VARY AS REQUIRED TO PROVIDE ADEQUATE TREATMENT STORAGE FOR THE GIVEN STORM VOLUME.
3. DRY WELL/INLET SHALL BE INSTALLED A MINIMUM OF 8 FT FROM THE NEAREST CURB OPENING TO PREVENT DIRECT INFLOW INTO THE OVERFLOW GRATE. PROVIDE A MINIMUM OF 3 INCH FREEBOARD BETWEEN THE LOWEST SWALE INLET AND THE BASE OF THE TOP OF THE BEEHIVE GRATE.
4. SWALES WITH LONGITUDINAL SLOPE STEEPER THAN 2% SHALL HAVE CHECK DAMS INSTALLED.
5. PROVIDE A MINIMUM 1 FT FLAT AREA ADJACENT TO SIDEWALK WHEN USING A SIDE-SLOPE NO STEEPER THAN 3:1. IF FLAT AREA IS NOT PROVIDED ADJACENT TO SIDEWALK, THEN USE A SIDE-SLOPE NO STEEPER THAN 4:1.
6. NO COMPACTION IN SWALE BOTTOM.
7. UTILITY SERVICE LINES SHALL NOT BE INSTALLED THROUGH BIOSWALES.
8. UNDERDRAINS SHALL BE UTILIZED IF SOIL BELOW IS FOUND TO DRAIN POORLY OR IF BIOSWALE IS UPSTREAM OF A PIPED STORMWATER SYSTEM
9. BIOSWALE LANDSCAPING SHALL COMPLY WITH MISSOULA CITY MODIFICATION TO MPWSS SECTION 02900. BIOSWALES SHALL INCLUDE TREE PLANTINGS, EXCEPT DIRECTLY OVER UNDERDRAIN SYSTEMS, AND SHALL COMPLY WITH THE PARKS APPROVED STREET TREE LIST FOR "SWALE SUITABLE" TREES. TREES SHALL BE PLANTED PER PARKS AND RECREATION BALL AND BURLAP PLANTING SPECIFICATION WITH THE EXCEPTION THAT THEY ARE TO BE PLANTED 6" ABOVE FINAL GRADE.
10. TREES SHALL BE PLANTED A MINIMUM OF 10 FT FROM THE EDGE OF THE DRY WELL CONCRETE STRUCTURE.

MISSOULA — THE GARDEN CITY — HUB OF FIVE VALLEYS Engineering Division	Bioswale		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 01/01/2023	STD - 620



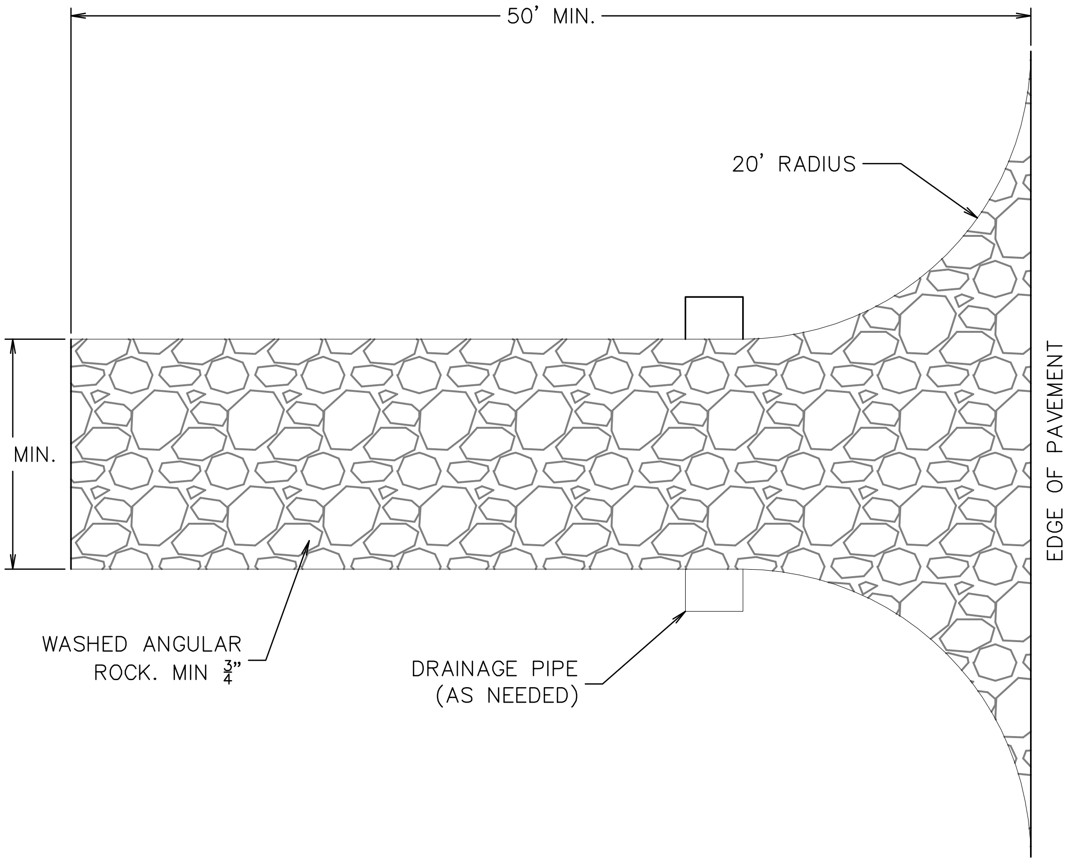


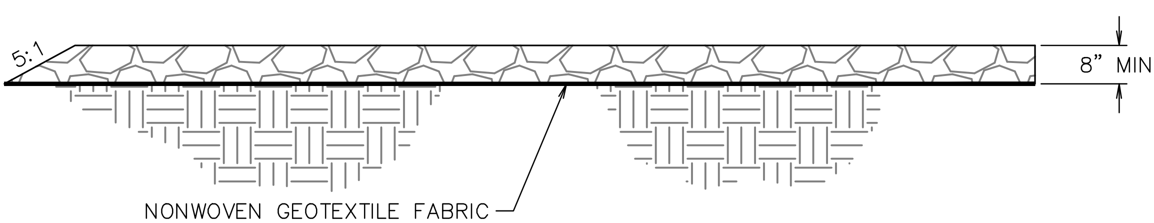
SECTION A–A

GENERAL NOTES:

1. CONSTRUCTION MATERIALS AND PROCEDURES SHALL COMPLY WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS), 7TH EDITION, APRIL 2021, AS MODIFIED BY THE MISSOULA CITY PUBLIC WORKS STANDARDS AND SPECIFICATIONS MANUAL, APPENDIX 2–A (STANDARD MODIFICATIONS TO MPWSS), CURRENT EDITION.
2. TWENTY–FOUR (24") INCH WIDTH CONCRETE CONTAINMENT COVE GUTTER.
3. EIGHT (8") INCH MINIMUM THICKNESS CONCRETE CONTAINMENT COVE GUTTER.
4. ONE (1") INCH TO ONE AND ONE–HALF (1–1/2") INCH DEPRESSION THROUGH CENTER OF CONCRETE CONTAINMENT COVE GUTTER AROUND ENTIRE FUEL ISLAND PERIMETER.
5. CONCRETE CONTAINMENT COVE GUTTER AND OIL AND SAND INTERCEPTOR MUST BE ENGINEERED BY A CERTIFIED LICENSED ENGINEER.
6. CANOPY AND CONCRETE CONTAINMENT COVE GUTTER SHALL BE SIZED SO AS TO COMPLETELY CONTAIN FUELING VEHICLES AT ANY/ALL FUEL PUMP(S).
7. CONCRETE CONTAINMENT COVE GUTTER SHALL BE LOCATED UNDER FUEL ISLAND CANOPY NOT TO EXCEED COVER OF THE FUEL ISLAND CANOPY. RAINWATER CANNOT DIRECTLY FALL WITHIN AND/OR UPON THE CONTAINMENT COVE GUTTER.
8. CONCRETE CONTAINMENT COVE GUTTER SHALL COLLECT AND DEPOSIT ANY AND ALL LIQUIDS FROM THE FUEL ISLAND, THROUGH AN APPROVED PIPE FOR FUEL/PETROLEUM PRODUCTS, TO FUEL SPILL CONTAINMENT TANK OR AN OIL AND SAND INTERCEPTOR AND GRASSY SWALE AS PER SPECIFICATIONS AND APPROVAL OF UTILITY ENGINEER.
9. CANOPY RAIN WATER COLLECTION CAN NOT BE DEPOSITED INTO FUEL ISLAND CONTAINMENT COLLECTION SYSTEM. CANOPY RAIN WATER COLLECTION MAY BE DEPOSITED INTO PARKING LOT STORMWATER COLLECTION SYSTEM.
10. REFER TO MISSOULA MUNICIPAL CODE (MMC) 13.26 – 'MISSOULA VALLEY WATER QUALITY ORDINANCE' FOR ADDITIONAL INFORMATION, SPECIFICATIONS AND REQUIREMENTS.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Typical Fuel Island Canopy and Containment Cove Gutter Approved By Utility Engineer Andy Schultz, PE	Revised: 01/01/2023	STD - 630

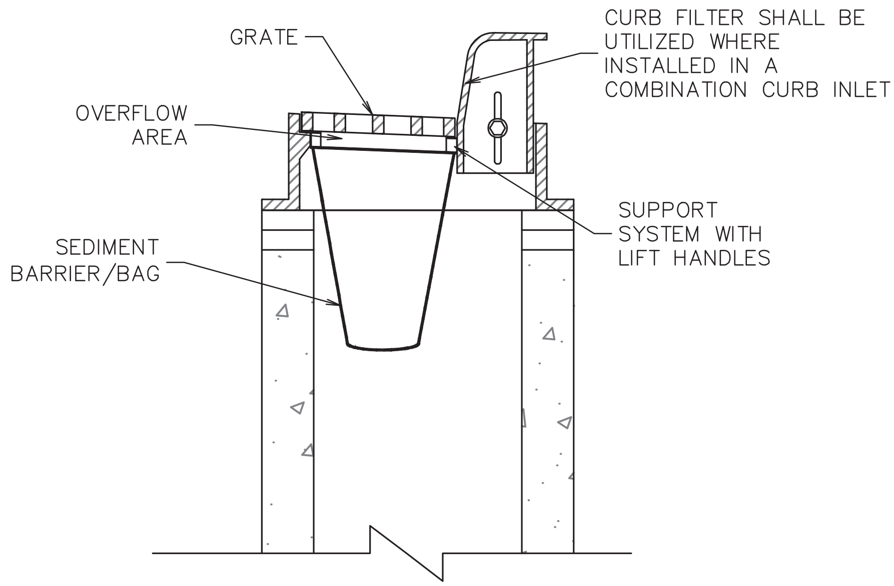




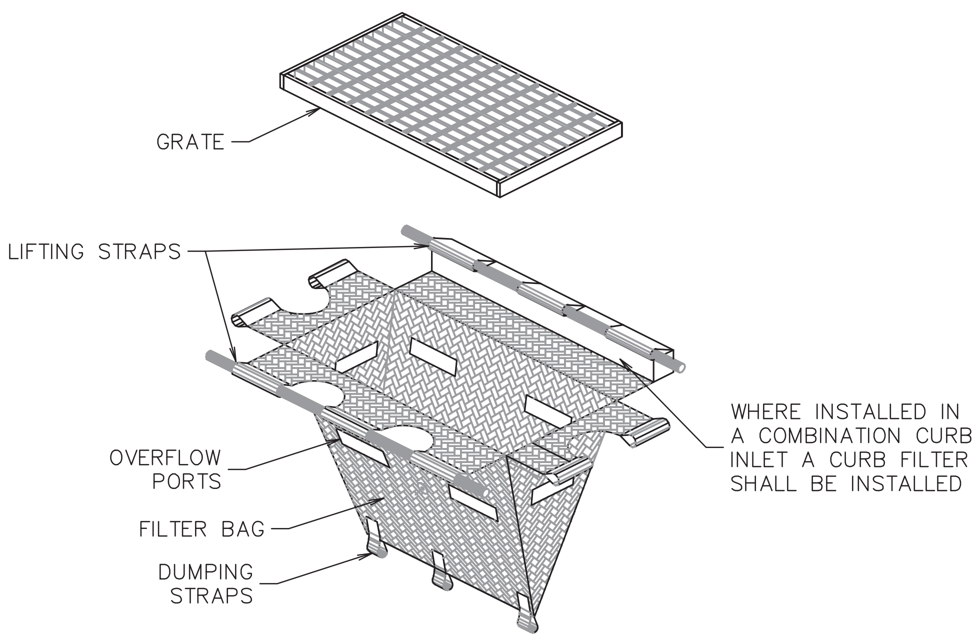
GENERAL NOTES:

1. A TEMPORARY GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT POINTS OF VEHICULAR EGRESS ON A CONSTRUCTION SITE TO LIMIT THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PUBLIC ROADS BY VEHICLES.
2. REMOVE AND REPLACE AGGREGATE WHEN VOIDS BECOME FILLED.
3. SWEEP AND REMOVE SEDIMENT TRACKED ONTO PAVED SURFACES.
4. PROPERLY GRADE INGRESS/EGRESS POINTS TO PREVENT RUNOFF FROM LEAVING THE SITE.
5. CONSIDER THE USE OF RUMBLE PADS, FODs, OR CATTLE GUARDS IN COMBINATION WITH THE GRAVEL CONSTRUCTION ENTRANCE TO IMPROVE EFFECTIVENESS

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Temporary Gravel Construction Entrance		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 01/01/2024	STD - 650



SECTION

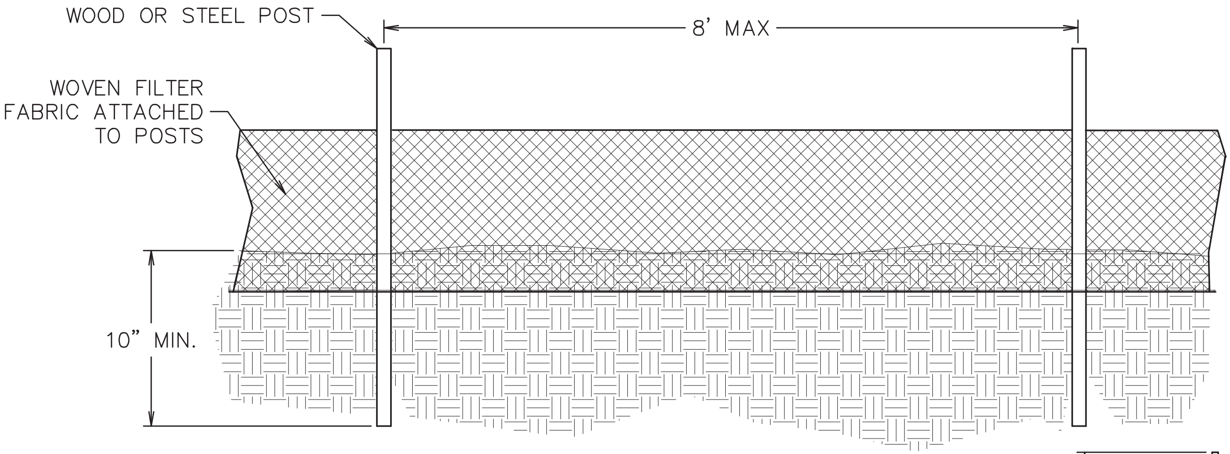


INSTALLATION

GENERAL NOTES:

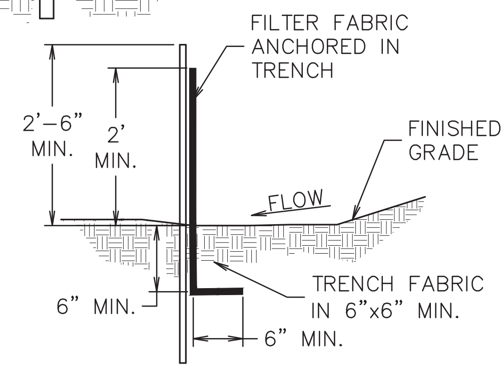
1. INLET PROTECTION SHALL BE USED AS A "LAST RESORT" BMP. CARE SHALL BE TAKEN TO MINIMIZE SEDIMENT LADEN STORMWATER FROM REACHING INLETS/DRY WELLS
2. INLET PROTECTION SHALL BE INSPECTED REGULARLY AND AFTER STORM EVENTS. IF UNIT IS MORE THAN 1/3 FULL OF ACCUMULATED SEDIMENT, THE UNIT MUST BE EMPTIED.
5. ALL TEMPORARY BMP'S TO BE REMOVED AT FINAL STABILIZATION.

Engineering Division	Inlet Protection		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 651



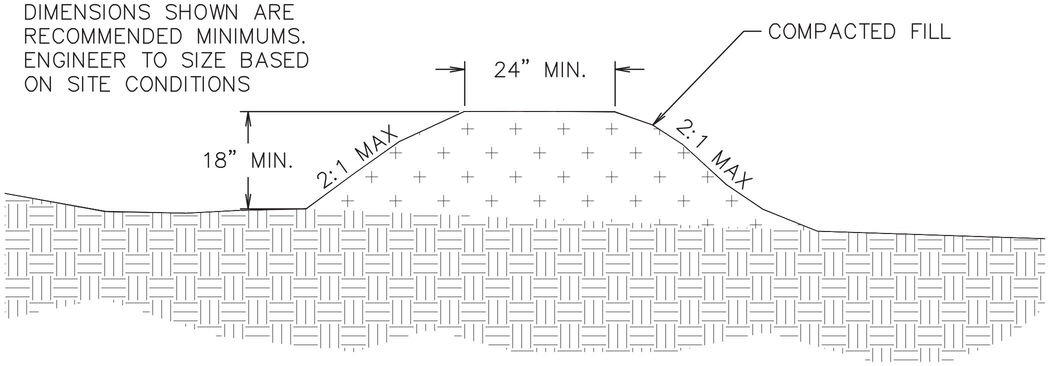
NOTES:
1. TURN SILT FENCE UP HILL AT ENDS
2. USE SILT FENCE ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND NEVER IN AREAS OF CONCENTRATED FLOW

SILT FENCE

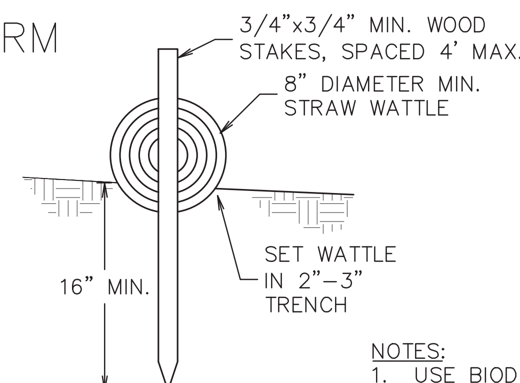


DETAIL

NOTES:
1. DIMENSIONS SHOWN ARE RECOMMENDED MINIMUMS. ENGINEER TO SIZE BASED ON SITE CONDITIONS



COMPACTED EARTHEN BERM



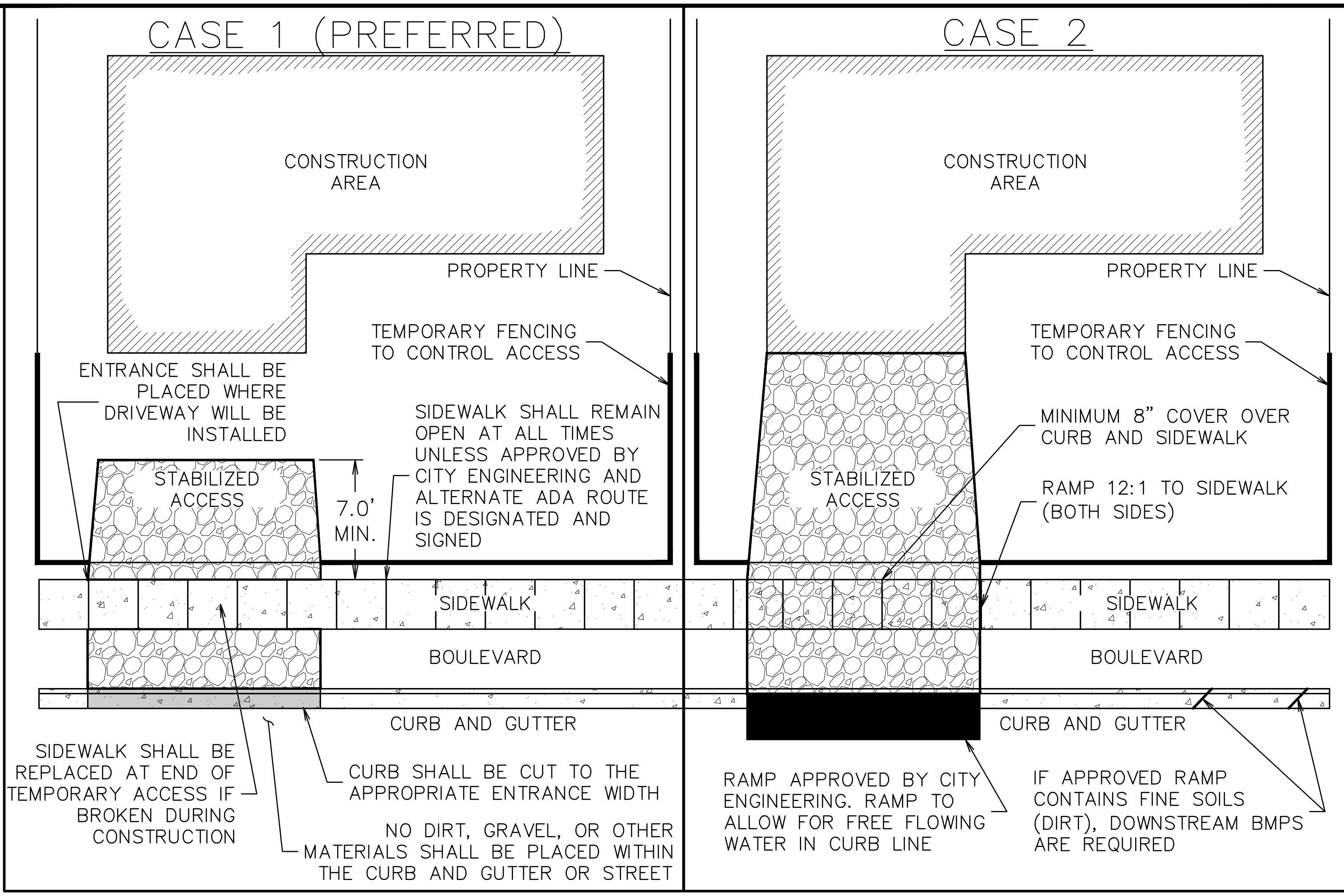
STRAW WATTLE

NOTES:
1. USE BIODEGRADABLE WRAP ON STRAW WATTLES IF THEY ARE TO BE LEFT IN PLACE.

GENERAL NOTES:

1. PRESERVING EXISTING VEGETATION SHALL BE USED AS THE PRIMARY PERIMETER CONTROL.
2. PERIMETER CONTROL BMPs SHALL BE INSTALLED BEFORE ANY EARTH REMOVAL OR EXCAVATION TAKES PLACE.
3. INSTALL PERIMETER CONTROL BMPs PARALLEL TO CONTOUR LINES.
4. FOLLOW MANUFACTURER'S INSTRUCTIONS TO OVERLAP THE SILT FENCE AND WATTLES AT JUNCTIONS.
5. ALL TEMPORARY BMP'S TO BE REMOVED AT FINAL STABILIZATION.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Perimeter Control		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 652



CASE 1 NOTES:

1. APPLIES TO SINGLE-FAMILY RESIDENCES.

2. COMMERCIAL AND LARGER RESIDENTIAL DEVELOPMENTS CONSISTING OF 25 OR MORE PARKING SPACES SHALL USE STD-650.

3. TEMPORARY ACCESS SHALL BE LOCATED WHERE DRIVEWAY WILL BE PERMANENTLY INSTALLED. FOR PROJECTS WHERE THE DRIVEWAY DOES NOT ACCESS THE STREET, ALTERNATIVE MEANS OF ACCESSING THE SITE CAN BE PROVIDED AND SHALL PROTECT THE CURB AND SIDEWALK WITHOUT GRAVEL OR DIRT MATERIAL IN THE CURB LINE OR STREET.

4. FOR CURBSIDE SIDEWALK, THE SIDEWALK SHALL BE REMOVED AND STABILIZED ACCESS SHALL BE COMPACTED GRAVEL AND SHALL BE PLACED A MINIMUM OF 7 FEET BEYOND THE CURB.

CASE 2 NOTES:

1. APPLIES TO LOTS WITHOUT EXISTING OR PROPOSED ACCESS(ES) AND LOTS WITH AN EXISTING ACCESS THAT IS DEEMED UNUSABLE DUE TO THE PROXIMITY OF CONSTRUCTION.

2. REQUIRES CITY ENGINEERING APPROVAL AND SHALL NOT CLOSE SIDEWALK FOR A DURATION LONGER THAN WHAT IS APPROVED.

3. RAMP PROJECTING INTO THE STREET SHALL BE MARKED WITH STANDARD TRAFFIC CANDLES OR OTHER APPROVED DEVICES.

4. PROVIDE BMP TO KEEP RAMP DEBRIS FROM ENTERING STORMWATER INFRASTRUCTURE

GENERAL NOTES:

1. STABILIZED ACCESS SHALL BE CONSTRUCTED OF COMPACTED CRUSHED 3/4" MINUS AGGREGATE IN CONFORMANCE WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS.

2. FILTER FABRIC SHALL BE PLACED UNDER STABILIZED ACCESS OR TRACKING CONTROL PAD IF UNSTABLE SOIL IS PRESENT ON SITE, OR BY DIRECTION OF CITY INSPECTOR.

3. TEMPORARY FENCING OR OTHER PHYSICAL BARRIER SHOULD BE CONSIDERED TO LIMIT ACCESS TO TEMPORARY ACCESS LOCATION. THIS SHOULD BE LIMITED TO PRIVATE PROPERTY UNLESS PRIOR APPROVAL HAS BEEN GIVEN BY CITY ENGINEERING TO PLACE FENCING IN THE RIGHT-OF-WAY.

4. ALL SIDEWALKS SHALL REMAIN OPEN FOR THE LENGTH OF CONSTRUCTION UNLESS RECEIVING PRIOR APPROVAL FROM CITY ENGINEERING FOR A DESIGNATED, SIGNED ALTERNATE PEDESTRIAN ADA ROUTE PER TRAFFIC CONTROL STANDARD TC-703.

5. <u>REQUIRED MITIGATION</u>: CONTRACTOR SHALL CLEAN UP MUD, DIRT, DUST, DEBRIS, ETC. FROM PUBLIC RIGHTS-OF-WAY INCLUDING BUT NOT LIMITED TO CURB & GUTTER, SIDEWALKS, STREETS, ALLEYS, AND DRY WELLS - AS APPLICABLE AND AT END OF TEMPORARY ACCESS. THIS WORK IS CONSIDERED A SECONDARY BMP. IF EXCESSIVE TRACK-OUT IS OCCURRING ADDITIONAL BMPS WILL BE REQUIRED TO MINIMIZE THE TRACK-OUT.

MISSOULA Engineering Division	Temporary Access to Construction Sites		
	Approved By City Engineer Kevin J. Slovarp	Adopted: 11/18/2020 Revised: 01/01/2024	STD - 653

Appendix G

Chapter 13.27, Missoula Municipal Code

City of Missoula, Montana
City Council Committee Agenda Item

Committee:	**Public Works and Mobility**
Item:	**An Ordinance Amending Missoula Municipal Code Chapter 13.27 to update Stormwater Regulations**
Date:	March 30, 2023
Sponsor(s):	**Tracy Campbell**
Prepared by:	Ashley Strayer

Ward(s) Affected:

☐ Ward 1	☐ Ward 4
☐ Ward 2	☐ Ward 5
☐ Ward 3	☐ Ward 6
☒ All Wards	☐ N/A

Action Required:
Set a public hearing and adopt an ordinance amending Missoula Municipal Code Chapter 13.27 entitled “Stormwater Management” and amending Sections 13.27.060, 13.27.200, 13.27.400, 13.27.460, 13.27.470, 13.27.500, 13.27.520, 13.27.530 to reflect current practices and clarify requirements, remove the exemption for existing Municipal Separate Storm Sewer System (MS4) permitted entities, require compliance with the Missoula City Public Works Standards and Specifications Manual, and establish reinspection and investigation fees.

Recommended Motion(s):
I move the City Council: Adopt an ordinance amending Missoula Municipal Code Chapter 13.27 entitled “Stormwater Management” and amending Sections 13.27.060, 13.27.200, 13.27.400, 13.27.460, 13.27.470, 13.27.500, 13.27.520, 13.27.530 to reflect current practices and clarify requirements, remove the exemption for existing MS4 permitted entities, require compliance with the Missoula City Public Works Standards and Specifications Manual, and establish reinspection and investigation fees.

Timeline:

Committee discussion:	April 5, 2023
Council action (or sets hearing):	April 10, 2023
Public Hearing (if required):	N/A
Final Consideration	N/A
Deadline:	N/A

Background and Alternatives Explored:
The City’s Stormwater Utility was created in October 2016, and since that time, the utility has been working to identify areas that need additional focus to fully comply with state and federal stormwater regulations. Changes to this chapter address requirements for implementing the conditions in the City’s Municipal Separate Storm Sewer System (MS4) Permit, administered by the Montana Department of Environmental Quality on behalf of the U.S. Environmental Protection Agency for Clean Water Act compliance.

Financial Implications: None

Links to external websites: none

ORDINANCE 3580

An Ordinance of the City Council of the City of Missoula, Montana, creating Chapter 13.27 of the Missoula Municipal Code titled, "Storm Water Utility, Rates, and Regulations" establishing a storm water utility, establishing rates for the same, outlining existing and new rules and regulations related to storm water pollution prevention and control, and repealing Missoula Municipal Code Section 13.04.080(C) and Chapter 15.65.

Be it ordained that Chapter 13.27 is hereby created as follows and Missoula Municipal Code Section 13.04.080(C) and Chapter 15.65 are hereby repealed.

CHAPTER 13.27
STORM WATER UTILITY, RATES, AND REGULATIONS

Articles:

Article I. Storm Water Utility

Sections:

13.27.010 Storm Water Utility Established

A city storm water utility is hereby established along with a rate schedule and adopted administrative rules and regulations for operation as well as specifications and design standards.

13.27.020 Purpose and Intent

The purpose and intent of this ordinance is to:

A. Protect and enhance the water quality of the Clark Fork River, Bitterroot River, Rattlesnake Creek, Pattee Creek, Grant Creek, Miller Creek, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with the Clean Water Act of 1972, and U.S. EPA and MDEQ storm water regulations.

B. Create permitting, submittal, and design standards for erosion and sedimentation control, protection of the storm water system, flood mitigation, site grading, and protection of property.

C. Minimize pollutants and non-storm water discharges to storm drains.

D. Provide design, construction, operation, and maintenance criteria for permanent and temporary Best Management Practices (BMPs) for storm water management facilities that handle storm water runoff.

E. Establish legal authority to conduct inspections, surveillance, monitoring, and enforcement procedures necessary to ensure compliance with federal and state regulations.

F. Establish legal authority to develop, implement, and enforce a program to reduce pollutants in storm water runoff from new development, redevelopment, and construction activities.

G. Provide an equitable distribution of cost for the program as outlined in the storm water utility rate schedule, which will be established by City Council resolution following a public hearing.

H. Provide for the regulation of contributors or dischargers to the City's storm water system through the development of a Storm Water Management Program.

I. Regulate grading and drainage to protect natural resources from erosion and in accordance with the Storm Water Pollution Prevention Plan and air quality standards.

J. Establish remedies and penalties for violations of this chapter.

K. Ensure consistency with the requirements of the Clean Water Act and acts amendatory thereof or supplementary thereto, applicable implementing regulations, and the MPDES General Permit and any amendments, revisions, or re-issuance thereof.

13.27.030 Definitions

The following words, terms, and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context explicitly indicates a different meaning:

"Administrative Rules of Montana (ARM)" means the regulations, standards, or statements of applicability that implement, interpret, or set law or policy in Montana.

"*Authorized enforcement agent*" means the City Public Works Director or any individual or entity designated by the Public Works Director as an authorized enforcement agent.

"*Belowground installations*" means activity that causes sediment-laden water, concrete sawing wash water, wash water, drilling mud, or similar construction water with a high concentration of suspended solids pumped from an excavation or structure and shall be treated as sediment-laden runoff for erosion control purposes.

"*Best Management Practices (BMPs)*" means schedule of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of state waters. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"*Code of Federal Regulations (CFR)*" means the compilation of administrative laws governing federal regulatory agency practice and procedures.

"*Clean Water Act (CWA)*" means the Federal Water Pollution Control Act enacted by Public Law 92-500 as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; and 33 USC 1251 et seq.

"*Construction activity*" means any work that results in land disturbance of any nature, which requires a building or other construction-related permit.

"Design standards" means the City standards and specifications prepared and updated by the Public Works Department or Development Services Department.

"Developer" means a person who creates a development or causes a development to be created.

"*Development*" means any construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure within the jurisdiction of the City as well as any manmade change or alteration to the landscape, including but not limited to mining, drilling, dredging, grading, paving, excavating, and filling.

"*Discharge*" means any introduction or addition of any substance into waterbodies of the MS4, waters of the state, or waters of the United States.

"*Discharger*" means any person who causes, allows, permits, or is otherwise responsible for a discharge, including, without limitation, any operator of a construction site or industrial facility.

"Drainage" means the natural and/or artificial draining, movement, or removal of water due to the following:

- a creek, stream, or river in normal or flood capacity or other natural body of water;
- natural rainfall, runoff, or storm water; or
- sheeting, which is melting snow and/or thawing ice on the surface of frozen ground.

"General Permit" means an MPDES permit issued by the State of Montana under ARM 17.30.1341 that authorizes a category of discharges under the Act within a geographical area.

"Grading" means the mechanical movement of dirt, gravel, rock, sand, or soil to adjust the level or steepness (grade) of a construction site, development, parcel, or lot.

"*Illicit connection*" means any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the MS4, including but not limited to any conveyances which allow any discharge, such as sewage, process wastewater, and wash water, to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether the drain or connection had been previously allowed, permitted, or approved by a government agency; or any drain or conveyance connected from a commercial or industrial land use to the MS4 which has not been documented in plans, maps, or equivalent records and approved or permitted by the city.

"*Illicit discharge*" means any discharge to an MS4 that is not composed entirely of storm water except discharges not identified as significant contributors of pollutants listed in the General Permit and allowable under the City's MS4 program.

"*Impervious surface*" means a surface which prevents or retards the penetration of water into the ground, including but not limited to roofs, sidewalks, patios, driveways, parking lots, concrete and asphalt paving, gravel, compacted native surfaces and earthen materials, and oiled, macadam (asphalt), or other surfaces which similarly impede the natural infiltration of storm water.

"*Major modification*" means an alteration to an existing or planned storm water drainage facility that does one or more of the following: changes the volume, surface area, depth, capacity, inflow rates, outflow rates, or level of treatment by 5 percent or more; changes the treatment process; adds more than 1,000 square feet of impervious surface; or increases the tributary impervious drainage area to an individual drainage facility component by more than 10 percent.

"*Maximum extent practicable (MEP)*" means the technology based discharge standard for municipal separate storm sewer systems to reduce pollutants in the storm water discharges that was established by the Clean Water Act, §402(p). See ARM 17.30.1111(5).

"*Missoula Municipal Code (MMC)*" means the official code of the general ordinances of the City of Missoula.

"Montana Department of Environmental Quality (MDEQ)" means the Montana state agency responsible to protect the environment as guaranteed by the Montana State Constitution.

"*Montana Pollution Discharge Elimination System (MPDES) permit*" means an area-wide permit that is issued to a government agency or agencies for the discharge of pollutants from any point source into the waters of the state or United States.

"*Municipal separate storm sewer system (or MS4)*" means a conveyance or system of conveyance (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) owned or operated by a public body (created under state law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law, such as sewer district, irrigation district, flood control district, or drainage district, or similar entity that discharges to the waters of the United States and which are not part of a publicly owned treatment works (POTW) as defined in ARM Title 17, Chapter 30, Subchapter 13.

"*Non-storm water discharge*" means any discharge that is not entirely composed of storm water.

“Notice of Violation (NOV)” means a notice issued by City inspectors for failure to comply with submitted, approved, or issued SWPPP Permits.

“*Owner or operator*” means a person who owns, leases, operates, controls, or supervises an activity that may produce storm water runoff. For the purpose of permitting, an “owner or operator” means a person associated with a construction project who is designated as an eligible signatory, has operational control over the construction plans and specifications, or has day-to-day operational control at the project to ensure compliance with the SWPPP.

“Permittee” means the person or owner or operator to whom the Storm Water Pollution Prevention Plan (SWPPP) Permit is issued.

“*Person*” means any individual, firm, association, club, organization, corporation, partnership, business trust, company, or other entity that is recognized by law as the subject of rights or duties.

“*Point source*” means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, and vessel or other floating craft from which pollutants are or may be discharged, including but not limited to chemical mixing, loading, and storage sites and sites of agricultural chemical spills.

“*Pollutant*” means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water and as otherwise defined in 40 CFR 122.2. The terms “sewage,” “industrial waste,” and “other wastes” as defined in 75-5-103, MCA, are interpreted as having the same meaning as pollutant.

“*Redevelopment*” means a project that proposes to add, replace, and/or alter impervious surfaces affecting an existing drainage system, other than routine maintenance, resurfacing, or repair. A project which meets the criteria of a major modification as defined in this chapter shall be considered a redevelopment.

“*State waters*” means any body of water, irrigation system, or drainage system, either surface or underground.

“*Storm water*” means storm water runoff, snow melt runoff, and surface runoff and drainage.

“*Storm water management*” means the process of collection, conveyance, storage, treatment, and disposal of storm water to ensure control of the magnitude and frequency of runoff and to minimize the hazards associated with flooding. Also includes implementing controls to reduce the discharge of pollutants, including management practices, control techniques and systems, and design and engineering methods.

“*Storm Water Management Plan (SWMP)*” means details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to control storm water, including drawings, engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation for developments equal to or less than five acres.

"*Storm Water Pollution Prevention Plan (SWPPP)*" means a document developed to help identify sources of pollution potentially affecting the quality of storm water discharges associated with a facility or activity, and to ensure implementation of measures to minimize and control pollutants in storm water discharges associated with a person, facility, or activity.

"*Storm water system*" means the physical facilities, private and public, temporary or permanent, designed to treat, collect, and transport storm water, including but not limited to curbs, inlets, pipe, box culverts, swales, ditches, ponds, French drains, boulder pits, wattles, and silt fences. "Storm water system" in this chapter also includes the City's flood control devices, such as levees, flood walls, and their appurtenances.

"*Storm water utility*" means a mechanism for planning, operating, maintaining, regulating, financing, and performing capital improvements to the storm water system. The storm water utility is funded from a user fee charged to properties within the service area.

"Unit" means real property or portions of property as identified and classified in the Montana Department of Revenue's property tax records. For the purposes of this ordinance and its related documentation, a unit is either a single-family residential dwelling or a single commercial/industrial business.

"*United States Environmental Protection Agency (U.S. EPA)*" means the federal agency established to coordinate programs aimed at reducing pollution and protecting the environment.

"Wetland" means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, does support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

13.27.040 Authority

A. The Public Works Director shall have the authority to adopt administrative rules and regulations as well as specifications and design standards interpreting this chapter and governing the use, operation, and management of the storm water utility.

B. The City shall create and maintain administrative rules and regulations that provide additional policy, criteria, and information for the proper implementation of the requirements of this chapter. Design and construction of storm water facilities shall meet the minimum water quality performance standards contained in the specifications and design standards.

C. Activities regulated by this chapter may be subject to further regulation by administrative rules and regulations and/or specifications and design standards. No permit or approval issued pursuant to this chapter shall relieve a person of the responsibility to secure permits and approvals required for activities regulated by any other applicable law, rule, code, act, permit, or ordinance.

13.27.050 Applicability

This chapter shall apply to any activity that may potentially affect the City's MS4 or may introduce storm water pollutants into any private or public storm drain or any body of water within the City's MS4 jurisdiction. Exceptions include activities that are contained entirely on federal, state, or county lands and do not impact adjacent jurisdictions or MS4s.

Additionally, permanent and temporary storm water management controls and facilities constructed as part of any activities listed in this chapter that are located within the City's MS4 jurisdiction are also subject to this chapter.

13.27.060 Storm Water Utility Service Area

The storm water utility service area is inclusive of all lands annexed to the City and bounded by the incorporated city limits as the same may be adjusted by the City Council, with the exception of other MS4 permittees. The City reserves the right to plan for storm water system improvements outside the service area. The City may also construct storm water system improvements outside the service area when needed as an integral part of the storm water system located within the storm water utility service area, or as part of an agreement with an adjacent MS4 permittee.

13.27.070 Operation Cost Determination

The Public Works Director shall determine the total annual cost of operation and maintenance of the storm water system and shall develop operating plans for the system. The total annual cost of operation and maintenance of the storm water system shall include, but is not limited to, all costs related to the following:

A. The acquisition by gift, purchase, or condemnation of real and personal property, and interests therein, necessary to manage storm water or to construct, operate, and maintain storm water systems;

B. Costs of administration and implementation of the storm water utility, including the establishment of reasonable operating and capital reserves to meet unanticipated or emergency storm water management requirements;

C. Costs related to planning, engineering and design, debt service and related financing expenses, construction costs for new storm water systems, and enlargement or improvement of existing storm water systems;

D. Operation and maintenance of the storm water system;

E. Monitoring, surveillance, and inspection of storm water systems;

F. Water quality monitoring and water quality programs;

G. Retrofitting developed areas for pollution control;

H. Inspection and enforcement activities;

I. Billing and administrative costs;

J. Permitting;

K. Staff;

L. Equipment; and

M. Other expenses related to the storm water utility.

13.27.080 Storm Water Utility Service Fee

A storm water utility service fee shall be charged to properties in the utility service area based upon a methodology and at a rate to be established by City Council resolution following a public hearing. A copy of the resolution shall be placed on file in the City Clerk's office and on the City's website. Any changes to the methodology or rates also shall be made by City Council resolution following a public hearing. The storm water utility service fee is to be used to pay for the costs necessary to fulfill the purpose and intent of this chapter, including but not limited to, all costs related to the City's activities under this chapter.

13.27.090 Coordination with the Missoula Valley Water Quality District and Other Missoula Valley MS4 Agencies

The City may coordinate storm water-related management activities with the Missoula Valley Water Quality District and other Missoula Valley MS4 agencies to make the best use of resources and finances for the purpose of meeting all Missoula MPDES Storm Water Permit discharge requirements. Coordination may include pooling resources, forming interlocal agreements, and entering into contractual agreements with other agencies where applicable.

13.27.100 Ultimate Responsibility of Discharger

The standards set forth in and promulgated pursuant to this chapter are minimum standards. This chapter does not intend or imply that compliance by any person will ensure that there will be no contamination, pollution, or unauthorized discharge of pollutants into waters of the state caused by that person. This chapter shall not create liability on the part of the City or any City agent or employee for any damages that result from any discharger's reliance on this chapter or any administrative decision lawfully made pursuant to this chapter.

13.27.110 Conflict of Law or Regulations

This chapter shall not diminish nor supersede any of the laws and regulations governing the Missoula Valley Water Quality District. In the event any part of this chapter or referenced regulations in this chapter should overlap or conflict with Title 13, Chapter 26, MMC, the more stringent of the codes or regulations shall prevail.

Article II. Discharge Prohibitions

Sections:

13.27.200 Prohibition of Illicit Discharges

A. Except as authorized by a separate MPDES permit, it shall be unlawful to discharge or cause to be discharged into the MS4 any discharge that is not composed entirely of storm water, including but not limited to discharges containing pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards or that could cause the City to be in violation of its MPDES permit.

B. The commencement, conduct, or continuance of any discharge not composed entirely of storm water to the MS4 is prohibited except as follows:

1. Discharges pursuant to an MPDES general permit for MS4s permit and discharges due to firefighting activities.

2. Discharges from the following activities shall not be considered a source of pollutants to the MS4 and to state waters when properly managed and shall not be considered illicit discharges unless determined by the City to be significant contributors of pollutants to the MS4, or to cause a violation of the provisions of the Clean Water Act or this chapter based on quantity of flow, concentration of pollutants, proximity to a watercourse, or condition of a receiving water:

a. Irrigation water;

b. Irrigation ditch return flows;

c. Landscape irrigation;

d. Permitted diverted stream flows;

e. Rising ground waters;

f. Rising natural floodwaters;

g. Uncontaminated groundwater infiltration to separate storm sewers;

h. Uncontaminated pumped groundwater;

i. Discharges from potable water sources;

j. Foundation drains;

k. Air conditioning condensation;

l. Springs;

m. Water from crawl space or basement pumps;

n. Footing drains;

o. Lawn watering (excluding overwatering);

p. Individual residential car washing;

q. Individual residential dechlorinated swimming pool and hot tub discharges;

r. Individual residential street washing;

s. Fire hydrant flushing;

t. Water line flushing;

u. Flows from riparian habitats and wetlands;

v. Uncontaminated water from irrigation system meter pits;

w. Flows from emergency firefighting activities;

x. Charity or other non-commercial car washes; and

y. Residential gardening or landscaping activities on areas less than 1,000 square feet.

3. Before applying the listed exceptions, the City shall make a determination on a case-by-case basis as to what is considered significant contributors of pollutants. In addition, the following non-storm water discharges need not be prohibited from entering the MS4, provided approved control measures to minimize the impacts from the sources are implemented:

   a. Municipally owned dechlorinated swimming pool discharges, municipal water tank draining, and water from street washing (including sidewalks and medians) that is conducted by City staff or under contract with the City.

   b. The City may exempt, in writing, other non-storm water discharges which are not a significant source of pollutants to the City's MS4 or state waters.

C. No person shall throw, deposit, leave, maintain, wash, rinse, or keep any substance that may cause or contribute to pollution or permit any such substance to be thrown, deposited, left, maintained, washed, or rinsed in or upon any public or private property, driveway, parking area, street, alley, sidewalk, catch basin, manhole, ditch, channel, pond, or any other component of the MS4 or state waters. Pollutants for this purpose include but are not limited to oil, solvents, antifreeze, flammables, septage, poisonous or infectious substances, garbage, soaps, acids, bases, and sediment. Wastes deposited in streets in a manner allowed by the City for the purpose of collection are exempted from this prohibition.

D. It shall be unlawful to store, handle, or apply any pollutant in a manner that will cause exposure to storm water, rainfall or runoff, and discharge to the MS4 and to state waters or waters of the United States.

E. All other requirements and restrictions pertaining to illicit discharges to the MS4 or the storm water system shall comply with the requirements of this chapter, the Storm Water Specifications and Design Standards, and Title 13, Chapter 26, MMC.

13.27.210 Prohibition of Illicit Connections

A. The construction, use, maintenance, or continued existence of illicit connections to the MS4 is prohibited. An owner or operator responsible for an illicit connection to the MS4 shall comply with the requirements of this chapter; Title 13, Chapter 4, MMC; and Title 13, Chapter 26, MMC.

B. This prohibition expressly includes, without limitation, illicit connections made in the past regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. A person is in violation of this chapter if the person connects a line conveying sewage or other pollutant to the MS4 or allows an existing connection to continue.

D. Illicit connections must be disconnected at the property owner's expense, or the City shall arrange for the disconnection and charge the resulting costs to the property owner.

E. Any drain or conveyance that has not been documented in plans, maps, or equivalent and which may be connected to the storm sewer system, shall be located by the owner or operator of that property upon receipt of written notice from the City. The notice will specify a reasonable time period to locate the drain or conveyance, identify the drain or conveyance as storm sewer, sanitary sewer, or other, and identify the outfall location or point of connection to the storm sewer system, sanitary sewer system, or other discharge point. Results of these investigations shall be documented and provided to the Public Works Director.

Article III. Regulations and Requirements

Sections:

13.27.300 Requirement to Control and Reduce Storm Water Pollutants

A. The City's Storm Water Management Plan and Storm Water Specifications and Design Standards outline appropriate BMPs to control the volume, rate, and potential of pollutants in storm water runoff from new development and redevelopment projects as may be appropriate to minimize the generation, transport, and discharge of pollutants.

B. Any owner or operator engaged in activities or operations which will or may result in pollutants entering storm water, the MS4, or state waters shall implement BMPs to the maximum extent practicable to provide protection from discharge into the MS4. BMPs shall be provided and maintained at the owner or operator's expense. The Public Works Director shall have the authority to require the installation, operation, maintenance, and/or replacement of BMPs as well as the authority to order the removal of temporary BMPs.

13.27.310 Requirement to Monitor and Analyze

The City may require any owner or operator engaged in any activity or owning or operating any facility which may cause or contribute to storm water pollution, illicit discharges, or non-storm water discharges to the MS4 or state waters to undertake, at the owner or operator's expense, monitoring and analysis by a state-certified laboratory pursuant to the provisions of this chapter and furnish those reports to the Public Works Department as deemed necessary to determine compliance with this chapter as well as the Storm Water Specifications and Design Standards.

13.27.320 Notification of Spills

Notwithstanding other requirements of law, as soon as any owner or operator of a facility or operation has information of any known or suspected release of pollutants discharging into storm water, the MS4, or state waters from that facility, that person shall take all necessary steps to ensure the discovery, containment, and cleanup of the release. If a pollutant is released, the owner or operator shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). If there is a release not requiring an emergency response, the owner or operator shall notify the City by calling the Public Works Department within 24 hours and providing a written notice thereto within five business days. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator shall make and keep an onsite written record of the circumstances of the discharge and the actions taken to prevent its recurrence. These records shall be retained for not less than five years.

13.27.330 Discharge Pursuant to MPDES General Permit

The prohibition of discharges shall not apply to any discharge regulated under an MPDES General Permit issued and administered by MDEQ, provided that the discharger is in full compliance with all requirements of the permit and other applicable laws or regulations. Compliance with an applicable MPDES General Permit governing discharges into the MS4 shall be considered compliance with this chapter.

13.27.340 Noncompliance with MPDES General Permit

Any discharge that would constitute a violation of an MPDES General Permit and any amendments, revisions, or re-issuance thereto, when either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person causing or responsible for the discharge. The City is not liable for violations under another MPDES General Permit holder's jurisdiction.

All owners or operators shall comply with applicable federal and state laws, including those related to facility personnel, training, training records, training record maintenance, maintenance of notification procedures, and implementation of notification requirements for spill response, to ensure containment, cleanup, and immediate notification to the owner or operator of the MS4. Persons responsible for spills are to comply with applicable state and federal notification requirements to ensure containment, clean up, and immediate notification to the owner or operator of the MS4.

Article IV. Construction Activity

Sections:

13.27.400 Permits Required

A. It shall be unlawful for any person, firm or corporation to commence grading associated with a building permit or zoning compliance permit on public or private property without first obtaining a Grading Permit from Development Services. Any new building which requires a building permit where grades are altered more than 3 feet, except single-family residences located on slopes less than 5 percent, shall require a Grading Permit. Any construction activities related to grading that meets the requirements of this chapter shall require a Grading Permit. The applicant for the permit shall provide plans of the proposed site development in conformance with Storm Water Specifications and Design Standards and receive approval for such plans prior to commencing any construction.

B. Grading, Drainage, and Erosion Control Permits shall expire by limitation and become null and void if work authorized does not begin within 180 calendar days after date of issuance. Also, permits shall expire by limitation and become null and void if work authorized by the permit is suspended for more than 30 calendar days, except for weather-related delays. Issued Grading, Drainage, and Erosion Control Permits expire one year from date of issuance. Before work begins or resumes, the permittee shall obtain a new permit and pay a full permit fee. The Development Services Director or designee may grant a time extension on permits. Applicants shall give Development Services staff a minimum of two hours' notice before beginning grading operations and provide notice of completion of work under the permit.

C. SWPPP Permits shall expire by limitation and become null and void if work authorized does not begin within 180 calendar days after date of issuance. Also, permits shall expire by limitation and become null and void if work authorized by the permit is suspended for more than 30 calendar days, except for weather-related delays. Issued SWPPP Permits expire one year from date of issuance. Before work begins or resumes, the permittee shall obtain a new permit and pay a full permit fee. The Development Services Director or designee may grant a time extension on permits.

Applicants shall give the Development Services staff a minimum of two hours' notice before beginning grading operations and provide notice of completion of work under the permit.

13.27.410 Permit—Application—Fee

A. Permit fees are based on the average direct and indirect costs to provide plan checks, permit administration, field inspection, and record management. The fee for obtaining a permit shall be established or amended by City Council resolution after conducting a public hearing.

B. Revenue from these fees shall be credited to the general fund.

13.27.420 Permit Fee Exceptions

A. The Development Services Director may exempt any contractor doing work for the City from permit fees referred to in this chapter.

B. Work performed by the City is exempt from permit fees.

13.27.430 Investigation Fees; Work Without a Permit

Whenever any work for which a permit is required by this ordinance has been commenced without first obtaining said permit, a special investigation shall be made before a permit may be issued for such work. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by this ordinance. The payment of such investigation fee shall not exempt any person from compliance with all provisions of this ordinance. SWPPP Permits shall also be subject to U.S. EPA, MDEQ, and/or county air quality standards, penalties, and fines, as applicable.

13.27.440 Permit Fee Refunds

Refunds or credits of permit fees shall only be given when permit errors or mistakes are caused by the City.

13.27.450 Construction Submittals

In addition to all other permits required in this chapter, all new developments and redevelopment projects will be required to provide a Storm Water Management Plan and all other submittals regarding storm water control and runoff in accordance with adopted rules and regulations and Storm Water Specifications and Design Standards.

12.27.460 Construction Requirements

General requirements shall be in accordance with adopted rules and regulations and Storm Water Specifications and Design Standards.

13.27.470 Storm Water Facility Management Procedures for Developments

The developer, owner, or operator shall create, manage, and maintain storm water facilities in accordance with the Storm Water Specifications and Design Standards.

Article V. Inspection and Enforcement

Sections:

13.27.500 Inspections

A. The City will conduct all inspections of any construction activities within the MS4 area that require a SWPPP and will conduct them in accordance with adopted rules and regulations.

B. Once construction activities are completed, the developer, owner, or operator shall conduct inspections of the storm water facilities and maintain records of such inspections in accordance with adopted rules and regulations.

13.27.510 Sampling, Testing, and Monitoring

All sampling, testing, and monitoring conducted on any portion of the storm water system shall be conducted in accordance with adopted rules and regulations.

13.27.520 Violations

A. Whenever the City finds that a discharge of pollutants within the MS4 area is taking place or has occurred which will result in or has resulted in pollutants entering storm water, the MS4, or state waters, the City will do one or more of the following:

1. Issue a Notice of Violation (NOV)

   The NOV issued will notify the owner or operator of the violation and will describe what needs to be done to correct the violation as well as the timeframe in which the correction is to be made. SWPPP violations shall result in the City issuing an NOV with the owner or operator being allowed 24 hours to correct the violation.

2. Require Corrective Action

The City will notify the responsible owner or operator in writing and give him or her the opportunity to remediate the affected property in accordance with the provisions of this chapter using a remediation plan approved by the Public Works Director or designee.

a. An authorized enforcement agent may issue a stop work order pursuant to the remediation of a current violation or the potential of a violation of this chapter.

b. Owners or operators shall submit remediation plans to and have them approved by the Public Works Director before remediation begins. The plan shall include, but is not limited to, a remediation schedule, a course of action, a list of personnel performing remediation work, and a list of equipment to be used.

c. An authorized enforcement agent may enter private property, obtaining warrants when necessary, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in section 7-1-4124(16), MCA.

d. Failure to take corrective action shall result in suspension of the permit.

(1) A suspended permit shall be reinstated without additional fees if it is resolved within seven days.

(2) A suspended permit that is not resolved within seven days shall not be reinstated; the permittee shall re-apply and re-purchase permit and shall be subject to permit fees.

e. Failure to take corrective action shall result in a fine equal to the permit fee amount.

B. The owner or operator shall take appropriate preventive action to ensure a violation does not recur.

C. Whenever an authorized enforcement agent finds any potential pollutant—including but not limited to oil, earth dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, or waste—upon the sidewalk abutting or adjoining any parcel of land or upon any parcel of land that is in close proximity to any portion of the storm water system and may result in the pollutant entering the storm water system, an authorized enforcement agent may give notice to the owner or operator to remove and lawfully dispose of the material. The owner or operator shall undertake the activities described in the notice and within the time frames set forth therein. If the owner or operator fails to conduct the activities as described in the notice, the Public Works Director may cause the required activities to be performed and have the cost assessed and invoiced to the property owner, as set forth in this chapter and adopted rules and regulations.

13.27.530 Enforcement and Penalties

A. If an owner or operator fails to take corrective actions on, or prior to, a required date on a reported or observed spill or the potential to release pollutants, including sediment, into the storm water system, the City, or a designated contractor, may remediate the affected property at the owner or operator’s expense if the owner or operator does not take corrective actions. The owner or operator shall reimburse the City for all expenditures pertaining to the corrective action.

B. In addition to the penalties herein provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter that the Public Works Director or designee considers to be an immediate threat to the public health, safety, and welfare and the environment may be summarily abated and/or restored by the City, or a designated contractor, with the owner or operator responsible to pay the costs of any abatement and restoration.

C. An authorized enforcement agent may enter private property, obtaining warrants when necessary, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in section 7-1-4124(16), MCA.

D. Each day a violation continues shall constitute a new violation and any resultant fines.

E. Failure to pay the costs to the City, or a designated contractor, as described in this chapter may result in the City placing a lien against the property. Continued non-payment may result in the City pursuing payment as outlined in 7-13-4309, MCA.

F. Any person convicted of violating any of the provisions of this chapter, with the exception of a late payment of a storm water utility bill, may be charged with a misdemeanor. The maximum fine imposed shall be $500 per day and no imprisonment shall be imposed.

13.27.540 Violation of Federal Clean Water Act

Any owner or operator who violates any provision of this chapter or any provision of any permit issued pursuant to this chapter; who discharges pollutants, waste, or wastewater so as to cause an illicit discharge into the MS4; or who violates any cease and desist order, prohibition, or effluent limitation also may be in violation of the Federal Clean Water Act and may be subject to the sanctions of that Act, including civil and criminal penalties.

13.27.550 Concealment

Causing, permitting, aiding, abetting, or concealing a violation of any provision of this chapter shall constitute a violation of this chapter

13.27.560 Civil Actions

In addition to any other remedies provided in this chapter, any violation of this chapter may be enforced by civil action brought by the City. In any such action, the City may seek, and the court shall grant, as appropriate, any or all of the following remedies:

A. A temporary and/or permanent injunction.

B. Assessment of the owner or operator in violation for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation and for the reasonable costs of preparing and bringing legal action under this section.

C. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

D. Compensatory damages for loss or destruction to water quality, wildlife, fish, and aquatic life. Assessments under this section shall be paid to the City to be used exclusively for costs associated with monitoring and establishing storm water discharge control systems and/or implementing or enforcing the provisions of this chapter.

E. Fines to be paid to the City for MPDES permit violations.

13.27.570 Administrative Enforcement Powers

The City will enforce the requirements under the state's General Permit for storm water discharges associated with construction activity in whole or in part as determined by the authorized enforcement agent and in accordance with this chapter, adopted administrative rules and regulations, Storm Water Specifications and Design Standards, and Title 13, Chapter 26, MMC.

13.27.580 Appeal

Any person notified of non-compliance with this chapter or required to perform monitoring, analysis, reporting, and/or corrective action, who is aggrieved by the decision of the City's authorized enforcement agent, may appeal such decision in writing to the Public Works Director within 10 business days following the effective date of the decision or written notice. Upon receipt of such request, the Public Works Director shall request a report and recommendation from the City's authorized enforcement agent and shall set the matter for administrative hearing at the earliest practical date. At said hearing, the Public Works Director may hear additional evidence, and may revoke, affirm, or modify the authorized enforcement agent's decision. The decision shall be final.

13.27.590 Disclaimer of Liability

A. The degree of protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific, engineering, and other relevant technical considerations. The standards set forth here are minimum standards, and this chapter does not imply that compliance will ensure that there will be no unauthorized discharge of pollutants into the waters of the state or the United States.

B. This chapter shall not create liability on the part of the City, any agent, or employee thereof for any damages that result from reliance on this chapter or any administrative decision lawfully made thereunder.

EFFECTIVE DATE

The provisions of the ordinance shall be effective in 30 days.

SEVERABILITY

If any selection, subsection, sentence, clause, phrase, or word of this ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The council hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, phrase, and words thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, phrases, or words have been declared invalid or unconstitutional, then the remaining ordinance provisions will be in full force and effect.

PASSED by a vote of:

First reading and preliminary adoption on the 22nd day of August, 2016 by a vote of 11 ayes, Julie Armstrong, Emily Bentley, Michelle Cares, John DiBari, Annelise Hedahl, Jordan Hess, Gwen Jones, Marilyn Marler, Bryan von Lossberg, Harlan Wells, Jon Wilkins; 1 nay, Heidi West; 0 abstentions; and 0 absent.

Second and final reading and adoption on the 12th day of September, 2016, by a vote of 9 ayes, Julie Armstrong, Emily Bentley, John DiBari, Annelise Hedahl, Gwen Jones, Marilyn Marler, Bryan von Lossberg, Heidi West, Jon Wilkins; 2 nays, Michelle Cares, Harlan Wells; 0 abstentions; and 1 absent, Jordan Hess.

APPROVED by the Mayor this 12th day of September, 2016.

ATTEST:	**APPROVED:**
/s/ Martha L. Rehbein	/s/ John Engen
Martha L. Rehbein	John Engen
City Clerk	Mayor

(SEAL)

Ordinance 3659

An ordinance generally amending Missoula Municipal Code Chapter 13.27 entitled "Storm Water Utility, Rates and Regulations" renaming the chapter "Storm Water Management" to update the storm water regulations in compliance with the City's MS4 Storm Water Discharge Permit and provide for the enactment of standards by administrative rule.

Be it ordained that Chapter 13.27 is hereby amended as follows:

CHAPTER 13.27
STORM WATER MANAGEMENT

Articles:

Article I. Storm Water Utility

Sections:

13.27.010 Storm Water Utility Established

The City of Missoula Storm Water Utility is hereby established along with administrative rules to implement the provisions of this chapter.

13.27.020 Purpose and Intent

The purpose and intent of this ordinance is to:

A. Protect and enhance the water quality of named and unnamed surface waters, groundwater, and wetlands within the city limits, in a manner pursuant to and consistent with current federal and state water quality standards and regulations.

B. Create permitting, submittal, and design standards for erosion and sedimentation control, protection of the storm water system, flood mitigation, site grading, and protection of property.

C. Minimize pollutants and non-storm water discharges to storm drains.

D. Provide design, construction, operation, and maintenance criteria for permanent and temporary Best Management Practices (BMPs) for storm water systems.

E. Establish legal authority to conduct inspections, surveillance, monitoring, and enforcement procedures necessary to ensure compliance with federal and state regulations.

F. Establish legal authority to develop, implement, and enforce a program to reduce pollutants in storm water runoff from new development, redevelopment, and construction activities.

G. Provide an equitable distribution of cost for the program as outlined in the storm water utility rate schedule, which will be established by City Council resolution following a public hearing.

H. Provide for the regulation of contributors or dischargers to the City's storm water system through the development of a Storm Water Management Program.

I. Regulate construction, grading, and post-construction storm water management to protect natural resources from erosion and in accordance with current federal, state, and local environmental quality standards and regulations.

J. Establish remedies and penalties for violations of this chapter.

K. Ensure consistency with the applicable requirements of the Clean Water Act, Safe Drinking Water Act, Montana Water Quality Act, and acts amendatory thereof or supplementary thereto, applicable implementing regulations, and Montana Pollutant Discharge Elimination System (MPDES) permits that may affect storm water and any amendments, revisions, or re-issuance thereof.

13.27.30 Definitions

The following words, terms, and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context explicitly indicates a different meaning.

"Administrative rule(s)" means any rule(s) approved by the Director for the implementation of this chapter.

"Administrative Rules of Montana (ARM)" means the regulations, standards, or statements of applicability that implement, interpret, or set law or policy in Montana.

"*Authorized agent*" means the Director or any individual or entity designated by the Director with the authority to inspect or enforce storm water compliance.

"*Best Management Practices (BMPs)*" means schedule of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of state waters. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"City" is the City of Missoula and its employees designated by the Director with the authority to inspect or enforce storm water compliance.

"*Code of Federal Regulations (CFR)*" means the compilation of administrative laws governing federal regulatory agency practice and procedures.

"*Construction activity*" means an activity (e.g., clearing, grading, excavation, stockpiling earth materials, and other placement or removal of earth material performed during construction projects) that is subject to MPDES construction permits and/or an activity subject to a City Storm Water and/or Excavation Permit.

"Construction General Permit" means the MPDES General Permit for Storm Water Discharges Associated with Construction Activity, required for construction activities that disturb greater than or equal

to one acre of land, including clearing, excavating, grading, grubbing, or placement/removal of earth material. A Construction General Permit is also required if construction activity that disturbs less than one acre is part of a larger common plan of development or sale that would disturb one acre or more. A Construction General Permit (commonly referred to as a SWPPP) is issued by MDEQ under ARM 17.30.1341.

"Construction Site BMP Manuals" means the Montana Department of Transportation Erosion and Sediment Control Best Management Practices Manual and the Montana Department of Environmental Quality Storm Water Management During Construction Field Guide for Best Management Practices, as periodically updated. Where there may be discrepancies between the two, the MDEQ manual shall prevail.

"Design standards" means the City standards and specifications prepared and updated by the Public Works Department or Development Services Department.

"Developer" means a person who creates a development or causes a development to be created.

"*Development*" means any construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure within the jurisdiction of the City as well as any manmade change or alteration to the landscape, including but not limited to mining, drilling, dredging, grading, paving, excavating, and filling.

"Director" means the Public Works Director or their designee.

"*Discharge*" means any introduction or addition of any substance into the storm water system or state waters.

"*Discharger*" means any person who causes, allows, permits, or is otherwise responsible for a discharge, including, without limitation, any operator of a construction site or industrial facility.

"Drainage" means the natural and/or artificial draining, movement, or removal of water due to the following:

- a named or unnamed creek, stream, or river in normal or flood capacity or other natural body of water;
- natural rainfall, runoff, or storm water; or
- irrigation.

"Dry Well" means a USEPA-designated Class V storm water injection well: a bored, drilled, or driven shaft or dug hole whose depth is greater than the opening width at the widest point, for the subsurface infiltration of storm water.

"Final approval" is the completion of a project, site, or building in accordance with City requirements and ordinances. In the case of a building, a certificate of occupancy is issued. In case of a subdivision, when the two-year warranty and maintenance bond has been submitted and the appointed City employee certifies all work is complete.

"Grading" means the mechanical movement of dirt, gravel, rock, sand, or soil to adjust the level or steepness (grade) of a construction site, development, parcel, or lot.

"Green infrastructure" means an approach to storm water management that protects, restores, or mimics the natural water cycle. Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments.

"Hazardous material" means 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 present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

"*Illicit connection*" means any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the storm water system, including but not limited to any conveyances which allow any discharge, such as sewage, process wastewater, and wash water, to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether the drain or connection had been previously allowed, permitted, or approved by a government agency; or 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 or permitted by the City.

"*Illicit discharge*" means any discharge to the storm water system that is not composed entirely of storm water, except as exempted in §13.27.200B of this chapter.

"*Impervious surface*" means a surface which prevents or retards the penetration of water into the ground, including but not limited to roofs, sidewalks, patios, driveways, parking lots, concrete and asphalt paving, gravel, compacted native surfaces and earthen materials, and oiled, macadam (asphalt), or other surfaces which similarly impede the natural infiltration of storm water.

"*Larger common plan of development or sale*" means a contiguous area where multiple separate and distinct land-disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. For the purposes of this definition, "one proposed plan" is broadly defined as any announcement or piece of documentation (e.g., a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, or computer design) or physical demarcation (e.g., boundary signs, lot stakes, or surveyor markings) indicating construction activities may occur on a specific parcel.

"*Low impact development*" means practices that work with nature to manage storm water as close to its source as practicable, utilizing various principles: e.g., preserving and recreating natural landscape features; minimizing effective imperviousness; creating functional and aesthetically appealing site drainage; and treating storm water as a resource rather than a waste product.

"*Major modification*" means an alteration to an existing or planned storm water drainage facility that does one or more of the following: changes the volume, surface area, depth, capacity, inflow rates, outflow rates, or level of treatment by 5% or more; changes the treatment process; adds more than 1,000 square feet of impervious surface; or increases the tributary impervious drainage area to an individual drainage facility component by more than 10%.

"*Maximum extent practicable*" means there must be a serious attempt to comply with technology-based effluent limitations to reduce pollutants in storm water discharges, established by the Clean Water Act §402(p), also see ARM 17.30.1111(5). Practical solutions may not be lightly rejected. If a permittee chooses only a few of the least expensive BMPs, it is likely that 'maximum extent practicable' has not been met. However, if a permittee employs all applicable BMPs, except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit to be derived, it would have met the standard. 'Maximum extent practicable' requires permittees to choose effective BMPs, and to reject applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive.

"*Missoula Municipal Code (MMC)*" means the official code of the general ordinances of the City of Missoula.

"*Montana Department of Environmental Quality (MDEQ)*" means the Montana state agency responsible to protect the environment as guaranteed by the Montana State Constitution.

"*Montana Pollution Discharge Elimination System (MPDES) permit*" means any of the permits issued by MDEQ that regulate discharges by limiting the quantities of pollutants to be discharged. The limits and/or requirements in the permit help ensure compliance with Montana's Water Quality Standards, state, and federal regulations, all of which were written to protect public health and the aquatic environment.

"Municipal Separate Storm Sewer System (MS4) Permit" means the MPDES General Permit for Storm Water Discharges Associated with Small MS4s.An MS4 means a system of conveyances that is:

- owned by a state, city, town, village, or other public entity that discharges to state waters;
- designed or used to collect or convey storm water (e.g., dry wells, inlets, pipes, and outfalls),
- not a combined sewer; and
- not part of a sewage treatment plant, or publicly owned treatment works per ARM 17.30.13.

The City's MS4 Permit (MTR040007) is administered by MDEQ, under authorization of the USEPA for compliance with the Clean Water Act. Pursuant to the Montana Water Quality Act (§75-5-401, MCA) and requirements in ARM 17.30 §§11-13, MDEQ requires designated municipalities, like the City, to obtain and maintain coverage under this permit.

"*Non-point source discharge*" generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrologic modification. Non-point source pollution, unlike pollution from industrial and sewage treatment plants or other discrete point sources, comes from many diffuse sources. Non-point source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, and groundwater.

"*Non-storm water discharge*" means any discharge that is not entirely composed of storm water.

"Notice of Violation (NOV)" means a notice issued by City inspectors for failure to comply with any of the listed conditions in the Storm Water Permit or Dry Well Approval.

"Noxious weed" is a non-native plant that displaces native plant species. The Montana Department of Agriculture updates the Montana State Noxious Weed List annually. The Missoula County Weed District monitors the control and eradication of noxious weeds throughout Missoula County. The City relies on the designations provided by these entities regarding the noxious weed status of a non-native plant species. The City reserves the right to prioritize management of non-native species that are not listed as noxious weeds, for site-specific management.

"*Owner or operator*" means a person who owns, leases, operates, controls, or supervises an activity that may produce storm water runoff. For the purpose of permitting, an "owner or operator" means a person associated with a construction project who is designated as an eligible signatory, has operational control over the construction plans and specifications, or has day-to-day operational control at the project to ensure compliance with any applicable permits.

"Permittee" means the person, owner, or operator to whom any permit issued pursuant to this chapter.

"*Person*" means any individual, firm, association, club, organization, corporation, partnership, business trust, company, or other entity that is recognized by law as the subject of rights or duties.

"*Point source*" means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, and vessel or other floating craft from which pollutants are or may be discharged, including but not limited to chemical mixing, loading, and storage sites and sites of hazardous material spills.

"*Pollutant*" means anything that causes or contributes to pollution: e.g., paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; sediment, refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, which may cause or contribute to pollution; floatables; detergents, pesticides, herbicides, and fertilizers; hazardous materials and wastes; sewage, fecal coliform, and pathogens; dissolved and particulate metals; animal wastes; construction wastes and residues; and noxious or offensive matter of any kind. The terms "sewage," "industrial waste," and "other wastes" as defined in §75-5-103, MCA, are interpreted as having the same meaning as pollutant.

"Post-Construction BMP Design Manual" is the Montana Post-Construction Storm Water BMP Design Guidance Manual produced for Montana's MS4 Municipalities, as periodically updated.

"Post-construction storm water management controls" are the BMPs that are used to manage storm water and prevent potential pollutants in storm water discharges after construction activities have been completed: e.g., biofiltration (vegetated) swale, bioretention pond, detention basin, proprietary treatment device, rain garden, and dry well.

"*Redevelopment*" means a project that proposes to add, replace, and/or alter impervious surfaces affecting an existing storm water system, other than routine maintenance, resurfacing, or repair. A project which meets the criteria of a major modification as defined in this chapter shall be considered redevelopment.

"*State waters*" has the meaning provided in § 75-5-103(34a), MCA.

"*Storm water*" means storm water runoff, snow melt runoff, and surface runoff and drainage. The City has relied on MDEQ's use of the term as two words, per the MS4 Permit. However, MDEQ uses the compound word in its Construction General Permit.

"*Storm water management*" means the process of collection, conveyance, storage, treatment, and disposal of storm water to ensure control of the magnitude and frequency of runoff and to minimize the hazards associated with flooding. Also includes implementing controls to reduce the discharge of pollutants, including management practices, control techniques and systems, and design and engineering methods.

"*Storm Water Management Site Plan*" means details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction storm water management, including drawings.

"Storm Water Management Report" means the engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation for the Storm Water Management Site Plan.

"*Storm Water Pollution Prevention Plan (SWPPP)*" is a document developed to help identify sources of pollution potentially affecting the quality of storm water discharges associated with a facility or activity, and to ensure implementation of measures to minimize and control pollutants in storm water discharges associated with a person, facility, or activity. A SWPPP is required when applying for a Construction General Permit.

"*Storm water system*" means the physical facilities, private and public, temporary or permanent, designed to treat, collect, and transport storm water, including but not limited to curbs, inlets, pipe, culverts, dry wells, swales, ditches, ponds, French drains, boulder pits, wattles, and silt fences. "Storm water system" in this chapter also includes the City's flood control devices, such as levees, floodwall, high-hazard dams, and their appurtenances.

"*Storm water utility*" means a mechanism for planning, operating, maintaining, regulating, financing, and performing capital improvements to the City's storm water system. The storm water utility is funded from a rate that is charged to properties within the service area.

"Underground source of drinking water (USDW)" is an aquifer or part of an aquifer that is currently used as a drinking water source. A USDW may also be groundwater needed as a drinking water source in the future.

"*United States Environmental Protection Agency (USEPA)*" means the federal agency established to coordinate programs aimed at reducing pollution and protecting the environment.

"*Wetland*" means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, does support a prevalence of vegetation typically adapted for life in saturated soil conditions.

13.27.040 Authority

A. The Director shall have the authority to adopt administrative rules interpreting this chapter and governing the use, operation, and management of the storm water utility.

B. The City shall create and maintain administrative rules that provide additional policy, criteria, and information for the proper implementation of the requirements of this chapter. Design and construction of storm water facilities shall meet the minimum water quality performance standards contained in this chapter and any applicable administrative rules.

C. Activities regulated by this chapter may be subject to further regulation by administrative rules and/or specifications and design standards. No permit or approval issued pursuant to this chapter shall relieve a person of the responsibility to secure permits and approvals required for activities regulated by any other federal, state, and/ or local law, rule, code, act, permit, and/or ordinance.

13.27.050 Applicability

This chapter shall apply to any activity that may potentially affect the City's storm water system or may introduce storm water pollutants into any storm water system or any state waters within the City's jurisdiction. Exceptions include activities that are contained entirely on federal, state, or county lands and do not affect adjacent jurisdictions or storm water systems.

Additionally, permanent and temporary storm water management controls and facilities constructed as part of any activities listed in this chapter that are located within the City's jurisdiction are also subject to this chapter.

13.27.055 Infrastructure Protection

To ensure public safety and the security of storm water infrastructure, no person may break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is part of the City storm water system, including but not limited to, any storm hatch, conveyance, detention/retention basin, power source, sampling equipment, supporting structures or substrate, or any part whatsoever.

13.27.060 Storm Water Utility Service Area

The storm water utility service area is inclusive of all lands annexed to the City and bounded by the incorporated city limits as the same may be adjusted by the City Council, with the exception of lands under the jurisdiction of another MS4 Permit. The City reserves the right to plan for storm water system improvements outside the service area. The City may also construct storm water system improvements outside the service area when needed as an integral part of the storm water system located within the storm water utility service area, or as part of an agreement with a neighboring MS4.

13.27.070 Operation Cost Determination

The Director shall determine the total annual cost of operation and maintenance of the City's storm water system and shall develop operating plans for the system. The City is responsible for maintaining the storm water system within the City right-of-way and on City-owned properties. Storm water systems that are not on City-owned properties and are outside the City right-of-way are maintained by the property owner or their assignee. The total annual cost of operation and maintenance of the City storm water system shall include, but is not limited to, all costs related to the following:

A. The acquisition by gift, purchase, or condemnation of real and personal property, and interests therein, necessary to manage storm water or to construct, operate, and maintain storm water systems;

B. Costs of administration and implementation of the storm water utility, including the establishment of reasonable operating and capital reserves to meet unanticipated or emergency storm water management requirements;

C. Costs related to planning, engineering and design, debt service and related financing expenses, construction costs for new storm water systems, and enlargement or improvement of existing storm water systems;

D. Operation and maintenance of the City's storm water system;

E. Monitoring, surveillance, and inspection of the City's storm water system;

F. Water quality monitoring and water quality programs;

G. Retrofitting developed areas for pollution control;

H. Inspection and enforcement activities;

I. Billing and administrative costs;

J. Permitting;

K. Staff;

L. Equipment; and

M. Other expenses related to the storm water utility.

13.27.080 Storm Water Utility Service Fee

A storm water utility service fee shall be charged to properties in the utility service area based upon a methodology and at a rate to be established by City Council resolution following a public hearing. A copy of the resolution shall be placed on file in the City Clerk's office and on the City's website. Any changes to the methodology or rates also shall be made by City Council resolution following a public hearing. The storm water utility service fee is to be used to pay for the costs necessary to fulfill the purpose and intent of this chapter, including but not limited to, all costs related to the City's activities under this chapter.

13.27.090 Coordination with the Missoula Valley Water Quality District and Neighboring MS4s

The City may coordinate storm water-related management activities with the Missoula Valley Water Quality District and neighboring MS4s, in order to attempt to seek the best use of resources and finances for the purpose of meeting all the City's MS4 Permit requirements. Coordination may include pooling resources, forming interlocal agreements, and entering into contractual agreements with other agencies where applicable.

13.27.100 Ultimate Responsibility of Discharger

The standards set forth in and promulgated pursuant to this chapter are minimum standards. This chapter does not intend or imply that compliance by any person will ensure that there will be no contamination, pollution, or unauthorized discharge of pollutants into state waters caused by that person. This chapter shall not create liability on the part of the City or any authorized agent or employee for any damages that result from any discharger's reliance on this chapter or any administrative decision lawfully made pursuant to this chapter.

13.27.110 Conflict of Law or Regulations

This chapter shall not diminish nor supersede any of the laws and regulations governing the Missoula Valley Water Quality District. In the event any part of this chapter or referenced regulations in this chapter should overlap or conflict with any other chapters in the MMC, the more stringent of the codes or regulations shall prevail.

Article II. Discharge Prohibitions

Sections:

13.27.200 Prohibition of Illicit Discharges

A. Except as authorized by a separate MPDES permit, it shall be unlawful to discharge or cause to be discharged into the storm water system any discharge that is not composed entirely of storm water, including but not limited to discharges containing pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards or that could cause the City to be in violation of its MPDES permit.

B. The commencement, conduct, or continuance of any discharge not composed entirely of storm water to the storm water system is prohibited except as follows:
   1. Discharges pursuant to an MPDES permit and discharges due to firefighting activities.

   2. Discharges from the following activities shall not be considered a source of pollutants to the storm water system and to state waters when properly managed and shall not be considered illicit discharges unless determined by the City to be significant contributors of pollutants to the storm water system, or to cause a violation of the provisions of the Clean Water Act or this chapter based on quantity of flow, concentration of pollutants, proximity to a watercourse, or condition of a receiving water:
      a. Irrigation water;
      b. Irrigation ditch return flows;
      c. Landscape irrigation;
      d. Permitted diverted stream flows;
      e. Rising groundwater;
      f. Rising natural floodwaters;
      g. Uncontaminated groundwater infiltration to separate storm sewers;
      h. Uncontaminated pumped groundwater;
      i. Discharges from potable water sources;
      j. Foundation drains;
      k. Air conditioning condensation;
      l. Springs;
      m. Water from crawl space or basement pumps;
      n. Footing drains;
      o. Lawn watering (excluding overwatering);
      p. Residential car washing;
      q. Residential dechlorinated swimming pool and hot tub discharges;

r. Residential street washing;
s. Flows from riparian habitats and wetlands;
t. Uncontaminated water from irrigation system meter pits;
u. Flows from emergency firefighting activities; and
v. Residential gardening or landscaping activities.

3. Before applying the listed exceptions, the City shall make a determination as needed regarding what is considered significant contributors of pollutants. In addition, the following non-storm water discharges are not prohibited from entering the storm water system, provided that approved BMPs are implemented:
   a. Municipally owned dechlorinated swimming pool discharges, municipal water tank draining, and water from street washing (including sidewalks and medians) that is conducted by City staff or under contract with the City;

   b. Charity or other non-commercial car washes;

   c. Fire hydrant flushing; and

   d. Water line flushing.

C. No person shall throw, deposit, leave, maintain, wash, rinse, or keep any substance that may cause or contribute to pollution or permit any such substance to be thrown, deposited, left, maintained, washed, or rinsed in or upon any public or private property, driveway, parking area, street, alley, sidewalk, catch basin, structure/storm hatch, ditch, channel, pond, or any other component of the storm water system or state waters. Pollutants for this purpose include but are not limited to oil, solvents, antifreeze, flammables, septage, poisonous or infectious substances, garbage, soaps, acids, bases, and sediment. Wastes deposited in streets in a manner allowed by the City for the purpose of collection are exempted from this prohibition.

D. It shall be unlawful to store, handle, or apply any pollutant in a manner that will cause exposure to storm water, rainfall or runoff, which may lead to a discharge to the storm water system, state waters, or waters of the United States.

E. All other requirements and restrictions pertaining to illicit discharges to the storm water system shall comply with the requirements of this chapter, administrative rules, and any applicable chapters of the MMC.

13.27.210 Prohibition of Illicit Connections

A. The construction, use, maintenance, or continued existence of illicit connections to the storm water system is prohibited. An owner or operator responsible for an illicit connection to the storm water system shall comply with the requirements of this chapter and any applicable chapters of the MMC.

B. This prohibition expressly includes, without limitation, illicit connections made in the past regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. A person is in violation of this chapter if the person connects a line conveying sewage or other pollutant to the storm water system or allows an existing connection to continue.

D. Illicit connections shall be disconnected at the property owner's expense, or the City shall arrange for the disconnection and charge the resulting costs to the property owner.

E. Any drain or conveyance that has not been documented in plans, maps, or equivalent—and which may be connected to the storm water system—shall be located by the owner or operator of that property upon receipt of written notice from the City. The notice will specify a reasonable time period to locate the drain or conveyance, identify the drain or conveyance as storm water, sanitary sewer, or other, and identify the outfall location or point of connection to the storm water system, sanitary sewer system, or other discharge point. Results of these investigations shall be documented and provided to the Director.

Article III. Regulations and Requirements

Sections:

13.27.300 Requirement to Control and Reduce Storm Water Pollutants

A. Based on federal and state law, MDEQ requires the Cityto obtain and maintain coverage under the MS4 Permit, and abide by applicable water quality laws and regulations.

B. Pursuant to the Safe Drinking Water Act of 1974, the City must also report on dry wells that are part of the City's storm water infrastructure. An owner or operator of a dry well on private property is required to submit its inventory information directly to the USEPA. Owners or operators of dry wells on private property shall not rely on the City to submit their inventory for them.

C. The administrative rules adopted pursuant to this chapter, which include the Construction Site BMP Manuals and Post-Construction BMP Design Manual, outline the BMPs to control the volume, rate, and potential of pollutants in storm water runoff from new development and redevelopment projects that may be appropriate to minimize the generation, transport, and discharge of pollutants and comply with federal and state water quality laws.

D. The City supports and encourages the use of post-construction storm water management controls that rely on low-impact development and green infrastructure techniques. In addition to reducing and delaying runoff volumes, these techniques can also reduce pollutant levels in storm water, enhance aquifer recharge, protect surface water from storm water runoff, increase carbon sequestration, mitigate urban heat islands, and increase wildlife habitat.

E. Any owner or operator engaged in activities or operations, which will or may result in pollutants entering storm water, the storm water system, or state waters, shall implement BMPs to the maximum extent practicable. BMPs shall be provided and maintained at the owner or operator's expense. The Director shall have the authority to require the installation, operation, maintenance, and/or replacement of BMPs as well as the authority to order the removal of temporary BMPs.

13.27.310 Requirement to Monitor and Analyze

The City may require any owner or operator engaged in any activity that may cause or contribute to storm water pollution, illicit discharges, or non-storm water discharges to the storm water system or state waters, to undertake at the owner or operator's expense, monitoring and analysis by a state-certified laboratory, pursuant to the provisions of this chapter. These reports shall be submitted to the Public Works Department, to determine compliance with this chapter and administrative rules.

13.27.320 Notification of Spills

Notwithstanding other requirements of law, as soon as any owner or operator of a facility or operation has information of any known or suspected release of pollutants discharging into a storm water system from that facility, that person shall take all necessary steps to ensure the discovery, containment, cleanup, and documentation of the release. If a hazardous material is released, the owner or operator shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). If there is a release not requiring an emergency response, the owner or operator shall notify the Missoula Valley Water Quality District and the Public Works Department within 24 hours and provide a written notice thereto within five business days. If the discharge of a hazardous material emanates from a commercial or industrial establishment, the owner or operator shall make and keep an onsite written record of the circumstances of the discharge and the actions taken to prevent its recurrence. These records shall be retained for not less than five years.

The Missoula Valley Water Quality District administers an Enforcement Response Plan and Illicit Discharge Investigation and Corrective Action Plan for spills within the City limits and all places within five miles outside the City limits (MMC 13.26), and spills in this area must comply with the requirements of those plans.

13.27.330 Discharge Pursuant to an MPDES Permit

The prohibition of discharges shall not apply to any discharge regulated under an MPDES permit issued and administered by MDEQ, provided that the discharger is in full compliance with all requirements of the permit and other applicable laws or regulations. Compliance with an applicable MPDES permit governing discharges into the storm water system shall be considered compliance with this chapter.

13.27.340 Noncompliance with an MPDES Permit

Any storm water discharge within the City limits that would constitute a violation of an MPDES permit and any amendments, revisions, or re-issuance thereto, when either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person causing or responsible for the discharge.

All owners or operators shall comply with applicable federal and state laws, including those related to facility personnel, training, training records, training record maintenance, maintenance of notification procedures, and implementation of notification requirements for spill response, to ensure containment, cleanup, and immediate notification to the owner or operator of the storm water system. Persons responsible for spills are to comply with applicable state and federal notification requirements to ensure containment, clean up, and immediate notification to the owner or operator of the storm water system.

Article IV. Construction Activity

Sections:

13.27.400 Permits Required

A. Storm Water Permit. It shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of the lot by 3 feet or more without first obtaining a Storm Water Permit from the City. Land disturbance activities related to agricultural practices or improvements are exempt from this requirement, as is any emergency activity that is immediately necessary for the protection of life, property, or natural resources. Activities that disturb one acre or more of land—or less than one acre but are part of a larger common plan of development—are also required to obtain coverage under a Construction General Permit, in addition to the Storm Water Permit. The Storm Water Permit application shall be submitted to Development Services no more than 180 days and no fewer than 60 days from the start date of construction.

1. Erosion Control Site Plan. This plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to manage storm water runoff during construction. An Erosion Control Site Plan is required as part of the Storm Water Permit package.
   a. The applicant shall use the Erosion Control Site Plan Review Checklist to ensure their plan meets the City's requirements.
   b. The applicant shall complete the Construction Inspection Frequency Determination to identify their project's priority ranking.

2. Storm Water Management Site Plan and Report. This site plan shall provide details of theon-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction storm water management, including drawings. The Storm Water Management Report shall include engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation. A Storm Water Management Site Plan and Report are required for medium- to high-priority projects, per the Construction Inspection Frequency Determination.
   a. The applicant shall use the Storm Water Management Site Plan Review Checklist to ensure their plan meets the City's requirements.
   b. The applicant shall complete the Post-Construction Inspection Frequency Determination to identify their project's priority ranking.
   c. The City shall determine the final priority ranking.

B. Construction General Permit. An authorization from MDEQ under the Construction General Permit is required for construction activities—including clearing, excavating, grading, grubbing, or placement/removal of earth material—that disturb a total area of one or more acres of land, including activities that disturb less than one acre when part of a larger common plan of development or sale that would disturb one acre or more. To apply for an authorization under the Construction General Permit, a complete Notice of Intent Application Package shall be submitted to MDEQ. Once the application has been approved by MDEQ, a copy of the Notice of Intent, Storm Water Pollution Prevention Plan (SWPPP), and MDEQ's approval letter shall be submitted to the Storm Water Utility for review. Upon City approval, the City will then issue any required permits for construction activity. When construction activity is completed, MDEQ's Notice of Termination for Storm Water Construction (NOT-SWC) shall be submitted to both MDEQ and the Storm Water Utility. The NOT-SWC is separate from the NOT required by the City for termination of permit coverage under the City's Storm Water Permit and/or Dry Well Approval.

C. Dry Well Approval. Underground injection control wells—commonly referred to as dry wells, sumps, or infiltration devices—are subsurface structures that allow storm water to flow into the ground under the force of gravity. A Dry Well Approval for new, redeveloped, or closed drywells is required to protect the Missoula aquifer and for the City to maintain an updated inventory for reporting to USEPA and MDEQ. The City's Dry Well Approval does not relieve an owner or operator of the responsibility to submit the required inventory information directly to USEPA.

   1. Dry Well Approval is obtained under the City's Excavation Permit.

D. Notice of Termination (NOT). The City of Missoula requires notification that permit coverage under the Storm Water Permit and/or Dry Well Approvals should be terminated. Once permanent erosion control has been established on 70% or greater of the disturbed areas, the permittee shall complete a permit-specific NOT and submit it to Development Services. Additionally, for NOT approval, all temporary BMPs shall be removed, all construction equipment and vehicles shall be removed, and all potential pollutant-generating actives due to construction activity shall be complete.

1. For post-construction storm water management, the Storm Water-NOT shall include a recorded covenant for maintenance, utility easement, and an accurate post-construction (as-built) plan of the system, signed and sealed by a Montana-licensed professional engineer.

2. When the Storm Water Utilityconcurs that the permit coverage conditions have been achieved, the permittee will be notified that the authorization is terminated. An NOT-SWC is required by MDEQ for activities covered under MDEQ's Construction General Permit and a copy shall be submitted to the City, along with the Storm Water-NOT.

13.27.410 Permit Application Fees

A. Storm Water Permit and Dry Well Approval fees are based on the average direct and indirect costs to provide plan reviews, permit administration, field inspection, and record management. The fee for obtaining a permit shall be established or amended by City Council resolution after conducting a public hearing.

B. These fees are provided on the Engineering Fee Schedule.

C. Revenue from these fees shall be credited to the general fund.

13.27.420 Permit Fee Exceptions

A. The Director may exempt any contractor doing work for the City from permit fees referred to in this chapter.

B. Work performed by the City is exempt from permit fees, but the City department shall submit and obtain permit approval prior to commencing work. The same guidelines for submitting and obtaining approval of a Storm Water Permit, Dry Well Approval, and Notice of Termination apply to all City departments.

13.27.430 Investigation Fees; Work Without a Permit

Whenever any work for which a permit is required by this ordinance has been commenced without first obtaining said permit, a special investigation shall be made before a permit may be issued for such work. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by this ordinance. The payment of such investigation fee shall not exempt any person from compliance with all provisions of this ordinance. MPDES permits shall also be subject to USEPA, MDEQ, and/or county air quality standards, penalties, and fines, as applicable.

13.27.440 Permit Fee Refunds

Refunds or credits of permit fees shall considered when permit errors or mistakes are caused by the City.

13.27.450 Repealed

12.27.460 Construction Requirements

Construction activity involving grading, erosion control, sediment control, or waterway crossing shall meet the design criteria set forth in the most recent versions of the Construction Site BMP Manuals and administrative rules. The design criteria shall be adequate to prevent transportation of sediment from the site, to the satisfaction of the City.

A. Permittees shall follow the minimum standards described as Non-Numeric Technology-Based Effluent Limits in the most current Construction General Permit.

B. Concrete operations (e.g., washout and slurry) shall require BMPs that allow for the capture and disposal of generated pollutants.

C. Clearing and Grading Requirements
   1. Clearing and grading of natural resources, such as water bodies and wetlands, shall not be permitted, except when in compliance with all other required permits.
   2. Clearing techniques that retain natural vegetation and retain natural drainage patterns shall be used.
   3. Phasing shall be required on all sites disturbing equal to or greater than 30 acres, with the size of each phase to be established at plan review and as approved by the City.
   4. Clearing, except that necessary to establish sediment control devices, shall not begin until all sediment control devices have been installed and have been stabilized.

D. Construction Site Access Requirements
   1. Ingress and egress point BMPs shall mitigate the tracking of debris off site onto the right-of-way.
   2. At least one temporary access entrance shall be provided at all sites.
   3. Other measures may be required at the discretion of the City in order to ensure that sediment is not tracked onto public streets by construction vehicles, or washed into storm drains.

E. Erosion Prevention Requirements
   1. Soil must be stabilized using recommended methods described in the Construction Site BMP Manuals.
   2. Soil stockpiles shall be stabilized or covered at the end of each workday.
   3. Techniques shall be employed to prevent the blowing of dust or sediment from the site.
   4. Techniques that divert upland runoff past disturbed slopes shall be employed.

F. Noxious Weeds
   1. Disturbed areas shall be managed to prevent noxious weeds from becoming established in the short and long term. Per the Montana County Weed Control Act (§7-22-2101 to 2154, MCA), it is unlawful to permit noxious weeds to propagate.
   2. The City or County reserves the right to prioritize management of non-native species that are not listed as noxious weeds, for site-specific management.
   3. Permittees are responsible for ensuring their projects comply with state and local weed management regulations.

G. Removal of Temporary BMPs
   1. Upon establishing 70% or greater permanent ground cover, all temporary storm water management control devices shall be removed.

H. Sediment Control Requirements
   1. Where necessary, sediment controls shall be provided in the form of settling basins or sediment traps or tanks, temporary seeding, perimeter controls, or other methods described in the Construction Site BMP Manuals.
   2. Adjacent properties shall be protected by the use of a vegetative buffer, silt fence, fiber rolls, or other BMPs outlined in the Construction Site BMP Manuals.

I. Activity involving waterways and watercourses

1. When a watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided and an approval obtained from the City and all other authorized permitting agencies.
2. When in-channel work is conducted, the channel shall be stabilized before, during and after work.
3. Stabilization adequate to prevent erosion must be provided at the outlets of all pipes and paved channels.
4. Stabilization methods shall follow those described in the Construction Site BMP Manuals or administrative rules.

J. Winterization Requirements
   1. Winterization BMPs shall be implemented on projects prior to seasonal shut downs or downtime of one month or longer.

13.27.470 Post-Construction Storm Water Management

The permittee shall create, manage, and maintain post-construction storm water controls in accordance with the Post-Construction BMP Design Manual and any other applicable administrative rules. The permittee shall also comply with MMC §20.50.030, when applicable.

A. When required, post-construction storm water management controls shall be designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measureable precipitation.
   1. For projects that cannot meet 100% of the runoff reduction requirement, the remainder of the runoff form the first 0.5 inches of rainfall must be either:
      a. Treated onsite using post-construction storm water management control(s) expected to remove 80% total suspended solids (TSS);
      b. Managed offsite within the same sub-watershed using post-construction storm water management controls designed to infiltrate, evapotranspire, and/or capture for reuse; or
      c. Treated offsite within the same sub-watershed using post-construction storm water management control(s) expected to remove 80% TSS.

B. Any new storm water outfalls to a named waterbody shall implement BMPs to reduce pollutant discharge to the maximum extent practicable.

C. Riparian resource buffer areas (MMC §20.50.030) shall be clearly defined in the Storm Water Management Site Plan.

D. A recorded utility easement, covenant for maintenance, and as-built plan for any required private storm water systems shall be provided in a form acceptable to the City with submission of the Storm Water-NOT.
   1. The utility easement shall provide sufficient space for vehicle or heavy machinery access for inspection and maintenance, as appropriate for the facility and determined by a Montana-licensed professional engineer.
   2. The covenant shall give the City the right to inspect the facilities and provide a guarantee to the City that the private storm water system will be maintained by the owner or operator, such that the facility will function as designed in perpetuity.

Article V. Inspection and Enforcement

Sections:

13.27.500 Inspections

An authorized agent may inspect—at a reasonable time and in a reasonable manner—the premises for which a permit application has been filed or the premises for which the City has issued a permit.

A. The City will conduct all inspections of any activities within its jurisdiction that require a Storm Water Permit, Dry Well Approval, and/or Construction General Permit; and the City will conduct them pursuant to adopted administrative rules.

B. During construction, sites will be inspected according to the Construction Inspection Frequency Determination.

C. Once construction activities are completed, post-construction storm water management controls shall be inspected annually according to the Post-Construction Inspection Frequency Determination. Annual inspections and periodic maintenance are required to ensure the storm water system continues to function as designed. The City shall have the right to inspect all private post-construction storm water management controls within the City limits but is not responsible for maintenance.
   1. Low- to medium- priority sites shall be self-inspected annually.
   2. High priority sites shall be inspected annually by the City.
   3. All sites shall require a renewal of their Storm Water Permit every five years; and the City will inspect all sites upon renewal.

13.27.510 Sampling, Testing, and Monitoring

All sampling, testing, and monitoring conducted on any portion of the storm water system shall be conducted in accordance with adopted administrative rules. With the consent of the owner or occupant or with authorization from a court of competent jurisdiction, any authorized agent may establish on any property such devices as are necessary to conduct sampling or metering operations. During all inspections as provided herein, the authorized agent may take any samples deemed necessary. Samples shall be collected, stored, and transported in conformance with accepted sampling and testing standards and protocols.

13.27.520 Violations

A. Whenever the City finds that any permit conditions, or other conditions required by this chapter, have been violated or that a discharge of pollutants within the City's jurisdiction is taking place or has occurred, which may result in or has resulted in pollutants entering storm water, the storm water system, or state waters, the City will do one or more of the following:
   1. Issue an NOV
      The NOV issued will notify the owner or operator of the violation and will describe what needs to be done to correct the violation, as well as the timeframe in which the correction is to be made. Storm Water Permit and/or Dry Well Approval violations shall result in the City issuing an NOV. The City shall determine the timeframe to correct the violation, based on the nature of the violation and the potential threat.

   2. Require Corrective Action

The City will notify the responsible owner or operator in writing and give him or her the opportunity to remediate the affected property in accordance with the provisions of this chapter using a remediation plan approved by the Director.

a. An authorized agent may issue a stop work order until the violation is corrected.
b. Owners or operators shall submit remediation plans to and have them approved by the Director before remediation begins. The plan shall include, but is not limited to, a remediation schedule, a course of action, a list of personnel performing remediation work, and a list of equipment to be used.
c. An authorized agent may enter private property, obtaining warrants when necessary, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in §7-1-4124(16), MCA.
d. Failure to take corrective action shall result in suspension of the relevant permit.
    (1) A suspended permit shall be reinstated without additional fees if it is resolved within seven days.
    (2) A suspended permit that is not resolved within seven days shall not be reinstated; the permittee shall re-apply and re-purchase permit and shall be subject to permit fees.
e. Failure to diligently pursue corrective action shall result in fines per the Storm Water Penalty Assessment and Escalation Table, which will be established by City Council resolution following a public hearing.

B. The owner or operator shall take appropriate preventive action to ensure a violation does not recur.

C. Whenever an authorized agent finds any potential pollutant—including but not limited to oil, earth dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, or waste—upon the sidewalk or right-of-way abutting or adjoining any parcel of land or upon any parcel of land that is in close proximity to any portion of the storm water system and may result in the pollutant entering the storm water system, an authorized agent may give notice to the owner or operator to remove and lawfully dispose of the material. The owner or operator shall undertake the activities described in the notice and within the time frames set forth therein. If the owner or operator fails to conduct the activities as described in the notice, the Director may cause the required activities to be performed and have the cost assessed and invoiced to the property owner, as set forth in this chapter and adopted administrative rules.

13.27.530 Enforcement and Penalties

A. If an owner or operator fails to take corrective actions on, or prior to, a required date on a reported or observed spill or the potential to release pollutants, including sediment, into the storm water system, the City, or a designated contractor, may remediate the affected property at the owner or operator's expense, if the owner or operator does not take corrective actions. The owner or operator shall reimburse the City for all expenditures pertaining to the corrective action.

B. In addition to the penalties herein provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter that the Director or designee considers to be an immediate threat to the public health, safety, and welfare and the environment may be summarily abated and/or restored by the City, or a designated contractor, with the owner or operator responsible to pay the costs of any abatement and restoration.

C. An authorized agent may enter private property, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in §7-1-4124(16), MCA.

D. Each day a violation continues shall constitute a new violation and fines will be assessed per the Storm Water Penalty Assessment and Escalation Table.

E. Failure to pay the costs to the City, or a designated contractor, as described in this chapter may result in the City placing a lien against the property. Continued non-payment may result in the City pursuing payment as outlined in §7-13-4309, MCA.

F. Any person convicted of violating any of the provisions of this chapter, with the exception of a late payment of a storm water utility bill, may be charged with a misdemeanor. The maximum fine imposed shall be $1000 per day and no imprisonment shall be imposed.

13.27.540 Violation of the Clean Water Act

Any owner or operator who violates any provision of this chapter or any provision of any permit issued pursuant to this chapter; discharges pollutants, waste, or wastewater, so as to cause an illicit discharge into the storm water system, or violates any cease and desist order, prohibition, or effluent limitation, may be in violation of the Clean Water Act and subject to the sanctions thereof, including civil and criminal penalties.

13.27.550 Concealment

Causing, permitting, aiding, abetting, or concealing a violation of any provision of this chapter shall constitute a violation of this chapter.

13.27.560 Civil Actions

In addition to any other remedies provided in this chapter, any violation of this chapter may be enforced by civil action brought by the City. In any such action, the City may seek, and the court shall grant, as appropriate, any or all of the following remedies:

A. A temporary and/or permanent injunction.

B. Assessment of the owner or operator in violation for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation and for the reasonable costs of preparing and bringing legal action under this section.

C. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

D. Compensatory damages for loss or destruction to water quality, wildlife, fish, and aquatic life. Assessments under this section shall be paid to the City to be used exclusively for costsassociated with monitoring and establishing storm water discharge control systems and/or implementing or enforcing the provisions of this chapter.

E. Fines to be paid to the City for MPDES permit violations.

13.27.570 Administrative Enforcement Powers

The City will enforce the requirements under the Construction General Permit for storm water discharges associated with construction activity in whole or in part as determined by the authorized agent and in accordance with this chapter, administrative rules, and MMC §13.26.

13.27.580 Appeal

Any person notified of non-compliance with this chapter or required to perform monitoring, analysis, reporting, and/or corrective action, who is aggrieved by the decision of the City's authorized agent, may appeal such decision in writing to the Director within 10 business days following the effective date of the decision or written notice. Upon receipt of such request, the Director shall request a report and recommendation from the City's authorized agent and shall set the matter for administrative hearing at the earliest practical date. At said hearing, Director may hear additional evidence, and may revoke, affirm, or modify the authorized agent's decision. The decision shall be final.

13.27.590 Disclaimer of Liability

A. The degree of protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific, engineering, and other relevant technical considerations. The standards set forth here are minimum standards, and this chapter does not imply that compliance will ensure that there will be no unauthorized discharge of pollutants into the waters of the state or the United States.

B. This chapter shall not create liability on the part of the City, any agent, or employee thereof for any damages that result from reliance on this chapter or any administrative decision lawfully made thereunder.

Severability. If any section, subsection, sentence, clause, phrase or word of this ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The council hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, phrase and words thereof, irrespective of the fact that any one or more sections, subsections, sentences, for any reason this ordinance should be declared invalid or unconstitutional, then the remaining ordinance provisions will be in full force and effect.

First reading and preliminary adoption on the 24th day of February, 2020, by a vote of AYES: (11): Alderperson Anderson, Alderperson Becerra, Alderperson Contos, Alderperson Harp, Alderperson Jones, Alderperson Merritt, Alderperson Ramos, Alderperson Sherrill, Alderperson Vasecka, Alderperson von Lossberg, and Alderperson West ABSENT: (1): Alderperson Hess

Second and final reading and on the 9th day of March 2020, by a vote of: AYES: (10): Alderperson Anderson, Alderperson Becerra, Alderperson Contos, Alderperson Hess, Alderperson Jones, Alderperson Merritt, Alderperson Sherrill, Alderperson Vasecka, Alderperson von Lossberg, and Alderperson West ABSENT: (2): Alderperson Harp, and Alderperson Ramos

ATTEST: APPROVED:

Martha L. Rehbein, CMC
City Clerk

John Engen
Mayor

CITY OF MISSOULA
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
MISSOULA COUNTY, MONTANA

Ordinance 3716

An ordinance amending Missoula Municipal Code Chapter 13.27 entitled "Stormwater Management" and amending Sections 13.27.060, 13.27.200, 13.27.400, 13.27.460, 13.27.470, 13.27.500, 13.27.520, 13.27.530 to reflect current practices and clarify requirements, remove the exemption for existing MS4 permitted entities, require compliance with the Missoula City Public Works Standards and Specifications Manual, and establish reinspection and investigation fees.

Be it ordained that Chapter 13.27, Sections 13.27.060, 13.27.200, 13.27.400, 13.27.460, 13.27.470, 13.27.500 and 13.27.520 are hereby amended as follows:

13.27.060 Stormwater Utility Service Area

The stormwater utility service area is inclusive of all lands annexed to the City and bounded by the incorporated city limits as the same may be adjusted by the City Council. The City reserves the right to plan for stormwater system improvements outside the service area. The City may also construct stormwater system improvements outside the service area when needed as an integral part of the stormwater system located within the stormwater utility service area, or as part of an agreement with a neighboring MS4.

13.27.200 Prohibition of Illicit Discharges

A. Except as authorized by a separate MPDES permit, it shall be unlawful to discharge or cause to be discharged into the stormwater system any discharge that is not composed entirely of stormwater, including but not limited to discharges containing pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards or that could cause the City to be in violation of its MPDES permit. This prohibition on illicit discharges shall include discharges that may have an adverse effect on water quality, riparian ecosystems, streambanks, and/or city infrastructure.

B. The commencement, conduct, or continuance of any discharge not composed entirely of stormwater to the stormwater system is prohibited except as follows:
   1. Discharges pursuant to an MPDES permit and discharges due to firefighting activities.

   2. Discharges from the following activities shall not be considered a source of pollutants to the stormwater system and to state waters when properly managed and shall not be considered illicit discharges unless determined by the City to be significant contributors of pollutants to the stormwater system, or to cause a violation of the provisions of the Clean Water Act or this chapter based on quantity of flow, concentration of pollutants, proximity to a watercourse, or condition of a receiving water:
      a. Irrigation water;
      b. Irrigation ditch return flows;
      c. Landscape irrigation;
      d. Permitted diverted stream flows;
      e. Rising groundwater;
      f. Rising natural floodwaters;
      g. Uncontaminated groundwater infiltration to separate storm sewers;
      h. Uncontaminated pumped groundwater;
      i. Discharges from potable water sources;
      j. Foundation drains;
      k. Air conditioning condensation;
      l. Springs;
      m. Water from crawl space or basement pumps;
      n. Footing drains;
      o. Lawn watering (excluding overwatering);

p. Residential car washing;
q. Residential dechlorinated swimming pool and hot tub discharges;
r. Residential street washing;
s. Flows from riparian habitats and wetlands;
t. Uncontaminated water from irrigation system meter pits;
u. Flows from emergency firefighting activities; and
v. Residential gardening or landscaping activities.

3. Before applying the listed exceptions, the City shall make a determination as needed regarding what is considered significant contributors of pollutants. In addition, the following non-stormwater discharges are not prohibited from entering the stormwater system, provided that approved BMPs are implemented:
   a. Municipally owned dechlorinated swimming pool discharges, municipal water tank draining, and water from street washing (including sidewalks and medians) that is conducted by City staff or under contract with the City;
   b. Charity or other non-commercial car washes;
   c. Fire hydrant flushing; and
   d. Water line flushing.

C. No person shall throw, deposit, leave, maintain, wash, rinse, or keep any substance that may cause or contribute to pollution or permit any such substance to be thrown, deposited, left, maintained, washed, or rinsed in or upon any public or private property, driveway, parking area, street, alley, sidewalk, catch basin, structure/storm hatch, ditch, channel, pond, or any other component of the stormwater system or state waters. Pollutants for this purpose include but are not limited to oil, solvents, antifreeze, flammables, septage, poisonous or infectious substances, garbage, soaps, acids, bases, and sediment. Wastes deposited in streets in a manner allowed by the City for the purpose of collection are exempted from this prohibition.

D. It shall be unlawful to store, handle, or apply any pollutant in a manner that will cause exposure to stormwater, rainfall or runoff, which may lead to a discharge to the stormwater system, state waters, or waters of the United States.

E. All other requirements and restrictions pertaining to illicit discharges to the stormwater system shall comply with the requirements of this chapter, administrative rules, and any applicable chapters of the MMC.

13.27.400 Permits Required

A. Stormwater Permit. It shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of the lot by 3 feet or more without first obtaining a Stormwater Permit from the City. Land disturbance activities related to agricultural practices or improvements are exempt from this requirement, as is any emergency activity that is immediately necessary for the protection of life, property, or natural resources. Activities that disturb one acre or more of land—or less than one acre but are part of a larger common plan of development—are also required to obtain coverage under a Construction General Permit, in addition to the Stormwater Permit. The Stormwater Permit application shall be submitted to Development Services no more than 180 days and no fewer than 60 days from the start date of construction.

   1. Erosion Control Site Plan. This plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to manage stormwater runoff during construction. An Erosion Control Site Plan is required as part of the Stormwater Permit package.
      a. The applicant shall use the Erosion Control Site Plan Review Checklist to ensure their plan meets the City's requirements.
      b. The applicant shall indicate their project's construction priority ranking.

2. Clearing techniques that retain natural vegetation and retain natural drainage patterns shall be used.
3. Phasing shall be required on all sites disturbing equal to or greater than 30 acres, with the size of each phase to be established at plan review and as approved by the City.
4. Clearing, except that necessary to establish sediment control devices, shall not begin until all sediment control devices have been installed and have been stabilized.

D. Construction Site Access Requirements
1. Ingress and egress point BMPs shall mitigate the tracking of debris off site onto the right-of-way.
2. At least one temporary access entrance shall be provided at all sites.
3. Other measures may be required at the discretion of the City in order to ensure that sediment is not tracked onto public streets by construction vehicles, or washed into storm drains.

E. Erosion Prevention Requirements
1. Soil must be stabilized using recommended methods described in the Construction Site BMP Manuals.
2. Soil stockpiles shall be stabilized or covered at the end of each workday.
3. Techniques shall be employed to prevent the blowing of dust or sediment from the site.
4. Techniques that divert upland runoff past disturbed slopes shall be employed.

F. Noxious Weeds
1. Disturbed areas shall be managed to prevent noxious weeds from becoming established in the short and long term. Per the Montana County Weed Control Act (§7-22-2101 to 2154, MCA), it is unlawful to permit noxious weeds to propagate.
2. The City or County reserves the right to prioritize management of non-native species that are not listed as noxious weeds, for site-specific management.
3. Permittees are responsible for ensuring their projects comply with state and local weed management regulations.

G. Removal of Temporary BMPs
1. Upon establishing 70% or greater permanent ground cover, all temporary stormwater management control devices shall be removed.

H. Sediment Control Requirements
1. Where necessary, sediment controls shall be provided in the form of settling basins or sediment traps or tanks, temporary seeding, perimeter controls, or other methods described in the Construction Site BMP Manuals.
2. Adjacent properties shall be protected by the use of a vegetative buffer, silt fence, fiber rolls, or other BMPs outlined in the Construction Site BMP Manuals.

I. Activity involving waterways and watercourses
1. When a watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided and an approval obtained from the City and all other authorized permitting agencies.
2. When in-channel work is conducted, the channel shall be stabilized before, during and after work.
3. Stabilization adequate to prevent erosion must be provided at the outlets of all pipes and paved channels.
4. Stabilization methods shall follow those described in the Construction Site BMP Manuals or administrative rules.

J. Winterization Requirements
1. Winterization BMPs shall be implemented on projects prior to seasonal shutdowns or downtime of one month or longer.

13.27.470 Post-Construction Stormwater Management

The permittee shall create, manage, and maintain post-construction stormwater controls in accordance with the Post-Construction BMP Design Manual and any other applicable administrative rules. The permittee shall also comply with MMC §20.50.030, when applicable.

2. Stormwater Management Site Plan and Report. This site plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction stormwater management, including drawings. The Stormwater Management Report shall include engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation. A Stormwater Management Site Plan and Report are required for medium- to high-priority projects, per the construction priority ranking.
   a. The applicant shall use the Stormwater Management Site Plan Review Checklist to ensure their plan meets the City's requirements.
   b. The applicant shall their project's post-construction priority ranking.
   c. The City shall determine the final priority ranking.

B. Construction General Permit. An authorization from MDEQ under the Construction General Permit is required for construction activities—including clearing, excavating, grading, grubbing, or placement/removal of earth material—that disturb a total area of one or more acres of land, including activities that disturb less than one acre when part of a larger common plan of development or sale that would disturb one acre or more. To apply for an authorization under the Construction General Permit, a complete Notice of Intent Application Package shall be submitted to MDEQ. Once the application has been approved by MDEQ, a copy of the Notice of Intent, Stormwater Pollution Prevention Plan (SWPPP), and MDEQ's approval letter shall be submitted to the City for review. Upon City approval, the City will then issue any required permits for construction activity. When construction activity is completed, MDEQ's Notice of Termination for Storm Water Construction (NOT-SWC) shall be submitted to both MDEQ and the City.

C. Dry Well Approval. Underground injection control wells—commonly referred to as dry wells, sumps, or infiltration devices—are subsurface structures that allow stormwater to flow into the ground under the force of gravity. A Dry Well Approval is required for new, redeveloped, or closed dry wells. The City's Dry Well Approval does not relieve an owner or operator of the responsibility to submit the required inventory information directly to USEPA. The Dry Well Approval is obtained under a City Excavation Permit.

D. The Stormwater Permit for low-priority projects (per their construction priority ranking) and the Dry Well Approval shall expire one year from date of issuance. If work begins, resumes, or continues after the permit expires, then the permittee shall renew their permit and pay a full permit fee. Additionally, if permanent erosion control is not established on 70% or greater of the disturbed areas before the Stormwater Permit expires, then the permit must be renewed. After construction is complete, all medium- to high-priority projects (per their construction priority ranking) shall require a renewal of their Stormwater Permit every five years.

12.27.460 Construction Requirements

Construction activity involving grading, erosion control, sediment control, or waterway crossing shall meet the design criteria set forth in the most recent versions of the Construction Site BMP Manuals and administrative rules. The design criteria shall be adequate to prevent transportation of sediment from the site, to the satisfaction of the City.

A. Permittees shall follow the minimum standards described as Non-Numeric Technology-Based Effluent Limits in the most current Construction General Permit.
B. Concrete operations (e.g., washout and slurry) shall require BMPs that allow for the capture and disposal of generated pollutants.
C. Clearing and Grading Requirements
   1. Clearing and grading of natural resources, such as water bodies and wetlands, shall not be permitted, except when in compliance with all other required permits.

A. Post-construction stormwater management controls shall be designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation.
   1. For projects that cannot meet 100% of the runoff reduction requirement, the remainder of the runoff form the first 0.5 inches of rainfall must be either:
      a. Treated onsite using post-construction stormwater management control(s) expected to remove 80% total suspended solids (TSS);
      b. Managed offsite within the same sub-watershed using post-construction stormwater management controls designed to infiltrate, evapotranspire, and/or capture for reuse; or
      c. Treated offsite within the same sub-watershed using post-construction stormwater management control(s) expected to remove 80% TSS.

B. Any new stormwater outfalls to a named waterbody, or projects that propose alterations of the existing outfall and/or its associated infrastructure, shall implement BMPs to reduce pollutant discharge to the maximum extent practicable.
C. Riparian resource buffer areas (MMC §20.50.030) shall be clearly defined in the Stormwater Management Site Plan.
D. When applicable, a recorded utility easement, covenant for maintenance, and as-built plan for any required private stormwater systems shall be provided in a form acceptable to the City.
   1. The utility easement shall provide sufficient space for vehicle or heavy machinery access for inspection and maintenance, as appropriate for the facility and determined by a Montana-licensed professional engineer.
   2. The covenant shall give the City the right to inspect the facilities and provide a guarantee to the City that the private stormwater system will be maintained by the owner or operator, such that the facility will function as designed in perpetuity.

13.27.500 Inspections

An authorized agent may inspect—at a reasonable time and in a reasonable manner—the premises for which a permit application has been filed or the premises for which the City has issued a permit.

A. The City will conduct all inspections of any activities within its jurisdiction that require a Stormwater Permit, Dry Well Approval, and/or Construction General Permit; and the City will conduct them pursuant to adopted administrative rules.

B. During construction, sites will be inspected according construction priority ranking. If the site fails an inspection, the permittee shall be assessed a re-inspection fee equal to the permit fee. Failure to pay the re-inspection fee shall result in a hold on the issuance of any new City permits to the permittee and/or a hold on the Certificate of Occupancy until the fee is paid. If the site fails a re-inspection or if a permittee fails to pay the re-inspection fee, it may result in a Notice of Violation (MMC §13.27.520).

C. Once construction activities are completed, post-construction stormwater management controls shall be inspected annually according to their post-construction priority ranking. Annual inspections and periodic maintenance are required to ensure the stormwater system continues to function as designed. The City shall have the right to inspect all private post-construction stormwater management controls within the City limits but is not responsible for maintenance.
   1. Low- to medium- priority sites shall be self-inspected annually.
   2. High priority sites shall be inspected annually by the City.
   3. All sites shall require a renewal of their Stormwater Permit every five years; and the City will inspect all sites upon renewal.

13.27.520 Violations

A. It shall be a violation to not comply with the Missoula City Public Works Standards & Specifications Manual that was in effect at the time the permit was issued. Whenever the City finds that any permit conditions, or other conditions required by this chapter, have been violated or that a discharge of pollutants within the City's jurisdiction is taking place or has occurred, which may result in or has resulted in pollutants entering stormwater, the stormwater system, or state waters, the City will do one or more of the following:

1. Issue an NOV
   The NOV issued will notify the owner or operator of the violation and will describe what needs to be done to correct the violation, as well as the timeframe in which the correction is to be made. The City shall determine the timeframe to correct the violation, based on the nature of the violation and the potential threat.

2. Require Corrective Action
   The City will notify the responsible owner or operator in writing and give him or her the opportunity to remediate the affected property in accordance with the provisions of this chapter using a remediation plan approved by the Director.
   a. An authorized agent may issue a stop work order until the violation is corrected.
   b. Owners or operators shall submit remediation plans to and have them approved by the Director before remediation begins. The plan shall include, but is not limited to, a remediation schedule, a course of action, a list of personnel performing remediation work, and a list of equipment to be used.
   c. An authorized agent may enter private property, obtaining warrants when necessary, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in §7-1-4124(16), MCA.
   d. Failure to take corrective action shall result in suspension of the relevant permit.
      (1) A suspended permit shall be reinstated without additional fees if it is resolved within seven days.
      (2) A suspended permit that is not resolved within seven days shall not be reinstated; the permittee shall re-apply and re-purchase permit and shall be subject to permit fees.
   e. Failure to diligently pursue corrective action shall result in assessing the permittee an investigation fee equal to the permit fee. Failure to pay the investigation fee shall result in a hold on the issuance of any new City permits to the permittee and/or a hold on the Certificate of Occupancy until the fee is paid.

B. The owner or operator shall take appropriate preventive action to ensure a violation does not recur.

C. Whenever an authorized agent finds any potential pollutant—including but not limited to oil, earth dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, or waste—upon the sidewalk or right-of-way abutting or adjoining any parcel of land or upon any parcel of land that is in close proximity to any portion of the stormwater system and may result in the pollutant entering the stormwater system, an authorized agent may give notice to the owner or operator to remove and lawfully dispose of the material. The owner or operator shall undertake the activities described in the notice and within the time frames set forth therein. If the owner or operator fails to conduct the activities as described in the notice, the Director may cause the required activities to be performed and have the cost assessed and invoiced to the property owner, as set forth in this chapter and adopted administrative rules.

D. Failure to take corrective action will result in filing a notice of violation in the records for the property with the Missoula County Clerk and Recorder's office.

13.27.530 Enforcement and Penalties

A. If an owner or operator fails to take corrective actions on, or prior to, a required date on a reported or observed spill or the potential to release pollutants, including sediment, into the stormwater system, the City, or a designated contractor, may remediate the affected property at the owner or operator's expense, if the owner or operator does not take corrective actions. The owner or operator shall reimburse the City for all expenditures pertaining to the corrective action.

B. In addition to the penalties herein provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter that the Director or designee considers to be an immediate threat to the public health, safety, and welfare and the environment may be summarily abated and/or restored by the City, or a designated contractor, with the owner or operator responsible to pay the costs of any abatement and restoration.

C. An authorized agent may enter private property, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in §7-1-4124(16), MCA.Each day a violation continues shall constitute a new violation.

D. Failure to pay the costs to the City, or a designated contractor, as described in this chapter may result in the City placing a lien against the property. Continued non-payment may result in the City pursuing payment as outlined in §7-13-4309, MCA.

E. Any person convicted of violating any of the provisions of this chapter, with the exception of a late payment of a stormwater utility bill, may be charged with a misdemeanor. The maximum fine imposed shall be $1000 per day and no imprisonment shall be imposed.

F. At the discretion of the Director, any enforcement action under this Chapter may proceed using the general penalty set forth in Chapter 1.20, MMC, or proceed as a municipal infraction authorized by Section 7-1-4150 through 7-1-4152, Montana Code Annotated. Municipal infractions shall be governed by the procedures and requirements found in § 7-1-4150, § 7-1-4151, and § 7-1-4152, Montana Code Annotated, as amended. The City Attorney's Office is authorized to file citations for municipal infraction of this Title in Municipal Court, and arrange to have them served in accordance with the provisions of § 7-1-4150, Montana Code Annotated. If the person named in the citation is shown to have been served with the civil citation in the proper manner and, without good cause, fails to appear in response to the citation, judgment shall be entered against the person by the Missoula Municipal Court.

13.27.540 Violation of the Clean Water Act

Any owner or operator who violates any provision of this chapter or any provision of any permit issued pursuant to this chapter; discharges pollutants, waste, or wastewater, so as to cause an illicit discharge into the stormwater system, or violates any cease and desist order, prohibition, or effluent limitation, may be in violation of the Clean Water Act and subject to the sanctions thereof, including civil and criminal penalties.

13.27.550 Concealment

Causing, permitting, aiding, abetting, or concealing a violation of any provision of this chapter shall constitute a violation of this chapter.

13.27.560 Civil Actions

In addition to any other remedies provided in this chapter, any violation of this chapter may be enforced by civil action brought by the City. In any such action, the City may seek, and the court shall grant, as appropriate, any or all of the following remedies:

A. A temporary and/or permanent injunction.

B. Assessment of the owner or operator in violation for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation and for the reasonable costs of preparing and bringing legal action under this section.

C. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

D. Compensatory damages for loss or destruction to water quality, wildlife, fish, and aquatic life. Assessments under this section shall be paid to the City to be used exclusively for costs associated with monitoring and establishing stormwater discharge control systems and/or implementing or enforcing the provisions of this chapter.

E. Fines to be paid to the City for MPDES permit violations.

13.27.570 Administrative Enforcement Powers

The City will enforce the requirements under the Construction General Permit for stormwater discharges associated with construction activity in whole or in part as determined by the authorized agent and in accordance with this chapter, administrative rules, and MMC §13.26.

13.27.580 Appeal

Any person notified of non-compliance with this chapter or required to perform monitoring, analysis, reporting, and/or corrective action, who is aggrieved by the decision of the City's authorized agent, may appeal such decision in writing to the Director within 10 business days following the effective date of the decision or written notice. Upon receipt of such request, the Director shall request a report and recommendation from the City's authorized agent and shall set the matter for administrative hearing at the earliest practical date. At said hearing, Director may hear additional evidence, and may revoke, affirm, or modify the authorized agent's decision. The decision shall be final.

13.27.590 Disclaimer of Liability

A. The degree of protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific, engineering, and other relevant technical considerations. The standards set forth here are minimum standards, and this chapter does not imply that compliance will ensure that there will be no unauthorized discharge of pollutants into the waters of the state or the United States.

B. This chapter shall not create liability on the part of the City, any agent, or employee thereof for any damages that result from reliance on this chapter or any administrative decision lawfully made thereunder.

Severability. If any section, subsection, sentence, clause, phrase or word of this ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The council hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, phrase and words thereof, irrespective of the fact that any one or more sections, subsections, sentences, for any reason this ordinance should be declared invalid or unconstitutional, then the remaining ordinance provisions will be in full force and effect.

First reading and preliminary adoption on the 10th day of April, 2023, by a vote of 10 ayes: Alderperson Becerra, Alderperson Carlino, Alderperson Contos, Alderperson Farmer, Alderperson Jones, Alderperson Nugent, Alderperson Savage, Alderperson Sherrill, Alderperson Vasecka and Alderperson West; 0 Nays; 0 Abstain; and 2 Absent: Alderperson Anderson and Alderperson Jordan

Second and final reading on the 8th day of May, 2023, by a vote of 12 ayes: Alderperson Anderson, Alderperson Becerra, Alderperson Carlino, Alderperson Contos, Alderperson Farmer, Alderperson Jones, Alderperson Jordan, Alderperson Nugent, Alderperson Savage, Alderperson Sherrill, Alderperson Vasecka and Alderperson West; 0 Nays; 0 Abstain; and 0 Absent.

ATTEST:	APPROVED:
Marty Rehbein (May 22, 2023 16:39 MDT)	Jordan Hess (May 9, 2023 16:16 MDT)
Martha L. Rehbein, CMC	Jordan Hess
City Clerk	Mayor

CITY OF MISSOULA
MISSOULA
MISSOULA COUNTY, MONTANA

Appendix H

City Storm Water Permit

Rev. September 20, 2023

Stormwater Permit
Enforcement Response Plan

1. Introduction

In accordance with the General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer System (MS4), issued by the Montana Department of Environmental Quality (DEQ), the City of Missoula (City) is required to develop and implement an Enforcement Response Plan (ERP) to ensure compliance with stormwater regulations. The purpose of this ERP is to specify criteria by which City personnel can determine the most appropriate enforcement action for violations. This ERP also helps the City communicate how the enforcement tools available to City personnel will be used to achieve compliance following violations of the City's stormwater regulations. This document addresses the Montana DEQ MS4 Permit's ERP requirements for Minimum Control Measure (MCM) 4: Construction Site Stormwater Management (Part II.A.3.c.iii) and MCM 5: Post-Construction Stormwater Management (Part II.A.4.c.i).

The procedures within this ERP have been developed with the following objectives in mind:

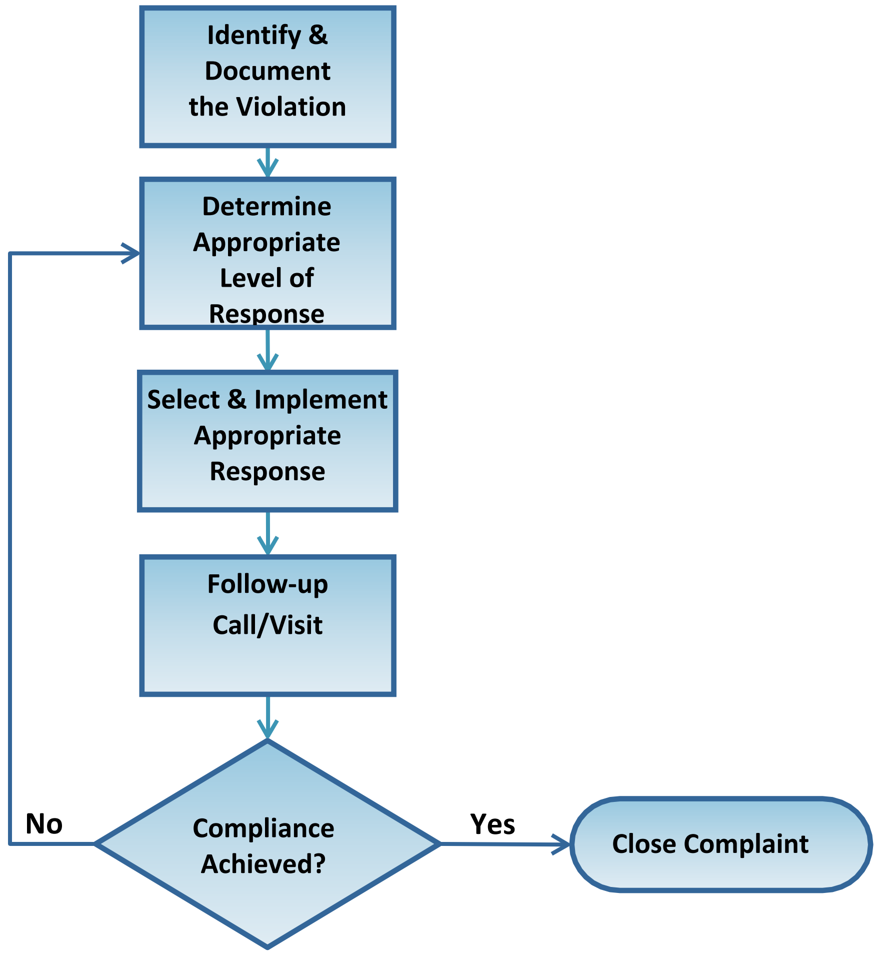
- Prevent pollutants from entering the MS4 and causing environmental harm;
- Communicate definitions for violations;
- Establish appropriate enforcement action based on the nature and severity of the violation;
- Promote consistent and timely use of enforcement tools;
- Ensure that violators return to compliance in a timely manner;
- Recover costs incurred by the City due to operator violations;
- Ensure post-construction stormwater facilities function per design; and
- Promote compliance through education and compliance assistance first and, if necessary, penalties second.

The City of Missoula has the authority to enforce stormwater regulations under Missoula Municipal Code Chapter 13.27 Stormwater Management (Ordinance 3580, 2016; Ordinance 3659, 2020; Ordinance 3716, 2023).

2. Enforcement Response Plan Overview

The enforcement process consists of six basic steps beginning with identification of a violation and concluding with closing the complaint. The overall process is shown in the flowchart below and is further explained in the following sections.

Figure 1: Enforcement Response Flowchart for the City of Missoula Stormwater Permit



3. Identifying/Investigating Violations

The City may become aware of stormwater violations in a number of ways.

- Permit-required inspections or monitoring may reveal violations: the City's programs include periodic or complaint-based compliance inspections of facilities subject to City permits and routine monitoring and inspections, as required by the MS4 permit.
- Staff of other City divisions or departments may also identify and report violations during the course of performing their regular job functions.
- Staff may receive complaints from the public.

3.1. *Construction Site Stormwater Management*

The MS4 Permit Part II.A.3 requires the City to address stormwater runoff to the MS4 from new construction activities and redevelopment projects that result in soil disturbance of 1 acre or more. The City does this by requiring stormwater permits and compliance with the City's stormwater regulations. Sites that are less than 1 acre, but where the activity is part of a larger common plan of development or sale that would disturb one acre or more, are also covered by the City's permitting and regulatory system. Further, the City adopted local regulations for projects that result in the disturbance of 2,500 square feet or more. The City inspects construction sites for compliance with the conditions in their Stormwater Permit, under the City's permitting, inspection, and enforcement program.

With respect to construction permitting, the City uses announced and unannounced inspections, in addition to inspections triggered by complaints to determine whether projects have obtained appropriate permits under the City's program and are complying with their Stormwater Permit and their DEQ Stormwater Pollution Prevention Plan (SWPPP), when applicable. The City prioritizes inspection sites most likely to have an adverse impact on water quality, based on the amount of exposed soil, proximity to a waterbody, maximum proposed slope, and the past performance of the responsible parties.

3.2. *Post-Construction Site Stormwater Management*

The MS4 Permit Part II.A.4 requires the City to develop a program to manage post-construction stormwater management from new and redevelopment projects. Per the Stormwater Permit Site Evaluation Form, medium- and high-priority projects must submit a Stormwater Management Site Plan. This plan must include submit a Drainage Report, including a geotechnical investigation, along with a Private Stormwater Maintenance Agreement. These projects must submit a Post-Construction Inspection Evaluation Form to determine inspection frequency. Per this form, low and medium priority sites must complete annual inspections and the City inspects the facility every 5 years. For high priority post-construction projects, the City completes annual inspections to ensure the facility is function per design.

4. Evaluating the Violation

Once a potential violation is identified, the appropriate level of response should be evaluated in order to select the most appropriate response remedy. The City has five levels of response, each of which is briefly described below. All actions shall be documented in the permit record in the City's permitting software using the Enforcement Response Documentation Form (Attachment A) or other equivalent form. Relevant additional records should also be attached to the record, such as a pdf of email correspondence or phone record, for future reference.

4.1. *Level 1: No Enforcement Action*

There may be situations where City personnel are made aware of a potential violation, but either sufficient evidence does not exist to prove a violation is taking place or there is simply no violation occurring at the time of the inspection. An example of such situation may be if a complaint is received stating that a private stormwater control has not been properly maintained. However, after a brief site inspection and/or verbal discussion, City staff determines the stormwater control is within compliance and no enforcement action is required.

4.2. *Level 2: Informal Response*

The City's intent is to pursue compliance with stormwater violations through informal methods whenever reasonable. Informal responses include telephone notification, email/verbal notice, agreement for a compliance schedule, or meetings, each of which is described in Section 5.1 These methods are appropriate for situations where education is needed, violations do not pose a significant impact to human health or the environment, or the City believes that compliance can be achieved without the use of formal measures

4.3. ***Level 3: Formal Response***

Formal procedures are appropriate to resolve prolonged or repeated violations or immediate impacts to human health and the environment. Additionally, formal responses may be implemented immediately when the responsible party has a history of violations. A history of violations is defined as a permittee receiving 3 or more informal or formal responses to stormwater violations in the past two years. When an informal response has not effectively achieved consistent and proactive compliance, an EPEI may issue a re-inspection fee for a failed inspection to offset the costs incurred by the City to ensure compliance and reinspect the site. The Stormwater Superintendent or their designee is responsible for implementing a Notice of Violation or Stop Work Order. The Public Works Director implements administrative orders, and the City Attorney issues Pre-Citation Letters. Formal responses are described in Section 5.2.

4.4. ***Level 4: Judicial Remedies***

A judicial remedy involves civil enforcement or criminal prosecution and may be implemented when a violation is significant, ongoing, or the responsible party is uncooperative throughout the City's attempts to achieve compliance using less formal responses. The City Attorney is responsible for seeking judicial remedies. Judicial responses include seeking injunctive relief, consent decrees, civil penalties, and criminal penalties, each of which is discussed in Section 5.3.

4.5. ***Level 5: Referral to Other Agencies***

If formal responses prove insufficient to resolve the situation, the City may enlist the help of the Montana DEQ or any other applicable governmental agency. Help from the Montana DEQ may be solicited at an earlier stage of the process in the event the Montana DEQ has a vested interest in the site, has a history of dealing with the responsible party, or the violation is deemed significant enough for immediate action. The Stormwater Superintendent or their designee will seek referral to other agencies when necessary.

5. Selecting an Appropriate Response Remedy

Once the severity of the violation is evaluated, the proper response should be identified and initiated. The City's available response remedies are described below. Each violation must be documented with the permit in the City's permitting software, even if the decision is to take no action. Documentation should explain why such action was or was not taken and include relevant background documents.

5.1. ***Informal Responses***

5.1.1. Verbal/Email Notice

A verbal/email notice of potential violation will be used to obtain additional information pertaining to a potential violation or to resolve an infrequent violation by identifying needed corrective action. The initial contact should take place within 24 hours of determining a potential violation exists. At a minimum, the conversation should be documented in the following manner:

1. date/time of contact;
2. the City staff member who initiated contact;
3. the person contacted (responsible party); and

4. the content of the conversation.

The initial contact will start the enforcement timeline, to establish the length of time it takes to address the violation. Per MMC 13.27.530.F., any person convicted of violating any provision in MMC 13.27 may be charged with a misdemeanor. The maximum fine imposed shall be $1000 per day that the violation occurs. In the event the call/email is not answered, the EPEI or another delegated City employee will make a site visit and leave a note on the property if feasible. If no contact is made after attempting both methods, the enforcement timeline will begin on the date of the site visit. The length of the violation will be measured beginning with the initial contact or site visit depending on the situation. If a violation is found during a City inspection, the inspection will serve as the start of the enforcement timeline.

5.1.2. Compliance Schedule

A compliance schedule directs the responsible party to address the violation and come into compliance with the permit terms and applicable regulations by a specified date:

1. the specific violation;
2. the City's previous correspondence and attempts to achieve compliance;
3. required actions to be completed by the responsible party; and
4. date(s) by which the action(s) must be completed to return to compliance.

Issuance of a compliance schedule does not necessarily relieve the responsible party of having to meet any existing stormwater control commitments, nor does it protect the responsible party from further enforcement, especially where they do not comply with the terms of the compliance schedule.

5.1.3. Meeting

A meeting should be requested with the responsible party within 2 working days (or a timeframe deemed appropriate for the situation) of the initial contact where the permitting has not fully mitigated the violation. A meeting may also be appropriate where, in the opinion of the EPEI, the responsible party is not putting forth a good faith effort to resolve the violation. The meeting will serve to educate the responsible party regarding the violation and to discuss necessary measures for correction. The meeting should be conducted by the EPEI or another delegated City employee. City staff should document the following elements of any meeting:

1. meeting location;
2. date/time of meeting;
3. meeting attendees;
4. content of the conversation; and
5. agreements made at the meeting.

5.2. *Formal Responses*

5.2.1. Re-inspection Fee

When an informal response is elevated to a formal response, a re-inspection fee may be charged to the permittee if the site fails an inspection. The re-inspection fee is equal to the permit fee and is intended to cover the additional costs incurred by the City to reinspect the site. Failure to pay the re-inspection fee shall result in a hold of any new City permits to the permittee and/or a hold on the Certificate of Occupancy until the fee is paid. If a site fails a re-inspection or if the permittee fails to pay the re-inspection fee, a Notice of Violation may be issued.

5.2.2. Notice of Violation

A Notice of Violation (NOV) is an official communication from the City to the responsible party which informs the party a violation has occurred. The NOV will be issued as a warning for significant violations of the City's stormwater ordinance and requirements or in cases where a verbal/email notice for a minor infraction has been ignored for at least 7 days, or when minor infractions occur repeatedly. The NOV documents the initial attempts of the City to resolve the violation and other details including:

1. the specific violation;
2. photos (if possible);
3. timeframe and actions required to return to compliance; and
4. a warning that further enforcement action may be taken for failure to comply.

The NOV may include an investigation fee equal to the permit fee. Failure to pay the investigation fee shall result in a hold on the issuance of any new City permits to the permittee and/or hold on the Certificate of Occupancy until the fee is paid.

5.2.3. Stop Work Order

A Stop Work Order is a notice which informs the construction site operator of an ongoing stormwater management violation and requires a cessation of work until the matter is resolved. No work shall be allowed onsite during a stop work order except for the maintenance and installation of best management practices, or other work related to coming into compliance with the applicable regulations or permit terms. No City permits, payments, or approvals of any kind will be issued for any project the owner or contractor is involved with as long as the Stop Work Order is in effect. The Stop Work Order will be issued for failure to comply with an NOV or for extreme violations of the City's construction site stormwater requirements. The Stop Work Order should include the following information:

1. the specific violation,
2. contact information for the City personnel who must be contacted to discuss required remediation procedures,
3. the mitigation goals necessary to remove the stop work order, and
4. a warning notifying the site operator of additional enforcement actions for continued noncompliance.

A Stop Work Order will not be removed until the situation is substantially resolved, as determined by the issuer of the Stop Work Order.

5.2.4. Administrative Order

An administrative order is a formal enforcement document that requires the responsible party to either cease the specified activity or implement specified corrective measures. An administrative order will be issued when informal remedies have been pursued and have not resulted in compliance.

5.2.5. Pre-Citation Warning Letter

An Pre-Citation Warning Letter is issued by the City Attorney's Office and requires the responsible party to explain their noncompliance and show cause why more severe enforcement actions, including criminal sanctions, should not be pursued. A Pre-Citation Warning Letter should be issued when an administrative order or other enforcement remedy has not resulted in compliance.

5.3. ***Judicial Remedies***

5.3.1. Injunctive Relief

An injunction is a court order which directs the responsible party to cease a specified action or behavior. The City will seek injunctive relief if the responsible party refuses to comply with an administrative order or if delays associated with litigating a civil suit would result in irreparable harm to the MS4 or state waters (§75-5-103(34a), MCA).

5.3.2. Consent Decree

A consent decree is an agreement between the City and the responsible party reached after a lawsuit has been filed. A consent decree will be pursued when the City and the responsible party can reach a suitable agreement.

5.3.3. Municipal Infraction

A municipal infraction is a civil offense punishable by a civil penalty of not more than $300, or not more than $500 for a repeated violation. A municipal infraction is assessed after a proceeding in front of a municipal court judge where the court enters judgement against the party responsible for a violation of the City's stormwater management requirements. The penalty is not related to any specific cost borne by the City, and does not prevent the City from seeking alternative relief, including response costs. The amount of the penalty sought by the City will be proportional to the harm caused by the violation, at the discretion of the Municipal Court Judge. The City may also recover damages to its MS4 or for the cost of fixing/maintaining stormwater infrastructure as stated in City ordinances.

5.3.4. Criminal Penalties

Criminal prosecution is a formal process of charging the responsible party with violations of ordinance provisions punishable by fines. Criminal prosecution will be pursued when the responsible party has ignored previous orders to take corrective actions for at least 2 weeks; and in the view of the City Attorney or Montana DEQ, the responsible party is not taking sufficient action to mitigate the violation. Criminal penalties may be started sooner at the discretion of the City Attorney.

5.4. ***Additional Considerations***

Several criteria will be used to aid in determining the correct level of response:

5.4.1. Magnitude

Incidents which may cause damage to the MS4 or pose a threat to human health and/or the environment will be considered significant and necessitate a formal enforcement action.

5.4.2. Duration

Violations which continue over prolonged periods of time will result in escalated enforcement actions.

5.4.3. Compliance History

The responsible party's compliance history will be an important factor in determining the appropriate remedy to apply. The City has the authority to issue informal or formal notices for less severe violations. However, recurring violations may lead the City to escalate the level of response in a shorter time frame than usual.

5.4.4. Good Faith of the Operator

Good faith is a characteristic of actions showing the responsible party intends to achieve compliance in a timely manner. If the responsible party is attempting in good faith to correct the violation, the City's enforcement responses may be less severe. However, potential threats to human health or the environment will always take precedence when considering the City's level of response. While the responsible party's good faith in correcting its violations may be a factor in determining which enforcement response is suitable, good faith does not preclude the responsible party from enforcement action.

6. Enforcement Roles and Responsibilities

Table 1 details the typical enforcement roles of City staff: ① indicates primary responsibility, ② represents secondary responsibility, and NA indicates staff does not participate at that response level or does not have the authority.

Table 1: Staff Enforcement Roles

Enforcement Action	EPEI	Stormwater Superintendent	Public Works Director	City Attorney
Level 1: No Enforcement				
No action required	①	②	NA	NA
Level 2: Informal				
Verbal/Email Notice	①	②	NA	NA
Compliance Schedule	①	②	NA	NA
Meeting	①	②	NA	NA
Level 3: Formal				
Re-inspection Fee	①	②		
Notice of Violation	①	②	NA	NA
Investigation Fee	①	②		
Stop Work Order	NA	①	②	NA
Administrative Order	NA	NA	①	②
Pre-Citation Warning	NA	NA	NA	①
Level 4: Judicial				
All Judicial Remedies	NA	NA	NA	①
Level 5: Referral to Other Agencies				
All Referrals	NA	①	②	NA

All significant violations and the responses shall be reported to the Stormwater Superintendent and the Public Works Director. The Stormwater Superintendent or delegated City employee will be primarily responsible for informal responses to achieving compliance. If compliance is not achieved or the risk to the environment or safety and health of the community increases, the Public Works Director will take over primary responsibility for enforcement. When the situation requires a formal response, the Public Works Director will assume the responsibility for deciding the proper approach to achieve compliance. The City Attorney and the Stormwater Superintendent will be copied on all formal enforcement responses. The Public Works Director will consult with the City Attorney's Office when judicial remedies may be sought.

7. Escalation Process and Schedule for Site Violations

Tables 2 and 3 provide typical responses to common construction site violations and a typical schedule for escalation of enforcement actions. Each violation has unique circumstances and concerns. Therefore, the tables below will serve as guidance only. Violations which a pose a significant threat to human health and/or the environment will utilize more severe enforcement actions on a compressed timeframe in order to quickly eliminate the violation, abate any damages, and prevent recurrence.

Table 2: Examples of Common Construction Site Stormwater Violation Responses

Example Violation	Status of Violation	Level of Response	Recommended Response Remedy
Conducting earth disturbing activities without a City Stormwater Permit	Operator is unaware of requirements	Informal	Verbal/Email Notice Compliance Schedule
	Operator is aware but has chosen not to obtain appropriate permit	Formal	Stop Work Order
Best management practices (BMPs) not maintained/installed correctly, no off-site discharge	First Violation	Informal	Verbal/Email Notice Compliance Schedule
	Second Violation, good faith effort	Informal	Meeting
	Second Violation, no good faith effort	Formal	Re-inspection Fee (Notice of Violation)
BMPs not maintained/installed correctly, with off-site discharge	First Violation	Informal	Verbal/Email Notice Compliance Schedule
	Second Violation, good faith effort	Informal	Meeting
	Second Violation, no good faith effort	Formal	Re-inspection Fee (Notice of Violation)
	>2 Violations, no good faith effort	Formal	Stop Work Order
Improper handling of hazardous material (e.g., concrete washout, paint, or oil)	First Violation	Informal	Verbal/Email Compliance Schedule
	Second Violation	Formal	Re-inspection Fee (Notice of Violation)
	>2 Violations, no good faith effort	Formal	Stop Work Order
Tracking soil off-site, dust blowing off-site	First Violation	Informal	Verbal/Email Notice Compliance Schedule
	Second Violation, good faith effort	Informal	Meeting
	Second Violation, no good faith effort	Formal	Re-inspection Fee (Notice of Violation)
	>2 Violations, no good faith effort	Formal	Stop Work Order
Extreme infractions	First Violation	Formal	Re-inspection fee (Notice of Violation)
	Repeat Violation	Formal	Stop Work Order
Not conducting regular inspections and maintenance as specified in the permit	First Violation	Informal	Verbal/Email Notice Compliance Schedule
	Second Violation, good faith effort and no off-site discharge	Informal	Meeting
	Second Violation, off-site discharge	Formal	Re-inspection fee and/or (Notice of Violation)
	Second Violation, no good faith effort	Formal	Stop Work Order
Terminated MDEQ Construction General Permit before site is stabilized	First notice that permit needs to remain open	Informal	Verbal/Email Notice Compliance Schedule
	No good faith effort	Formal	Investigation Fee Stop Work Order

Table 3: Possible Escalation Process, Response Schedule, and Responsibilities for Construction Site Stormwater Management Violations

Response	Time Frame	Responsibility
Verbal/Email Notice	Within 24 hours of determining a violation	EPEI or designee
Compliance Schedule	Within 2 days of violation	EPEI or designee
Notice of Violation	Within 2 days of violation or when verbal/email notice has been ignored for at least 7 days (or same day when there the responsible party has a history of violations)	EPEI or Stormwater Superintendent
Stop Work Order	Within 7 days of Notice of Violation (or same day when there are immediate impacts to public health and the environment or when the responsible party has a history of violations)	Stormwater Superintendent or Public Works Director
Administrative Order	Within 4 days of Stop Work Order	Public Works Director or City Attorney
Judicial Remedies	As deemed appropriate	City Attorney
Referral to other agencies	As deemed appropriate	Stormwater Superintendent or Public Works Director

7.1. *Violations*

7.1.1. Minor Violations

Minor violations of City ordinances do not cause immediate harm to the environment or the public health and safety, but have a strong likelihood to do so if the weather changes. Examples include,

- BMPs incorrectly installed, but no runoff is occurring on site;
- Trash or other debris not adequately contained;
- Contractor not following their own Erosion Control Site Plan but there are no deleterious effects on the environment;
- Not installing sediment control BMPs and just sweeping street as needed; or
- Allowing sediment to be tracked off-site during dry weather.

7.1.2. Significant Violations

Significant violations of City ordinances create an immediate risk to the environment, state waters, or public health and safety. Examples include,

- Sediment plume from site reaches a City storm drain;
- Sediment has remained in City right-of-way for 7 days or more;
- Sediment from construction site has been transported more than 50 feet off-site;
- Dust from the site is causing a safety hazard;
- Dust from site reduces visibility to less than 100 feet for any length of time; or
- A visible layer of dust is deposited on parked cars or impervious surfaces a quarter mile or more from the site that was observed coming from a specific construction site, or there is direct evidence

of the origin of the dust.

7.1.3. Extreme Violations

Extreme violations of City ordinances create an immediate risk to the environment or public health and safety on a large scale. Examples include,

- Sites over 5 acres with insufficient erosion controls implemented and dust reducing visibility to less than 30 feet at any time or causing an immediate safety hazard; or
- Sites over 5 acres with insufficient erosion controls implemented and sediment flowing offsite to a surface water body or storm sewer drain.

7.2. ***Compliance Timeline***

The length of compliance timeline will vary with the severity of the violation. Compliance schedules will be determined by City staff using the following guidelines:

- The City will determine the level of effort from the contractor that constitutes a good faith effort.
- Mitigating stormwater issues is the top priority on-site.
- When computing working days, the weekend (Saturday and Sunday) will only be counted as one working day.
- The minimum compliance timeline will be 24 hours.
- The availability of materials can be a factor. For example, if the contractor is unable to obtain rock for a tracking pad after checking with all local suppliers, the timeline can be lengthened to accommodate this issue.
- All immediate risks to public health and safety or the environment shall be mitigated to the point where the site is not polluting the environment within a maximum of 24 hours.

MISSOULA
PUBLIC WORKS & MOBILITY DEPARTMENT — STORMWATER
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

ATTACHMENT A
ENFORCEMENT RESPONSE DOCUMENTATION FORM

City Personnel Involved Date

Description of Violation

Location of Violation (address)

( ) -
Responsible Party Telephone

Street City Zip

Description of Violation:

Level of Response Selected Remedy Date for Follow-Up

Additional Notes:

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial	☐ Open Space ☐ Golf Course
☐ Ultra-Urban Residential (High Density)	☐ Institutional
☐ Suburban Residential	Other: ______
☐ Commercial	Known Industries: ______

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

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

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

MISSOULA
PUBLIC WORKS & MOBILITY DEPARTMENT – STORMWATER
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial	☐ Open Space ☐ Golf Course
☐ Ultra-Urban Residential (High Density)	☐ Institutional
☐ Suburban Residential	Other: ___
☐ Commercial	Known Industries: ___

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

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

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

rev. 2/6/2023

Construction Site Inspection Form

☐ Pass ☐ Fail

Project Name:____ **Permit No**.:_______________

Address or Latitude/Longitude:____

Date of Inspection:________________________ **Start/End Time:**____________________________________

Inspected by:________________________________ **Title:**__________________________________

City Department/Division:____

Describe Present Phase of Construction:____

Type of Inspection:

❑ Beginning of Construction ❑ Pre-storm event ❑ During rain event

❑ Post-rain event ❑ Conclusion of Project ❑ Response to violation or complaint

Weather Information

Has it rained since the last inspection? ❑Yes ❑No

If yes, provide:

Storm Start Date & Time: Storm Duration (hrs): Approximate Rainfall (in):

Weather at time of this inspection:

❑ Clear ❑ Cloudy ❑ Raining ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds

❑ Other: Temperature:

Do you suspect that discharges may have occurred since the last inspection?

❑Yes ❑No

Are there any stormwater discharges at the time of inspection? ❑Yes ❑No

If yes, provide location(s) and a description of stormwater discharged from the site (presence of suspended sediment, turbid water, discoloration, and/or oil sheen:

Prohibited Discharges

Are there any prohibited discharges at the time of inspection? ❑Yes ❑No

If yes, provide location(s) and a description:

Photos? ☐ Yes ☐ No

If yes, please attach and/or provide filepath:

	BMP/Activity	Implemented	Maintained	Corrective Action & Notes
Erosion Prevention and Sediment Control				
1	Are stormwater volume and velocity controls being used to minimize soil erosion within the site? (e.g., check dams and fiber rolls)	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
2	Are stormwater volume and velocity controls being used to minimize soil erosion at discharge locations? (e.g., stilling basins and fiber rolls)	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
3	Are efforts being made to minimize the amount of soil exposed throughout the site?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
4	Are efforts being made to minimize the disturbance of steep slopes?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
5	Are perimeter controls and sediment barriers (e.g., silt fence) adequately installed (keyed into substrate) and maintained?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
6	Are storm drain inlets properly protected?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
7	Are discharge points and receiving waters free of sediment deposits? If no, provide locations.	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
8	Is there evidence of sediment being tracked into the street?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
9	Are natural resource areas (e.g., streams, wetlands, and mature trees) protected by natural buffers, barriers, or similar BMPs?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
10	Are efforts being made to minimize soil compaction and preserve topsoil?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	

	BMP/Activity	Implemented	Maintained	Corrective Action & Notes
Soil Stabilization				
11	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Dewatering				
12	Are discharges from dewatering activities being managed by appropriate controls?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Pollution Prevention Measures				
13	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
14	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
15	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
16	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
17	Are vehicle and equipment fueling, cleaning, material storage, and maintenance areas free of spills, leaks, or other harmful materials?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Surface Outlets and Miscellaneous				
18	When discharging from basins and impoundments, are outlet structures that withdraw water from the surface being used?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
19	Are there locations where additional BMPs appear to be necessary?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Describe any incidents of non-compliance not described above:				

Inspector’s Signature

Date

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

CONSTRUCTION SITE INSPECTION LOG

PROJECT NAME	PROJECT FILE NO.	ADDRESS

TOTAL PROJECT ACRES	TOTAL DISTURBED ACRES

LATIENT

LATITUDE: LONGITUDE:

SWPPP ADMINISTRATOR	ADDRESS	PHONE NUMBER

GENERAL PERMIT PERMIT/SWPPP NUMBER

Site Inspection Log

Date	Inspector	Inspection Type	Follow-Up Required?	Date of Follow-Up Inspection
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	

Supplemental Site Inspection Log

Date	Inspector	Inspection Type	Follow-Up Required?	Date of Follow-Up Inspection
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	

Rev. Feb. 6, 2023

Erosion Control Site Plan Checklist

Date: _________________________

Project Name: ____

Address: _________________________Zip Code:____________________

Project Area (square feet):_________Disturbance Area (square feet):___________________

Owner Name:____________________Phone Number:_____________________

Owner Address:____

Disturbance Area is any area that is subject to clearing, excavating, grading, and/or placement/removal of earth materials.

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—the City of Missoula is required to regulate runoff and the treatment of stormwater into drainage systems and water bodies, including the Missoula aquifer. The regulation of stormwater includes construction stormwater from project sites (Montana Code Annotated 75-5-401). Projects that involve 1 acre or more of land disturbance, or less than one acre but are part of a larger common plan of development, are required to demonstrate coverage under the Montana Pollutant Discharge and Elimination System General Permit for Stormwater Discharges Associated with Construction Activity.

Clearly show each item below on the Erosion Control Site Plan and fill in the corresponding check box. Best management practices (BMPs) are structural, vegetative, or managerial practices used to treat, prevent, or reduce water pollution. Help us protect our waterways and sole-source aquifer with BMPs. For guidance, please refer to the Public Works Manual Chapter 8, MDT BMP Manual, and/or MDEQ Construction Field Guide.

Project Area	
☐	All areas of construction, including but not limited to: areas to be graded as shown on a grading plan, areas to be cleared, as well as structures, retaining walls, roads, drives, utilities, trenches, scaffolds, catch basins, etc. These areas should be consolidated and located outside steep or sensitive areas.
☐	Location of all existing buildings, structures, easements, or underground utilities.
☐	Accurate contours showing the topography OR drainage arrows showing existing drainage patterns and direction of flow
☐	Surface water location(s) within 200 feet of the project boundary
☐	Inlet locations within 200 feet of the project boundary and protection measure details
☐	Perimeter controls (e.g., **vegetative buffer**, compacted berm, silt fencing, and/or fiber rolls). On slopes greater than 10%, the measures must be installed along contour lines.
☐	All areas that will be used for stockpiling earth and storing construction materials
☐	For slopes less than 3:1, provide sediment control along contour lines. For slopes greater than 3:1, slope stabilization BMPs are required.

Construction Access	
☐	Stabilized, designated access points for entrance onto the property. If using an existing paved driveway, identify it.
☐	Designated area(s) for parking of construction vehicles.
Construction Materials and Waste	
☐	Location, installation, and maintenance of a concrete mixer, washout, and pits. No concrete, mortar, or stucco washout shall be placed directly on the soil/ground. Specify the method used to contain the washout.
☐	Location(s) of portable toilets away from surface water locations and storm drain inlets.
☐	Show storage location and containment of construction materials or stockpiles during work, as well as afterhours/weekends. No materials shall be stored or stockpiled on the street.
Add these Standard Comments on the Site Plan	
☐	Locations of temporary stockpiles must be covered when not being actively worked in dry weather. Alternatively, in wet weather, or for longer storage, use seeding and mulching, soil blankets, or mats.
☐	Perform clearing and earth-moving activities only during dry weather; when necessary, use dust control measures to comply with air quality ordinances. Measures to ensure adequate erosion prevention and sediment control shall be installed prior to earth-moving activities and construction.
☐	Measures to ensure adequate erosion prevention and sediment control are required year-round. Stabilize all disturbed areas and maintain erosion prevention measures continuously between from April 30 through October 1.
☐	Maximize and protect areas to be undisturbed (including sensitive areas and buffer zones), using a vegetative buffer or 6-foot fence/barrier. Do not disturb riparian areas.
☐	Inlet protection shall be cleaned out after each rain event, or as needed, to function properly. Do not use sand bags, as these tear and can result in sand entering the storm drains.
☐	Store, handle, and dispose of construction materials and wastes properly, to prevent their contact with storm water. No materials shall be stored or stockpiled on the street.
☐	Stockpiles must be covered when left overnight; if not being worked within 14 days, they must be stabilized with seed, covered with mulch, soil blankets, or mats.
☐	Control and prevent the discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, wash water, or sediments, and non-storm water discharges to storm drains and watercourses.
☐	Avoid cleaning, fueling, or maintaining vehicles on site, except in a designated area where wash water is contained and treated. Limit and time applications of pesticides and fertilizers to prevent polluted runoff.
☐	Limit construction access routes to stabilized, designated access points.
☐	Avoid tracking dirt or other materials off site; clean off-site paved areas and sidewalks using dry sweeping methods.
☐	The areas delineated on the plans for parking, grubbing, storage, etc., shall not be enlarged or "run over."
☐	Erosion prevention and sediment control materials shall be stored on site.
☐	Tree protection shall be in place before any demolition, grading, excavating, or grubbing is started.

rev. Feb 27, 2023

Landscape Agreement
Low Priority Sites (All) and Medium Priority Sites (SFR)
per the Stormwater Site Evaluation Form

Date:____________________________

Applicant Name:____________________________________**Stormwater Permit No.:**________________

Applicant Address: ____**Zip Code:**________________

Applicant Email: _______________________________________**Phone:** ____________________________

Subject Property Address:______________________________________**Zip Code:**___________________

Owner Name (if applicable):____________________________**Phone Number:**______________________

To close out the City Stormwater Permit, permanent erosion control must be established on 70% or greater of the disturbed areas. Low priority sites and single-family residential medium priority sites, per the Stormwater Site Evaluation Form, may close out their Stormwater Permits prior to reaching this condition, if permanent stabilization (e.g., landscaping) is installed on 70% or more of the disturbed areas within 6 months of closing the permit. Temporary best management practices (BMPs) must remain in place to prevent sediment-laden discharge from leaving the site until permanent erosion control is established.

Contractor/Landscaper Name/Company:_____________________________________

Phone:________________________ Email: _____________________________

Estimated Start date: ___________________ Estimated completion date: ______________________

The Applicant hereby agrees to meet the conditions in this Landscape Agreement by installing permanent erosion control on 70% or more of the disturbed areas within 6 months of closing the permit. Failure to comply this this condition will be considered a violation of Missoula Municipal Code Chapter 13.27 Stormwater Management and subject to penalties therein.

_____________________________ _____________________

Applicant Signature Date

rev. Feb. 06, 2023

Site Stabilization Agreement
Low Priority Sites (All) and Medium Priority Sites (SFR)
per the Stormwater Site Evaluation Form

Date:____________________________

Applicant Name:_____________________________________**Stormwater Permit No.:**________________

Applicant Address: ____**Zip Code:**________________

Applicant Email: _______________________________________**Phone:** ____________________________

Subject Property Address:______________________________________**Zip Code:**___________________

Owner Name (if applicable):____________________________**Phone Number:**_______________________

To close out the City Stormwater Permit, permanent erosion control must be established on 70% or greater of the disturbed areas. Low priority sites and single-family residential medium priority sites, per the Stormwater Site Evaluation Form, may close out their Stormwater Permits prior to reaching this condition, if permanent stabilization (e.g., landscaping) is installed on 70% or more of the disturbed areas within 6 months of closing the permit. Temporary best management practices (BMPs) must remain in place to prevent sediment-laden discharge from leaving the site until permanent erosion control is established.

Contractor/Landscaper Name/Company:______________________________________

Phone:_________________________ Email: ______________________________

Estimated Start date: ___________________ Estimated completion date: ______________________

The Applicant hereby agrees to meet the conditions in this Site Stabilization Agreement by installing permanent erosion control on 70% or more of the disturbed areas within 6 months of closing the permit. Failure to comply this this condition will be considered a violation of Missoula Municipal Code Chapter 13.27 Stormwater Management and subject to penalties therein.

______________________________ ______________________
Applicant Signature Date

rev. Feb. 06, 2023

Stormwater Site Evaluation Form

This form is used for the Construction Site Inspection Frequency Determination and is completed by the applicant/owner.

Date:__________________

Project Name:____ **Permit No.:**__________________

Address:____ **Zip Code:**___________________

Project Area (acres):_______________________ **Disturbance Area (acres):**_________________________

Applicant/Owner Representative:________________________ **Phone number:**______________________

Owner Name:____ **Phone Number:**_____________________

Owner Address:____

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—the City of Missoula must inspect construction sites based upon their priority ranking.

If your site is in a subdivision that has been approved per current standards, then it is automatically LOW priority and you do not need to complete the worksheet on page 2. If you are unsure, then contact the Engineering Desk at (406)552-6636 or engpermitdesk@ci.missoula.mt.us.

Site Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 2.

Score	Priority	Inspection Frequency	Project Priority
6 to 11	Low	1. Once at commencement of construction after BMPs have been implemented	
12 to 30	Medium	1. Once at commencement of construction after BMPs have been implemented 2. Once at the conclusion of the project prior to finalization	
31 to 67	High	1. Once at commencement of construction after BMPs have been implemented 2. Once within 48 hours, after one rain event of 0.25 inches or greater 3. Once within 48 hours, after runoff from snowmelt due to thawing conditions that cause visible surface erosion at the project site 4. Once at the conclusion of the project prior to finalization	

rev. Aug. 10, 2022

Site Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Project type	Subdivision with 5 or more units	7	
	TED with 5 or more units	7	
	Commercial site ≥ 0.5 acres	7	
	None of the above	0	
Proximity to surface water	≥ 1,500 feet	1	
	200 to 1,499 feet	5	
	< 200 feet	7	
	Discharge to waterbody	10	
Depth to groundwater	> 20 feet	1	
	≤ 20 feet	10	
Discharge to an impaired waterbody	No (dry well/groundwater, Butler Creek, LaValle Creek, Pattee Creek, or Rattlesnake Creek)	1	
	Yes (Bitterroot River, Clark Fork River, Grant Creek, or Miller Creek)	10	
Maximum proposed slope	Slopes < 20:1 (H:V) Slopes < 5%	1	
	20:1 ≤ Slopes < 10:1 (H:V) 5% ≤ Slopes < 10%	5	
	Slopes ≥10:1 (H:V) Slopes ≥ 10%	10	
History of non-compliance (applicant and/or owner)	No history of non-compliance	1	
	1 time non-compliant	5	
	2+ times non-compliant	10	
Risk of hazardous material spills/leaks	No hazardous materials stored on site	1	
	Non-liquid hazardous materials stored on site	5	
	Liquid hazardous materials stored on site	10	
		Total Score	
6 to 11 = Low	12 to 30 = Medium	31 to 67 = High	

Permittees found to be habitually non-compliant may be subject to one or more disciplinary actions: compliance through the Missoula Valley Water Quality District Enforcement Response Plan; increased inspection frequency; formal Notice of Violation (NOV), including stop work order; fine(s); and/or suspension/revocation of City Business License.

rev. Feb. 06, 2023

Dry Well Approval

Underground injection control wells—commonly referred to as dry wells, sumps, or infiltration devices—are subsurface structures that allow storm water to flow into the ground under the force of gravity. A Dry Well Approval for new, redeveloped, or closed dry wells is required to protect the Missoula aquifer and for the City to comply with our MS4 Permit. The City's Dry Well Approval does not relieve an owner or operator of the responsibility to submit the required inventory information directly to the U. S. Environmental Protection Agency: https://www.epa.gov/uic/class-v-inventory-form-epa-region-8-only.

Applicant Name:____ Phone:______________________

Facility Name (if applicable):____________________________ Land Use Type:____________________

Address of Facility:____

Mailing Address (if different than above):____

Property Owner (if different):________________________________ Phone:____________________

Property Owner Address:____

☐City of Missoula Standard Detail: Standard 8' Precast Dry Well

☐Soil profile provides acceptable infiltration for facility to function as designed

Does the facility incorporate pretreatment? (circle) **Yes** **No**

Type of pretreatment (circle): **vegetation** **catch basin** **other**______________________

Our dry wells discharge to our sole-source aquifer and pretreatment of pollutants helps to protect our drinking water.

Operating Status (circle one)

New/Proposed **Redeveloped** **Closed**

Check one: ☐ Private Property ☐ Public Right-of-Way Check one: ☐ Landscaped ☐ Not Landscaped

Number of dry wells:_____________ Please fill out 1 to 6 below.

If greater than one, please attach sheet answering questions 1 to 6 for all dry wells.

1. Latitude/Longitude:____
2. Month/year of **Construction** or **Closure** (circle one):_________________________________
3. Dry Well Depth (feet):__________+______ feet of sump rock
4. Total drainage area (square feet):_____________
5. Total impervious area draining to the structure (square feet):_______________
6. Depth to Groundwater (feet):________________________________

Minimum vertical separation from bottom of sump rock and seasonal high water table is 4 feet. Ground water elevation data can be obtained on the Montana Ground Water Information Center website (https://mbmg.mtech.edu/mapper/mapper.asp?view=Wells&) or by contacting the Storm Water Utility at (406) 552-6744 or stormwater@ci.missoula.mt.us.

I certify, under penalty of law, that this document was prepared under my guidance and supervision, and that I am assured that qualified personnel properly gathered and evaluated the information reported here to the best of my knowledge; the information presented above is true, accurate, and complete.

____
Printed Name

____ ____________________
Signature Date

Off-Site Storm Water Treatment Evaluation

Project Information

Project name:

Description of work:

Subdivision name (if applicable):

Site area (acres): Impervious surface created or altered (acres):

Runoff reduction volume (acre feet): Runoff reduction flow (cfs):

Project classification (check all that apply):

❑ New Development ❑ Redevelopment ❑ Residential ❑ Commercial

Regional Facility Considerations

Basin name:

Regional treatment facility to be utilized:

Design capacity of regional treatment facility:

Does the regional treatment facility have adequate capacity? ❑Yes ❑No

Technical Considerations

These criteria must be addressed in the technical report to support offsite treatment

Topography (Steep Slopes)	❑Yes	❑No	Space available	❑Yes	❑No
Soil infiltration rate	❑Yes	❑No	Shallow bedrock	❑Yes	❑No
Contaminated soils	❑Yes	❑No	Prohibitive costs	❑Yes	❑No
High groundwater	❑Yes	❑No	Down-gradient structures	❑Yes	❑No
City code/ordinance	❑Yes	❑No	Community development rules	❑Yes	❑No
Water quality benefits	❑Yes	❑No	Other	❑Yes	❑No

Additional Information

Evaluated by:______________________________ Date:____________________

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Post-Construction Inspection Frequency Determination Form

Date:__________________

Project Name:____**Permit No.:**__________________

Address:____**Zip Code:**____________________

Stormwater Management Control Type:____________________**Drainage Area Treated (acres):**_______

Owner Name:____**Phone Number:**_____________________

Owner Address:____

In compliance with the Missoula Municipal Code Chapter 13.27, the Clean Water Act, and the National Pollutant Discharge and Elimination System, post-construction stormwater management controls shall be inspected per their priority ranking.

Evaluated by:___________________________________**Department/Division:**______________________

Post-Construction Stormwater Management Control Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 2.

Total	Priority	Inspection Frequency	Project Priority
5 to 40	Low to Medium	1. Annual self-inspection by the owner/operator 2. Five-year inspection by the City, with renewal fee	
41 to 60	High	1. Annual inspection by the City of Missoula 2. Five-year inspection by the City, with renewal fee	

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Post-Construction Stormwater Management Control Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Operation and Maintenance Needs (measured as the time between O&M activities for the control to function as designed)	Greater than or equal to five years	1	
	Once every one to five years	5	
	Annual or more often	10	
Proximity to surface water	1,500+ feet	1	
	200 to 1,499 feet	5	
	<200 feet	10	
Location within an impaired waterbody watershed	No (dry well/aquifer, Butler Creek, LaValle Creek, Pattee Creek, or Rattlesnake Creek)	1	
	Yes (Bitterroot River, Clark Fork River, Grant Creek, or Miller Creek)	10	
Land use type	Rural Agricultural/Residential	1	
	Urban Residential/Commercial	5	
	Industrial	10	
History of owner/operator non-compliance	No history of non-compliance	1	
	1 time non-compliant	5	
	2+ times non-compliant	10	
		Total	
5 to 20 = Low	21 to 40 = Medium	41 to 60 = High	

Permittees found to be habitually non-compliant may be subject to one or more disciplinary actions: compliance through the Missoula Valley Water Quality District Enforcement Response Plan; increased inspection frequency; formal Notice of Violation (NOV), including fine(s); loss of access to project site; and/or suspension/revocation of City Business License.

PUBLIC WORKS & MOBILITY DEPARTMENT — STORMWATER
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

POST-CONSTRUCTION STORM WATER MANAGEMENT CONTROL INSPECTION FORM

General Information

Site Name (if Applicable):	Type of Control:
Location:	
Site Owner:	Phone Number:
Responsible Party:	Phone Number:
Date of Inspection:	Start/End Time:
Inspector's Name:	Inspector's Title:
Inspector's Contact Information (phone):	

Type of Inspection:

❑ Routine, Dry Weather ❑ Routine, Wet Weather ❑ Complaint Response

❑ Other _________________

Weather Information

Weather at time of this inspection:

❑ Clear ❑ Cloudy ❑ Raining ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds

❑ Other: Temperature:

Do you suspect that any physical changes or damages to the storm water management control may have occurred since the last inspection?

❑Yes ❑No

Are there any stormwater discharges at the time of inspection? ❑Yes ❑No

If yes, provide location(s) and a description of stormwater discharged from the site (presence of suspended sediment, turbid water, discoloration and/or oil sheen, odor, etc…)

Prohibited Discharges

Are there any prohibited discharges at the time of inspection and/or any signs of prohibited discharges since the last inspection? ❑Yes ❑No

If yes, provide location(s) and a description:

Photos? ❑Yes ❑No

If yes, please attached and/or provide filepath:

	Desired Conditions	Findings	Corrective Action Needed & Notes
1	There is no excessive sediment deposition.	❑Yes ❑No ❑N/A	
2	Slopes are well stabilized and are not contributing sediment to the stormwater management control.	❑Yes ❑No ❑N/A	
3	There is no scour in swales or other vegetated areas.	❑Yes ❑No ❑N/A	
4	Trash racks, inlets, outlets, and low flow orifices are clear of trash, debris, and sediment.	❑Yes ❑No ❑N/A	
5	There is no woody vegetation impeding the performance of any structural component of the stormwater management control.	❑Yes ❑No ❑N/A	
6	Outfall structures do not show signs of settling, cracking, bulging, misalignment or other structural deterioration.	❑Yes ❑No ❑N/A	
7	Embankments, emergency spillways, side slopes or inlet/outlet structures show no signs of erosion.	❑Yes ❑No ❑N/A	
8	Pipes going into and/or out of any stormwater management control are unclogged and unobstructed.	❑Yes ❑No ❑N/A	
9	There is no evidence of animal burrows, nesting, or other habitation.	❑Yes ❑No ❑N/A	
10	There is no trash or debris in the stormwater management control.	❑Yes ❑No ❑N/A	

	Desired Conditions	Findings	Corrective Action Needed & Notes
11	There are no encroachments on the stormwater management control.	❑Yes ❑No ❑N/A	
12	All necessary repairs to safety devices such as fences, gates, covers or locks are complete.	❑Yes ❑No ❑N/A	
13	There is not excessive algae or vegetation in the pond/ditch.	❑Yes ❑No ❑N/A	
14	The ground surface stabilization is retaining any highly erosive or unstable soils, seed germination is being properly facilitated, and any netting or blankets are properly fastened to obtain full contact with the ground.	❑Yes ❑No ❑N/A	
15	Storm water controls appear to be functioning as designed.	❑Yes ❑No ❑N/A	
16	Are there locations where additional stormwater management controls appear to be necessary?	❑Yes ❑No ❑N/A	
17	(Other)	❑Yes ❑No ❑N/A	

Describe any incidents of non-compliance or need for maintenance not described above:

Follow-up inspection required? ❑Yes ❑No	If yes, then date:

Inspector's Signature

Date

POST-CONSTRUCTION STORM WATER MANAGEMENT CONTROL INSPECTION LOG

SITE NAME   TYPE OF STORM WATER CONTROL   GENERAL PERMIT/SWPPP NO.

❑Yes ❑No

IS THIS A HIGH PRIORITY CONTROL?   REQUIRED INSPECTION FREQUENCY

LATITUDE: LONGITUDE:

OWNER   ADDRESS   PHONE NUMBER

Inspection Log

Date	Inspector	Inspection Type	Follow-Up Required?	Date of Follow-Up Inspection
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	

Supplemental Inspection Log

Date	Inspector	Inspection Type	Follow-Up Required?	Date of Follow-Up Inspection
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	

rev. Feb. 06, 2023

____
DATE RECEIVED

POST-CONSTRUCTION STORMWATER MANAGEMENT SITE PLAN REVIEW CHECKLIST

PROJECT NAME	**Permit Number**	**ADDRESS**
TOTAL PROJECT AREA		**TOTAL DISTURBED AREA**
Latitude:		**Longitude:**

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: ______________________ ______________________

TECHNICAL REVIEW

____ The Post-Construction Stormwater Management Plan **includes** the necessary post-construction components, to comply with the State and local post-construction stormwater requirements (identified in the attached checklist).

____ The Post-Construction Stormwater Management Plan **does not include** the necessary components (identified in the attached checklist), to comply with State and local post-construction stormwater requirements through failure to include the following:

Reviewed by: ______________________________

Signature: ______________________________ **Date:** ______________

Project Name: Applicant:

General Information	Complete	Incomplete	N/A
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	☐	☐	☐
Drainage Plan Content			
1. Topographic map of existing and finished grade contours at 2-foot max intervals	☐	☐	☐
2. Location of each permanent storm water 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	☐	☐	☐
Calculations and Design Documentation			
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	☐	☐	☐
e. Existing and post-development peak runoff rate for each design storm	☐	☐	☐
f. Existing and post-development runoff volume for each design storm	☐	☐	☐

Project Name: Applicant

Calculations and Design Documentation (Continued)		Complete	Incomplete	N/A
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	☐	☐	☐
Additional Information				
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	☐	☐	☐

PUBLIC WORKS & MOBILITY DEPARTMENT — STORMWATER
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

Storm Water Permit Fact Sheet

The City of Missoula is required to comply with the conditions of our General Permit for Storm Water Discharges associated with Small Municipal Separate Storm Sewer Systems (MS4 Permit). To ensure compliance with federal and state environmental regulations, the City has implemented a Storm Water Permit. This Fact Sheet explains what is needed for your project (Table 1).

1. Does your project disturb more than 2,500 ft^2 of land or change the grade of the lot by three feet or more?
   Yes……………………………Storm Water Permit Application required, Go to 2
   No…………………………….No Storm Water Permit required, other City permits may apply

2. Using the Site Evaluation Form, submit documentation per your site priority:
   Low…………………………..Erosion Control Site Plan;
   Erosion Control Site Plan Review Checklist; and
   Site Evaluation Form
   Medium or High……….All of the above, in addition to:
   Post-Construction Inspection Frequency Determination
   Storm Water Management Site Plan
   Maintenance Agreement (template provided by City)*
   Operation and Maintenance Manual*
   Storm Drainage Report
   Geotechnical Report (for infiltration)

Table 1. Storm Water Permit Submittals

Site Priority per the Site Evaluation Form	
Low	Medium and High
• Erosion Control Site Plan • Erosion Control Site Plan Review Checklist • Site Evaluation Form	• Erosion Control Site Plan • Erosion Control Site Plan Review Checklist • Site Evaluation Form • Post-Construction Inspection Frequency Determination • Storm Water Management Site Plan • Maintenance Agreement* • Operation and Maintenance Manual* • Storm Drainage Report • Geotechnical Report (for infiltration)

*Projects that propose to infiltrate, evapotranspire, and/or capture for reuse all post-development storm water on-site—without the use of piped conveyance—do not require a Maintenance Agreement or O&M Manual.

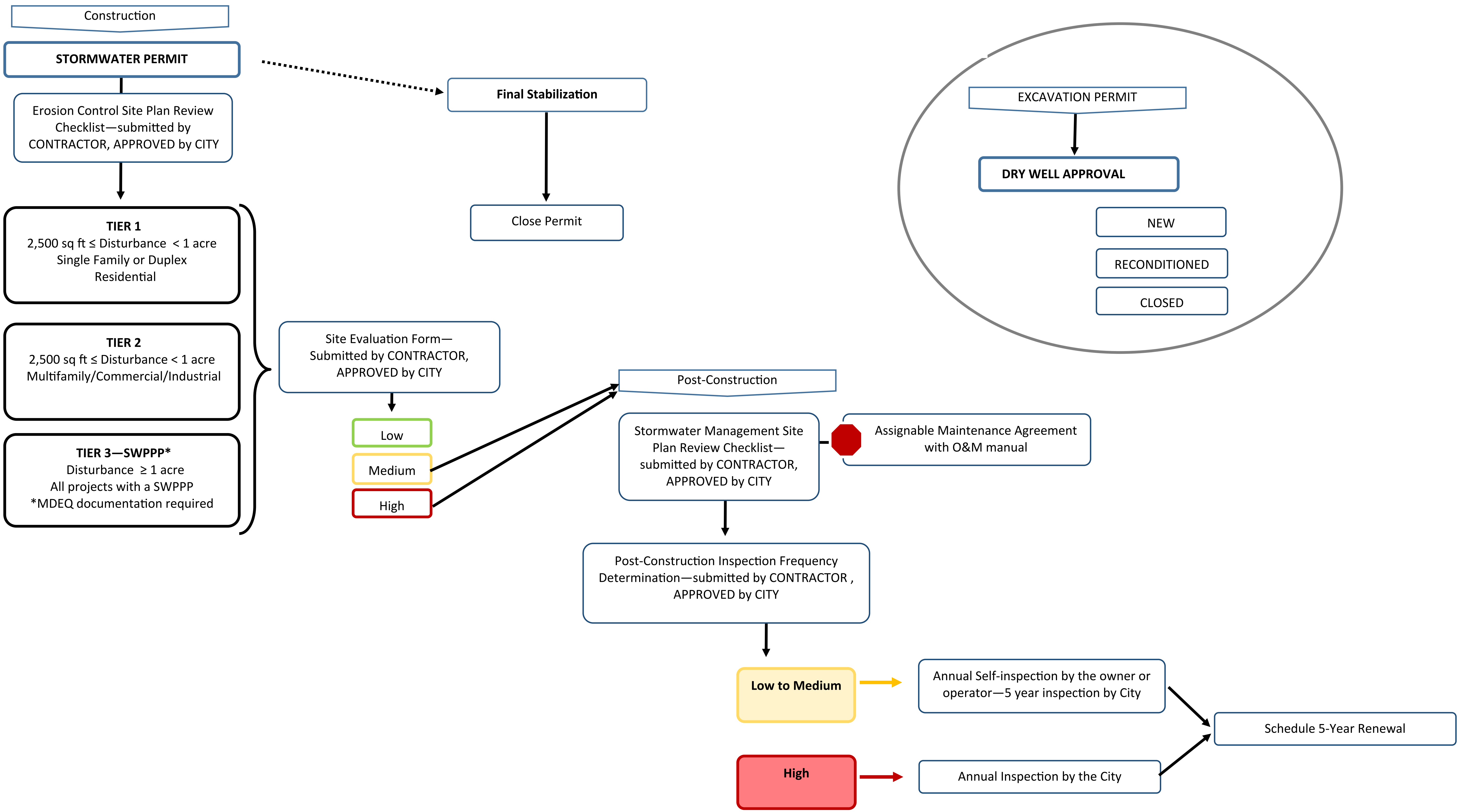
MISSOULA

THE GARDEN CITY · HUB OF FIVE VALLEYS

PUBLIC WORKS & MOBILITY DEPARTMENT — STORMWATER

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6379

Stormwater Compliance Permits




Permit Count by Month and Permit Type
Permit Type SWPPP
Permit Count
20
10
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
Permit Count by Inspected?
78 (34.36%)
149 (65.64%)
Inspected?
True
False
227
Permit Count
Year
2017
2018
2019
2020
2021
2022
2023
2024
$41,252.00
Fees Paid
Fees Paid and Permit Count by Year
Fees Paid
Permit Count
$60K
$40K
$20K
$0K
Fees Paid
200
100
0
Permit Count
2015
2020
Year

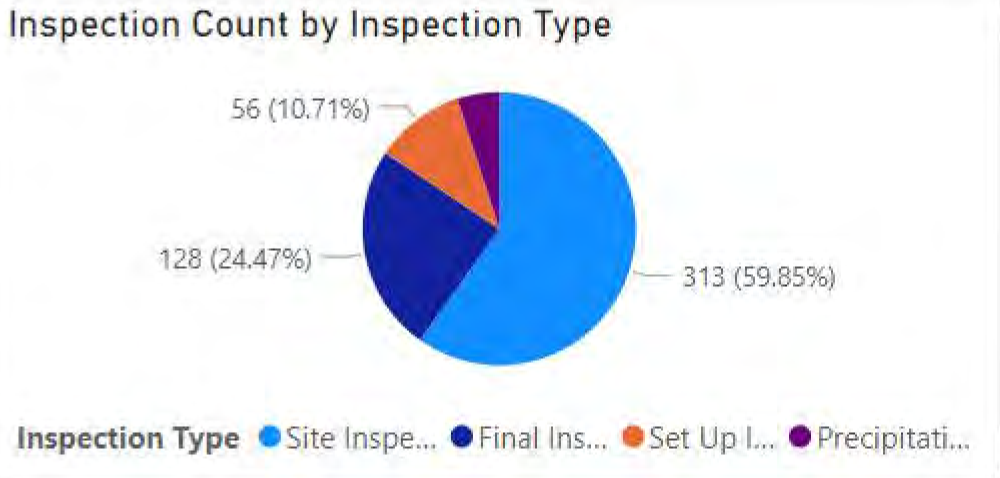
Year

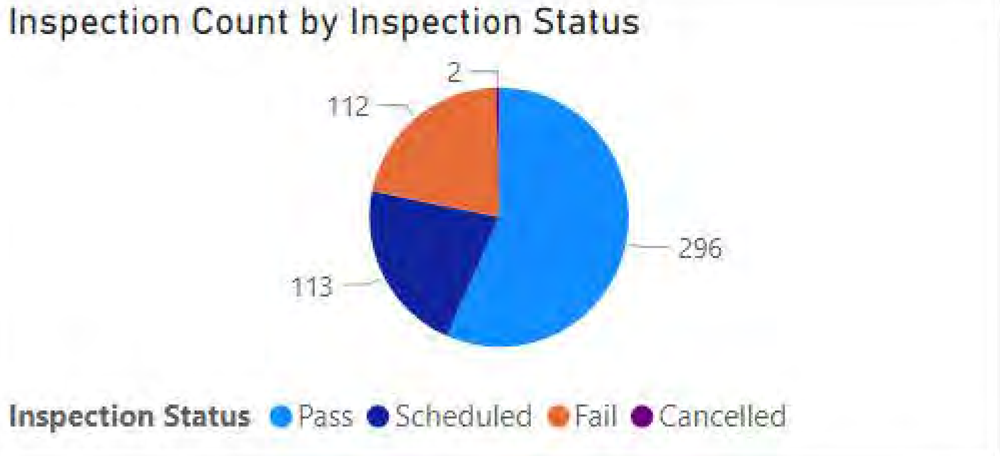
- [ ] 2016
- [ ] 2017
- [ ] 2018
- [ ] 2019
- [ ] 2020
- [ ] 2021
- [ ] 2022
- [x] 2023

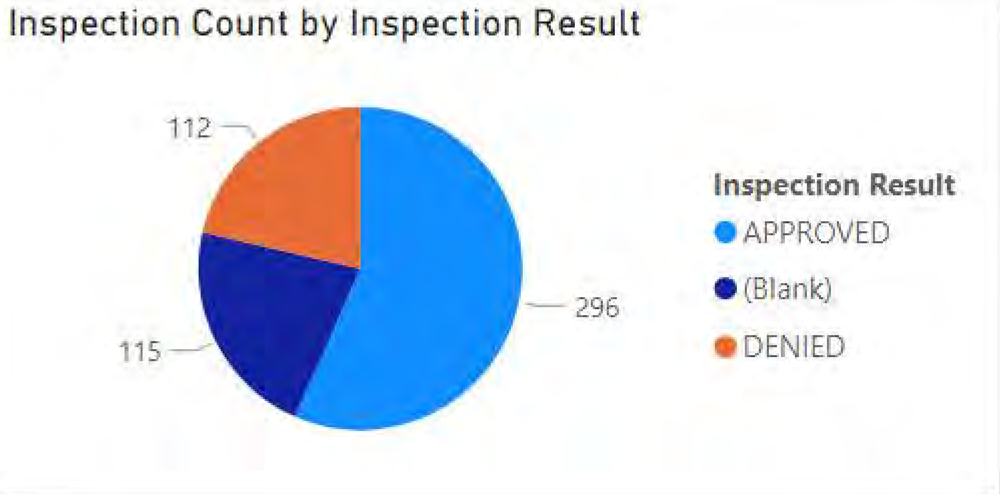
523

Inspection Count

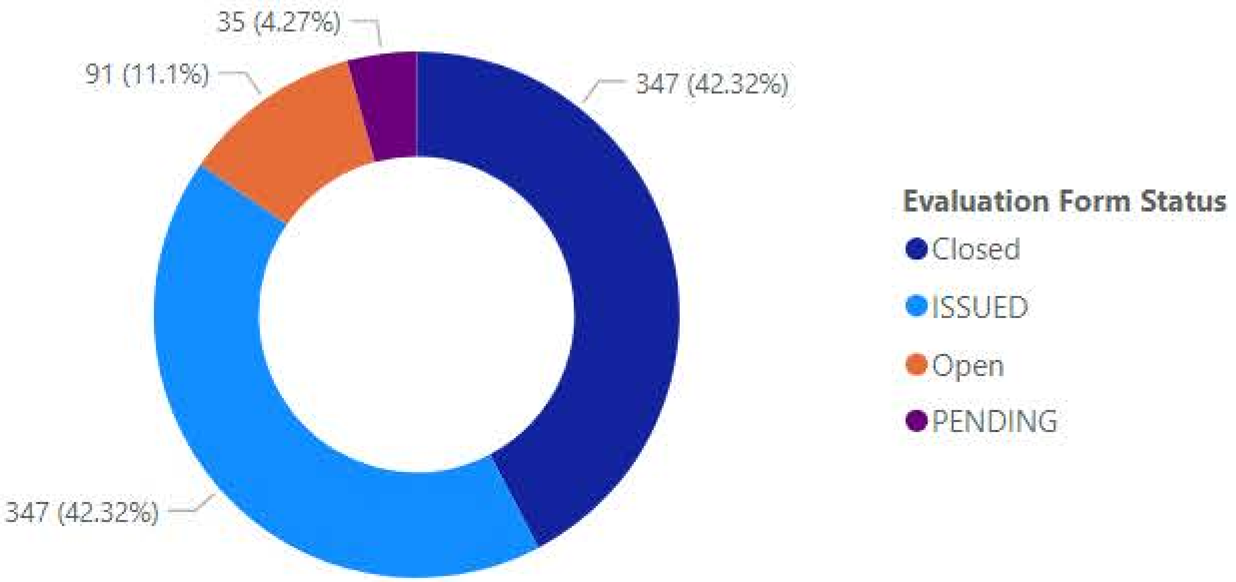
Inspector Name	Inspection Count
	20
Aaron	167
Burt	54
Carver	3
Jane	4
Lyndsey	4
Mickey	13
Traci	4
Triston	12
Will	242
Total	**523**



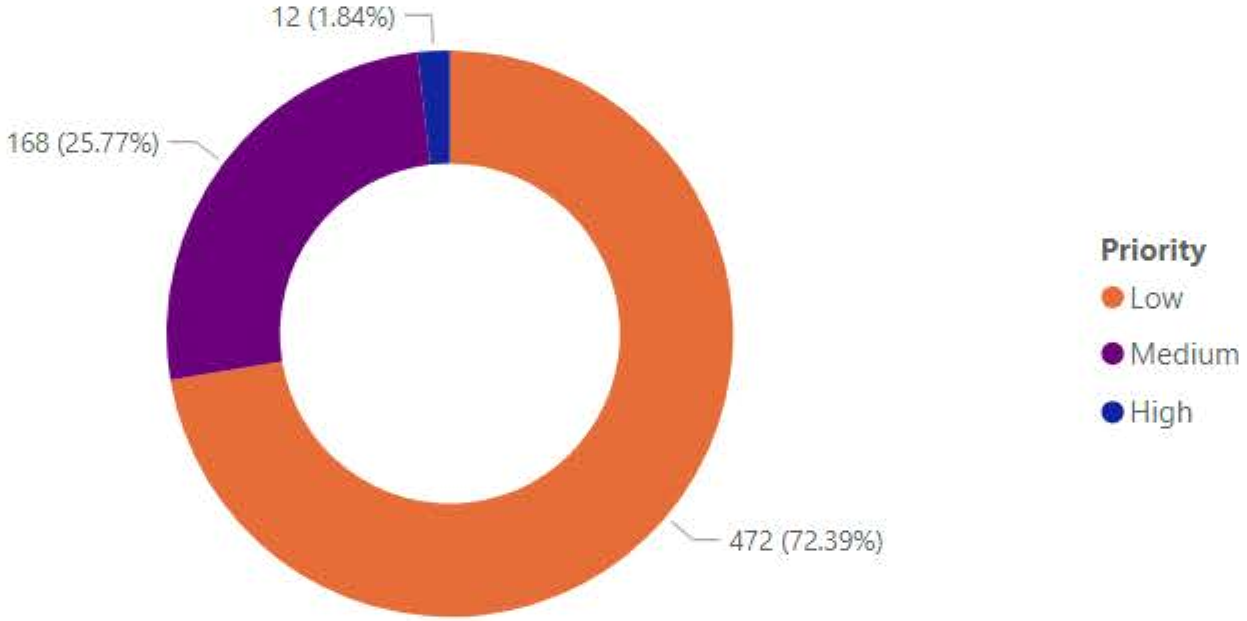




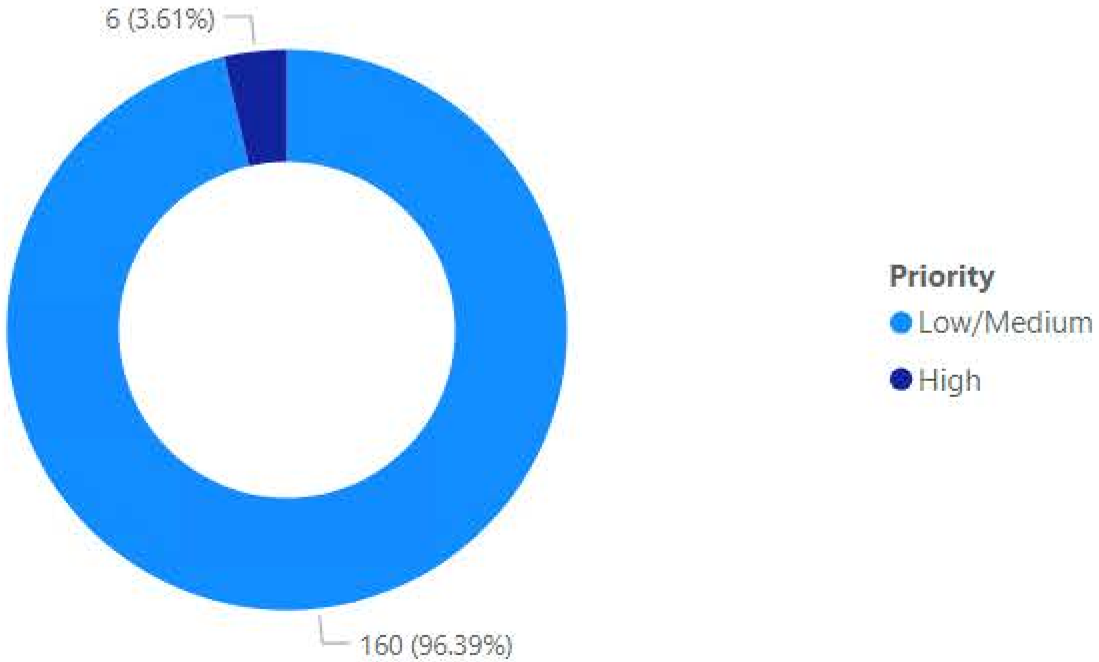
Post Construction Count by Evaluation Form Status



Evaluation Form by Priority



Post Construction by Priority



Appendix I

Water Sampling Plan

STORMWATER
City of Missoula

Water Sampling Plan

Montana Department of Environmental Quality
General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)
MPDES Permit No. MTR040007

City of Missoula
Public Works and Mobility Department
Stormwater Utility Division
1345 West Broadway
Missoula, Montana 59802

February 2024

Contents

TABLES

FIGURES

GRAPHS

ABBREVIATIONS

BMPs	best management practices
City	City of Missoula
HDS	hydrodynamic separator
MDEQ	Montana Department of Environmental Quality
MPDES	Montana Pollution Discharge Elimination System
MS4	Municipal Separate Storm Sewer System
SWMP	Stormwater Management Program
TMDL	total maximum daily load
WLA	wasteload allocation

1 Introduction

The City of Missoula operates its stormwater system under the authorization of the Montana Pollution Discharge Elimination System (MPDES) General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s), hereafter referred to as the MS4 Permit. The current MS4 General Permit, issued by the Montana Department of Environmental Quality (MDEQ), is effective from April 1, 2022 through March 31, 2027.

In accordance with Part III of the MS4 General Permit, the City is required to develop a sampling plan for total maximum daily load (TMDL)-related monitoring and include a TMDL section in its Stormwater Management Program (SWMP). The results from the TMDL-related monitoring, in conjunction with the TMDL section of the SWMP will address applicable TMDLs. Similarly, Part IV of the MS4 General Permit requires semi-annual monitoring (self-monitoring) that may be satisfied entirely or in part by the TMDL-related monitoring required under Part III.

In addition to the self-monitoring and TMDL parameters, stormwater runoff from two Clark Fork River outfalls is tested for *Escherichia coli* and total coliform. While these parameters are not required per the MS4 Permit, the City Parks and Recreation Department has identified them as a concern for river recreation.

1.1 Purpose

The purpose of this sampling plan is to describe the City's stormwater quality monitoring program for the 2022 -2027 permit term.

- The City collects water quality samples from six locations to comply with storm event monitoring and TMDL-related monitoring: two for the Clark Fork River, two for the Bitterroot River, one for Grant Creek, and one on the Clark Fork River (upstream of the MS4 boundary).
- The implemented plan will track and evaluate the effectiveness of best management practices (BMPs) selected for reducing MS4 loading to impaired waterbodies.
- In accordance with the MS4 Permit requirements, this plan will ultimately become part of the TMDL section of the City's SWMP.
- This document, when implemented, will fulfill the requirements of Part II.C of the MS4 Permit for completing a sampling plan for both Storm Event Monitoring and TMDL Monitoring.

2 MS4 Outfalls

The City is within the Middle Clark Fork and Bitterroot Sub-basins, with eight subwatersheds intersecting the City limits (Table 1). Four of these subwatersheds have MS4 outfalls to a surface waterbody. Within these four subwatersheds, 54 outfalls discharge stormwater to one of nine waterbodies: five streams, three irrigation ditches, and one unnamed drainage. Three of these five streams are listed as impaired (MDEQ, 2020a and b).

Table 1. City of Missoula stormwater outfalls per subwatershed and waterbody

HUC[1] 8 Subbasin	HUC 12 Subwatershed	Waterbody	Outfalls
Middle Clark Fork (17010204)	Butler Creek (170102040201)	Butler Creek	0
	Grant Creek (170102040103)	Irrigation Ditch	3
		Grant Creek[IMP]	4
	La Valle Creek (170102040202)	La Valle Creek	0
	Lower Rattlesnake Creek (170102040102)	Rattlesnake Creek	5
	Marshall Creek-Clark Fork (170102040104)	Clark Fork River[IMP]	12
		Orchard Homes Ditch Company	6
		Missoula Irrigation District	1
	Martin Gulch-Clark Fork (170102040205)	Clark Fork River[IMP]	0
Bitterroot (17010205)	Hayes Creek-Bitterroot River (170102051603)	Bitterroot River[IMP]	3
		Pattee Creek	6
		Moose Can Gully	12
	Miller Creek (170102051601)	Miller Creek[IMP]	0
		Total	**52**

[1]U.S. Geological Survey Hydrologic Unit Code
[IMP]Impaired surface water per *Montana Department of Environmental Quality Water Quality Integrated Report* (MDEQ, 2020a and b).

2.1 TMDL Overview

Three impaired waterbodies receive stormwater discharge from the City's MS4 outfalls:

- Bitterroot River
- Clark Fork River
- Grant Creek

MDEQ has assigned some waste-load allocations (WLAs) to the City's MS4, per TMDLs for the Bitterroot River (MDEQ and USEPA, 2014); Clark Fork River metals (MDEQ, 2014c); Clark Fork River non-metals (Tri-State Implementation Council, 1998); and Grant Creek (MDEQ, 2014a and b) (Table 2). Figure 1 provides map of the subwatersheds that intersect the City's boundary.

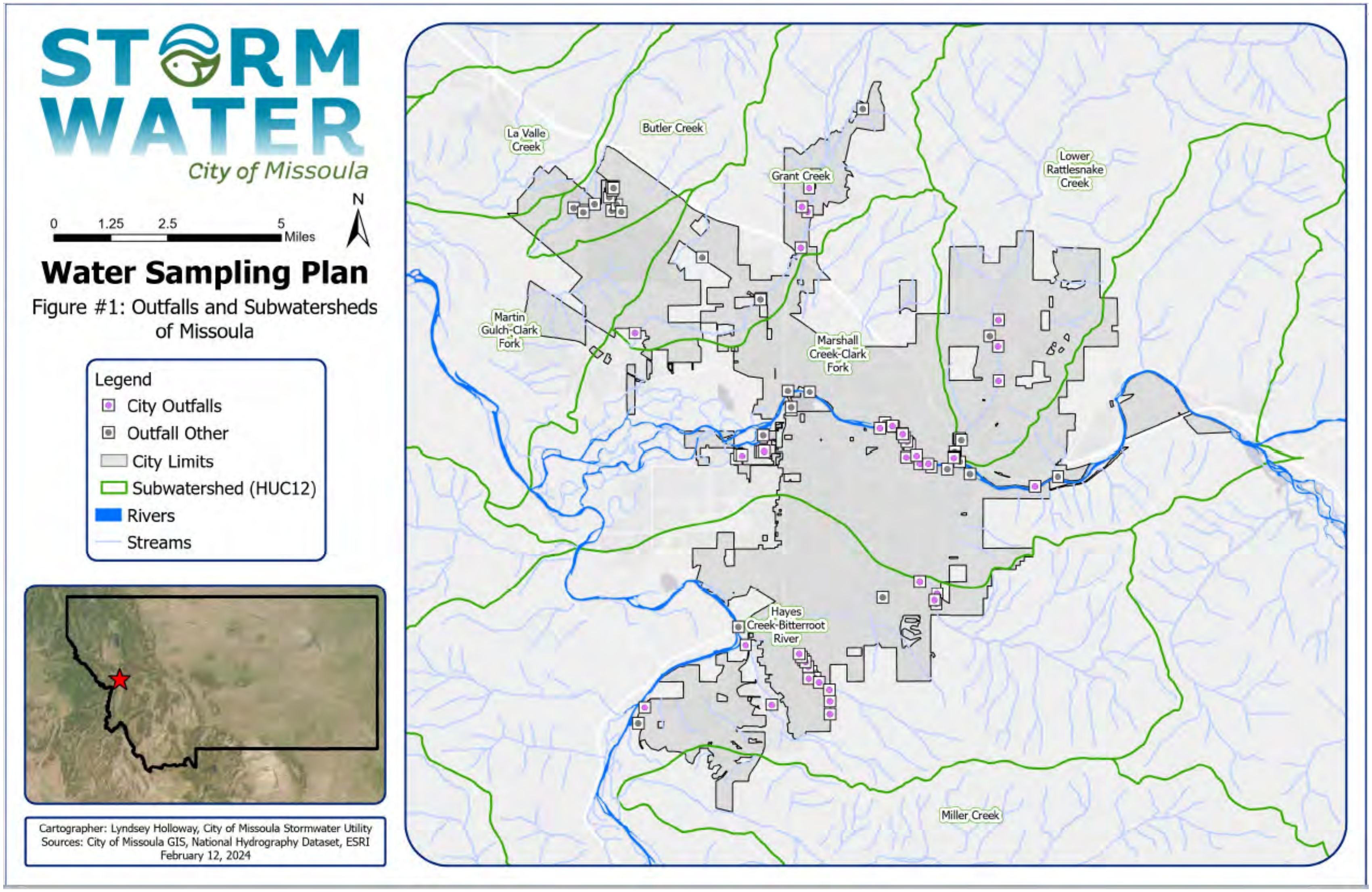


Figure 1. Subwatersheds that intersect the City of Missoula

Table 2. Waste-load allocations (WLAs) for the City of Missoula's MS4[1]

Surface Water	Waterbody ID	Pollutant	TMDL[2]	MS4 WLA
Bitterroot River	MT76H001_030	Lead	9.23 to 27.0 lbs/day[3]	0.08 lbs/day
		Temperature	1,853 kcal/sec	*
Clark Fork River, Blackfoot River to Rattlesnake Creek	MT76M001_030	Arsenic	136.08 to 626.4 lbs/day[3]	**
		Cadmium	4.24 to 14.47 lbs/day[3]	**
		Chlorophyll-a	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	149.41 to 487.04 lbs/day[3]	0.009 lbs/day
		Iron	13,608 to 62,640 lbs/day[3]	**
		Lead	55.19 to 151.93 lbs/day[3]	0.0045 lbs/day
		Total Nitrogen	300 µg/L	***
		Total Phosphorus	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
		Zinc	1,916 to 6,265 lbs/day[3]	0.00004 lbs/day
Clark Fork River, Rattlesnake Creek to Fish Creek	MT76M001_020	Chlorophyll α	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	219.9 to 747.9 lbs/day[3]	1.1 lbs/day
		Iron	30,915 to 129,600 lbs/day[3]	**
		Lead	65.7 to 201.6 lbs/day[3]	0.51 lbs/day
		Total Nitrogen	300 µg/L	***
		Total Phosphorus	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
Grant Creek	MT76M002_130	Total Nitrogen	31.72 lbs/day	0 lbs/day
		Sediment	1,440.2 tons/year	7.8 tons/year
		Temperature	470 kcal/sec	0 kcal/sec

[1]municipal separate storm sewer system
[2]Total Maximum Daily Load
[3]Low to high flow
*Because there are no point sources, there is no WLA (MDEQ and USEPA, 2014).
**Insufficient data were available to provide numeric load estimates (MDEQ, 2014c).
***The TMDL was established prior to the creation of WLAs (Tri-State Implementation Council, 1998).

2.2 TMDL Strategy

Part II.C of the MS4 Permit specifies that the City shall develop and implement a section of their SWMP to address TMDLs. More specifically, the City shall identify the stormwater control measures and BMPs it plans to implement to address TMDL MS4-related requirements. This section shall describe the MS4's impairment priorities and long-term strategy in making progress towards meeting the TMDL. The long-term strategy outlines interim milestones (i.e., a completion schedule for action items) for controlling the discharge of the pollutants of concern. The City will evaluate existing and potential monitoring locations in watersheds where future BMPs are aimed at reducing pollutants of impairment for its receiving waterbodies. Additional discussion of target pollutants and impairment priorities will be provided within the TMDL section of the SWMP.

3 Methods: Monitoring Locations and Strategies

The city has selected six locations for sampling (Figure 2). Per Part II.C.1.a, at least one location represents a predominantly commercial and/or industrial area and at least one location represents a predominantly residential area. One monitoring location may be upstream, outside the MS4 boundary to evaluate water quality entering the MS4. Two sites contribute flow to the Bitterroot River from primarily residential areas, two to the Clark Fork River from primarily commercial areas, one to Grant Creek from a residential area, and one is on the Clark Fork River, upstream of the MS4. The outfall site IDs concur with the City's Public Works Department infrastructure asset IDs. We are using the City asset IDs to identify sampling locations because it facilitates long-term tracking and comparative analysis. Once we have sufficient data, we will calculate site-specific long-term medians.

3.1 Detention Basin Performance in a Residential Area

Due to significant flooding in the Pattee Creek and South Hills area, the City invested in major stormwater infrastructure improvements—South Hills Storm Drain System—from the late 70s and early 2000s. Steep roads in the Pattee Canyon area necessitate the use of sand and gravel during the winter. This has the potential to enter Pattee Creek and cause negative impacts from increased sedimentation. Sediment is the most common pollutant in waterbodies across the U.S., accelerating erosion and degrading ecosystems. Thus, to prevent the excess sediment from entering Pattee Creek and the Bitterroot River, the City constructed several settling ponds in 2003: Bancroft Ponds, Cattail Corner, and Pattee Creek Cutthroat Corner. These detention basins slow the flow of water and allow particulates to settle to the bottom. The depth of the sediment in the ponds is measured annually and the ponds are excavated when necessary to ensure these BMPs function as designed. The South Hills Storm Drain System terminates at the Bitterroot River. Figure 3 depicts the stormwater infrastructure connected to these outfalls; the inlets and dry wells are not shown because they would overwhelm the map.

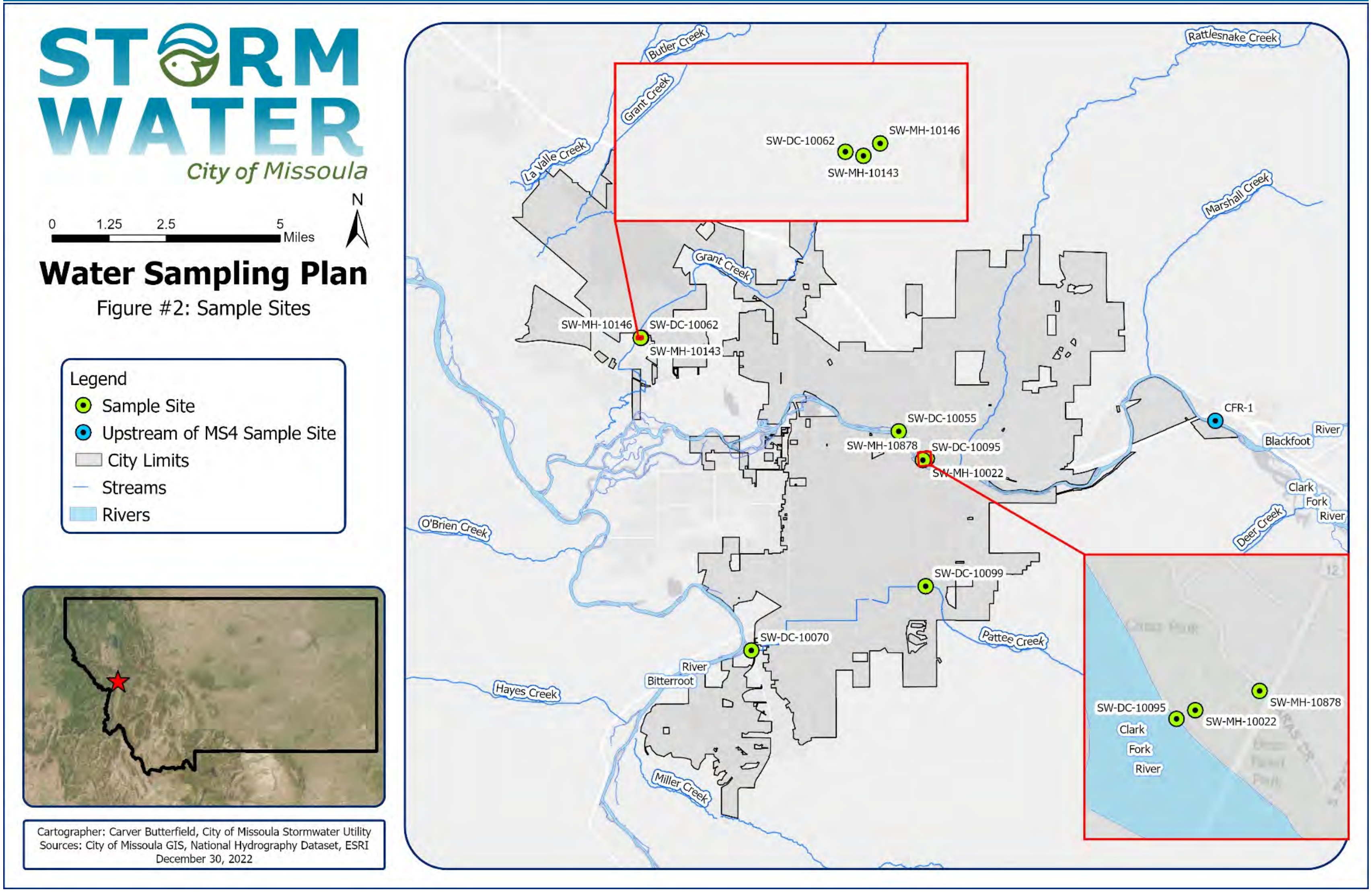


Figure 2. City of Missoula stormwater monitoring sites

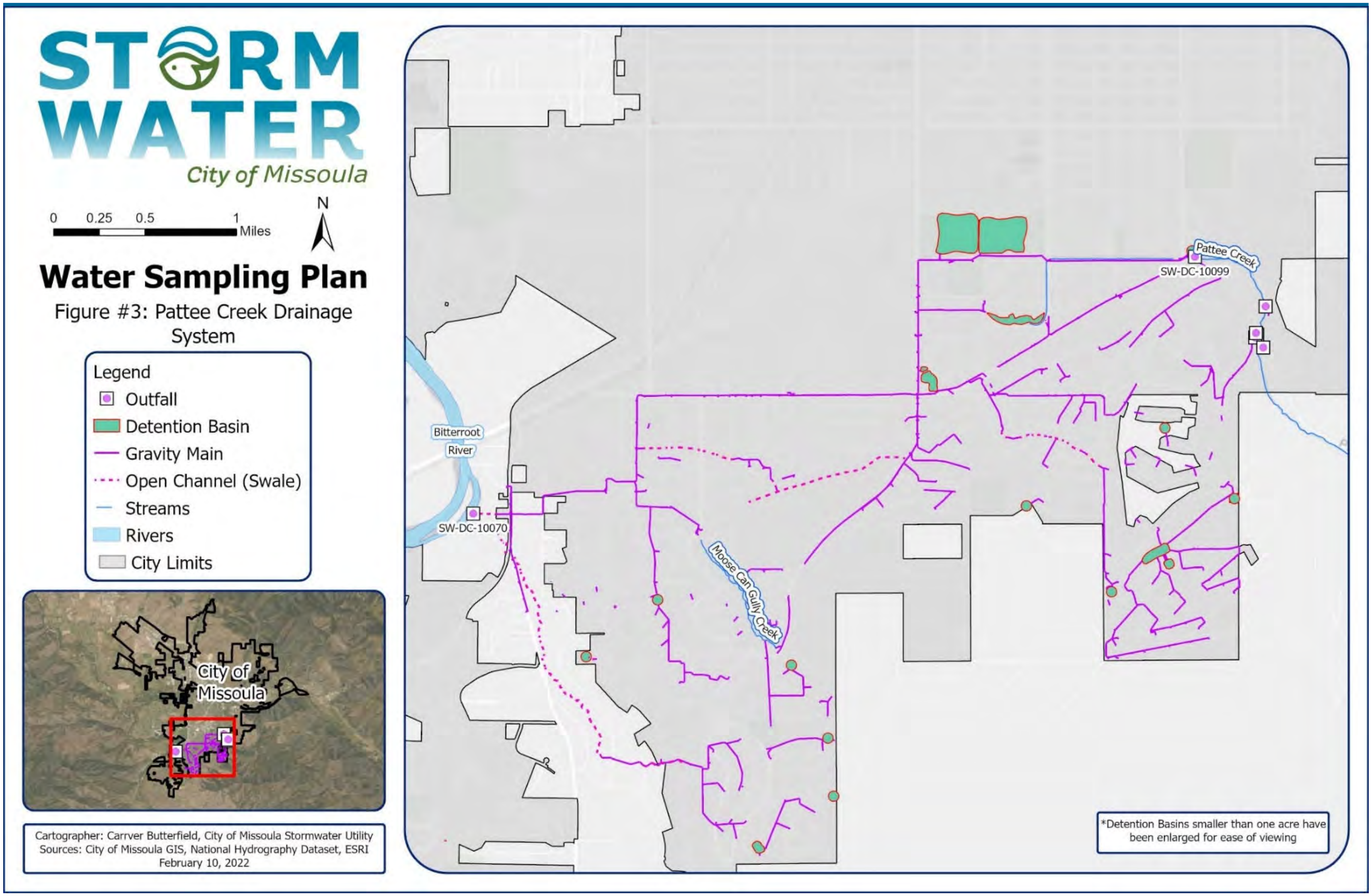


Figure 3. Sample sites for evaluating detention basin performance in a residential area

While sediment is not considered a pollutant of impairment for the Bitterroot River, without these settling ponds, it has greater potential to enter the river and cause negative impacts. Thus, it is important to monitor the effectiveness of these BMPs. In the City's MS4 area, there are approved TMDLs for temperature and lead for the Bitterroot River. Artificially induced water-temperature changes in streams, caused by the release of water from upstream impoundments, may adversely affect downstream aquatic ecosystems. Moreover, the age of the pipes in this system may contribute to lead loads. Thus, we chose two sampling sites in the South Hills Storm Drain System: upstream of the detention basins (SW-DC-10099) and at the system's terminus at the Bitterroot outfall (SW-DC-10070). Site SW-DC-10099 enters Pattee Creek above Cutthroat Corner and the Bitterroot outfall (SW-DC-10070) flows into a 450-foot-long vegetated swale before reaching the river. The predominant land use that contributes to flows is residential.

These sites fulfil both TMDL-related monitoring and self-monitoring requirements. Thus, in addition to the TMDL parameters for the Bitterroot River (temperature and lead), the samples will also be analyzed in accordance with Table 1 in Part II.C of the MS4 Permit. The results of this evaluation will be used to assist the City in making informed decisions about installing detention ponds, or similar BMPs, in other locations.

Table 3. Site Summary: Evaluation of Detention Pond Performance in a Residential Area

Facility ID	Drainage Area (acres)	Pipe (feet)	Inlets
SW-DC-10099	22.8	3,870	22
SW-DC-10070	1,969	111,026	576

3.2 Hydrodynamic Separator Performance in a Commercial Area

The City installed a hydrodynamic separator (HDS) (CDS® by Contech) at Caras Park in 2017, to screen, separate, and trap debris, sediment, and hydrocarbons from stormwater runoff before it enters the Clark Fork River. To evaluate its effectiveness, we will sample upstream and downstream of the HDS (upstream mainhole SW-MH-10878 (replaced with SW-MH-10835 in 2022) and downstream mainhole SW-MH-10022 (replaced with SW-MH-10952 in 2022)). An inline infiltration gallery was constructed in Caras Park in fall 2021. The outfall to the river is SW-DC-10095, but we no longer sample this location since most runoff enters the infiltration gallery and does not reach the outfall. Now, runoff will only reach the outfall to the river during very high runoff events, so we will continue to sample inside the mainholes above and below the HDS to assess its performance. We will also sample a control site without an HDS (SW-DC-

10055). Both sites drain commercial areas in downtown Missoula, in the reach from Rattlesnake Creek to Fish Creek.

Notably, the Caras Park outfall receives perennial flow from the heating, ventilation, and air conditioning (HVAC) system at the Florence Building. This antiquated HVAC system does not recirculate the water that is pumped via a well on the property; it is discharged into the stormwater system. This water flows through the HDS and into the infiltration gallery; and it does not flow into the river since the infiltration gallery was installed. The clean water dilutes pollutants at this outfall. Figure 4 depicts the stormwater infrastructure connected the outfalls, in addition to showing dry wells within the vicinity.

Figure 4. Sample sites for evaluating hydrodynamic separator performance in a commercial area

The samples will be analyzed for the TMDL parameters in this reach and for the reach from the Blackfoot River to Rattlesnake Creek: arsenic, cadmium, copper, iron, lead, zinc, total nitrogen, and total phosphorus. There are few City outfalls in the upstream reach—which drain small, residential areas—and do not provide meaningful data for comparison. Thus, we chose to apply these TMDLs to all samples within the Marshall Creek-Clark Fork River subwatershed (HUC 170102040104). Although chlorophyll α has an approved TMDL for the Clark Fork River, we stopped sampling this parameter in 2023, since it is a metric of attached algae in the river and is not a stormwater-related pollutant. The Clark Fork River Voluntary Nutrient Reduction Program (1998) that established the TMDL for chlorophyll α identified the sources as wastewater treatment effluent and septic tanks. Per MS4 Permit Part II.C.2.b., "The sampling plan shall address monitoring for stormwater-related pollutant(s) listed as a source of impairment specific to the receiving waterbody and be collected following procedures in 40 CFR Part 136." Per 40 CFR Part 136, there are no approved procedures for measuring chlorophyll. This is because it is collected on rocks in the river and measured in mg/m^2. Thus, sampling chlorophyll α in stormwater runoff does not provide meaningful data for monitoring TMDLs. The only way to monitor the effects of stormwater runoff on attached algae in the river is to sample for nutrients. We will continue to sample runoff for total nitrogen and total phosphorus.

Further, the samples will be analyzed in accordance with Table 1 in Part II.C of the MS4 Permit; these sites fulfill both the TMDL-related monitoring and self-monitoring requirements. The results of this evaluation will be used to assist the City in making informed decisions about installing an HDS, or similar BMPs, in other commercial locations.

Table 4. Site Summary: Evaluation of Hydrodynamic Separator Performance in a Commercial Area

Facility ID	Drainage Area (acres)	Pipe (feet)	Inlets
SW-DC-10095	59.5	11,068	86
SW-MH-10835 (upstream of HDS)			
SW-MH-10022 or SW-MH-10952 (downstream of HDS)			
SW-DC-10055	20	2,519	17

3.3 Hydrodynamic Separator Performance in a Residential Area

The City installed an HDS (Vortechs® by Contech) at the 44 Ranch outfall in 2006, to treat stormwater before it enters a detention basin which flows into Grant Creek. To evaluate its effectiveness, we will sample the outfall that is connected to the HDS, formerly identified as S06-16-OF and now SW-DC-10062.

In 2021, we began sampling inside the mainholes upstream (SW-MH-10146) and downstream (SW-MH-10143) of the HDS. Figure 5 depicts the stormwater infrastructure connected to this outfall. In addition to TMDL parameters for Grant Creek (temperature, total nitrogen, and total suspended solids), the samples will also be analyzed in accordance with Table 1 in Part II.C of the MS4 Permit. This site fulfills the TMDL-related monitoring requirements for Grant Creek. The results of this evaluation will be used to assist the City in making informed decisions about installing an HDS, or similar BMPs, in other residential locations.

Table 5. Site Summary: Evaluation of Hydrodynamic Separator Performance in a Residential Area

Facility ID	Drainage Area (acres)	Pipe (feet)	Inlets
SW-DC-10062			
SW-MH-10146 (upstream of HDS)	106	15,644	88
SW-MH-10143 (downstream of HDS)			

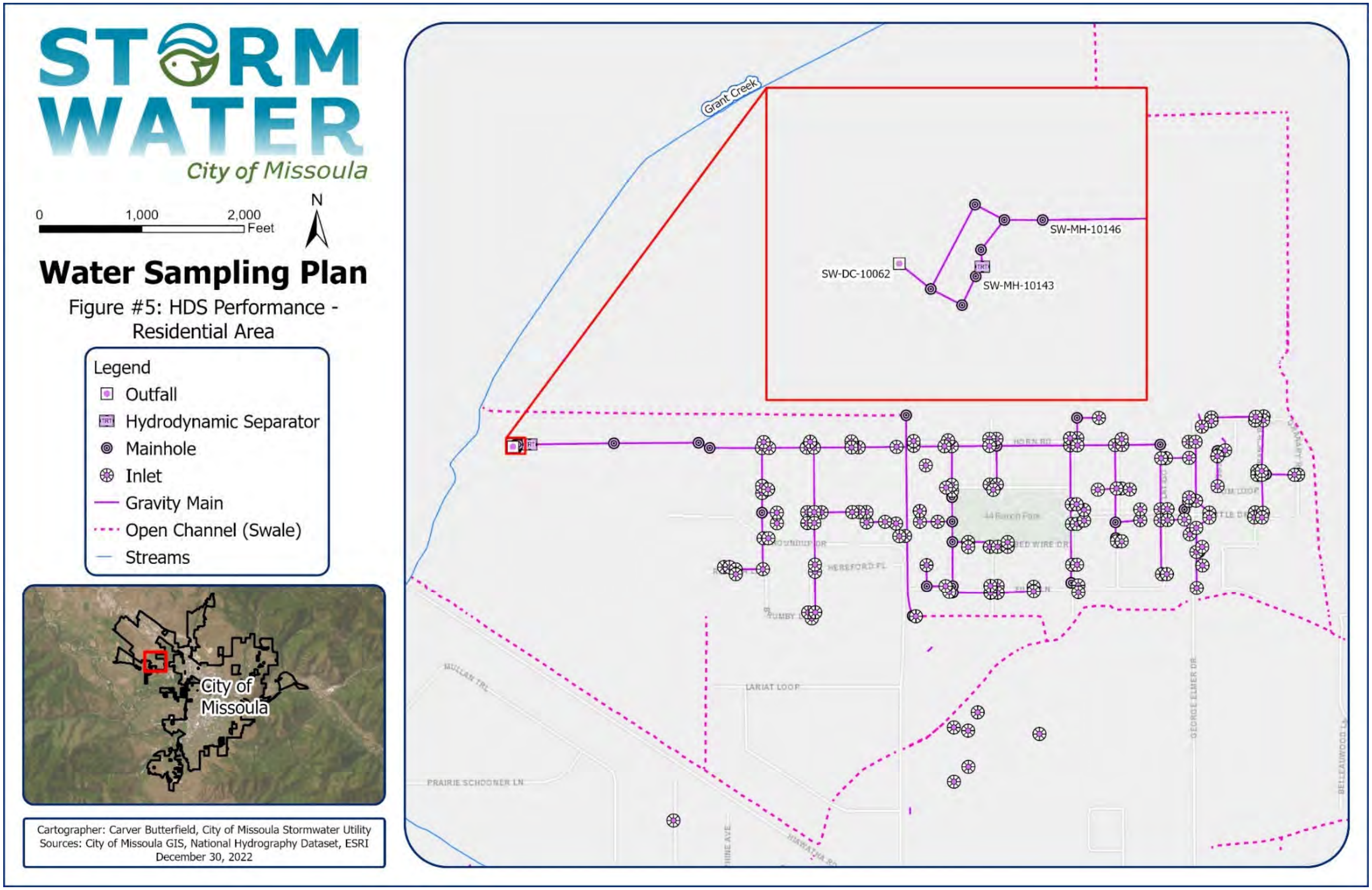


Figure 5. Sample site for evaluating hydrodynamic separator performance in a residential area

3.4 Water Quality Upstream of the City of Missoula

Per Part II.C.1.a of the MS4 Permit, the City must sample at least one location upstream, outside the MS4 boundary. We chose a sampling location on the Clark Fork River, located on the stretch in between the Blackfoot River and Rattlesnake Creek, off Juniper Drive at the Milltown State Park Confluence Area (Site CFR-1, Figure 2). The samples will be analyzed for the TMDL parameters identified for both reaches of the Clark Fork River in the City's MS4 boundary. In addition to TMDL parameters, the samples will also be analyzed in accordance with Table 1 in Part II.C of the MS4 Permit. This site fulfills the self-monitoring requirements of the MS4 Permit. The purpose of these samples is to evaluate water quality entering the City.

3.5 Green Infrastructure Performance

Green infrastructure is a stormwater management method that uses natural processes to improve water quality. The City has constructed various detention basins and vegetated swales as part of the South Hills Storm Drain System, described in Section 3.1. These systems are designed to remove sediment and promote nutrient uptake, using vegetation and soils. As the City works to promote green infrastructure, it is important to assess how well these facilities are performing. Further, the data will inform our decisions regarding implementation of similar facilities, based on the efficacy of these existing systems. Three sites have been selected: Cutthroat Corner, Bancroft Ponds, and Bitterroot Swale. To analyze the performance of two basins and a swale, we will sample upstream and downstream of these facilities, at least twice annually during wet or dry weather. The samples will be collected on the same day and brought to the City Wastewater Treatment Plant Laboratory (WWTP Lab) for analysis: total suspended solids, total persulfate nitrogen, and total phosphorus.

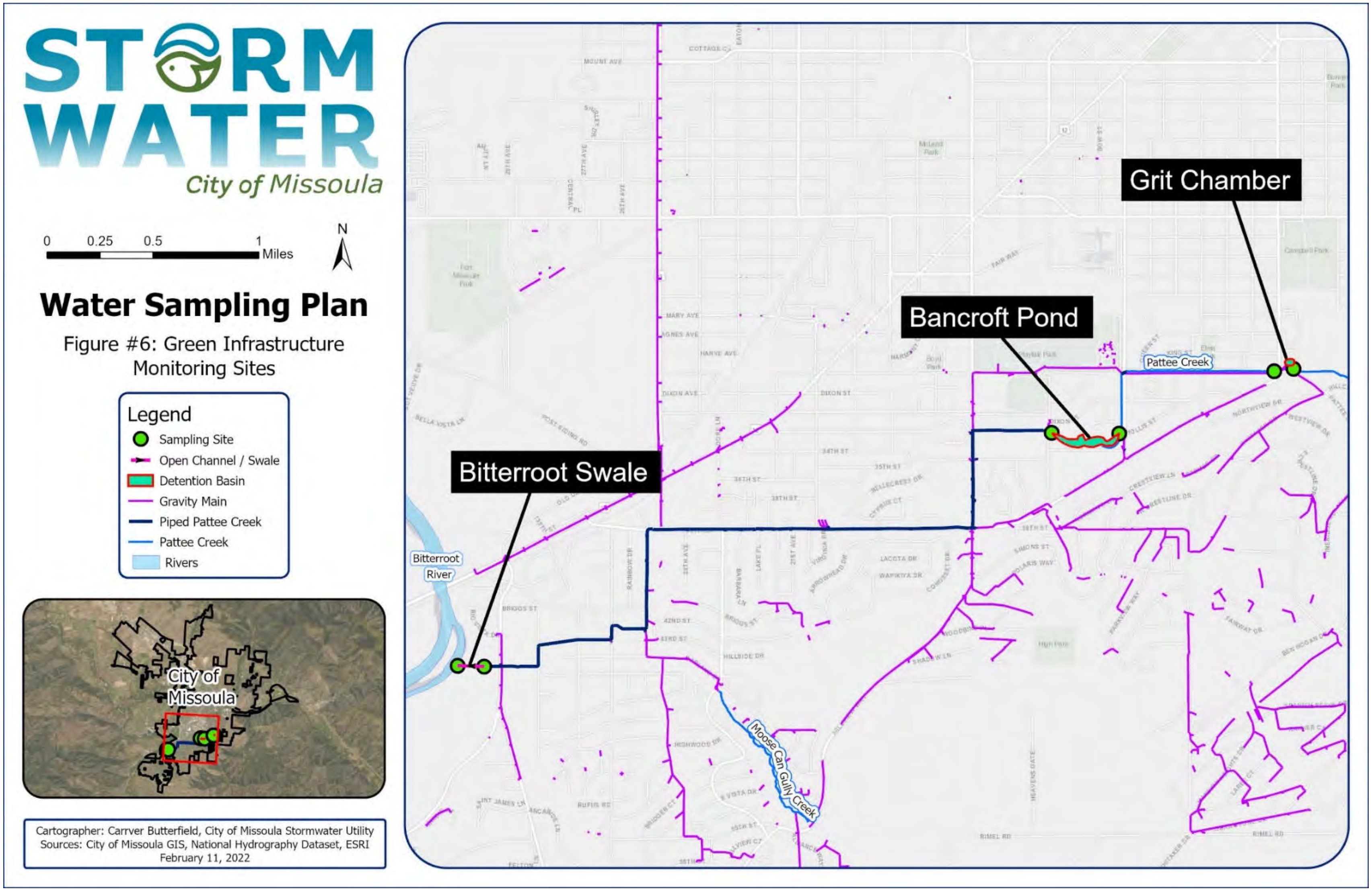


Figure 6. Green infrastructure monitoring locations

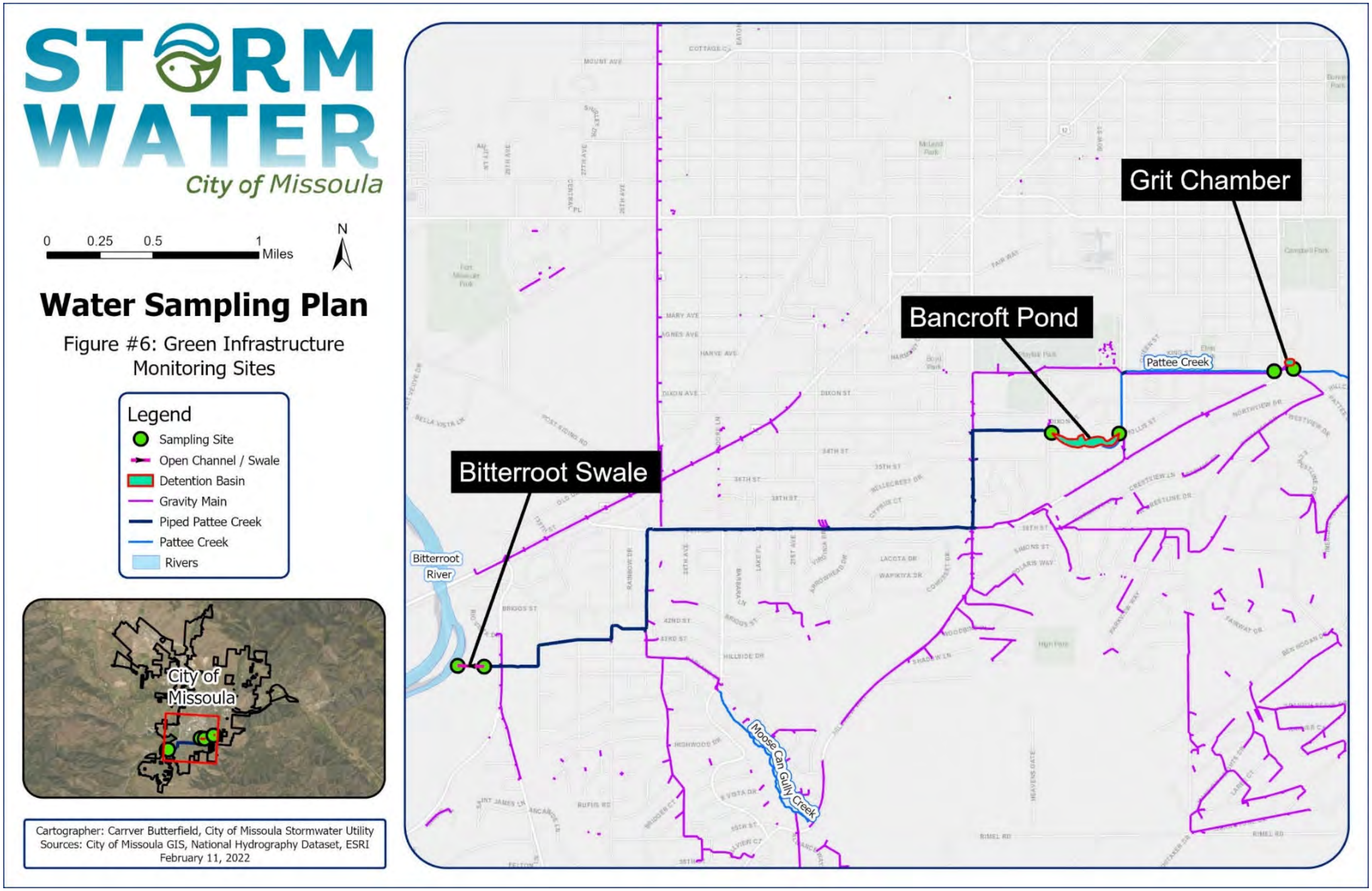


Figure 6. Green infrastructure monitoring locations

4 Methods: Monitoring Requirements

Quality assurance/quality control (QA/QC) is critical for accurate sampling. This section provides details of sampling methods, laboratory analytical methods, and QA/QC procedures for sampling.

4.1 Field Sampling Methods

The City will use manual sample collection techniques to conduct monitoring activities at each site in the immediate future.

4.1.1 Manual Sample Collection

Manual techniques will be used to collect grab samples by field personnel during rainfall events. Grab samples are collected at one location, at one point in time. Rainfall events will be monitored using on-site conditions and data provided by the National Oceanic and Atmospheric Administration's Nation Weather Service for the Missoula International Airport weather station. Snowmelt may also be sampled when conditions are favorable for sampling this matrix. Thus, field personnel can determine when to be present in the watershed during active events to obtain manual samples. The samples will be collected in clean, labeled bottles provided by Energy Laboratories, Inc. (Billings, MT) or the Wastewater Treatment Plant Laboratory (Missoula, MT). If necessary, an extension pole, rope, or other apparatus can be used to aid the field crew in safe sample collection, especially when sampling inside mainholes or during high flow conditions.

4.1.2 Sampling Equipment Decontamination

Decontaminated sample collection bottles and lids will be provided by Energy Laboratories or the WWTP Laboratory.

4.2 Sampling Parameters and Analytical Methods

The water quality samples will be analyzed for the listed pollutants of impairment in the specific receiving waterbody, as well as the parameters listed in Table 1 of Part II.C in the MS4 Permit (Self-Monitoring and Reporting Requirements). Table 6 shows the parameters and standard analytical methods that will be used.

Table 6. Sampling parameters and analytical methods

Parameter	Reporting Limit	Method	Sample Container	Preservative
Bacteria, Total Coliform	1.0 mpn/100 mL	A9223 B	100 mL plastic sterile	None
Bacteria, E-Coli Coliform	1.0 mpn/100 mL	A9223 B	100 mL plastic sterile	None
Total Suspended Solids	10 mg/L	A2540 D	1 L plastic	None
Chemical Oxygen Demand	1 mg/L	E410.4	500 mL plastic	H_2SO_4
Phosphorus, Total	0.01 mg/L	E365.1	250 mL plastic	H_2SO_4
Nitrogen, Total Kjeldahl (TKN)	0.2 mg/L	E351.2		
Nitrogen, Nitrate + Nitrite (NO_3+NO_2)	0.01 mg/L	E353.2		
Nitrogen, Total (TKN+NO_3+NO_2)	0.21 mg/L	Calculation		
Total Recoverable Metals			250 mL plastic	HNO_3
Arsenic (As)	0.001 mg/L	E200.8		
Cadmium (Cd)	0.00003 mg/L	E200.8		
Copper (Cu)	0.002 mg/L	E200.8		
Iron (Fe)	0.02 mg/L	E200.7		
Lead (Pb)	0.0003 mg/L	E200.8		
Zinc (Zn)	0.008 mg/L	E200.8		
Oil & Grease	1 mg/L	E1664A	1 L glass (×2)	H_2SO_4
Phosphorus, Orthophosphate	0.01 mg/L	E365.1	120 mL plastic, filtered	None
Estimated Flow	NA	varies	Field Analysis	None
Temperature	NA	YSI ProDSS	Field Analysis	None
pH	NA	YSI ProDSS	Field Analysis	None
Conductivity	NA	YSI ProDSS	Field Analysis	None
Total Dissolved Solids	NA	YSI ProDSS	Field Analysis	None

All data shall meet the precision, recovery, and accuracy requirements specified in the laboratory method. Additionally, the laboratory will use a combination of blanks, laboratory control spikes, surrogates, and duplicates to evaluate the analytical results.

4.3 Sample Handling and Documentation

Where applicable, automatic samplers will be serviced immediately following a storm event. Chain of custody forms will accompany all samples that are submitted for analysis. An Outfall Reconnaissance/Sample Collection form will be kept for each sampling site with the date, time, personnel, and purpose of visit, weather, and conditions observed, samples collected, and actions performed.

4.4 Storm Events and Sample Frequency

Sampling will be attempted for measurable runoff events: ≥0.10 inch within 24 hours, including precipitation and/or snowmelt. In accordance with Part II.C.1.b. of the MS4 Permit, a minimum of one sample will be collected at each site between January 1st and June 30th and a minimum of one sample will be collected at each site between July 1st and December 31st of each year. If a sample is not collected during a six-month monitoring period, rationale must be recorded in the corresponding annual report. A substitute sample must be collected during the subsequent six-month monitoring period in addition to the required sample. The substitute and required six-month sample may be collected from back-to-back storm events when there has been at least 48 hours of no measurable precipitation between storms.

Precipitation will be monitored using a combination of on-site conditions and precipitation data provided by the National Oceanic and Atmospheric Administration's Nation Weather Service for the Missoula International Airport weather station. These data may be used to delineate storm characteristics, if necessary (timing, duration, intensity, and relative total rainfall).

4.5 Analysis

Using Microsoft Excel, we will amalgamate the results for comparative analysis. After we have collected at least one full year of samples, we will compare percent changes in pollutant concentration to analyze BMP performance.

$$\%\triangle = [(\alpha - \beta)/\alpha] \times 100$$

α = pollutant-specific concentration (mg/L) without treatment

β = pollutant-specific concentration (mg/L) with treatment

To evaluate HDS performance in a commercial area, we will use the same formula. Where α is the concentration upstream of the HDS and β is the concentration downstream of the HDS. The calculated percent change for each sample collected will be presented on a graph (sample date vs. percent change) to assess the long-term performance of the BMP. A positive percent change indicates that BMPs are effective, while a negative percent change indicates that they are not effective at reducing pollutants. A separate analysis of each parameter can be used to help understand the effectiveness of BMPs for a variety of parameters considered.

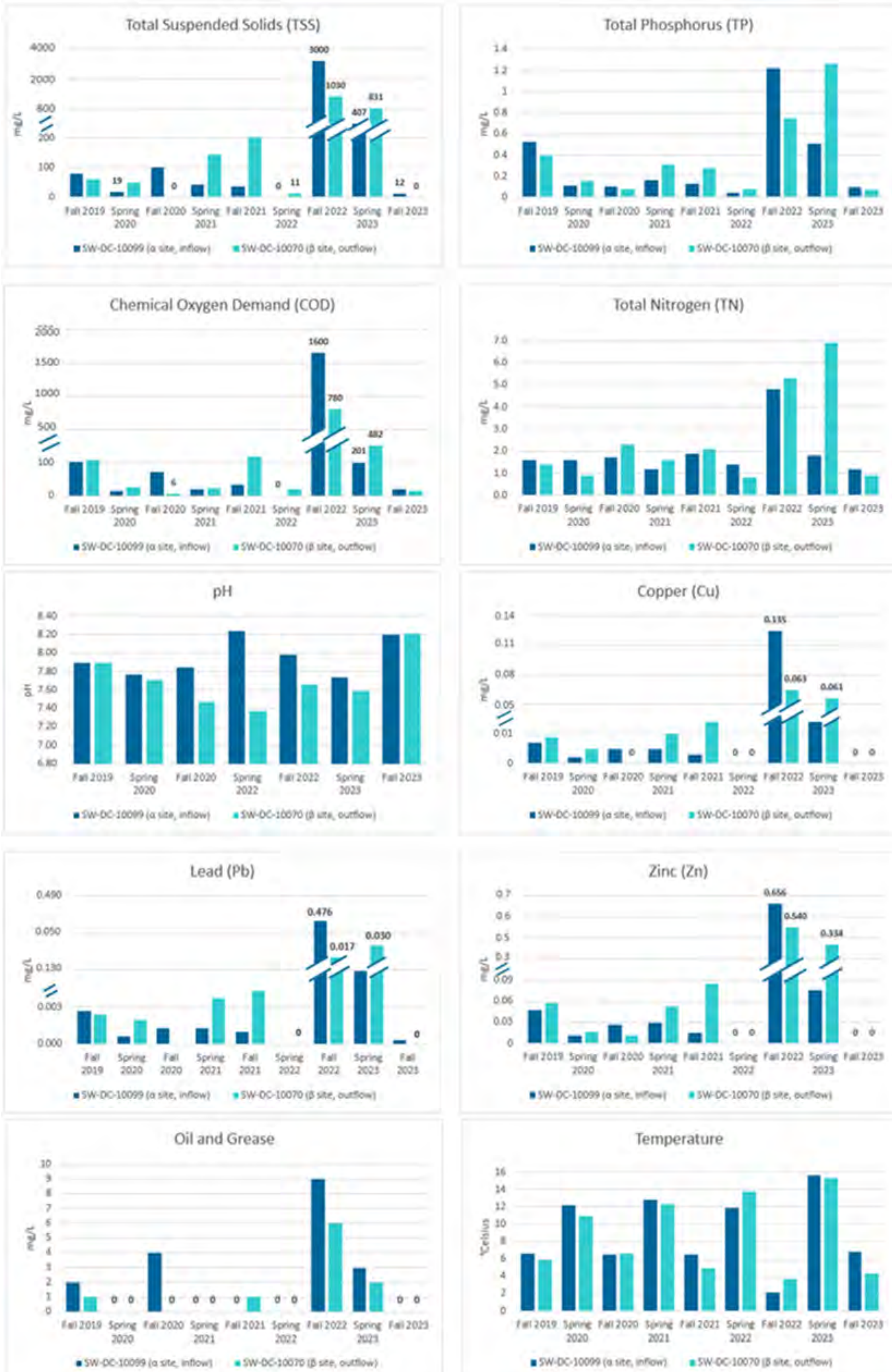
For the other samples, graphs will be generated showing sample date and pollutant-specific concentration for each parameter. These graphics will show the trend in water quality data over time.

5 Results

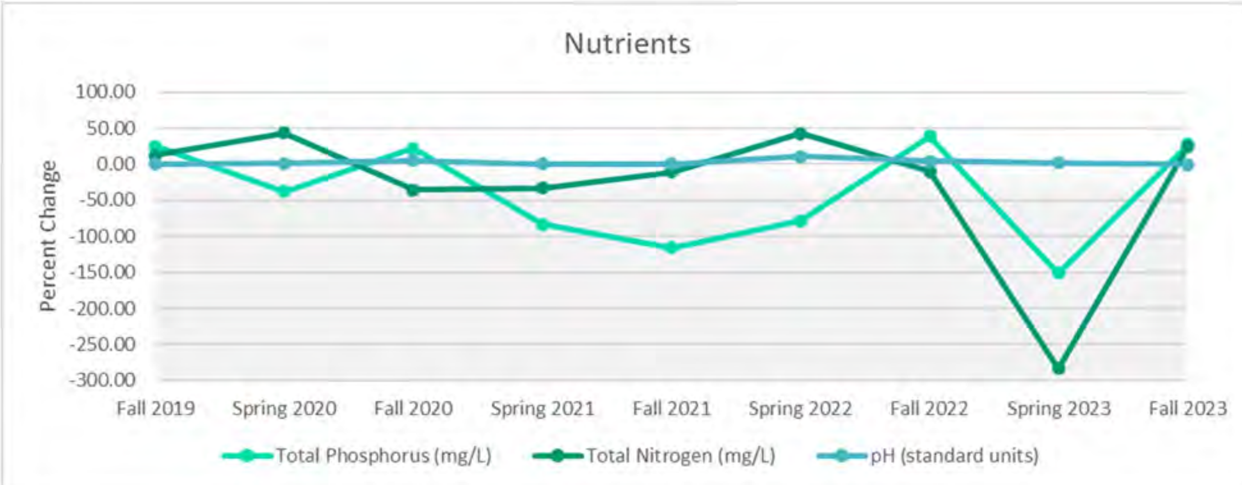
5.1.1 Detention Basin Performance in a Residential Area

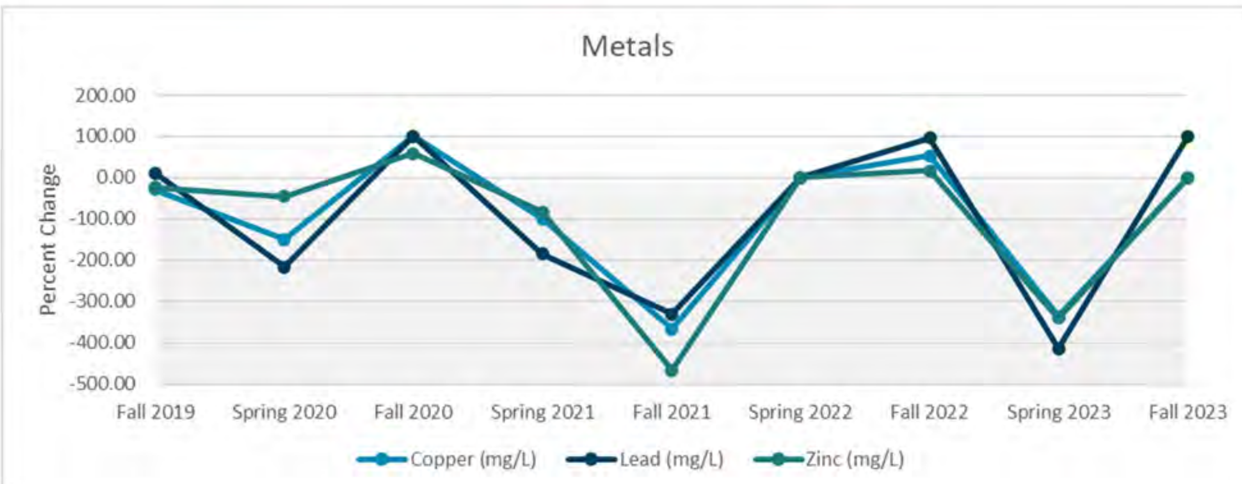
Since 2019, we have collected 9 samples each from SW-DC-10099 and SW-DC-10070 (Graph 1).

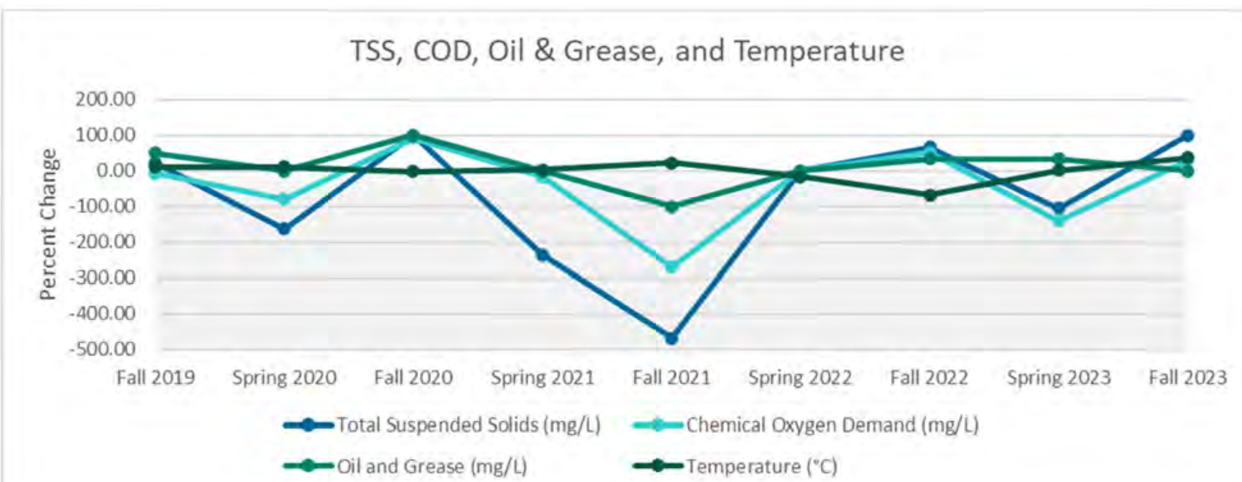
Generally, the data indicate increased levels of nearly all parameters at the outfall to the Bitterroot River (Graph 2).



Graph 1. Outfall sampling results (residential area, Bitterroot River)





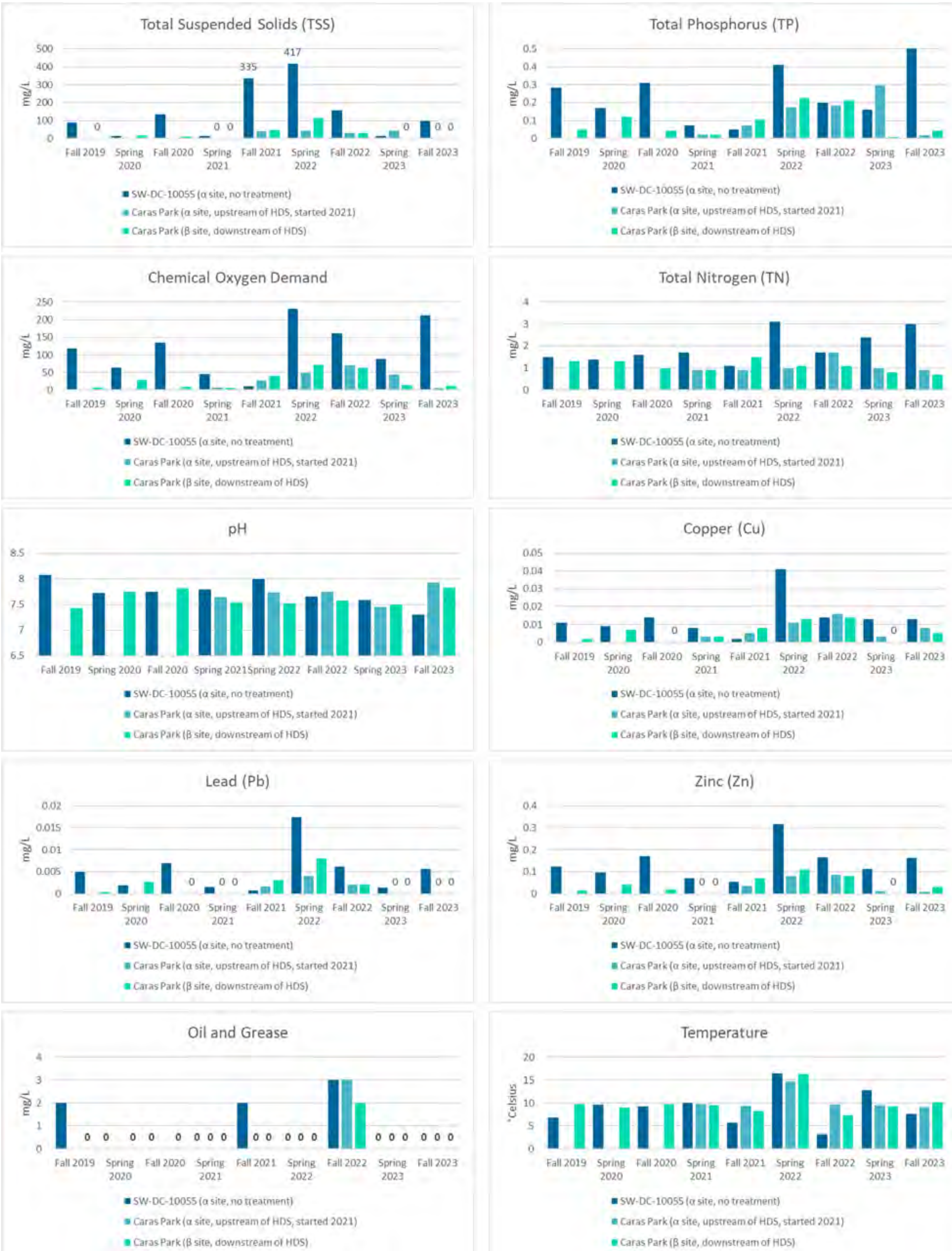


A positive percent change indicates that BMPs are effective, while a negative percent change indicates that they are not effective at reducing pollutants.

Graph 2. Detention basin performance (residential area, Bitterroot River)

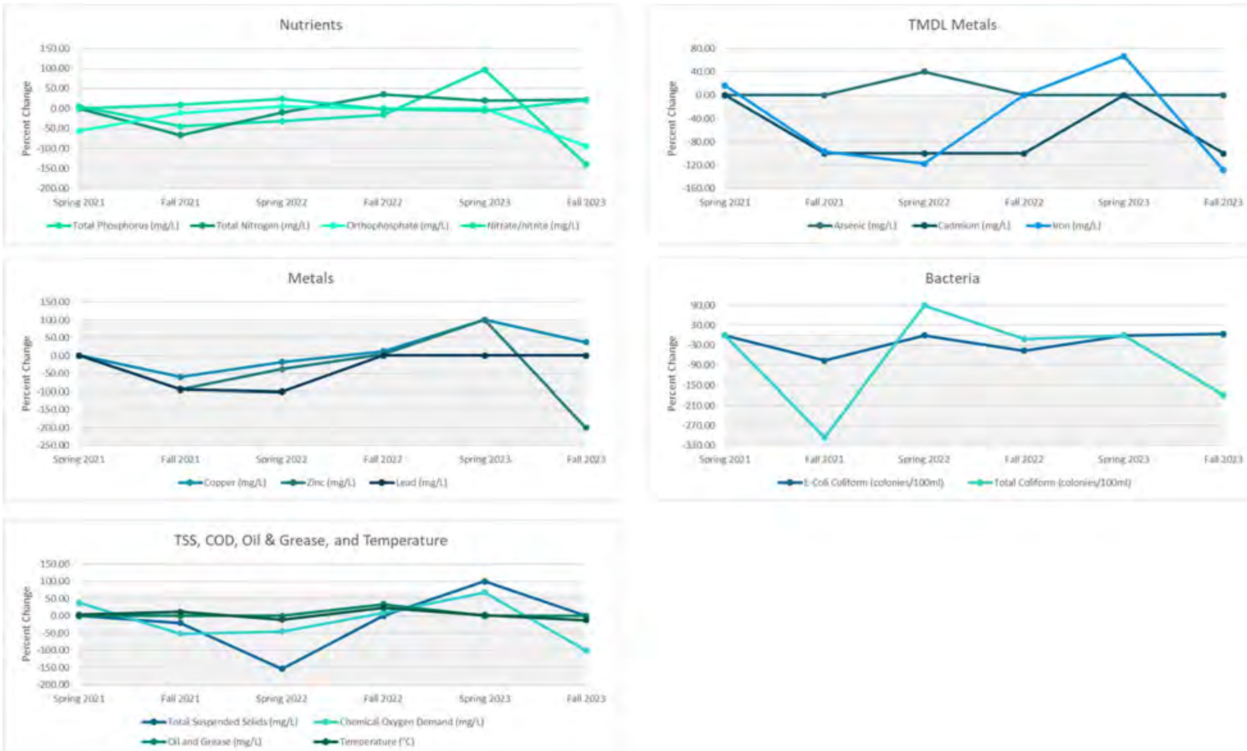
5.1.2 Hydrodynamic Separator Performance in a Commercial Area

Since 2019, we have collected 9 samples from SW-DC-1—55 and SW-DC-10095; and since 2021, we have collected 6 samples from SW-MH-10878 (Graph 3 and Graph 4). The results show that the water discharged to the Caras Park outfall has generally less pollutants than the outfall at the railroad (Graph 3 and Graph 4).



Graph 3. Outfall sampling results (commercial/urban area, Clark Fork River)

Graph 4. Total maximum daily load (TMDL) monitoring (commercial/urban area, Clark Fork River)

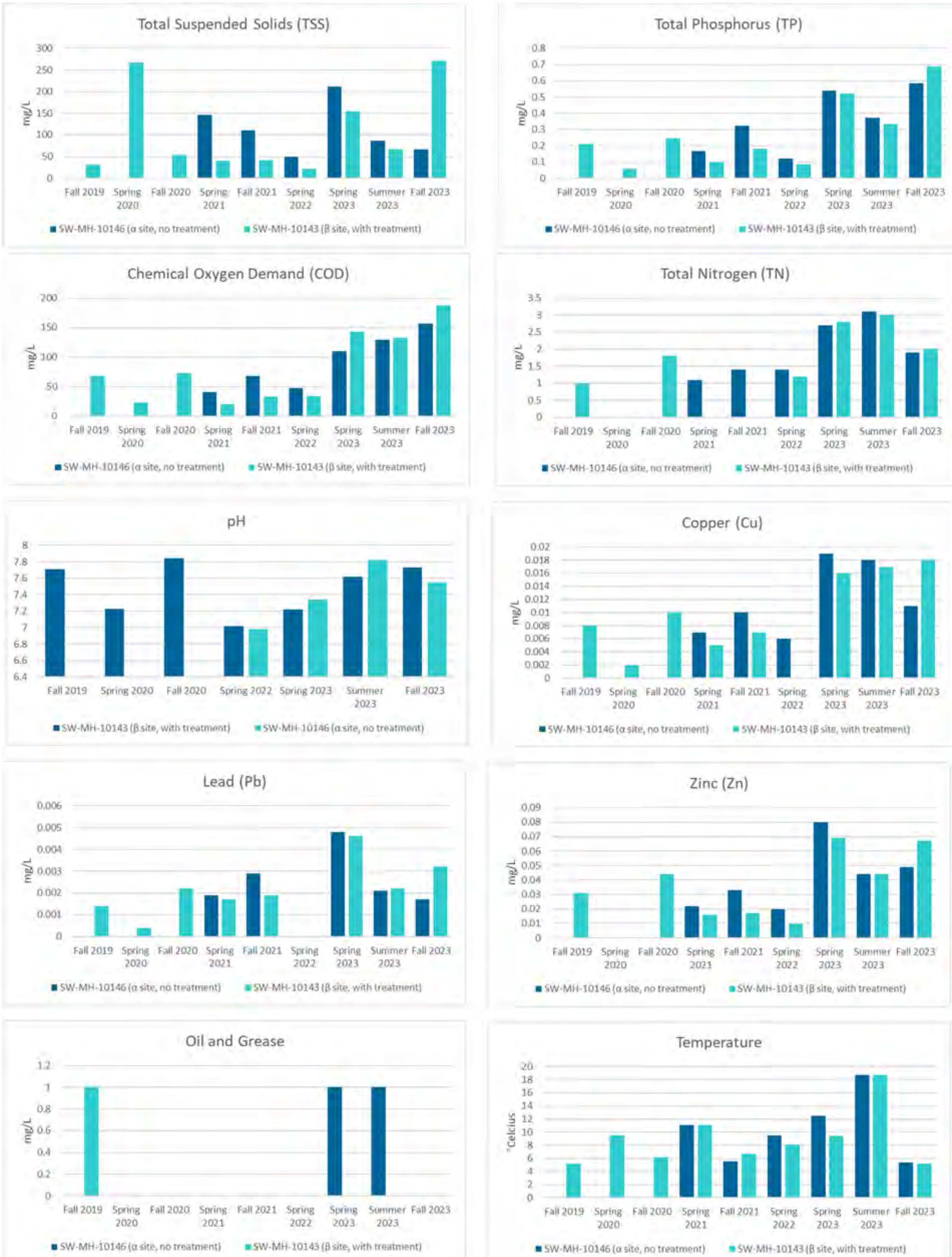


A positive percent change indicates that BMPs are effective, while a negative percent change indicates that they are not effective at reducing pollutants.

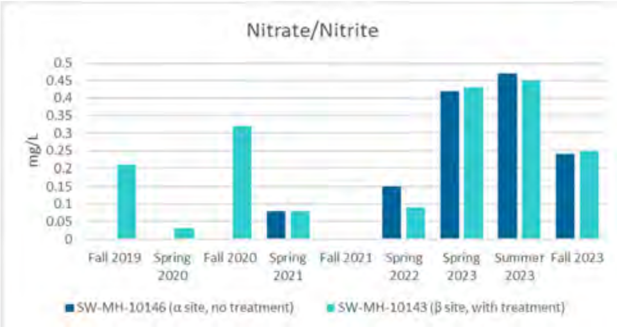
Graph 5. Hydrodynamic separator performance (commercial/urban area, Clark Fork River)

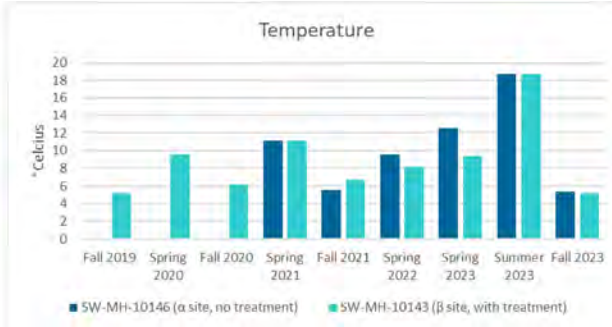
5.1.3 Hydrodynamic Separator Performance in a Residential Area

Since 2019, we have collected 9 samples downstream of the Vortechs at SW-MH-10143 (Graph 6). In spring 2021, we began collecting samples above the HDS to measure the effectiveness of this BMP. We have collected 6 samples from SW-MH-10146.

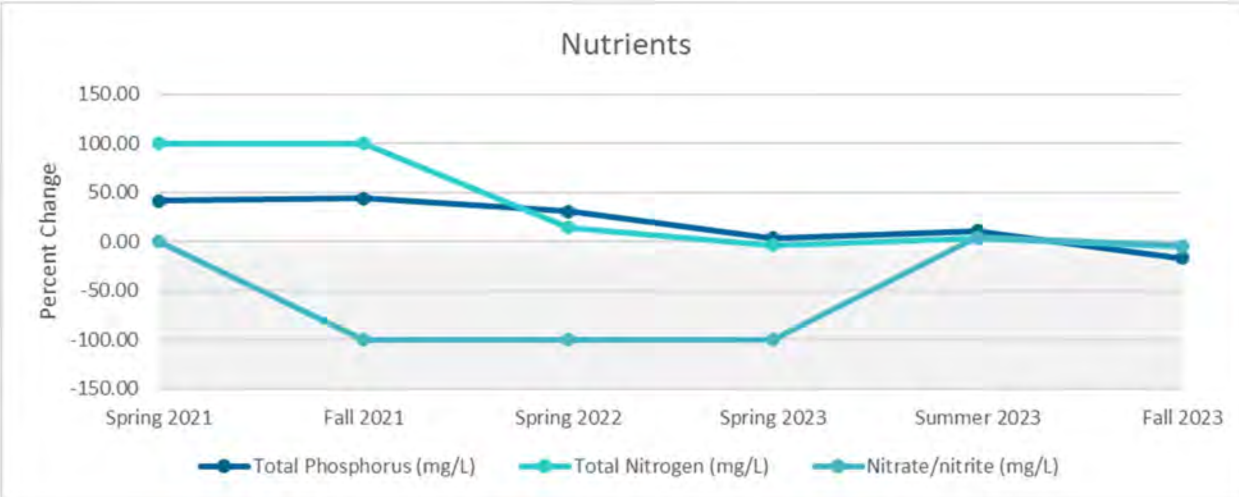


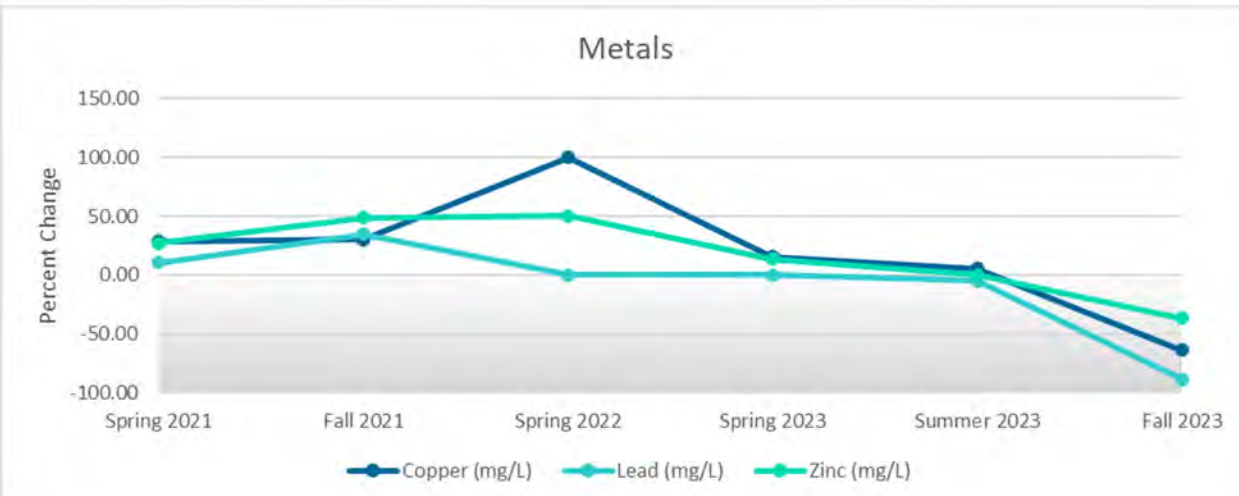
Graph 6. Outfall sampling results (residential area, Grant Creek)

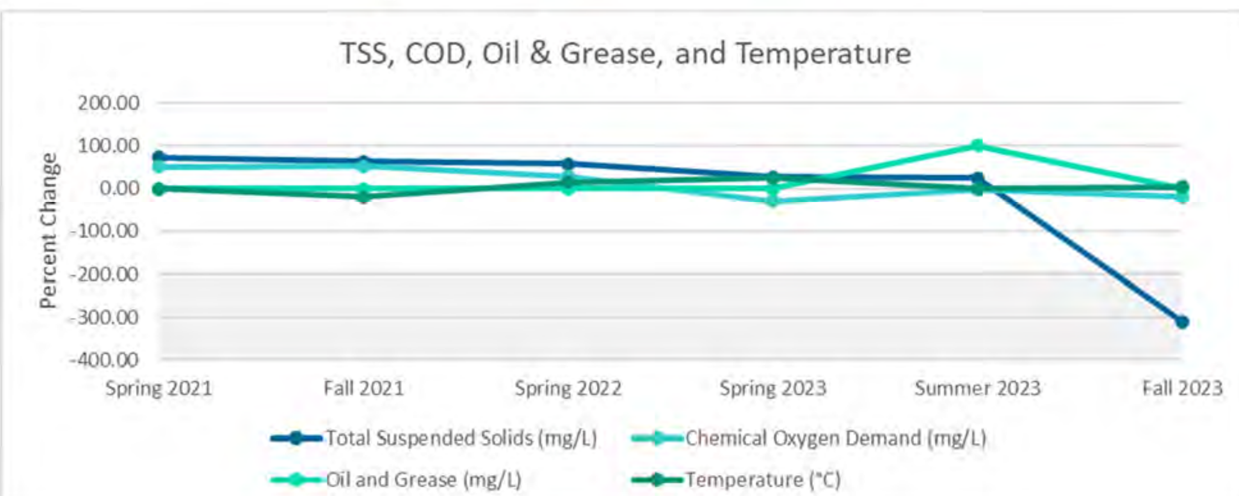




Graph 7. Total maximum daily load (TMDL) monitoring (residential area, Grant Creek)





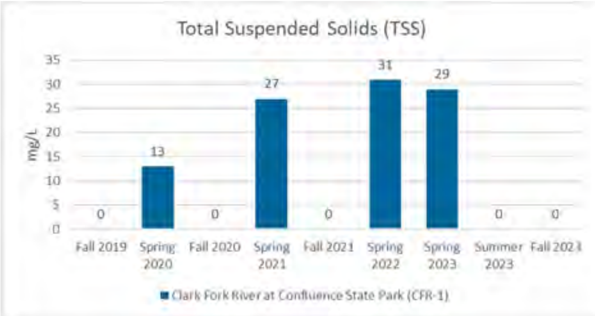


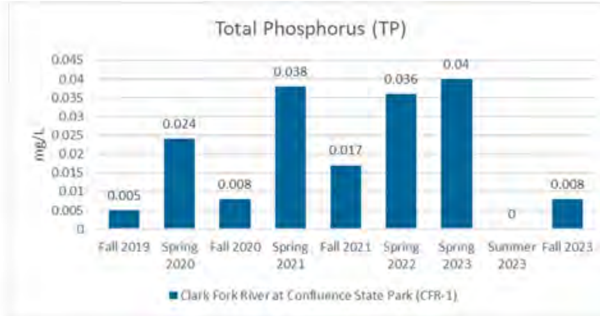
A positive percent change indicates that BMPs are effective, while a negative percent change indicates that they are not effective at reducing pollutants.

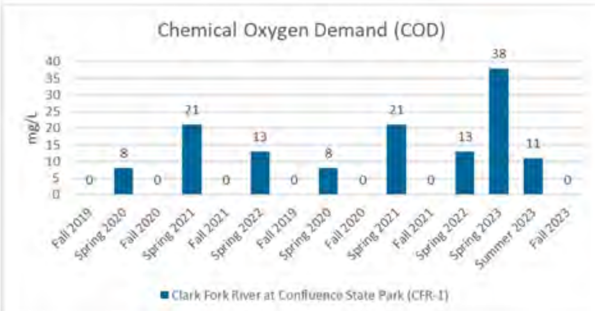
Graph 8. Hydrodynamic separator performance (residential area, Grant Creek)

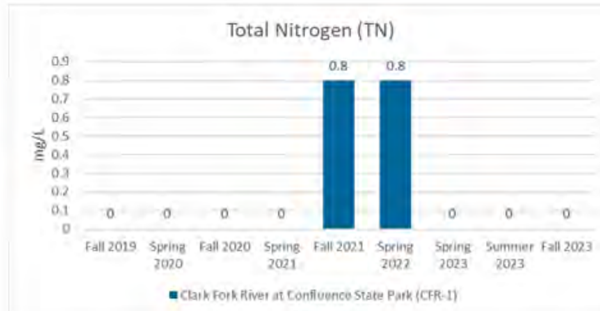
5.1.4 Water Quality Upstream of the City of Missoula

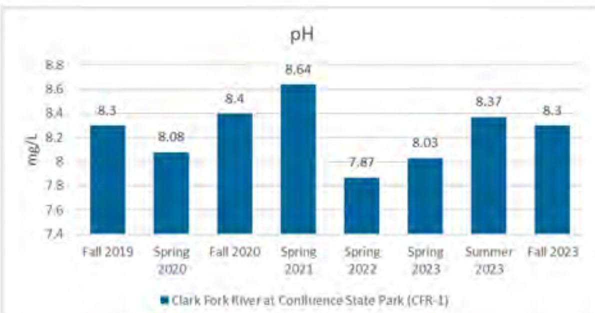
Since 2019, we have collected 9 samples from the Clark Fork River, upstream of the City of Missoula (Graph 9 and Graph 10).

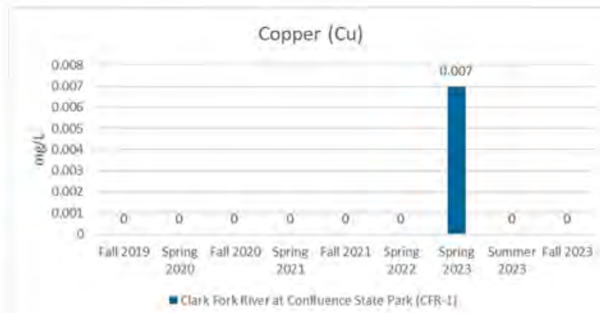


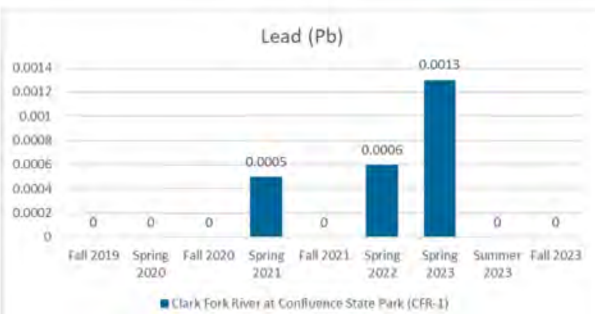


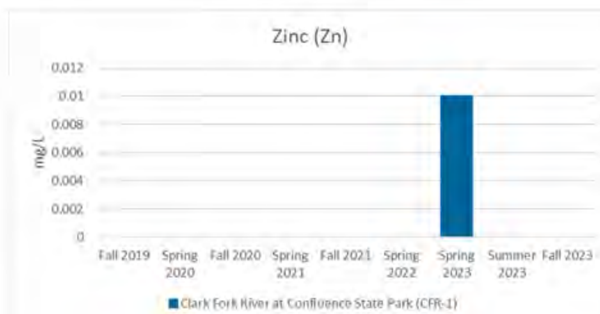


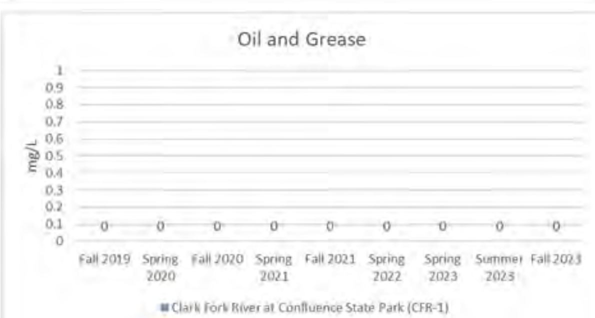


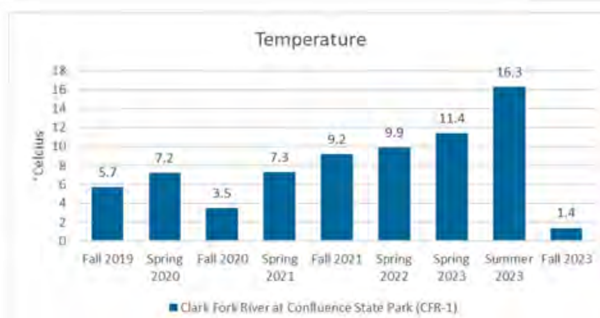




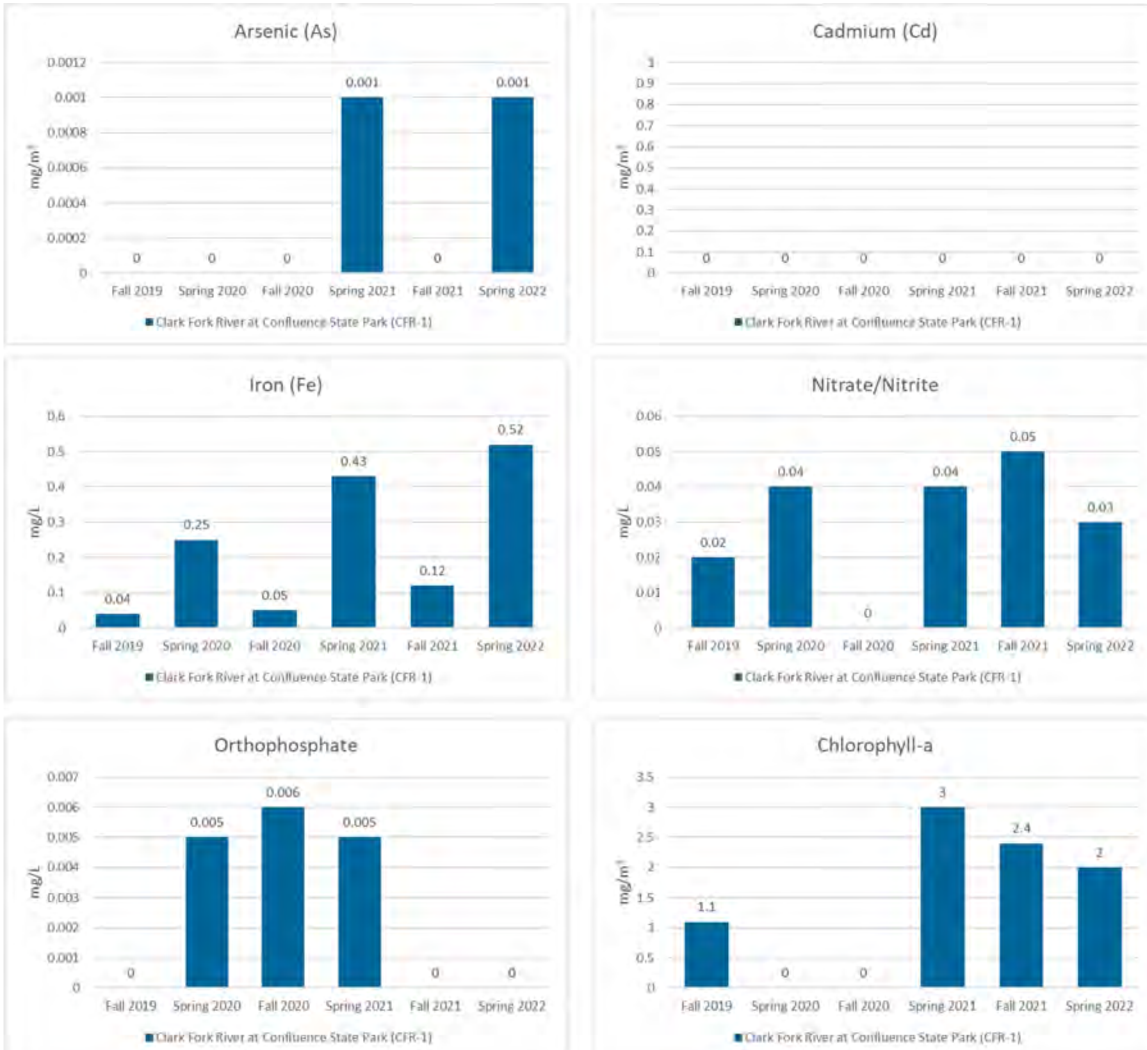








Graph 9. Sampling results (Clark Fork River at Confluence State Park)

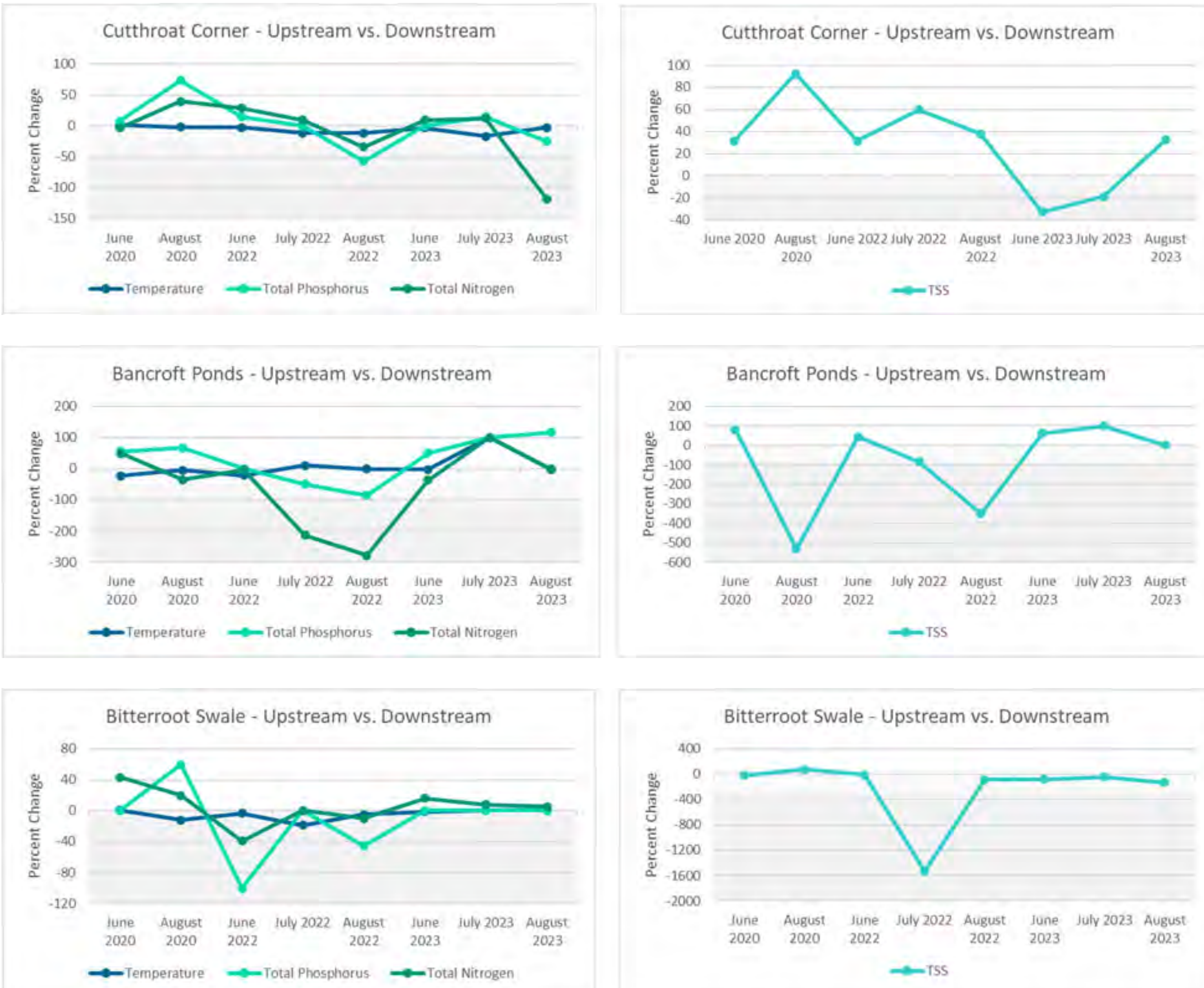


Graph 10. Total maximum daily load (TMDL) monitoring (Clark Fork River at Confluence State Park)

5.1.5 Green Infrastructure Performance

Since 2020, we have collected 8 samples from each of the 6 sites: upstream and downstream of Cutthroat Corner, Bancroft Ponds, and Bitterroot Swale. We are monitoring trends in water quality downstream of the green infrastructure facilities: temperature, total suspended solids, total nitrogen, total phosphorus, and pH (Graph 11 and Graph 12).

Graph 11. Samplings results (green infrastructure monitoring)



A positive percent change indicates that BMPs are effective, while a negative percent change indicates that they are not effective at reducing pollutants.

Graph 12. Green infrastructure performance

6 Discussion

The purpose of our sampling methods is to evaluate the effectiveness of BMPs. Generally, the results are inconclusive and inconsistent. This is because stormwater sampling is challenging, due to the unpredictability of storm events and the variable nature of stormwater discharges. For example, in Fall 2021, TSS at SW-DC-10099 was 36 mg/L and at SW-DC-10070 it was 304 mg/L, or nearly 10 times higher at the downstream versus the upstream location. Conversely, in Fall 2022, TSS at SW-DC-10099 was 3,000 mg/L and at SW-DC-10070, it was 1,030 mg/L, or nearly 3 times lower at the downstream location. It is difficult to identify trends in most of our dataset. We will examine implementing different statistical methods next year, to better understand the effectiveness of the BMPs. We will likely use the t-test, which is a statistical calculation that measures the difference in means between two sample groups. The results from a t-test evaluate the significance of the mean difference to determine whether the outcomes occur by chance.

One consistent result is that the sampling parameters at SW-DC-10055 are notably higher than those at SW-DC-10095 and SW-MH-10878. This is likely due to the baseflow from the Florence Building's HVAC system that is constantly discharged to this outfall, thus diluting pollutants at this location. Additionally, when comparing the pollutant concentrations upstream and downstream of the HDS, we see that the levels below the HDS are higher after treatment (Graph 5). We reached out to Contech, the manufacturer of the storm separator, to seek their input. They sent us an automatic sampling unit and helped us to install it. Unfortunately, the unit was never functional because the software that ran its operating system was no longer supported. This is because the sampler had been discontinued, and it was Contech's hope that we could get it to function. They loaned the sampler to us because they stated that the reason for the higher parameters downstream of the HDS was due to sampling issues. We agree this is possible, because we cannot be on site at the first flush event, which is the most polluted stormwater discharge. To rule out other confounding factors, we cleaned the HDS one week prior to sampling and the results still showed higher contamination downstream. Our engineering consultant, Morrison Maierle, is working with the Florence Building to construct an injection well for their HVAC system, so it will no longer discharge to the stormwater system. It is likely that this continuous flow of water disrupts the ability of the HDS to function per design during a storm event. We anticipate that the injection well will be completed this year.

7 Conclusion

The results show that stormwater quality degrades as it flows across the valley in the Pattee Creek and Bitterroot watershed. Nonpoint source pollution causes an increase in nearly all parameters. We have a project at the Bitterroot outfall to improve the biofiltration and sediment deposition capacity of the swale, to improve the quality of water that is discharged to the river. We will analyze results before and after the project, to measure the outcome. Finally, neither the proprietary stormwater separators nor green infrastructure facilities appear to adequately remove pollutants nor function per their design requirements. We will continue to evaluate water quality BMPs and test their effectiveness.

8 References

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Appendix A - Photographs

SW-DC-10099 (SNA-1563), Pattee Creek above the Grit Chamber (November 19, 2019, wet weather)

SW-DC-10070 (S86-35-OF), Bitterroot Outfall (September 19, 2019, dry weather)

SW-DC-10095 (SNA-1521), Caras Park Outfall (September 5, 2019, dry weather)

SW-DC-10055 (SNA-1526), Clark Fork River downstream of railroad bridge (November 19, 2019, wet weather)

SW-DC-10062 (S06-16-OF), Grant Creek outfall at 44 Ranch (November 19, 2019, wet weather)

CFR-1, Clark Fork River upstream of the City of Missoula MS4 (October 22, 2019, wet weather)

Appendix B – Sampling Results

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** GC_US

Sample ID: **2607** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/26/2023		7/6/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.06
6/26/2023		7/6/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.43
6/26/2023		7/4/2023	LM	Total Suspended Solids	SM 2540D		6.7

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** GC_DS

Sample ID: **2608** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
7/6/2023		7/6/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.06
6/26/2023		7/6/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.39
6/26/2023		7/4/2023	LM	Total Suspended Solids	SM 2540D		8.9

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BP_US

Sample ID: **2609** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/26/2023		7/6/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.06
6/26/2023		7/6/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.3
6/26/2023		7/4/2023	LM	Total Suspended Solids	SM 2540D		11.5

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BP_DS

Sample ID: **2610** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/26/2023		7/6/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.04
6/26/2023		7/6/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.41
6/26/2023		7/4/2023	LM	Total Suspended Solids	SM 2540D		4.2

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BS_US

Sample ID: **2611** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/26/2023		7/6/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.06
6/26/2023		7/6/2023	LM	Total Persulfate Phosphorus	EPA 365.1		1.08
6/26/2023		7/4/2023	LM	Total Suspended Solids	SM 2540D		3.2

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BS_DS

Sample ID: **2612** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/26/2023		7/6/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.06
6/26/2023		7/6/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.91
6/26/2023		7/4/2023	LM	Total Suspended Solids	SM 2540D		5.9

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** GC_US

Sample ID: **2614** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
7/25/2023		8/3/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.49
7/25/2023		8/3/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.07
7/25/2023		8/7/2023	KR	Total Suspended Solids	SM 2540D		4.3

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** GC_DS

Sample ID: **2615** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
7/25/2023		8/3/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.43
7/25/2023		8/3/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.06
7/25/2023		7/27/2023	KR	Total Suspended Solids	SM 2540D		5.1

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BP_US

Sample ID: **2616** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
7/25/2023		8/3/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.3
7/25/2023		8/3/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.05
7/25/2023		7/27/2023	KR	Total Suspended Solids	SM 2540D		20.5

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BS_US

Sample ID: **2617** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
7/25/2023		8/3/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		1.38
7/25/2023		8/3/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.09
7/25/2023		7/27/2023	KR	Total Suspended Solids	SM 2540D		5.1

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water **Sampling Location:** BS_DS

Sample ID: **2618** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
7/25/2023		8/3/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		1.27
7/25/2023		8/3/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.09
7/25/2023		7/27/2023	KR	Total Suspended Solids	SM 2540D		7.4

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 Fax: (406)552-6614

City of Missoula-Storm Water

BS - US

Area: Storm Water

Sampling Loca[redacted]

Sample ID: 2625

MIU#:

Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/22/2023		8/31/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.09
8/22/2023		8/31/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		1.49
8/22/2023		8/23/2023	LM	Total Suspended Solids	SM 2540D		1.9

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water

Sampling Location: BP_DS

Sample ID: 2624

MIU#:

Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/22/2023		8/31/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.18
8/22/2023		8/31/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		1.02
8/22/2023		8/23/2023	LM	Total Suspended Solids	SM 2540D		14.6

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

BP_US

Area: Storm Water

Sampling Location: [redacted]

Sample ID: **2623**

MIU#:

Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/22/2023		8/22/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.39
8/22/2023		8/22/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		1.01
8/22/2023		8/22/2023	LM	Total Suspended Solids	SM 2540D		14.9

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water

Sampling Location: GC_DS

Sample ID: 2622

MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/22/2023		8/31/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.1
8/22/2023		8/31/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.72
8/22/2023		8/22/2023	LM	Total Suspended Solids	SM 2540D		3.1

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

BS_DS

Area: Storm Water

Sampling Location: [redacted]

Sample ID: 2626

MIU#:

Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/22/2023		8/31/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.09
8/22/2023		8/31/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		1.41
8/22/2023		8/22/2023	LM	Total Suspended Solids	SM 2540D		4.4

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

Area: Storm Water

Sampling Location: GC_US

Sample ID: 2621

MIU#:

Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/22/2023		8/31/2023	LM	Total Persulfate Phosphorus	EPA 365.1		0.08
8/22/2023		8/31/2023	LM	Total Persulfate Nitrogen	SM 4500-N C		0.33
8/22/2023		8/23/2023	LM	Total Suspended Solids	SM 2540D		4.6

ANALYTICAL SUMMARY REPORT

May 25, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23050860

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 5/9/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23050860-001	SW-MH-10146	05/05/23 14:00	05/09/23	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B23050860-002	SW-MH-10143	05/05/23 14:30	05/09/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23050860

Report Date: 05/25/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	05/25/23
Project:	MS4 Permit	**Collection Date:**	05/05/23 14:00
Lab ID:	B23050860-001	**DateReceived:**	05/09/23
Client Sample ID:	SW-MH-10146	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	212	mg/L		20		A2540 D	05/10/23 10:04 / ctb
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	110	mg/L		5		E410.4	05/10/23 13:45 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.42	mg/L		0.01		E353.2	05/11/23 19:48 / krt
Nitrogen, Kjeldahl, Total as N	2.3	mg/L		0.5		E351.2	05/15/23 12:50 / jaw
Nitrogen, Total	2.7	mg/L		0.5		Calculation	05/17/23 07:30 / jbm
Phosphorus, Total as P	0.541	mg/L		0.005		E365.1	05/11/23 17:08 / jaw
METALS, TOTAL							
Copper	0.019	mg/L		0.002		E200.8	05/18/23 14:45 / jks
Lead	0.0048	mg/L		0.0003		E200.8	05/18/23 14:45 / jks
Zinc	0.080	mg/L		0.008		E200.8	05/18/23 14:45 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	1	mg/L		1		E1664A	05/23/23 08:36 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	05/25/23
Project:	MS4 Permit	**Collection Date:**	05/05/23 14:30
Lab ID:	B23050860-002	**DateReceived:**	05/09/23
Client Sample ID:	SW-MH-10143	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	155	mg/L		20		A2540 D	05/10/23 10:04 / ctb
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	143	mg/L		5		E410.4	05/10/23 13:45 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.43	mg/L		0.01		E353.2	05/11/23 19:49 / krt
Nitrogen, Kjeldahl, Total as N	2.4	mg/L		0.5		E351.2	05/15/23 12:51 / jaw
Nitrogen, Total	2.8	mg/L		0.5		Calculation	05/17/23 07:30 / jbm
Phosphorus, Total as P	0.522	mg/L		0.005		E365.1	05/11/23 17:10 / jaw
METALS, TOTAL							
Copper	0.016	mg/L		0.002		E200.8	05/18/23 14:52 / jks
Lead	0.0046	mg/L		0.0003		E200.8	05/18/23 14:52 / jks
Zinc	0.069	mg/L		0.008		E200.8	05/18/23 14:52 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/23/23 08:36 / eli-g

Report Definitions:	RL - Analyte Reporting Limit	MCL - Maximum Contaminant Level
	QCL - Quality Control Limit	ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/23/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 230523A
Lab ID: MBLK2305230820		Method Blank				Run: BAL-ACCU-124_230523A				05/23/23 08:34
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2305230820		Laboratory Control Sample				Run: BAL-ACCU-124_230523A				05/23/23 08:34
Oil & Grease (HEM)		38	mg/L	5.0	96	78	114			
Lab ID: LCSD2305230820		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_230523A				05/23/23 08:34
Oil & Grease (HEM)		38	mg/L	5.0	96	78	114	0.0	18	
Lab ID: G23050286-001GMS		Sample Matrix Spike				Run: BAL-ACCU-124_230523A				05/23/23 08:36
Oil & Grease (HEM)		12	mg/L	5.0	29	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/25/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 178586
Lab ID: MB-178586	Method Blank					Run: BAL #30_230510A				05/10/23 10:03
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-178586	Laboratory Control Sample					Run: BAL #30_230510A				05/10/23 10:03
Solids, Total Suspended TSS @ 105 C		96.0	mg/L	25	96	80	120			
Lab ID: B23050778-001B DUP	Sample Duplicate					Run: BAL #30_230510A				05/10/23 10:03
Solids, Total Suspended TSS @ 105 C		37.5	mg/L	12				7.7	10	
Lab ID: B23050793-002B DUP	Sample Duplicate					Run: BAL #30_230510A				05/10/23 10:04
Solids, Total Suspended TSS @ 105 C		37.5	mg/L	12				2.7	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/25/23

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**E200.8**							Analytical Run: ICPMS208-B_230517A			
Lab ID:	**QCS**	3	Initial Calibration Verification Standard								05/18/23 09:31
Copper			0.0514	mg/L	0.010	103	90	110			
Lead			0.0487	mg/L	0.010	97	90	110			
Zinc			0.0524	mg/L	0.010	105	90	110			
Lab ID:	**CCV**	3	Continuing Calibration Verification Standard								05/18/23 14:20
Copper			0.0499	mg/L	0.010	100	90	110			
Lead			0.0493	mg/L	0.010	99	90	110			
Zinc			0.0504	mg/L	0.010	101	90	110			
Method:	**E200.8**										Batch: 178761
Lab ID:	**MB-178761**	3	Method Blank				Run: ICPMS208-B_230517A				05/18/23 10:47
Copper			ND	mg/L	0.0004						
Lead			ND	mg/L	0.00004						
Zinc			ND	mg/L	0.001						
Lab ID:	**LCS4-178761**	3	Laboratory Control Sample				Run: ICPMS208-B_230517A				05/18/23 10:53
Copper			0.104	mg/L	0.0050	104	85	115			
Lead			0.0988	mg/L	0.0010	99	85	115			
Zinc			0.105	mg/L	0.010	105	85	115			
Lab ID:	**B23050858-001EMS4**	3	Sample Matrix Spike				Run: ICPMS208-B_230517A				05/18/23 13:55
Copper			0.118	mg/L	0.0050	99	70	130			
Lead			0.0990	mg/L	0.0010	99	70	130			
Zinc			0.111	mg/L	0.010	102	70	130			
Lab ID:	**B23050858-001EMSD**	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230517A				05/18/23 14:01
Copper			0.110	mg/L	0.0050	91	70	130	7.0	20	
Lead			0.0990	mg/L	0.0010	99	70	130	0	20	
Zinc			0.102	mg/L	0.010	93	70	130	8.2	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/25/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_230515A
Lab ID: ICV-178056		Initial Calibration Verification Standard								05/15/23 11:23
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: CCV-178056		Continuing Calibration Verification Standard								05/15/23 12:37
Nitrogen, Kjeldahl, Total as N		10.5	mg/L	0.50	105	90	110			
Method: E351.2										Batch: 178673
Lab ID: MB-178673		Method Blank				Run: FIA204-B_230515A				05/15/23 12:14
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-178673		Laboratory Control Sample				Run: FIA204-B_230515A				05/15/23 12:16
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: B23050872-001BMS		Sample Matrix Spike				Run: FIA204-B_230515A				05/15/23 12:56
Nitrogen, Kjeldahl, Total as N		132	mg/L	5.0	107	90	110			
Lab ID: B23050872-001BMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230515A				05/15/23 12:58
Nitrogen, Kjeldahl, Total as N		137	mg/L	5.0	112	90	110	3.7	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/25/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_230511A
Lab ID: ICV		Initial Calibration Verification Standard								05/11/23 10:23
Nitrogen, Nitrate+Nitrite as N		0.564	mg/L	0.010	100	90	110			
Lab ID: ICV		Initial Calibration Verification Standard								05/11/23 17:54
Nitrogen, Nitrate+Nitrite as N		0.550	mg/L	0.010	97	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/11/23 19:39
Nitrogen, Nitrate+Nitrite as N		0.960	mg/L	0.010	96	90	110			
Method: E353.2										Batch: R401879
Lab ID: MBLK		Method Blank				Run: FIA203-B_230511A				05/11/23 17:56
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_230511A				05/11/23 17:58
Nitrogen, Nitrate+Nitrite as N		1.03	mg/L	0.010	103	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_230511A				05/11/23 17:59
Nitrogen, Nitrate+Nitrite as N		1.03	mg/L	0.010	103	90	110			
Lab ID: B23050948-002EMS		Sample Matrix Spike				Run: FIA203-B_230511A				05/11/23 19:42
Nitrogen, Nitrate+Nitrite as N		3.92	mg/L	0.020	102	90	110			
Lab ID: B23050948-002EMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230511A				05/11/23 19:43
Nitrogen, Nitrate+Nitrite as N		3.89	mg/L	0.020	100	90	110	0.9	10	
Lab ID: B23050493-002AMS		Sample Matrix Spike				Run: FIA203-B_230511A				05/11/23 19:55
Nitrogen, Nitrate+Nitrite as N		14.4	mg/L	0.050	106	90	110			
Lab ID: B23050493-002AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230511A				05/11/23 19:56
Nitrogen, Nitrate+Nitrite as N		14.5	mg/L	0.050	109	90	110	1.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/25/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA202-B_230511A
Lab ID: ICV-178375		Initial Calibration Verification Standard								05/11/23 16:19
Phosphorus, Total as P		0.518	mg/L	0.0050	104	90	110			
Lab ID: CCV-178375		Continuing Calibration Verification Standard								05/11/23 16:53
Phosphorus, Total as P		0.524	mg/L	0.0050	105	90	110			
Method: E365.1										Batch: 178649
Lab ID: MB-178649		Method Blank				Run: FIA202-B_230511A				05/11/23 16:23
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-178649		Laboratory Control Sample				Run: FIA202-B_230511A				05/11/23 16:25
Phosphorus, Total as P		0.220	mg/L	0.0050	110	90	110			
Lab ID: B23050872-002BMS		Sample Matrix Spike				Run: FIA202-B_230511A				05/11/23 17:19
Phosphorus, Total as P		3.08	mg/L	0.025	81	90	110			S
Lab ID: B23050872-002BMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230511A				05/11/23 17:21
Phosphorus, Total as P		3.05	mg/L	0.025	78	90	110	0.8	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23050860 **Report Date:** 05/25/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_230510B
Lab ID: CCV		Continuing Calibration Verification Standard								05/10/23 13:45
Oxygen Demand, Chemical (COD)		47.7	mg/L	5.0	95	90	110			
Method: E410.4										Batch: 178578
Lab ID: MB-178578		Method Blank				Run: SPEC3_230510B				05/10/23 13:45
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-178578		Laboratory Control Sample				Run: SPEC3_230510B				05/10/23 13:45
Oxygen Demand, Chemical (COD)		24.6	mg/L	5.0	101	90	110			
Lab ID: B23050826-001DMS		Sample Matrix Spike				Run: SPEC3_230510B				05/10/23 13:45
Oxygen Demand, Chemical (COD)		136	mg/L	10	98	90	110			
Lab ID: B23050826-001DMSD		Sample Matrix Spike Duplicate				Run: SPEC3_230510B				05/10/23 13:45
Oxygen Demand, Chemical (COD)		136	mg/L	10	98	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23050860

Login completed by: Yvonna E. Smith
Reviewed by: gmccartney
Reviewed Date: 5/13/2023

Date Received: 5/9/2023
Received by: kkw
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	4.5°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information (Billing information)

Company/Name	City Missoula Stormwater
Contact	Tracy Campbell
Phone	406-830-5455
Mailing Address	1345 W Broadway
City, State, Zip	Missoula MT 59802
Email	CampbellTL@ci.missoulamt.us
Receive Invoice ☐Hard Copy ☒Email	Receive Report ☐Hard Copy ☒Email
Purchase Order	Quote / Bottle Order 169908

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report ☐Hard Copy ☐Email	
Special Report/Formats: ☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other______	

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 Permit
Sampler Name T Campbell	Sampler Phone 406-830-5455
Sample Origin State MT	EPA/State Compliance ☒Yes ☐No

URANIUM MINING CLIENTS MUST Indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-MH-10146	5-5-23	14:00	5	W	X		B23050860
2	SW-MH-10143	5-5-23	14:30	5	W	X		
3								
4								
5								
6								
7								
8								
9								

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Tracy Campbell	5-8-23 09:36	[illegible]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Kelly Wilson	Date/Time 5/8/23 09:50	Signature [illegible]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

BOTTLE ORDER 169908

SHIPPED TO: **City of Missoula Storm Water Utility**

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 12/27/2022
VIA: FedEx Ground Service

Project: Grant Creek

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365.1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		HNO3		1

Comments
Metals: Cu, Pb, Zn

HNO3 - Nitric Acid	H2SO4 - Sulfuric Acid	NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate	HCl - Hydrochloric Acid	H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

BO#: 169908

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

June 07, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23051711

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 5/18/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23051711-001	CFR-1	05/17/23 10:45	05/18/23	Aqueous	Metals by ICP/ICPMS, Total Recoverable Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B23051711-002	SW-DC-10055	05/17/23 9:20	05/18/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23051711

Report Date: 06/07/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/07/23
Project:	MS4 Permit	**Collection Date:**	05/17/23 10:45
Lab ID:	B23051711-001	**DateReceived:**	05/18/23
Client Sample ID:	CFR-1	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	29	mg/L		10		A2540 D	05/23/23 12:09 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	38	mg/L		5		E410.4	05/19/23 13:50 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.02	mg/L		0.01		E353.2	05/24/23 17:16 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	05/24/23 10:43 / jaw
Nitrogen, Total	ND	mg/L		0.5		Calculation	05/30/23 11:14 / rs4
Phosphorus, Orthophosphate as P	0.006	mg/L		0.005		E365.1	05/18/23 17:47 / jaw
Phosphorus, Total as P	0.040	mg/L		0.005		E365.1	05/22/23 14:57 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	06/04/23 22:39 / aem
Cadmium	ND	mg/L		0.00003		E200.8	06/06/23 01:24 / aem
Copper	0.007	mg/L		0.002		E200.8	06/04/23 22:39 / aem
Iron	0.66	mg/L		0.02		E200.8	06/04/23 22:39 / aem
Lead	0.0013	mg/L		0.0003		E200.8	06/06/23 01:24 / aem
Zinc	0.010	mg/L		0.008		E200.8	06/06/23 01:24 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/27/23 07:24 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/07/23
Project:	MS4 Permit	**Collection Date:**	05/17/23 09:20
Lab ID:	B23051711-002	**DateReceived:**	05/18/23
Client Sample ID:	SW-DC-10055	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	13	mg/L		10		A2540 D	05/23/23 12:09 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	89	mg/L		5		E410.4	05/19/23 13:50 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.16	mg/L		0.01		E353.2	05/24/23 17:17 / krt
Nitrogen, Kjeldahl, Total as N	1.2	mg/L		0.5		E351.2	05/24/23 10:45 / jaw
Nitrogen, Total	2.4	mg/L		0.5		Calculation	05/30/23 11:14 / rs4
Phosphorus, Orthophosphate as P	0.053	mg/L		0.005		E365.1	05/18/23 17:48 / jaw
Phosphorus, Total as P	0.160	mg/L		0.005		E365.1	05/22/23 14:59 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	06/01/23 14:34 / jks
Cadmium	0.00008	mg/L		0.00003		E200.8	06/01/23 14:34 / jks
Copper	0.013	mg/L		0.002		E200.8	06/01/23 14:34 / jks
Iron	0.46	mg/L		0.02		E200.8	06/01/23 14:34 / jks
Lead	0.0014	mg/L		0.0003		E200.8	06/01/23 14:34 / jks
Zinc	0.114	mg/L		0.008		E200.8	06/01/23 14:34 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/27/23 07:24 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 05/30/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 230527A
Lab ID: MBLK2305270643		Method Blank				Run: BAL-ACCU-124_230527A				05/27/23 07:19
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2305270643		Laboratory Control Sample				Run: BAL-ACCU-124_230527A				05/27/23 07:19
Oil & Grease (HEM)		34	mg/L	5.0	86	78	114			
Lab ID: LCSD2305270643		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_230527A				05/27/23 07:19
Oil & Grease (HEM)		37	mg/L	5.0	93	78	114	7.8	18	
Lab ID: G23050432-002DMS		Sample Matrix Spike				Run: BAL-ACCU-124_230527A				05/27/23 07:20
Oil & Grease (HEM)		19	mg/L	5.0	44	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 179069
Lab ID: MB-179069		Method Blank				Run: BAL #30_230523A				05/23/23 12:09
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-179069		Laboratory Control Sample				Run: BAL #30_230523A				05/23/23 12:09
Solids, Total Suspended TSS @ 105 C		103	mg/L	25	103	80	120			
Lab ID: B23051678-001B DUP		Sample Duplicate				Run: BAL #30_230523A				05/23/23 12:09
Solids, Total Suspended TSS @ 105 C		37.2	mg/L	10				7.8	10	
Lab ID: B23051819-011B DUP		Sample Duplicate				Run: BAL #30_230523A				05/23/23 12:11
Solids, Total Suspended TSS @ 105 C		21.8	mg/L	10				7.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_230524A			
Lab ID: ICV-178771		Initial Calibration Verification Standard							05/24/23 10:11	
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: CCV-178771		Continuing Calibration Verification Standard							05/24/23 10:37	
Nitrogen, Kjeldahl, Total as N		10.2	mg/L	0.50	102	90	110			
Method: E351.2									Batch: 179046	
Lab ID: MB-179046		Method Blank				Run: FIA204-B_230524A			05/24/23 10:14	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-179046		Laboratory Control Sample				Run: FIA204-B_230524A			05/24/23 10:16	
Nitrogen, Kjeldahl, Total as N		9.91	mg/L	0.50	99	90	110			
Lab ID: B23051284-023CMS		Sample Matrix Spike				Run: FIA204-B_230524A			05/24/23 10:32	
Nitrogen, Kjeldahl, Total as N		80.5	mg/L	2.5	100	90	110			
Lab ID: B23051284-023CMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230524A			05/24/23 10:33	
Nitrogen, Kjeldahl, Total as N		78.0	mg/L	2.5	95	90	110	3.2	10	
Lab ID: B23051744-001DMS		Sample Matrix Spike				Run: FIA204-B_230524A			05/24/23 10:54	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: B23051744-001DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230524A			05/24/23 10:56	
Nitrogen, Kjeldahl, Total as N		10.9	mg/L	0.50	109	90	110	2.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2							Analytical Run: FIA203-B_230524B			
Lab ID: ICV		Initial Calibration Verification Standard								05/24/23 12:45
Nitrogen, Nitrate+Nitrite as N		0.570	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/24/23 15:09
Nitrogen, Nitrate+Nitrite as N		0.351	mg/L	0.010	35	90	110			S
Lab ID: ICV		Initial Calibration Verification Standard								05/24/23 17:04
Nitrogen, Nitrate+Nitrite as N		0.550	mg/L	0.010	97	90	110			
Method: E353.2									Batch: R402617	
Lab ID: MBLK		Method Blank				Run: FIA203-B_230524B				05/24/23 17:05
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_230524B				05/24/23 17:07
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_230524B				05/24/23 17:11
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: B23051705-001AMS		Sample Matrix Spike				Run: FIA203-B_230524B				05/24/23 17:13
Nitrogen, Nitrate+Nitrite as N		1.15	mg/L	0.010	104	90	110			
Lab ID: B23051705-001AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230524B				05/24/23 17:14
Nitrogen, Nitrate+Nitrite as N		1.17	mg/L	0.010	106	90	110	1.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA202-B_230522A
Lab ID: ICV-178375		Initial Calibration Verification Standard								05/22/23 14:19
Phosphorus, Total as P		0.509	mg/L	0.0050	102	90	110			
Lab ID: CCV-178375		Continuing Calibration Verification Standard								05/22/23 14:53
Phosphorus, Total as P		0.507	mg/L	0.0050	101	90	110			
Method: E365.1										Batch: 178994
Lab ID: MB-178994		Method Blank				Run: FIA202-B_230522A				05/22/23 14:23
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-178994		Laboratory Control Sample				Run: FIA202-B_230522A				05/22/23 14:25
Phosphorus, Total as P		0.201	mg/L	0.0050	100	90	110			
Lab ID: B23051786-002AMS		Sample Matrix Spike				Run: FIA202-B_230522A				05/22/23 15:19
Phosphorus, Total as P		0.625	mg/L	0.0050	99	90	110			
Lab ID: B23051786-002AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230522A				05/22/23 15:21
Phosphorus, Total as P		0.614	mg/L	0.0050	94	90	110	1.8	10	
Method: E365.1										Analytical Run: FIA204-B_230518C
Lab ID: ICV		Initial Calibration Verification Standard								05/18/23 17:39
Phosphorus, Orthophosphate as P		0.229	mg/L	0.0050	92	90	110			
Method: E365.1										Batch: 178930
Lab ID: MB-178930		Method Blank				Run: FIA204-B_230518C				05/18/23 17:43
Phosphorus, Orthophosphate as P		ND	mg/L	0.002						
Lab ID: LFB-178930		Laboratory Fortified Blank				Run: FIA204-B_230518C				05/18/23 17:44
Phosphorus, Orthophosphate as P		0.227	mg/L	0.0050	91	90	110			
Lab ID: B23051711-002AMS		Sample Matrix Spike				Run: FIA204-B_230518C				05/18/23 17:49
Phosphorus, Orthophosphate as P		0.299	mg/L	0.0050	98	90	110			
Lab ID: B23051711-002AMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230518C				05/18/23 17:50
Phosphorus, Orthophosphate as P		0.303	mg/L	0.0050	100	90	110	1.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_230519B
Lab ID: CCV		Continuing Calibration Verification Standard								05/19/23 13:50
Oxygen Demand, Chemical (COD)		54.3	mg/L	5.0	109	90	110			
Method: E410.4										Batch: 178937
Lab ID: MB-178937		Method Blank				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-178937		Laboratory Control Sample				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		25.0	mg/L	5.0	102	90	110			
Lab ID: B23051684-002CMS		Sample Matrix Spike				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		97.8	mg/L	5.0	107	90	110			
Lab ID: B23051684-002CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		97.9	mg/L	5.0	108	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/07/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS207-B_230602A
Lab ID: QCS	3	Initial Calibration Verification Standard								06/04/23 15:10
Arsenic		0.0508	mg/L	0.0050	102	90	110			
Copper		0.0518	mg/L	0.010	104	90	110			
Iron		0.245	mg/L	0.020	98	90	110			
Lab ID: CCV	3	Continuing Calibration Verification Standard								06/04/23 21:17
Arsenic		0.0503	mg/L	0.0050	101	90	110			
Copper		0.0510	mg/L	0.010	102	90	110			
Iron		1.22	mg/L	0.020	94	90	110			
Method: E200.8										Analytical Run: ICPMS207-B_230605A
Lab ID: QCS	3	Initial Calibration Verification Standard								06/05/23 20:33
Cadmium		0.0253	mg/L	0.0010	101	90	110			
Lead		0.0466	mg/L	0.0010	93	90	110			
Zinc		0.0527	mg/L	0.0050	105	90	110			
Lab ID: CCV	3	Continuing Calibration Verification Standard								06/06/23 00:35
Cadmium		0.0502	mg/L	0.0010	100	90	110			
Lead		0.0477	mg/L	0.0010	95	90	110			
Zinc		0.0502	mg/L	0.0050	100	90	110			
Method: E200.8										Batch: 179187
Lab ID: MB-179187	6	Method Blank				Run: ICPMS207-B_230605A				06/06/23 01:12
Arsenic		ND	mg/L	0.0001						
Cadmium		ND	mg/L	0.00003						
Copper		ND	mg/L	0.0003						
Iron		ND	mg/L	0.003						
Lead		ND	mg/L	0.00006						
Zinc		ND	mg/L	0.001						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/07/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_230601A
Lab ID: QCS	6	Initial Calibration Verification Standard								06/01/23 12:09
Arsenic		0.0513	mg/L	0.0050	103	90	110			
Cadmium		0.0250	mg/L	0.0010	100	90	110			
Copper		0.0528	mg/L	0.010	106	90	110			
Iron		0.257	mg/L	0.020	103	90	110			
Lead		0.0498	mg/L	0.0010	100	90	110			
Zinc		0.0530	mg/L	0.0050	106	90	110			
Lab ID: CCV	6	Continuing Calibration Verification Standard								06/01/23 13:25
Arsenic		0.0506	mg/L	0.0050	101	90	110			
Cadmium		0.0500	mg/L	0.0010	100	90	110			
Copper		0.0514	mg/L	0.010	103	90	110			
Iron		1.33	mg/L	0.020	102	90	110			
Lead		0.0500	mg/L	0.0010	100	90	110			
Zinc		0.0504	mg/L	0.0050	101	90	110			
Method: E200.8										Batch: 179187
Lab ID: MB-179187	6	Method Blank				Run: ICPMS208-B_230601A				06/01/23 13:37
Arsenic		ND	mg/L	0.00006						
Cadmium		ND	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		ND	mg/L	0.004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-179187	6	Laboratory Control Sample				Run: ICPMS208-B_230601A				06/01/23 13:44
Arsenic		0.105	mg/L	0.0010	105	85	115			
Cadmium		0.0518	mg/L	0.0010	104	85	115			
Copper		0.108	mg/L	0.0050	107	85	115			
Iron		0.521	mg/L	0.020	104	85	115			
Lead		0.102	mg/L	0.0010	102	85	115			
Zinc		0.106	mg/L	0.010	106	85	115			
Lab ID: B23051675-001BMS4	6	Sample Matrix Spike				Run: ICPMS208-B_230601A				06/01/23 14:02
Arsenic		0.539	mg/L	0.0010		70	130			A
Cadmium		0.0497	mg/L	0.0010	99	70	130			
Copper		0.0921	mg/L	0.0050	92	70	130			
Iron		0.619	mg/L	0.025	96	70	130			
Lead		0.106	mg/L	0.0010	106	70	130			
Zinc		0.0928	mg/L	0.010	93	70	130			
Lab ID: B23051675-001BMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230601A				06/01/23 14:08
Arsenic		0.586	mg/L	0.0010		70	130	8.4	20	A
Cadmium		0.0510	mg/L	0.0010	102	70	130	2.5	20	
Copper		0.101	mg/L	0.0050	101	70	130	9.3	20	
Iron		0.629	mg/L	0.025	98	70	130	1.7	20	
Lead		0.106	mg/L	0.0010	106	70	130	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

A - Analyte level was greater than four times the spike level - in accordance with the method, percent recovery is not calculated

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051711 **Report Date:** 06/07/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Batch: 179187	
Lab ID: B23051675-001BMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230601A			06/01/23 14:08	
Zinc		0.101	mg/L	0.010	101	70	130	8.4	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23051711

Login completed by:	Gina McCartney	Date Received:	5/18/2023
Reviewed by:	ysmith	Received by:	htm
Reviewed Date:	5/22/2023	Carrier name:	Return-FedEx Ground

	Yes	No	Other
Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☐	No ☑	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	9.2°C Melted Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

The collection time indicated on the container label for sample CFR-1 is 11:00 and on the Chain of Custody it is 10:45. Proceeded with the collection time as indicated on the Chain of Custody.

The collection time indicated on the container label for sample SW-DC-10055 is 09:30 and on the Chain of Custody it is 09:20. Proceeded with the collection time as indicated on the Chain of Custody.

The samples for Orthophosphate were subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

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Chain of Custody & Analytical Request Record

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Page 1 of 1

Account Information (Billing information)

Company/Name City Missoula Stormwater
Contact Tracy Campbell
Phone 406-830-5455
Mailing Address 1345 W Broadway
City, State, Zip Missoula MT 59802
Email CampbellTL@ci.missoula.mt.us
Receive Invoice ☐Hard Copy ☒Email | Receive Report ☐Hard Copy ☒Email
Purchase Order | Quote | Bottle Order 169906 169907

Report Information (if different than Account Information)

Company/Name
Contact
Phone
Mailing Address
City, State, Zip
Email
Receive Report ☐Hard Copy ☐Email
Special Report/Formats:
☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Project Information

Project Name, PWSID, Permit, etc. MS4 Permit
Sampler Name T Campbell | Sampler Phone 406-830-5455
Sample Origin State MT | EPA/State Compliance ☒Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	CFR-1	5/17/23	10:45	6	W	X		B2305171
2	SW-DC-10055	5/17/23	9:20	6	W	X		
3								
4								
5								
6								
7								
8								
9								

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Lyndsey Holloway	5/17/23 11:00Am	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Hayden Moore	Date/Time 5/18/23 1150	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

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BOTTLE ORDER 169907

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239

Phone: (406) 542-6364

Project: Clark Fork River

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 12/27/2022
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		H2SO4		1
		E365.1	Phosphorus, Total				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E351.2	Nitrogen, Total Kjeldahl				
		E410.4	Chemical Oxygen Demand				
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total Recoverable		HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
not sampled → 1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		AF		1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample	1

Comments

BO#: 169907

ANALYTICAL SUMMARY REPORT

June 02, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23051729

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 5/18/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23051729-001	SW-TRTS-10005-US	05/17/23 10:00	05/18/23	Aqueous	Metals by ICP/ICPMS, Total Recoverable Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B23051729-002	SW-TRTS-10005-DS	05/17/23 10:10	05/18/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23051729

Report Date: 06/02/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility
Project: MS4 Permit
Lab ID: B23051729-001
Client Sample ID: SW-TRTS-10005-US

Report Date: 06/02/23
Collection Date: 05/17/23 10:00
DateReceived: 05/18/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	44	mg/L		10		A2540 D	05/23/23 12:09 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	44	mg/L		5		E410.4	05/19/23 13:51 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.72	mg/L		0.01		E353.2	05/24/23 17:20 / krt
Nitrogen, Kjeldahl, Total as N	1.0	mg/L		0.5		E351.2	05/24/23 10:46 / jaw
Nitrogen, Total	1.7	mg/L		0.5		Calculation	05/30/23 11:14 / rs4
Phosphorus, Orthophosphate as P	ND	mg/L		0.005		E365.1	05/18/23 17:46 / jaw
Phosphorus, Total as P	0.297	mg/L		0.005		E365.1	05/22/23 15:01 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	06/01/23 14:40 / jks
Cadmium	ND	mg/L		0.00003		E200.8	06/01/23 14:40 / jks
Copper	0.003	mg/L		0.002		E200.8	06/01/23 14:40 / jks
Iron	0.06	mg/L		0.02		E200.8	06/01/23 14:40 / jks
Lead	ND	mg/L		0.0003		E200.8	06/01/23 14:40 / jks
Zinc	0.013	mg/L		0.008		E200.8	06/01/23 14:40 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/30/23 09:04 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/02/23
Project:	MS4 Permit	**Collection Date:**	05/17/23 10:10
Lab ID:	B23051729-002	**DateReceived:**	05/18/23
Client Sample ID:	SW-TRTS-10005-DS	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	05/23/23 12:09 / pjw
- TSS did not obtain the minimum residue requirement of 2.5 mg residue.							
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	14	mg/L		5		E410.4	05/19/23 13:51 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.76	mg/L		0.01		E353.2	05/24/23 17:21 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	05/24/23 10:48 / jaw
Nitrogen, Total	0.8	mg/L		0.5		Calculation	05/30/23 11:14 / rs4
Phosphorus, Orthophosphate as P	0.012	mg/L		0.005		E365.1	05/18/23 17:45 / jaw
Phosphorus, Total as P	0.009	mg/L		0.005		E365.1	05/30/23 14:12 / jaw
- The Orthophosphate result is greater than the Total Phosphorus result. Both results have been confirmed by re-analysis.							
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	06/01/23 14:46 / jks
Cadmium	ND	mg/L		0.00003		E200.8	06/01/23 14:46 / jks
Copper	ND	mg/L		0.002		E200.8	06/01/23 14:46 / jks
Iron	0.02	mg/L		0.02		E200.8	06/01/23 14:46 / jks
Lead	ND	mg/L		0.0003		E200.8	06/01/23 14:46 / jks
Zinc	ND	mg/L		0.008		E200.8	06/01/23 14:46 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/30/23 09:04 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 05/31/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 230530A	
Lab ID: MBLK2305300822		Method Blank				Run: BAL-ACCU-124_230530A			05/30/23 09:03	
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2305300822		Laboratory Control Sample				Run: BAL-ACCU-124_230530A			05/30/23 09:03	
Oil & Grease (HEM)		33	mg/L	5.0	82	78	114			
Lab ID: LCSD2305300822		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_230530A			05/30/23 09:03	
Oil & Grease (HEM)		35	mg/L	5.0	87	78	114	5.3	18	
Lab ID: G23050472-001CMS		Sample Matrix Spike				Run: BAL-ACCU-124_230530A			05/30/23 09:06	
Oil & Grease (HEM)		36	mg/L	5.0	89	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 179069	
Lab ID: MB-179069	Method Blank					Run: BAL #30_230523A			05/23/23 12:09	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-179069	Laboratory Control Sample					Run: BAL #30_230523A			05/23/23 12:09	
Solids, Total Suspended TSS @ 105 C		103	mg/L	25	103	80	120			
Lab ID: B23051678-001B DUP	Sample Duplicate					Run: BAL #30_230523A			05/23/23 12:09	
Solids, Total Suspended TSS @ 105 C		37.2	mg/L	10				7.8	10	
Lab ID: B23051819-011B DUP	Sample Duplicate					Run: BAL #30_230523A			05/23/23 12:11	
Solids, Total Suspended TSS @ 105 C		21.8	mg/L	10				7.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: G_230530A
Lab ID: MBLK2305300822		Method Blank				Run: SUB-G277324				05/30/23 09:03
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2305300822		Laboratory Control Sample				Run: SUB-G277324				05/30/23 09:03
Oil & Grease (HEM)		33	mg/L	5.0	82	78	114			
Lab ID: LCSD2305300822		Laboratory Control Sample Duplicate				Run: SUB-G277324				05/30/23 09:03
Oil & Grease (HEM)		35	mg/L	5.0	87	78	114	5.3	18	
Lab ID: G23050472-001CMS		Sample Matrix Spike				Run: SUB-G277324				05/30/23 09:06
Oil & Grease (HEM)		36	mg/L	5.0	89	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_230601A
Lab ID: QCS	6	Initial Calibration Verification Standard								06/01/23 12:09
Arsenic		0.0513	mg/L	0.0050	103	90	110			
Cadmium		0.0250	mg/L	0.0010	100	90	110			
Copper		0.0528	mg/L	0.010	106	90	110			
Iron		0.257	mg/L	0.020	103	90	110			
Lead		0.0498	mg/L	0.0010	100	90	110			
Zinc		0.0530	mg/L	0.0050	106	90	110			
Lab ID: CCV	6	Continuing Calibration Verification Standard								06/01/23 13:25
Arsenic		0.0506	mg/L	0.0050	101	90	110			
Cadmium		0.0500	mg/L	0.0010	100	90	110			
Copper		0.0514	mg/L	0.010	103	90	110			
Iron		1.33	mg/L	0.020	102	90	110			
Lead		0.0500	mg/L	0.0010	100	90	110			
Zinc		0.0504	mg/L	0.0050	101	90	110			
Method: E200.8										Batch: 179187
Lab ID: MB-179187	6	Method Blank				Run: ICPMS208-B_230601A				06/01/23 13:37
Arsenic		ND	mg/L	0.00006						
Cadmium		ND	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		ND	mg/L	0.004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-179187	6	Laboratory Control Sample				Run: ICPMS208-B_230601A				06/01/23 13:44
Arsenic		0.105	mg/L	0.0010	105	85	115			
Cadmium		0.0518	mg/L	0.0010	104	85	115			
Copper		0.108	mg/L	0.0050	107	85	115			
Iron		0.521	mg/L	0.020	104	85	115			
Lead		0.102	mg/L	0.0010	102	85	115			
Zinc		0.106	mg/L	0.010	106	85	115			
Lab ID: B23051675-001BMS4	6	Sample Matrix Spike				Run: ICPMS208-B_230601A				06/01/23 14:02
Arsenic		0.539	mg/L	0.0010		70	130			A
Cadmium		0.0497	mg/L	0.0010	99	70	130			
Copper		0.0921	mg/L	0.0050	92	70	130			
Iron		0.619	mg/L	0.025	96	70	130			
Lead		0.106	mg/L	0.0010	106	70	130			
Zinc		0.0928	mg/L	0.010	93	70	130			
Lab ID: B23051675-001BMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230601A				06/01/23 14:08
Arsenic		0.586	mg/L	0.0010		70	130	8.4	20	A
Cadmium		0.0510	mg/L	0.0010	102	70	130	2.5	20	
Copper		0.101	mg/L	0.0050	101	70	130	9.3	20	
Iron		0.629	mg/L	0.025	98	70	130	1.7	20	
Lead		0.106	mg/L	0.0010	106	70	130	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

A - Analyte level was greater than four times the spike level - in accordance with the method, percent recovery is not calculated

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E200.8**									Batch: 179187	
Lab ID: **B23051675-001BMSD**	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230601A			06/01/23 14:08	
Zinc		0.101	mg/L	0.010	101	70	130	8.4	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_230524A			
Lab ID: ICV-178771		Initial Calibration Verification Standard							05/24/23 10:11	
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: CCV-178771		Continuing Calibration Verification Standard							05/24/23 10:37	
Nitrogen, Kjeldahl, Total as N		10.2	mg/L	0.50	102	90	110			
Method: E351.2							Batch: 179046			
Lab ID: MB-179046		Method Blank				Run: FIA204-B_230524A			05/24/23 10:14	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-179046		Laboratory Control Sample				Run: FIA204-B_230524A			05/24/23 10:16	
Nitrogen, Kjeldahl, Total as N		9.91	mg/L	0.50	99	90	110			
Lab ID: B23051744-001DMS		Sample Matrix Spike				Run: FIA204-B_230524A			05/24/23 10:54	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: B23051744-001DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230524A			05/24/23 10:56	
Nitrogen, Kjeldahl, Total as N		10.9	mg/L	0.50	109	90	110	2.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_230524B
Lab ID: ICV		Initial Calibration Verification Standard								05/24/23 12:45
Nitrogen, Nitrate+Nitrite as N		0.570	mg/L	0.010	101	90	110			
Lab ID: ICV		Initial Calibration Verification Standard								05/24/23 17:04
Nitrogen, Nitrate+Nitrite as N		0.550	mg/L	0.010	97	90	110			
Method: E353.2										Batch: R402617
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_230524B				05/24/23 17:07
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_230524B				05/24/23 17:11
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: B23051705-001AMS		Sample Matrix Spike				Run: FIA203-B_230524B				05/24/23 17:13
Nitrogen, Nitrate+Nitrite as N		1.15	mg/L	0.010	104	90	110			
Lab ID: B23051705-001AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230524B				05/24/23 17:14
Nitrogen, Nitrate+Nitrite as N		1.17	mg/L	0.010	106	90	110	1.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_230522A			
Lab ID: ICV-178375		Initial Calibration Verification Standard							05/22/23 14:19	
Phosphorus, Total as P		0.509	mg/L	0.0050	102	90	110			
Lab ID: CCV-178375		Continuing Calibration Verification Standard							05/22/23 14:53	
Phosphorus, Total as P		0.507	mg/L	0.0050	101	90	110			
Method: E365.1									Batch: 178994	
Lab ID: MB-178994		Method Blank				Run: FIA202-B_230522A			05/22/23 14:23	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-178994		Laboratory Control Sample				Run: FIA202-B_230522A			05/22/23 14:25	
Phosphorus, Total as P		0.201	mg/L	0.0050	100	90	110			
Lab ID: B23051786-002AMS		Sample Matrix Spike				Run: FIA202-B_230522A			05/22/23 15:19	
Phosphorus, Total as P		0.625	mg/L	0.0050	99	90	110			
Lab ID: B23051786-002AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230522A			05/22/23 15:21	
Phosphorus, Total as P		0.614	mg/L	0.0050	94	90	110	1.8	10	
Method: E365.1							Analytical Run: FIA202-B_230530A			
Lab ID: ICV-178375		Initial Calibration Verification Standard							05/30/23 13:55	
Phosphorus, Total as P		0.497	mg/L	0.0050	99	90	110			
Method: E365.1									Batch: 179231	
Lab ID: MB-179231		Method Blank				Run: FIA202-B_230530A			05/30/23 13:59	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-179231		Laboratory Control Sample				Run: FIA202-B_230530A			05/30/23 14:02	
Phosphorus, Total as P		0.200	mg/L	0.0050	100	90	110			
Lab ID: B23052182-001EMS		Sample Matrix Spike				Run: FIA202-B_230530A			05/30/23 14:25	
Phosphorus, Total as P		0.193	mg/L	0.0050	92	90	110			
Lab ID: B23052182-001EMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230530A			05/30/23 14:27	
Phosphorus, Total as P		0.197	mg/L	0.0050	94	90	110	2.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA204-B_230518C
Lab ID: ICV		Initial Calibration Verification Standard								05/18/23 17:39
Phosphorus, Orthophosphate as P		0.229	mg/L	0.0050	92	90	110			
Method: E365.1										Batch: 178930
Lab ID: MB-178930		Method Blank				Run: FIA204-B_230518C				05/18/23 17:43
Phosphorus, Orthophosphate as P		ND	mg/L	0.002						
Lab ID: LFB-178930		Laboratory Fortified Blank				Run: FIA204-B_230518C				05/18/23 17:44
Phosphorus, Orthophosphate as P		0.227	mg/L	0.0050	91	90	110			
Lab ID: B23051711-002AMS		Sample Matrix Spike				Run: FIA204-B_230518C				05/18/23 17:49
Phosphorus, Orthophosphate as P		0.299	mg/L	0.0050	98	90	110			
Lab ID: B23051711-002AMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230518C				05/18/23 17:50
Phosphorus, Orthophosphate as P		0.303	mg/L	0.0050	100	90	110	1.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23051729 **Report Date:** 06/02/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_230519B
Lab ID: CCV		Continuing Calibration Verification Standard								05/19/23 13:51
Oxygen Demand, Chemical (COD)		52.3	mg/L	5.0	105	90	110			
Method: E410.4										Batch: 178937
Lab ID: MB-178937		Method Blank				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-178937		Laboratory Control Sample				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		25.0	mg/L	5.0	102	90	110			
Lab ID: B23051684-002CMS		Sample Matrix Spike				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		97.8	mg/L	5.0	107	90	110			
Lab ID: B23051684-002CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_230519B				05/19/23 13:50
Oxygen Demand, Chemical (COD)		97.9	mg/L	5.0	108	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23051729

Login completed by: Yvonna E. Smith
Date Received: 5/18/2023
Reviewed by: jmiller
Received by: htm
Reviewed Date: 5/24/2023
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	11.0°C Melted Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

One of the two sample containers for Oil and Grease analysis on sample SW-TRTS-10005-DS was received with the lid partially off and leaking. There is sufficient volume to continue with analysis using the other 1L glass bottle.

The samples for Orthophosphate were subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City Missoula Stormwater
Contact	Tracy Campbell
Phone	406-531-5539
Mailing Address	1345 W Broadway
City, State, Zip	Missoula MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	169907

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other______

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 Permit
Sampler Name	T Campbell
Sampler Phone	406-830-5455
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-TRTS-10005-US	5-17-23	10:00	6	W	X		B23051729
2	SW-TRTS-10005-DS	5-17-23	10:10	6	W	X		
3								
4								
5								
6								
7								
8								
9								

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed						
Relinquished by (print)	Tracy Campbell	Date/Time 5-17-23 11:00	Signature [signature]	Received by (print)	Date/Time	Signature
Relinquished by (print)		Date/Time	Signature	Received by Laboratory (print) Hayden Moore	Date/Time 5/18/23 1150	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

ENERGY LABORATORIES Trust our People. Trust our Data. www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515 • Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

BOTTLE ORDER 169907

SHIPPED TO: **City of Missoula Storm Water Utility**

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 12/27/2022
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		H2SO4		1
		E365.1	Phosphorus, Total				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E351.2	Nitrogen, Total Kjeldahl				
		E410.4	Chemical Oxygen Demand				
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total Recoverable		HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
Not sampled 1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		AF		1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample	1

Comments

BO#: 169907

ANALYTICAL SUMMARY REPORT

June 08, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23052053

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 5/23/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23052053-001	SW-DC-10099	05/22/23 11:15	05/23/23	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B23052053-002	SW-DC-10070	05/22/23 12:15	05/23/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23052053

Report Date: 06/08/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/08/23
Project:	MS4 Permit	**Collection Date:**	05/22/23 11:15
Lab ID:	B23052053-001	**DateReceived:**	05/23/23
Client Sample ID:	SW-DC-10099	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	407	mg/L		20		A2540 D	05/26/23 09:43 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	201	mg/L		50		E410.4	05/24/23 12:55 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.18	mg/L		0.01		E353.2	05/26/23 14:16 / krt
Nitrogen, Kjeldahl, Total as N	1.6	mg/L		0.5		E351.2	05/25/23 10:51 / jaw
Nitrogen, Total	1.8	mg/L		0.5		Calculation	05/30/23 17:03 / rs4
Phosphorus, Total as P	0.506	mg/L		0.005		E365.1	05/31/23 15:29 / jaw
METALS, TOTAL							
Copper	0.014	mg/L		0.002		E200.8	06/03/23 23:09 / aem
Lead	0.0059	mg/L		0.0003		E200.8	06/03/23 23:09 / aem
Zinc	0.076	mg/L		0.008		E200.8	06/03/23 23:09 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	3	mg/L		1		E1664A	06/05/23 08:54 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/08/23
Project:	MS4 Permit	**Collection Date:**	05/22/23 12:15
Lab ID:	B23052053-002	**DateReceived:**	05/23/23
Client Sample ID:	SW-DC-10070	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	831	mg/L		40		A2540 D	05/26/23 09:43 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	482	mg/L		50		E410.4	05/24/23 12:55 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.22	mg/L		0.01		E353.2	05/26/23 14:17 / krt
Nitrogen, Kjeldahl, Total as N	6.7	mg/L		0.5		E351.2	05/25/23 10:56 / jaw
Nitrogen, Total	6.9	mg/L		0.5		Calculation	05/30/23 17:03 / rs4
Phosphorus, Total as P	1.27	mg/L		0.01		E365.1	05/31/23 16:23 / jaw
METALS, TOTAL							
Copper	0.061	mg/L		0.002		E200.8	06/03/23 23:15 / aem
Lead	0.0303	mg/L		0.0003		E200.8	06/03/23 23:15 / aem
Zinc	0.334	mg/L		0.008		E200.8	06/03/23 23:15 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	2	mg/L		1		E1664A	06/05/23 08:54 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/05/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 230605A	
Lab ID: MBLK2306050839		Method Blank				Run: BAL-ACCU-124_230605A			06/05/23 08:50	
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2306050839		Laboratory Control Sample				Run: BAL-ACCU-124_230605A			06/05/23 08:51	
Oil & Grease (HEM)		36	mg/L	5.0	89	78	114			
Lab ID: LCSD2306050839		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_230605A			06/05/23 08:51	
Oil & Grease (HEM)		37	mg/L	5.0	92	78	114	3.9	18	
Lab ID: G23050524-002AMS		Sample Matrix Spike				Run: BAL-ACCU-124_230605A			06/05/23 08:52	
Oil & Grease (HEM)		49	mg/L	5.0	79	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 179192	
Lab ID: MB-179192	Method Blank					Run: BAL #30_230526A			05/26/23 09:42	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-179192	Laboratory Control Sample					Run: BAL #30_230526A			05/26/23 09:42	
Solids, Total Suspended TSS @ 105 C		98.0	mg/L	25	98	80	120			
Lab ID: B23052034-001B DUP	Sample Duplicate					Run: BAL #30_230526A			05/26/23 09:42	
Solids, Total Suspended TSS @ 105 C		144	mg/L	10				8.2	10	
Lab ID: B23052252-001B DUP	Sample Duplicate					Run: BAL #30_230526A			05/26/23 09:43	
Solids, Total Suspended TSS @ 105 C		16.9	mg/L	10				0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8							Analytical Run: ICPMS208-B_230602A			
Lab ID: QCS	3	Initial Calibration Verification Standard							06/03/23 18:52	
Copper		0.0530	mg/L	0.010	106	90	110			
Lead		0.0495	mg/L	0.0010	99	90	110			
Zinc		0.0516	mg/L	0.0050	103	90	110			
Lab ID: CCV	3	Continuing Calibration Verification Standard							06/03/23 22:19	
Copper		0.0516	mg/L	0.010	103	90	110			
Lead		0.0495	mg/L	0.0010	99	90	110			
Zinc		0.0518	mg/L	0.0050	104	90	110			
Method: E200.8									Batch: 179321	
Lab ID: MB-179321	3	Method Blank				Run: ICPMS208-B_230602A			06/03/23 19:49	
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-179321	3	Laboratory Control Sample				Run: ICPMS208-B_230602A			06/03/23 19:55	
Copper		0.106	mg/L	0.0050	106	85	115			
Lead		0.100	mg/L	0.0010	100	85	115			
Zinc		0.106	mg/L	0.010	106	85	115			
Lab ID: B23052029-001AMS4	3	Sample Matrix Spike				Run: ICPMS208-B_230602A			06/03/23 21:54	
Copper		0.0943	mg/L	0.0050	94	70	130			
Lead		0.107	mg/L	0.0010	107	70	130			
Zinc		0.0945	mg/L	0.010	93	70	130			
Lab ID: B23052029-001AMSD	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230602A			06/03/23 22:00	
Copper		0.107	mg/L	0.0050	107	70	130	13	20	
Lead		0.0953	mg/L	0.0010	95	70	130	11	20	
Zinc		0.108	mg/L	0.010	106	70	130	13	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA204-B_230525A	
Lab ID: ICV-178771		Initial Calibration Verification Standard							05/25/23 09:39	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Lab ID: CCV-178771		Continuing Calibration Verification Standard							05/25/23 10:27	
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: CCV-178771		Continuing Calibration Verification Standard							05/25/23 10:53	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Method: E351.2									Batch: 179101	
Lab ID: MB-179101		Method Blank				Run: FIA204-B_230525A			05/25/23 10:30	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-179101		Laboratory Control Sample				Run: FIA204-B_230525A			05/25/23 10:32	
Nitrogen, Kjeldahl, Total as N		10.7	mg/L	0.50	107	90	110			
Lab ID: B23052053-002CMS		Sample Matrix Spike				Run: FIA204-B_230525A			05/25/23 10:58	
Nitrogen, Kjeldahl, Total as N		18.8	mg/L	0.50	121	90	110			S
Lab ID: B23052053-002CMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230525A			05/25/23 10:59	
Nitrogen, Kjeldahl, Total as N		17.3	mg/L	0.50	106	90	110	8.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_230526B
Lab ID: ICV		Initial Calibration Verification Standard								05/26/23 12:22
Nitrogen, Nitrate+Nitrite as N		0.583	mg/L	0.010	103	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/26/23 14:10
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110			
Method: E353.2										Batch: R402732
Lab ID: MBLK		Method Blank				Run: FIA203-B_230526B				05/26/23 12:23
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_230526B				05/26/23 12:25
Nitrogen, Nitrate+Nitrite as N		1.06	mg/L	0.010	106	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_230526B				05/26/23 12:26
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: B23052046-007DMS		Sample Matrix Spike				Run: FIA203-B_230526B				05/26/23 14:14
Nitrogen, Nitrate+Nitrite as N		1.15	mg/L	0.010	104	90	110			
Lab ID: B23052046-007DMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230526B				05/26/23 14:15
Nitrogen, Nitrate+Nitrite as N		1.18	mg/L	0.010	106	90	110	2.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA202-B_230531A
Lab ID: ICV-178375		Initial Calibration Verification Standard								05/31/23 14:03
Phosphorus, Total as P		0.507	mg/L	0.0050	101	90	110			
Lab ID: CCV-178375		Continuing Calibration Verification Standard								05/31/23 15:07
Phosphorus, Total as P		0.509	mg/L	0.0050	102	90	110			
Lab ID: CCV-178375		Continuing Calibration Verification Standard								05/31/23 16:12
Phosphorus, Total as P		0.513	mg/L	0.0050	103	90	110			
Method: E365.1										Batch: 179273
Lab ID: MB-179273		Method Blank				Run: FIA202-B_230531A				05/31/23 15:11
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-179273		Laboratory Control Sample				Run: FIA202-B_230531A				05/31/23 15:14
Phosphorus, Total as P		0.219	mg/L	0.0050	109	90	110			
Lab ID: B23052053-001CMS		Sample Matrix Spike				Run: FIA202-B_230531A				05/31/23 15:31
Phosphorus, Total as P		0.672	mg/L	0.0050	83	90	110			S
Lab ID: B23052053-001CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230531A				05/31/23 15:33
Phosphorus, Total as P		0.673	mg/L	0.0050	84	90	110	0.1	10	S
Lab ID: B23052106-001FMS		Sample Matrix Spike				Run: FIA202-B_230531A				05/31/23 15:48
Phosphorus, Total as P		0.437	mg/L	0.0050	105	90	110			
Lab ID: B23052106-001FMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230531A				05/31/23 15:50
Phosphorus, Total as P		0.434	mg/L	0.0050	103	90	110	0.7	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23052053 **Report Date:** 06/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4								Analytical Run: SPEC3_230524A		
Lab ID: CCV		Continuing Calibration Verification Standard							05/24/23 12:55	
Oxygen Demand, Chemical (COD)		49.5	mg/L	5.0	99	90	110			
Method: E410.4									Batch: 179091	
Lab ID: MB-179091		Method Blank				Run: SPEC3_230524A			05/24/23 12:55	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-179091		Laboratory Control Sample				Run: SPEC3_230524A			05/24/23 12:55	
Oxygen Demand, Chemical (COD)		24.5	mg/L	5.0	100	90	110			
Lab ID: B23052014-003BMS		Sample Matrix Spike				Run: SPEC3_230524A			05/24/23 12:55	
Oxygen Demand, Chemical (COD)		25.3	mg/L	5.0	104	90	110			
Lab ID: B23052014-003BMSD		Sample Matrix Spike Duplicate				Run: SPEC3_230524A			05/24/23 12:55	
Oxygen Demand, Chemical (COD)		26.1	mg/L	5.0	107	90	110	3.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23052053

Login completed by:	Yvonna E. Smith	Date Received:	5/23/2023
Reviewed by:	gmccartney	Received by:	htm
Reviewed Date:	5/27/2023	Carrier name:	Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	11.6°C Melted Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information (Billing information)

Company/Name	City Missoula Stormwater
Contact	Tracy Campbell
Phone	406-830-5455
Mailing Address	1345 W Broadway
City, State, Zip	Missoula MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	169906

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other____

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 Permit
Sampler Name	T Campbell
Sampler Phone	406-830-5455
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-DC-10099	5/22/23	11:15	5	W	X		B23052053
2	SW-DC-10070	5/22/23	12:15	5	W	X		
3								
4								
5								
6								
7								
8								
9								

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed						
Relinquished by (print)	Lyndsey Holloway	Date/Time 5/22/23 12:30	Signature	Received by (print)	Date/Time	Signature
Relinquished by (print)		Date/Time	Signature	Received by Laboratory (print) Hayden Moore	Date/Time 5/23/23 0825	Signature

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check____	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

BOTTLE ORDER 169906

SHIPPED TO: **City of Missoula Storm Water Utility**

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Bitterroot River

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 12/27/2022
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365.1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		HNO3		1

Comments
Metals: Cu, Pb, Zn

HNO3 - Nitric Acid | H2SO4 - Sulfuric Acid | NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate | HCl - Hydrochloric Acid | H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

September 06, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23082074
Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 3 samples for City of Missoula Storm Water Utility on 8/22/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23082074-001	SW-MH-10143	08/21/23 10:30	08/22/23	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B23082074-002	SW-MH-10146	08/21/23 10:15	08/22/23	Aqueous	Same As Above
B23082074-003	CFR-1	08/21/23 11:30	08/22/23	Aqueous	Metals by ICP/ICPMS, Total Bacteria, Total and E-Coli Coliforms - QT Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23082074

Report Date: 09/06/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility
Project: MS4 Permit
Lab ID: B23082074-001
Client Sample ID: SW-MH-10143

Report Date: 09/06/23
Collection Date: 08/21/23 10:30
DateReceived: 08/22/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	66	mg/L		10		A2540 D	08/22/23 14:51 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	132	mg/L		10		E410.4	08/23/23 14:30 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.45	mg/L		0.01		E353.2	08/29/23 14:26 / krt
Nitrogen, Kjeldahl, Total as N	2.5	mg/L		0.5		E351.2	08/25/23 12:02 / jaw
Nitrogen, Total	3.0	mg/L		0.5		Calculation	08/30/23 15:14 / bap
Phosphorus, Total as P	0.333	mg/L		0.005		E365.1	08/23/23 15:09 / jaw
METALS, TOTAL							
Copper	0.017	mg/L		0.002		E200.8	08/24/23 11:58 / aem
Lead	0.0022	mg/L		0.0003		E200.8	08/24/23 11:58 / aem
Zinc	0.044	mg/L		0.008		E200.8	08/24/23 11:58 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	09/01/23 09:29 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	09/06/23
Project:	MS4 Permit	**Collection Date:**	08/21/23 10:15
Lab ID:	B23082074-002	**DateReceived:**	08/22/23
Client Sample ID:	SW-MH-10146	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	87	mg/L		10		A2540 D	08/22/23 14:51 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	129	mg/L		10		E410.4	08/23/23 14:30 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.47	mg/L		0.01		E353.2	08/29/23 14:27 / krt
Nitrogen, Kjeldahl, Total as N	2.6	mg/L		0.5		E351.2	08/25/23 12:13 / jaw
Nitrogen, Total	3.1	mg/L		0.5		Calculation	08/30/23 15:14 / bap
Phosphorus, Total as P	0.373	mg/L		0.005		E365.1	08/23/23 15:15 / jaw
METALS, TOTAL							
Copper	0.018	mg/L		0.002		E200.8	08/24/23 12:05 / aem
Lead	0.0021	mg/L		0.0003		E200.8	08/24/23 12:05 / aem
Zinc	0.044	mg/L		0.008		E200.8	08/24/23 12:05 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	1	mg/L		1		E1664A	09/01/23 09:30 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility
Project: MS4 Permit
Lab ID: B23082074-003
Client Sample ID: CFR-1

Report Date: 09/06/23
Collection Date: 08/21/23 11:30
DateReceived: 08/22/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	816.4	mpn/100ml		1.0		A9223 B	08/22/23 09:52 / spb
Bacteria, E-Coli Coliform	43.2	mpn/100ml		1.0		A9223 B	08/22/23 09:52 / spb
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	08/22/23 14:51 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	11	mg/L		5		E410.4	08/23/23 14:30 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.01		E353.2	08/29/23 14:28 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	08/25/23 12:18 / jaw
Nitrogen, Total	ND	mg/L		0.5		Calculation	08/30/23 15:14 / bap
Phosphorus, Total as P	ND	mg/L		0.005		E365.1	08/23/23 15:17 / jaw
METALS, TOTAL							
Copper	ND	mg/L		0.002		E200.8	08/24/23 12:11 / aem
Lead	ND	mg/L		0.0003		E200.8	08/24/23 12:11 / aem
Zinc	ND	mg/L		0.008		E200.8	08/24/23 12:11 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	09/05/23 08:59 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/05/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 230901A
Lab ID: MBLK2309010838		Method Blank				Run: BAL-ACCU-124_230901A				09/01/23 09:25
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2309010838		Laboratory Control Sample				Run: BAL-ACCU-124_230901A				09/01/23 09:25
Oil & Grease (HEM)		35	mg/L	5.0	86	78	114			
Lab ID: LCSD2309010838		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_230901A				09/01/23 09:26
Oil & Grease (HEM)		36	mg/L	5.0	90	78	114	4.0	18	
Lab ID: G23080505-002AMS		Sample Matrix Spike				Run: BAL-ACCU-124_230901A				09/01/23 09:26
Oil & Grease (HEM)		12	mg/L	5.0	30	78	114			S
Method: E1664A										Batch: 230905A
Lab ID: MBLK2309050831		Method Blank				Run: BAL-ACCU-124_230905A				09/05/23 08:58
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2309050831		Laboratory Control Sample				Run: BAL-ACCU-124_230905A				09/05/23 08:58
Oil & Grease (HEM)		34	mg/L	5.0	86	78	114			
Lab ID: LCSD2309050831		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_230905A				09/05/23 08:58
Oil & Grease (HEM)		35	mg/L	5.0	88	78	114	2.3	18	
Lab ID: B23082074-003CMS		Sample Matrix Spike				Run: BAL-ACCU-124_230905A				09/05/23 08:59
Oil & Grease (HEM)		39	mg/L	5.0	83	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2540 D**									Batch: 182031	
Lab ID: **MB-182031**	Method Blank					Run: BAL #30_230822A			08/22/23 10:14	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: **LCS-182031**	Laboratory Control Sample					Run: BAL #30_230822A			08/22/23 10:14	
Solids, Total Suspended TSS @ 105 C		94.0	mg/L	25	94	80	120			
Lab ID: **B23082060-001B DUP**	Sample Duplicate					Run: BAL #30_230822A			08/22/23 12:48	
Solids, Total Suspended TSS @ 105 C		14.2	mg/L	10				7.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8							Analytical Run: ICPMS208-B_230823A			
Lab ID: QCS	3	Initial Calibration Verification Standard								08/24/23 05:39
Copper		0.0547	mg/L	0.010	109	90	110			
Lead		0.0512	mg/L	0.0010	102	90	110			
Zinc		0.0549	mg/L	0.0050	110	90	110			
Lab ID: CCV	3	Continuing Calibration Verification Standard								08/24/23 11:46
Copper		0.0541	mg/L	0.010	108	90	110			
Lead		0.0502	mg/L	0.0010	100	90	110			
Zinc		0.0533	mg/L	0.0050	107	90	110			
Method: E200.8									Batch: 182048	
Lab ID: MB-182048	3	Method Blank				Run: ICPMS208-B_230823A				08/24/23 08:17
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-182048	3	Laboratory Control Sample				Run: ICPMS208-B_230823A				08/24/23 08:23
Copper		0.111	mg/L	0.0010	111	85	115			
Lead		0.104	mg/L	0.0010	104	85	115			
Zinc		0.110	mg/L	0.0050	109	85	115			
Lab ID: B23081966-002BMS4	3	Sample Matrix Spike				Run: ICPMS208-B_230823A				08/24/23 09:33
Copper		0.594	mg/L	0.025	113	70	130			
Lead		0.522	mg/L	0.0025	103	70	130			
Zinc		0.703	mg/L	0.25	114	70	130			
Lab ID: B23081966-002BMSD4	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_230823A				08/24/23 09:39
Copper		0.586	mg/L	0.025	111	70	130	1.3	20	
Lead		0.522	mg/L	0.0025	104	70	130	0.2	20	
Zinc		0.662	mg/L	0.25	106	70	130	6.0	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_230825A
Lab ID: ICV-181965		Initial Calibration Verification Standard								08/25/23 11:19
Nitrogen, Kjeldahl, Total as N		10.4	mg/L	0.50	104	90	110			
Lab ID: CCV-181965		Continuing Calibration Verification Standard								08/25/23 11:44
Nitrogen, Kjeldahl, Total as N		10.8	mg/L	0.50	108	90	110			
Lab ID: CCV-181965		Continuing Calibration Verification Standard								08/25/23 12:07
Nitrogen, Kjeldahl, Total as N		10.8	mg/L	0.50	108	90	110			
Method: E351.2										Batch: 182128
Lab ID: MB-182128		Method Blank				Run: FIA204-B_230825A				08/25/23 11:22
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-182128		Laboratory Control Sample				Run: FIA204-B_230825A				08/25/23 11:23
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: B23082074-001BMS		Sample Matrix Spike				Run: FIA204-B_230825A				08/25/23 12:03
Nitrogen, Kjeldahl, Total as N		13.4	mg/L	0.50	109	90	110			
Lab ID: B23082074-001BMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230825A				08/25/23 12:05
Nitrogen, Kjeldahl, Total as N		13.5	mg/L	0.50	110	90	110	0.7	10	
Method: E351.2										Batch: 182130
Lab ID: MB-182130		Method Blank				Run: FIA204-B_230825A				08/25/23 12:10
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-182130		Laboratory Control Sample				Run: FIA204-B_230825A				08/25/23 12:11
Nitrogen, Kjeldahl, Total as N		10.9	mg/L	0.50	109	90	110			
Lab ID: B23082074-002BMS		Sample Matrix Spike				Run: FIA204-B_230825A				08/25/23 12:15
Nitrogen, Kjeldahl, Total as N		14.1	mg/L	0.50	114	90	110			S
Lab ID: B23082074-002BMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230825A				08/25/23 12:16
Nitrogen, Kjeldahl, Total as N		13.8	mg/L	0.50	111	90	110	2.2	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2							Analytical Run: FIA203-B_230829B			
Lab ID: ICV		Initial Calibration Verification Standard							08/29/23 12:44	
Nitrogen, Nitrate+Nitrite as N		0.568	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							08/29/23 14:16	
Nitrogen, Nitrate+Nitrite as N		1.00	mg/L	0.010	100	90	110			
Method: E353.2									Batch: R407938	
Lab ID: MBLK		Method Blank				Run: FIA203-B_230829B			08/29/23 12:45	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_230829B			08/29/23 12:49	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_230829B			08/29/23 12:51	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: B23082053-001CMS		Sample Matrix Spike				Run: FIA203-B_230829B			08/29/23 14:19	
Nitrogen, Nitrate+Nitrite as N		22.3	mg/L	0.10	104	90	110			
Lab ID: B23082053-001CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230829B			08/29/23 14:20	
Nitrogen, Nitrate+Nitrite as N		22.3	mg/L	0.10	104	90	110	0.2	10	
Lab ID: B23082094-004AMS		Sample Matrix Spike				Run: FIA203-B_230829B			08/29/23 14:35	
Nitrogen, Nitrate+Nitrite as N		1.15	mg/L	0.010	106	90	110			
Lab ID: B23082094-004AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230829B			08/29/23 14:36	
Nitrogen, Nitrate+Nitrite as N		1.15	mg/L	0.010	107	90	110	0.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1									Analytical Run: FIA202-B_230823A	
Lab ID: ICV-181554		Initial Calibration Verification Standard							08/23/23 14:54	
Phosphorus, Total as P		0.488	mg/L	0.0050	98	90	110			
Method: E365.1									Batch: 182066	
Lab ID: MB-182066		Method Blank				Run: FIA202-B_230823A			08/23/23 14:58	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-182066		Laboratory Control Sample				Run: FIA202-B_230823A			08/23/23 15:00	
Phosphorus, Total as P		0.218	mg/L	0.0050	109	90	110			
Lab ID: B23082074-001BMS		Sample Matrix Spike				Run: FIA202-B_230823A			08/23/23 15:11	
Phosphorus, Total as P		0.536	mg/L	0.0050	101	90	110			
Lab ID: B23082074-001BMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_230823A			08/23/23 15:13	
Phosphorus, Total as P		0.543	mg/L	0.0050	105	90	110	1.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23082074 **Report Date:** 09/06/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_230823B
Lab ID: CCV		Continuing Calibration Verification Standard								08/23/23 14:30
Oxygen Demand, Chemical (COD)		52.0	mg/L	5.0	104	90	110			
Method: E410.4										Batch: 182061
Lab ID: MB-182061		Method Blank				Run: SPEC3_230823B				08/23/23 14:30
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-182061		Laboratory Control Sample				Run: SPEC3_230823B				08/23/23 14:30
Oxygen Demand, Chemical (COD)		26.1	mg/L	5.0	107	90	110			
Lab ID: B23082118-001CMS		Sample Matrix Spike				Run: SPEC3_230823B				08/23/23 14:30
Oxygen Demand, Chemical (COD)		40.0	mg/L	5.0	108	90	110			
Lab ID: B23082118-001CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_230823B				08/23/23 14:30
Oxygen Demand, Chemical (COD)		40.0	mg/L	5.0	108	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23082074

Login completed by:	Danielle N. Harris	Date Received:	8/22/2023
Reviewed by:	darcy	Received by:	dnh
Reviewed Date:	8/25/2023	Carrier name:	Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	13.6°C Melted Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information (Billing information)

Company/Name	City Missoula Stormwater
Contact	Tracy Campbell
Phone	406-830-5455
Mailing Address	1345 W Broadway
City, State, Zip	Missoula MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice ☐Hard Copy ☒Email	Receive Report ☐Hard Copy ☒Email
Purchase Order / Quote	Bottle Order 173907

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report ☐Hard Copy ☐Email	
Special Report/Formats: ☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other______	

Comments

Project Information

Project Name, PWSID, Permit, etc. MS4 Permit

Sampler Name T. Campbell — Sampler Phone 406-830-5455

Sample Origin State MT — EPA/State Compliance ☒Yes ☐No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-MH-10143	8-21-23	10:30	5	W	X		B23082074
2	SW-MH-10146	8-21-23	10:15	5	W	X		
3	CFR-1	8-21-23	11:30	6	W	X		
4								
5								
6								
7								
8								
9								

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Tracy Campbell	8-21-23 12:00pm	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Danielle Harris	Date/Time 8/22/23 0905	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

BOTTLE ORDER 173907

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Grant Creek

CFR-1
SW-MH-10143
SW-MH-10146

Order Created by: Gina McCartney
Shipped From: Billings, MT
Ship Date: 5/19/2023
VIA: FedEx Ground Service

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365.1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		HNO3		1

Comments

Metals: Cu, Pb, Zn-DEQ 7 Limits

BOTTLE ORDER 150517

SHIPPED TO: **City of Missoula Storm Water Utility**

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River E.Coli

CFR-1

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 3/11/2021
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
100 mL Plastic Sterile	1	A9223 B	Bacteria, Total and E-Coli Coliforms - QT	30.00 hrs			1

HNO3 - Nitric Acid
H2SO4 - Sulfuric Acid
NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate
HCl - Hydrochloric Acid
H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

November 16, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23110199

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 11/3/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23110199-001	CFR-1	11/02/23 11:45	11/03/23	Aqueous	Metals by ICP/ICPMS, Total Recoverable Bacteria, Total and E-Coli Coliforms - QT Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B23110199-002	SW-DC-10055	11/02/23 12:00	11/03/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23110199

Report Date: 11/16/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	11/16/23
Project:	MS4 Permit	**Collection Date:**	11/02/23 11:45
Lab ID:	B23110199-001	**DateReceived:**	11/03/23
Client Sample ID:	CFR-1	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	980.4	mpn/100ml		1.0		A9223 B	11/03/23 10:58 / spb
Bacteria, E-Coli Coliform	109.9	mpn/100ml		1.0		A9223 B	11/03/23 10:58 / spb
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	11/03/23 10:34 / jpv
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		5		E410.4	11/10/23 17:24 / jpv
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.02	mg/L		0.01		E353.2	11/06/23 15:43 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	11/08/23 17:28 / jaw
Nitrogen, Total	ND	mg/L		0.5		Calculation	11/09/23 08:12 / klc
Phosphorus, Orthophosphate as P	ND	mg/L		0.005		E365.1	11/03/23 14:23 / jpv
Phosphorus, Total as P	0.008	mg/L		0.005		E365.1	11/07/23 15:02 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	0.001	mg/L		0.001		E200.8	11/11/23 16:16 / aem
Cadmium	ND	mg/L		0.00003		E200.8	11/11/23 16:16 / aem
Copper	ND	mg/L		0.002		E200.8	11/11/23 16:16 / aem
Iron	0.05	mg/L		0.02		E200.8	11/11/23 16:16 / aem
Lead	ND	mg/L		0.0003		E200.8	11/11/23 16:16 / aem
Zinc	ND	mg/L		0.008		E200.8	11/11/23 16:16 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/15/23 08:45 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	11/16/23
Project:	MS4 Permit	**Collection Date:**	11/02/23 12:00
Lab ID:	B23110199-002	**DateReceived:**	11/03/23
Client Sample ID:	SW-DC-10055	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	>24196	mpn/100ml		1.0		A9223 B	11/03/23 10:58 / spb
Bacteria, E-Coli Coliform	2046	mpn/100ml		1.0		A9223 B	11/03/23 10:58 / spb
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	98	mg/L		20		A2540 D	11/03/23 10:34 / jpv
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	212	mg/L		10		E410.4	11/10/23 17:24 / jpv
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.29	mg/L		0.01		E353.2	11/06/23 15:45 / krt
Nitrogen, Kjeldahl, Total as N	2.7	mg/L		0.5		E351.2	11/08/23 17:33 / jaw
Nitrogen, Total	3.0	mg/L		0.5		Calculation	11/09/23 08:12 / klc
Phosphorus, Orthophosphate as P	0.537	mg/L		0.005		E365.1	11/03/23 14:25 / jpv
Phosphorus, Total as P	0.746	mg/L		0.005		E365.1	11/07/23 15:08 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	0.002	mg/L		0.001		E200.8	11/11/23 16:23 / aem
Cadmium	0.00013	mg/L		0.00003		E200.8	11/11/23 16:23 / aem
Copper	0.013	mg/L		0.002		E200.8	11/11/23 16:23 / aem
Iron	2.39	mg/L		0.02		E200.8	11/11/23 16:23 / aem
Lead	0.0056	mg/L		0.0003		E200.8	11/11/23 16:23 / aem
Zinc	0.164	mg/L		0.008		E200.8	11/11/23 16:23 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/15/23 08:45 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 231115A
Lab ID: MBLK2311150812		Method Blank				Run: BAL-ACCU-124_231115A				11/15/23 08:43
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2311150812		Laboratory Control Sample				Run: BAL-ACCU-124_231115A				11/15/23 08:43
Oil & Grease (HEM)		34	mg/L	5.0	85	78	114			
Lab ID: LCSD2311150812		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_231115A				11/15/23 08:43
Oil & Grease (HEM)		34	mg/L	5.0	85	78	114	0.3	18	
Lab ID: B23110199-001EMS		Sample Matrix Spike				Run: BAL-ACCU-124_231115A				11/15/23 08:45
Oil & Grease (HEM)		32	mg/L	5.0	64	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 184531	
Lab ID: MB-184531	Method Blank					Run: BAL #30_231103C			11/03/23 09:57	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-184531	Laboratory Control Sample					Run: BAL #30_231103C			11/03/23 09:57	
Solids, Total Suspended TSS @ 105 C		96.0	mg/L	25	96	80	120			
Lab ID: B23110199-002BDUP	Sample Duplicate					Run: BAL #30_231103C			11/03/23 12:09	
Solids, Total Suspended TSS @ 105 C		104	mg/L	25				5.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_231108B			
Lab ID: ICV-184221		Initial Calibration Verification Standard								11/08/23 14:11
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: CCV-184221		Continuing Calibration Verification Standard								11/08/23 17:04
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: CCV-184221		Continuing Calibration Verification Standard								11/08/23 17:30
Nitrogen, Kjeldahl, Total as N		10.7	mg/L	0.50	107	90	110			
Method: E351.2										Batch: 184567
Lab ID: MB-184567		Method Blank				Run: FIA204-B_231108B				11/08/23 17:08
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-184567		Laboratory Control Sample				Run: FIA204-B_231108B				11/08/23 17:09
Nitrogen, Kjeldahl, Total as N		10.9	mg/L	0.50	109	90	110			
Lab ID: B23110199-002DMS		Sample Matrix Spike				Run: FIA204-B_231108B				11/08/23 17:34
Nitrogen, Kjeldahl, Total as N		14.2	mg/L	0.50	115	90	110			S
Lab ID: B23110199-002DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_231108B				11/08/23 17:36
Nitrogen, Kjeldahl, Total as N		13.6	mg/L	0.50	109	90	110	4.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_231106B	
Lab ID: ICV		Initial Calibration Verification Standard							11/06/23 15:01	
Nitrogen, Nitrate+Nitrite as N		0.563	mg/L	0.010	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/06/23 15:36	
Nitrogen, Nitrate+Nitrite as N		0.914	mg/L	0.010	91	90	110			
Method: E353.2									Batch: R411783	
Lab ID: MBLK		Method Blank				Run: FIA203-B_231106B			11/06/23 15:03	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_231106B			11/06/23 15:05	
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_231106B			11/06/23 15:06	
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: B23110191-001CMS		Sample Matrix Spike				Run: FIA203-B_231106B			11/06/23 15:39	
Nitrogen, Nitrate+Nitrite as N		1.68	mg/L	0.010	104	90	110			
Lab ID: B23110191-001CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_231106B			11/06/23 15:40	
Nitrogen, Nitrate+Nitrite as N		1.69	mg/L	0.010	105	90	110	0.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1						Analytical Run: FIA202-B_231107A				
Lab ID: ICV-183926		Initial Calibration Verification Standard							11/07/23 14:30	
Phosphorus, Total as P		0.498	mg/L	0.0050	100	90	110			
Lab ID: CCV-183926		Continuing Calibration Verification Standard							11/07/23 15:04	
Phosphorus, Total as P		0.510	mg/L	0.0050	102	90	110			
Method: E365.1									Batch: 184613	
Lab ID: MB-184613		Method Blank				Run: FIA202-B_231107A			11/07/23 14:34	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-184613		Laboratory Control Sample				Run: FIA202-B_231107A			11/07/23 14:36	
Phosphorus, Total as P		0.216	mg/L	0.0050	108	90	110			
Lab ID: B23110223-002AMS		Sample Matrix Spike				Run: FIA202-B_231107A			11/07/23 15:17	
Phosphorus, Total as P		0.682	mg/L	0.0050	88	90	110			S
Lab ID: B23110223-002AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_231107A			11/07/23 15:19	
Phosphorus, Total as P		0.684	mg/L	0.0050	89	90	110	0.3	10	S
Method: E365.1						Analytical Run: FIA204-B_231103A				
Lab ID: ICV		Initial Calibration Verification Standard							11/03/23 14:15	
Phosphorus, Orthophosphate as P		0.237	mg/L	0.0050	95	90	110			
Method: E365.1									Batch: 184549	
Lab ID: MB-184549		Method Blank				Run: FIA204-B_231103A			11/03/23 14:21	
Phosphorus, Orthophosphate as P		ND	mg/L	0.002						
Lab ID: B23110199-001AMS		Sample Matrix Spike				Run: FIA204-B_231103A			11/03/23 14:24	
Phosphorus, Orthophosphate as P		0.248	mg/L	0.0050	99	90	110			
Lab ID: B23110199-001AMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_231103A			11/03/23 14:24	
Phosphorus, Orthophosphate as P		0.246	mg/L	0.0050	98	90	110	0.8	10	
Lab ID: LFB-184549		Laboratory Fortified Blank				Run: FIA204-B_231103A			11/03/23 14:42	
Phosphorus, Orthophosphate as P		0.227	mg/L	0.0050	91	90	110			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4									Analytical Run: SPEC3_231110B	
Lab ID: CCV		Continuing Calibration Verification Standard							11/10/23 17:24	
Oxygen Demand, Chemical (COD)		48.3	mg/L	5.0	97	90	110			
Method: E410.4									Batch: 184506	
Lab ID: MB-184506		Method Blank				Run: SPEC3_231110B			11/10/23 17:24	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-184506		Laboratory Control Sample				Run: SPEC3_231110B			11/10/23 17:24	
Oxygen Demand, Chemical (COD)		22.7	mg/L	5.0	93	90	110			
Lab ID: B23110061-002CMS		Sample Matrix Spike				Run: SPEC3_231110B			11/10/23 17:24	
Oxygen Demand, Chemical (COD)		34.2	mg/L	5.0	98	90	110			
Lab ID: B23110061-002CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_231110B			11/10/23 17:24	
Oxygen Demand, Chemical (COD)		36.1	mg/L	5.0	106	90	110	5.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_231110A
Lab ID: QCS	6	Initial Calibration Verification Standard								11/11/23 09:33
Arsenic		0.0497	mg/L	0.0050	99	90	110			
Cadmium		0.0253	mg/L	0.0010	101	90	110			
Copper		0.0515	mg/L	0.010	103	90	110			
Iron		0.259	mg/L	0.020	103	90	110			
Lead		0.0506	mg/L	0.0010	101	90	110			
Zinc		0.0503	mg/L	0.0050	101	90	110			
Lab ID: CCV	6	Continuing Calibration Verification Standard								11/11/23 15:26
Arsenic		0.0482	mg/L	0.0050	96	90	110			
Cadmium		0.0488	mg/L	0.0010	98	90	110			
Copper		0.0499	mg/L	0.010	100	90	110			
Iron		1.25	mg/L	0.020	96	90	110			
Lead		0.0497	mg/L	0.0010	99	90	110			
Zinc		0.0506	mg/L	0.0050	101	90	110			
Method: E200.8										Batch: 184664
Lab ID: MB-184664	6	Method Blank				Run: ICPMS208-B_231110A				11/11/23 10:42
Arsenic		ND	mg/L	0.00006						
Cadmium		0.00003	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		0.02	mg/L	0.004						
Lead		0.00004	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-184664	6	Laboratory Control Sample				Run: ICPMS208-B_231110A				11/11/23 10:49
Arsenic		0.0999	mg/L	0.0010	100	85	115			
Cadmium		0.0525	mg/L	0.0010	105	85	115			
Copper		0.102	mg/L	0.0010	102	85	115			
Iron		0.532	mg/L	0.012	106	85	115			
Lead		0.102	mg/L	0.0010	102	85	115			
Zinc		0.104	mg/L	0.0050	103	85	115			
Lab ID: B23110193-002AMS4	6	Sample Matrix Spike				Run: ICPMS208-B_231110A				11/11/23 15:51
Arsenic		0.102	mg/L	0.0010	100	70	130			
Cadmium		0.0516	mg/L	0.0010	103	70	130			
Copper		0.103	mg/L	0.0050	103	70	130			
Iron		0.644	mg/L	0.012	99	70	130			
Lead		0.103	mg/L	0.0010	103	70	130			
Zinc		0.107	mg/L	0.010	101	70	130			
Lab ID: B23110193-002AMSD4	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_231110A				11/11/23 15:57
Arsenic		0.0992	mg/L	0.0010	97	70	130	2.9	20	
Cadmium		0.0517	mg/L	0.0010	103	70	130	0.2	20	
Copper		0.102	mg/L	0.0050	101	70	130	1.9	20	
Iron		0.633	mg/L	0.012	97	70	130	1.7	20	
Lead		0.102	mg/L	0.0010	102	70	130	1.0	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110199 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Batch: 184664	
Lab ID: B23110193-002AMSD4	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_231110A			11/11/23 15:57	
Zinc		0.107	mg/L	0.010	100	70	130	0.4	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23110199

Login completed by:	Yvonna E. Smith	Date Received:	11/3/2023
Reviewed by:	gmccartney	Received by:	dnh
Reviewed Date:	11/10/2023	Carrier name:	Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	3.6°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

Contact and Corrective Action Comments:

Page 2 of Bottle Order 177496 was not received with the provided attachment to the Chain of Custody.

The samples for Orthophosphate were subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

Work Order Receipt Checklist - Continued

City of Missoula Storm Water Utility B23110199

The following issues were resolved per phone conversation with Tracy Campbell on 11/3/2023:

Energy Laboratories does not accept samples for Total and E. Coli Coliform Bacteria analysis on Friday. Proceed with the Total and E. Coli Coliform Bacteria analysis and applied the Bacteria Additional Weekend Charge.

The attachment to the Chain of Custody indicates Chlorophyll A was not collected. Sample containers for Chlorophyll A were received. Chlorophyll A is not needed.

The sample container for Orthophosphate analysis for sample SW-DC-10055 was received empty. Proceeded with Orthophosphate analysis using additional unpreserved volume received for Chlorophyll A.

ENERGY LABORATORIES
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Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Stormwater
Contact	Tracy Campbell
Phone	406-830-5455
Mailing Address	1345 W Broadway
City, State, Zip	Missoula, MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	177496

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 Permit
Sampler Name	Campbell
Sampler Phone	406-830-5455
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See attached	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	CFR-1	11-2-23	11:45	7	W	X			B23110199
2	SW-DC-10055	11-2-23	12:00	7	W	X			
3									
4									
5									
6									
7									
8									
9									

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Marie Nelson	11/2/23	Marie Nelson			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Danielle Harris	Date/Time 11/3/23 0956	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

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BOTTLE ORDER 177496

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364

Project: Clark Fork River

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/8/2023
VIA: FedEx Ground Service

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(6 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	Calculation E365.1 E353.2 E351.2 E410.4	Nitrogen, Total (TKN+NO3+NO2) Phosphorus, Total Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Chemical Oxygen Demand		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total Recoverable		HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
~~1 Liter Amber Glass Narrow Mouth~~	~~1~~	~~A10200 H~~	~~Chlorophyll A~~ Not collected				1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample	1

BO#: 177496

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BOTTLE ORDER 177495

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River E.Coli

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/8/2023
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(6 Sets)							
100 mL Plastic Sterile	1	A9223 B	Bacteria, Total and E-Coli Coliforms - QT	30.00 hrs			1

Comments

■ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide ■ ZnAc - Zinc Acetate ■ HCl - Hydrochloric Acid ☐ H3PO4 - Phosphoric Acid	**We strongly suggest that the samples are shipped the same day as they are collected.**

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

November 20, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23110234

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 11/3/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23110234-001	SW-MH-10143	11/02/23 10:30	11/03/23	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B23110234-002	SW-MH-1014	11/02/23 10:30	11/03/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23110234

Report Date: 11/20/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	11/20/23
Project:	MS4 Permit	**Collection Date:**	11/02/23 10:30
Lab ID:	B23110234-001	**DateReceived:**	11/03/23
Client Sample ID:	SW-MH-10143	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	271	mg/L		20		A2540 D	11/06/23 16:57 / jpv
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	188	mg/L		5		E410.4	11/10/23 17:25 / jpv
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.25	mg/L		0.01		E353.2	11/07/23 15:53 / krt
Nitrogen, Kjeldahl, Total as N	1.8	mg/L		0.5		E351.2	11/10/23 11:16 / jaw
Nitrogen, Total	2.0	mg/L		0.5		Calculation	11/10/23 15:00 / klc
Phosphorus, Total as P	0.688	mg/L		0.005		E365.1	11/07/23 15:30 / jaw
METALS, TOTAL							
Copper	0.018	mg/L		0.002		E200.8	11/12/23 13:45 / aem
Lead	0.0032	mg/L		0.0003		E200.8	11/12/23 13:45 / aem
Zinc	0.067	mg/L		0.008		E200.8	11/12/23 13:45 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/15/23 08:46 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	11/20/23
Project:	MS4 Permit	**Collection Date:**	11/02/23 10:30
Lab ID:	B23110234-002	**DateReceived:**	11/03/23
Client Sample ID:	SW-MH-1014	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	66	mg/L		10		A2540 D	11/06/23 16:57 / jpv
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	157	mg/L		5		E410.4	11/10/23 17:25 / jpv
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.24	mg/L		0.01		E353.2	11/07/23 15:54 / krt
Nitrogen, Kjeldahl, Total as N	1.7	mg/L		0.5		E351.2	11/10/23 11:18 / jaw
Nitrogen, Total	1.9	mg/L		0.5		Calculation	11/10/23 15:00 / klc
Phosphorus, Total as P	0.587	mg/L		0.005		E365.1	11/07/23 15:32 / jaw
METALS, TOTAL							
Copper	0.011	mg/L		0.002		E200.8	11/12/23 13:51 / aem
Lead	0.0017	mg/L		0.0003		E200.8	11/12/23 13:51 / aem
Zinc	0.049	mg/L		0.008		E200.8	11/12/23 13:51 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/15/23 08:46 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/16/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 231115A
Lab ID: MBLK2311150812		Method Blank				Run: BAL-ACCU-124_231115A				11/15/23 08:43
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2311150812		Laboratory Control Sample				Run: BAL-ACCU-124_231115A				11/15/23 08:43
Oil & Grease (HEM)		34	mg/L	5.0	85	78	114			
Lab ID: LCSD2311150812		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_231115A				11/15/23 08:43
Oil & Grease (HEM)		34	mg/L	5.0	85	78	114	0.3	18	
Lab ID: G23110155-001EMS		Sample Matrix Spike				Run: BAL-ACCU-124_231115A				11/15/23 08:45
Oil & Grease (HEM)		32	mg/L	5.0	64	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 184579	
Lab ID: MB-184579	Method Blank					Run: BAL #30_231106A			11/06/23 16:56	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-184579	Laboratory Control Sample					Run: BAL #30_231106A			11/06/23 16:56	
Solids, Total Suspended TSS @ 105 C		100	mg/L	25	100	80	120			
Lab ID: B23110231-003CDUP	Sample Duplicate					Run: BAL #30_231106A			11/06/23 16:56	
Solids, Total Suspended TSS @ 105 C		147	mg/L	10				0.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8								Analytical Run: ICPMS208-B_231110A		
Lab ID: QCS	3	Initial Calibration Verification Standard							11/12/23 11:20	
Copper		0.0539	mg/L	0.010	108	90	110			
Lead		0.0519	mg/L	0.0010	104	90	110			
Zinc		0.0537	mg/L	0.0050	107	90	110			
Lab ID: CCV	3	Continuing Calibration Verification Standard							11/12/23 13:07	
Copper		0.0505	mg/L	0.010	101	90	110			
Lead		0.0495	mg/L	0.0010	99	90	110			
Zinc		0.0515	mg/L	0.0050	103	90	110			
Method: E200.8								Batch: 184741		
Lab ID: MB-184741	3	Method Blank				Run: ICPMS208-B_231110A			11/12/23 03:13	
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-184741	3	Laboratory Control Sample				Run: ICPMS208-B_231110A			11/12/23 03:19	
Copper		0.0996	mg/L	0.0010	100	85	115			
Lead		0.0961	mg/L	0.0010	96	85	115			
Zinc		0.0973	mg/L	0.0050	97	85	115			
Lab ID: B23110221-001DMS4	3	Sample Matrix Spike				Run: ICPMS208-B_231110A			11/12/23 09:12	
Copper		0.105	mg/L	0.0050	98	70	130			
Lead		0.0987	mg/L	0.0010	98	70	130			
Zinc		0.100	mg/L	0.010	96	70	130			
Lab ID: B23110221-001DMSD4	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_231110A			11/12/23 09:31	
Copper		0.104	mg/L	0.0050	97	70	130	1.1	20	
Lead		0.103	mg/L	0.0010	102	70	130	4.2	20	
Zinc		0.100	mg/L	0.010	96	70	130	0.3	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA204-B_231110A	
Lab ID: ICV-184221		Initial Calibration Verification Standard							11/10/23 10:38	
Nitrogen, Kjeldahl, Total as N		10.4	mg/L	0.50	104	90	110			
Lab ID: CCV-184221		Continuing Calibration Verification Standard							11/10/23 11:03	
Nitrogen, Kjeldahl, Total as N		10.2	mg/L	0.50	102	90	110			
Method: E351.2									Batch: 184703	
Lab ID: MB-184703		Method Blank				Run: FIA204-B_231110A			11/10/23 10:41	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-184703		Laboratory Control Sample				Run: FIA204-B_231110A			11/10/23 10:42	
Nitrogen, Kjeldahl, Total as N		9.63	mg/L	0.50	96	90	110			
Lab ID: B23110221-009EMS		Sample Matrix Spike				Run: FIA204-B_231110A			11/10/23 11:08	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Lab ID: B23110221-009EMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_231110A			11/10/23 11:10	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_231107B	
Lab ID: ICV		Initial Calibration Verification Standard							11/07/23 14:01	
Nitrogen, Nitrate+Nitrite as N		0.567	mg/L	0.010	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/07/23 15:41	
Nitrogen, Nitrate+Nitrite as N		0.978	mg/L	0.010	98	90	110			
Method: E353.2									Batch: R411845	
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_231107B			11/07/23 14:05	
Nitrogen, Nitrate+Nitrite as N		1.02	mg/L	0.010	102	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_231107B			11/07/23 14:06	
Nitrogen, Nitrate+Nitrite as N		1.02	mg/L	0.010	102	90	110			
Lab ID: MBLK		Method Blank				Run: FIA203-B_231107B			11/07/23 14:33	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: B23110231-001FMS		Sample Matrix Spike				Run: FIA203-B_231107B			11/07/23 15:45	
Nitrogen, Nitrate+Nitrite as N		12.3	mg/L	0.050	101	90	110			
Lab ID: B23110231-001FMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_231107B			11/07/23 15:46	
Nitrogen, Nitrate+Nitrite as N		12.4	mg/L	0.050	103	90	110	0.8	10	
Lab ID: B23110237-003CMS		Sample Matrix Spike				Run: FIA203-B_231107B			11/07/23 16:00	
Nitrogen, Nitrate+Nitrite as N		1.46	mg/L	0.010	105	90	110			
Lab ID: B23110237-003CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_231107B			11/07/23 16:01	
Nitrogen, Nitrate+Nitrite as N		1.47	mg/L	0.010	106	90	110	0.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_231107A			
Lab ID: ICV-183926		Initial Calibration Verification Standard							11/07/23 14:30	
Phosphorus, Total as P		0.498	mg/L	0.0050	100	90	110			
Lab ID: CCV-183926		Continuing Calibration Verification Standard							11/07/23 15:04	
Phosphorus, Total as P		0.510	mg/L	0.0050	102	90	110			
Method: E365.1									Batch: 184613	
Lab ID: MB-184613		Method Blank				Run: FIA202-B_231107A			11/07/23 14:34	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-184613		Laboratory Control Sample				Run: FIA202-B_231107A			11/07/23 14:36	
Phosphorus, Total as P		0.216	mg/L	0.0050	108	90	110			
Lab ID: B23110040-001CMS		Sample Matrix Spike				Run: FIA202-B_231107A			11/07/23 15:40	
Phosphorus, Total as P		14.3	mg/L	0.10	97	90	110			
Lab ID: B23110040-001CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_231107A			11/07/23 15:43	
Phosphorus, Total as P		14.1	mg/L	0.10	89	90	110	1.1	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23110234 **Report Date:** 11/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_231110B
Lab ID: CCV		Continuing Calibration Verification Standard								11/10/23 17:25
Oxygen Demand, Chemical (COD)		50.3	mg/L	5.0	101	90	110			
Method: E410.4										Batch: 184786
Lab ID: MB-184786		Method Blank				Run: SPEC3_231110B				11/10/23 17:24
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-184786		Laboratory Control Sample				Run: SPEC3_231110B				11/10/23 17:24
Oxygen Demand, Chemical (COD)		26.2	mg/L	5.0	108	90	110			
Lab ID: B23110440-001DMS		Sample Matrix Spike				Run: SPEC3_231110B				11/10/23 17:25
Oxygen Demand, Chemical (COD)		120	mg/L	5.0	97	90	110			
Lab ID: B23110440-001DMSD		Sample Matrix Spike Duplicate				Run: SPEC3_231110B				11/10/23 17:25
Oxygen Demand, Chemical (COD)		121	mg/L	5.0	100	90	110	0.7	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23110234

Login completed by: Danielle N. Harris
Reviewed by: ysmith
Reviewed Date: 11/10/2023

Date Received: 11/3/2023
Received by: dnh
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	5.0°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

Contact and Corrective Action Comments:

None

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Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information *(Billing information)*

Company/Name	City of Missoula Stormwater
Contact	Tracy Campbell
Phone	406-830-5455
Mailing Address	1345 W Broadway St
City, State, Zip	Missoula MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice ☐Hard Copy ☒Email	Receive Report ☐Hard Copy ☒Email
Purchase Order / Quote	Bottle Order 177494

Report Information *(if different than Account Information)*

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report ☐Hard Copy ☐Email	
Special Report/Formats: ☐ LEVEL IV ☐NELAC ☐ EDD/EDT *(contact laboratory)* ☐ Other	

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 Permit
Sampler Name: Campbell	Sampler Phone: 406-830-5455
Sample Origin State: MT	EPA/State Compliance ☒Yes ☐No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification *(Name, Location, Interval, etc.)*	Collection Date	Collection Time	Number of Containers	Matrix *(See Codes Above)*	see attached	See Attached	RUSH TAT	ELI LAB ID *Laboratory Use Only*
1	SW-MH-10143	11/2	1035	5	W	X			B23110234
2	SW-MH-1014	11/2	1035	5	W	X			
3									
4									
5									
6									
7									
8									
9									

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Lyndsey Holloway	11/2 1035	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Danielle Harris	Date/Time 11/3/23 0935	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number *(cash/check only)*

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

BOTTLE ORDER 177494

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364

Project: Grant Creek

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/8/2023
VIA: FedEx Ground Service

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(6 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365.1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		HNO3		1

Comments

Metals: Cu, Pb, Zn-DEQ 7 Limits

HNO3 - Nitric Acid H2SO4 - Sulfuric Acid NaOH - Sodium Hydroxide

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SW-MH-10146_UP	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): 44 Ranch, upstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: ____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ____	☐ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: 30	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ In-Stream					
Flow Present?	☐ Yes ☐ No	*If No, Skip to Section 5*			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	___' ___"	Ft, In	Tape measure
	Measured length	___' ___"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SW-MH-10143_DOWN
Today's date:		Time (Military):
Investigators:		Form completed by:
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:
Latitude:	Longitude:	GPS Unit: GPS LMK #:
Camera:		Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): 44 Ranch; Downstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL		SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☐ RCP ☐ PVC ☐ Steel ☐ Other: ______	☐ CMP ☒ HDPE	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____		☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ In-Stream						
Flow Present?	☐ Yes	☐ No	*If No, Skip to Section 5*			
Flow Description (If present)	☐ Trickle	☐ Moderate	☐ Substantial			

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	___' ___"	Ft, In	Tape measure
	Measured length	___' ___"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

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Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

ANALYTICAL SUMMARY REPORT

December 20, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23120342

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 12/6/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23120342-001	SW-TRTS-10005-US	12/05/23 09:20	12/06/23	Aqueous	Metals by ICP/ICPMS, Total Recoverable Bacteria, Total and E-Coli Coliforms - QT Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B23120342-002	SW-TRTS-10005-DS	12/05/23 09:40	12/06/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23120342

Report Date: 12/20/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/20/23
Project:	MS4 Permit	**Collection Date:**	12/05/23 09:20
Lab ID:	B23120342-001	**DateReceived:**	12/06/23
Client Sample ID:	SW-TRTS-10005-US	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	866.4	mpn/100ml		1.0		A9223 B	12/06/23 09:39 / spb
Bacteria, E-Coli Coliform	325.5	mpn/100ml		1.0		A9223 B	12/06/23 09:39 / spb
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	12/07/23 09:12 / pjw
- TSS did not obtain the minimum residue requirement of 2.5 mg residue.							
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	6	mg/L		5		E410.4	12/14/23 14:21 / jaw
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.88	mg/L		0.01		E353.2	12/07/23 13:09 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	12/08/23 09:48 / jaw
Nitrogen, Total	0.9	mg/L		0.5		Calculation	12/11/23 08:56 / rs4
Phosphorus, Orthophosphate as P	0.017	mg/L		0.005		E365.1	12/06/23 15:09 / jaw
Phosphorus, Total as P	0.018	mg/L		0.005		E365.1	12/12/23 15:43 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	12/10/23 00:00 / aem
Cadmium	ND	mg/L		0.001		E200.8	12/10/23 00:00 / aem
Copper	0.008	mg/L		0.005		E200.8	12/10/23 00:00 / aem
Iron	0.07	mg/L		0.02		E200.8	12/10/23 00:00 / aem
Lead	ND	mg/L		0.001		E200.8	12/10/23 00:00 / aem
Zinc	0.01	mg/L		0.01		E200.8	12/10/23 00:00 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	12/18/23 08:52 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility
Project: MS4 Permit
Lab ID: B23120342-002
Client Sample ID: SW-TRTS-10005-DS

Report Date: 12/20/23
Collection Date: 12/05/23 09:40
DateReceived: 12/06/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	>2419.6	mpn/100ml		1.0		A9223 B	12/06/23 09:39 / spb
Bacteria, E-Coli Coliform	313.0	mpn/100ml		1.0		A9223 B	12/06/23 09:39 / spb
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	12/07/23 09:12 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	12	mg/L		5		E410.4	12/14/23 14:21 / jaw
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.70	mg/L		0.01		E353.2	12/07/23 13:10 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	12/08/23 09:49 / jaw
Nitrogen, Total	0.7	mg/L		0.5		Calculation	12/11/23 08:56 / rs4
Phosphorus, Orthophosphate as P	0.033	mg/L		0.005		E365.1	12/06/23 15:12 / jaw
Phosphorus, Total as P	0.043	mg/L		0.005		E365.1	12/07/23 16:08 / jaw
METALS, TOTAL RECOVERABLE							
Arsenic	0.001	mg/L		0.001		E200.8	12/10/23 00:07 / aem
Cadmium	ND	mg/L		0.001		E200.8	12/10/23 00:07 / aem
Copper	0.005	mg/L		0.005		E200.8	12/10/23 00:07 / aem
Iron	0.16	mg/L		0.02		E200.8	12/10/23 00:07 / aem
Lead	ND	mg/L		0.001		E200.8	12/10/23 00:07 / aem
Zinc	0.03	mg/L		0.01		E200.8	12/10/23 00:07 / aem
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	12/18/23 08:52 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/18/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 231218A
Lab ID: MBLK2312180811		Method Blank				Run: BAL-ACCU-124_231218A				12/18/23 08:48
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2312180811		Laboratory Control Sample				Run: BAL-ACCU-124_231218A				12/18/23 08:49
Oil & Grease (HEM)		34	mg/L	5.0	85	78	114			
Lab ID: LCSD2312180811		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_231218A				12/18/23 08:49
Oil & Grease (HEM)		35	mg/L	5.0	87	78	114	2.0	18	
Lab ID: G23120159-001JMS		Sample Matrix Spike				Run: BAL-ACCU-124_231218A				12/18/23 08:50
Oil & Grease (HEM)		22	mg/L	5.0	48	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 185473
Lab ID: MB-185473		Method Blank				Run: BAL #30_231207A				12/07/23 09:12
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-185473		Laboratory Control Sample				Run: BAL #30_231207A				12/07/23 09:12
Solids, Total Suspended TSS @ 105 C		105	mg/L	25	105	80	120			
Lab ID: B23120332-001B DUP		Sample Duplicate				Run: BAL #30_231207A				12/07/23 09:12
Solids, Total Suspended TSS @ 105 C		30.8	mg/L	10				9.5	10	
Lab ID: B23120379-001C DUP		Sample Duplicate				Run: BAL #30_231207A				12/07/23 09:13
Solids, Total Suspended TSS @ 105 C		1.00	mg/L	10					10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8							Analytical Run: ICPMS208-B_231208A			
Lab ID: QCS	6	Initial Calibration Verification Standard								12/09/23 18:32
Arsenic		0.0494	mg/L	0.0050	99	90	110			
Cadmium		0.0259	mg/L	0.0010	103	90	110			
Copper		0.0531	mg/L	0.010	106	90	110			
Iron		0.255	mg/L	0.020	102	90	110			
Lead		0.0519	mg/L	0.0010	104	90	110			
Zinc		0.0519	mg/L	0.0050	104	90	110			
Lab ID: CCV	6	Continuing Calibration Verification Standard								12/09/23 23:10
Arsenic		0.0486	mg/L	0.0050	97	90	110			
Cadmium		0.0499	mg/L	0.0010	100	90	110			
Copper		0.0525	mg/L	0.010	105	90	110			
Iron		1.25	mg/L	0.020	96	90	110			
Lead		0.0488	mg/L	0.0010	98	90	110			
Zinc		0.0505	mg/L	0.0050	101	90	110			
Method: E200.8										Batch: 185463
Lab ID: MB-185463	6	Method Blank				Run: ICPMS208-B_231208A				12/09/23 19:23
Arsenic		ND	mg/L	0.00006						
Cadmium		ND	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		ND	mg/L	0.004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-185463	6	Laboratory Control Sample				Run: ICPMS208-B_231208A				12/09/23 19:29
Arsenic		0.0985	mg/L	0.0010	98	85	115			
Cadmium		0.0506	mg/L	0.0010	101	85	115			
Copper		0.106	mg/L	0.0010	106	85	115			
Iron		0.504	mg/L	0.012	101	85	115			
Lead		0.0971	mg/L	0.0010	97	85	115			
Zinc		0.105	mg/L	0.0050	105	85	115			
Lab ID: B23120322-002BMS4	6	Sample Matrix Spike				Run: ICPMS208-B_231208A				12/09/23 23:29
Arsenic		0.102	mg/L	0.0010	100	70	130			
Cadmium		0.0516	mg/L	0.0010	103	70	130			
Copper		0.106	mg/L	0.0050	104	70	130			
Iron		0.520	mg/L	0.020	101	70	130			
Lead		0.102	mg/L	0.0010	102	70	130			
Zinc		0.105	mg/L	0.010	102	70	130			
Lab ID: B23120322-002BMSD4	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_231208A				12/09/23 23:35
Arsenic		0.100	mg/L	0.0010	98	70	130	1.6	20	
Cadmium		0.0509	mg/L	0.0010	102	70	130	1.2	20	
Copper		0.104	mg/L	0.0050	102	70	130	2.0	20	
Iron		0.519	mg/L	0.020	101	70	130	0.2	20	
Lead		0.103	mg/L	0.0010	103	70	130	0.9	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E200.8**										Batch: 185463
Lab ID: **B23120322-002BMSD4**	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_231208A				12/09/23 23:35
Zinc		0.104	mg/L	0.010	102	70	130	0.7	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2								Analytical Run: FIA204-B_231208A		
Lab ID: ICV-184848		Initial Calibration Verification Standard							12/08/23 09:37	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Method: E351.2									Batch: 185477	
Lab ID: MB-185477		Method Blank				Run: FIA204-B_231208A			12/08/23 09:40	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-185477		Laboratory Control Sample				Run: FIA204-B_231208A			12/08/23 09:41	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Lab ID: B23120319-002CMS		Sample Matrix Spike				Run: FIA204-B_231208A			12/08/23 09:45	
Nitrogen, Kjeldahl, Total as N		12.3	mg/L	0.50	102	90	110			
Lab ID: B23120319-002CMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_231208A			12/08/23 09:46	
Nitrogen, Kjeldahl, Total as N		12.4	mg/L	0.50	103	90	110	0.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_231207A	
Lab ID: ICV	Initial Calibration Verification Standard								12/07/23 12:53	
Nitrogen, Nitrate+Nitrite as N		0.577	mg/L	0.010	102	90	110			
Method: E353.2									Batch: R413395	
Lab ID: MBLK	Method Blank					Run: FIA203-B_231207A			12/07/23 12:54	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB	Laboratory Fortified Blank					Run: FIA203-B_231207A			12/07/23 12:59	
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: FILTERLFB	Laboratory Fortified Blank					Run: FIA203-B_231207A			12/07/23 13:00	
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: B23120379-001FMS	Sample Matrix Spike					Run: FIA203-B_231207A			12/07/23 13:03	
Nitrogen, Nitrate+Nitrite as N		1.24	mg/L	0.010	109	90	110			
Lab ID: B23120379-001FMSD	Sample Matrix Spike Duplicate					Run: FIA203-B_231207A			12/07/23 13:04	
Nitrogen, Nitrate+Nitrite as N		1.25	mg/L	0.010	110	90	110	0.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_231207B			
Lab ID: ICV-185083		Initial Calibration Verification Standard							12/07/23 15:49	
Phosphorus, Total as P		0.479	mg/L	0.0050	96	90	110			
Method: E365.1									Batch: 185480	
Lab ID: MB-185480		Method Blank				Run: FIA202-B_231207B			12/07/23 15:53	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-185480		Laboratory Control Sample				Run: FIA202-B_231207B			12/07/23 15:56	
Phosphorus, Total as P		0.193	mg/L	0.0050	96	90	110			
Lab ID: B23120156-001CMS		Sample Matrix Spike				Run: FIA202-B_231207B			12/07/23 16:00	
Phosphorus, Total as P		5.34	mg/L	0.050	92	90	110			
Lab ID: B23120156-001CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_231207B			12/07/23 16:02	
Phosphorus, Total as P		5.41	mg/L	0.050	95	90	110	1.3	10	
Method: E365.1							Analytical Run: FIA202-B_231212B			
Lab ID: ICV-185083		Initial Calibration Verification Standard							12/12/23 15:34	
Phosphorus, Total as P		0.493	mg/L	0.0050	99	90	110			
Method: E365.1									Batch: 185584	
Lab ID: MB-185584		Method Blank				Run: FIA202-B_231212B			12/12/23 15:38	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-185584		Laboratory Control Sample				Run: FIA202-B_231212B			12/12/23 15:41	
Phosphorus, Total as P		0.205	mg/L	0.0050	102	90	110			
Lab ID: B23120561-001AMS		Sample Matrix Spike				Run: FIA202-B_231212B			12/12/23 15:51	
Phosphorus, Total as P		7.23	mg/L	0.050	97	90	110			
Lab ID: B23120561-001AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_231212B			12/12/23 15:53	
Phosphorus, Total as P		6.98	mg/L	0.050	85	90	110	3.5	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1									Analytical Run: FIA204-B_231206B	
Lab ID: ICV		Initial Calibration Verification Standard							12/06/23 14:49	
Phosphorus, Orthophosphate as P		0.244	mg/L	0.0050	98	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							12/06/23 15:08	
Phosphorus, Orthophosphate as P		0.500	mg/L	0.0050	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							12/06/23 15:21	
Phosphorus, Orthophosphate as P		0.494	mg/L	0.0050	99	90	110			
Method: E365.1									Batch: R413319	
Lab ID: ICB		Method Blank				Run: FIA204-B_231206B			12/06/23 14:51	
Phosphorus, Orthophosphate as P		ND	mg/L	0.002						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA204-B_231206B			12/06/23 14:52	
Phosphorus, Orthophosphate as P		0.243	mg/L	0.0050	97	90	110			
Lab ID: B23120342-001EMS		Sample Matrix Spike				Run: FIA204-B_231206B			12/06/23 15:10	
Phosphorus, Orthophosphate as P		0.255	mg/L	0.0050	95	90	110			
Lab ID: B23120342-001EMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_231206B			12/06/23 15:11	
Phosphorus, Orthophosphate as P		0.260	mg/L	0.0050	97	90	110	1.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120342 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_231214C
Lab ID: CCV		Continuing Calibration Verification Standard								12/14/23 14:20
Oxygen Demand, Chemical (COD)		46.4	mg/L	5.0	93	90	110			
Method: E410.4										Batch: 185682
Lab ID: MB-185682		Method Blank				Run: SPEC3_231214C				12/14/23 14:20
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-185682		Laboratory Control Sample				Run: SPEC3_231214C				12/14/23 14:20
Oxygen Demand, Chemical (COD)		24.3	mg/L	5.0	100	90	110			
Lab ID: B23120342-001CMS		Sample Matrix Spike				Run: SPEC3_231214C				12/14/23 14:21
Oxygen Demand, Chemical (COD)		28.8	mg/L	5.0	94	90	110			
Lab ID: B23120342-001CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_231214C				12/14/23 14:21
Oxygen Demand, Chemical (COD)		29.8	mg/L	5.0	98	90	110	3.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B23120342

Login completed by: Danielle N. Harris
Date Received: 12/6/2023
Reviewed by: darcy
Received by: cmj
Reviewed Date: 12/11/2023
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☐	No ☑	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	7.9°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

Contact and Corrective Action Comments:

The Ecoli sample for SW-TRTS-10005-US was received with insufficient time to meet the holding time. Proceed with analysis per phone conversation with Tracy Campbell on 12/6/2023.

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information (Billing information)

Company/Name: City of Missoula Stormwater
Contact: Tracy Campbell
Phone: 406-830-5455
Mailing Address: 1345 W Broadway
City, State, Zip: Missoula, MT 59802
Email: CampbellTL@ci.missoula.mt.us
Receive Invoice ☐Hard Copy ☒Email | Receive Report ☐Hard Copy ☒Email
Purchase Order | Quote | Bottle Order 177496

Report Information (if different than Account Information)

Company/Name
Contact
Phone
Mailing Address
City, State, Zip
Email
Receive Report ☐Hard Copy ☐Email
Special Report/Formats:
☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Project Information

Project Name, PWSID, Permit, etc. MS4 Permit
Sampler Name: Campbell | Sampler Phone: 406-830-5455
Sample Origin State: MT | EPA/State Compliance ☒Yes ☐No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested: see attached

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	see attached	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-TRTS-10005-US	12/5	9:20	7	W	X			B23120342
2	SW-TRTS-10005-DS	12/5	9:40	7	W	X			
3									
4									
5									
6									
7									
8									
9									

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	MARIE NELSON	12/5/23 9:40	Marie Nelson			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Crystal Jones	Date/Time 12/6/23 0900	Signature

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

Trust our People. Trust our Data.

Billings, MT 406.252.6325 • Casper, WY 307.235.0515 • Gillette, WY 307.686.7175 • Helena, MT 406.442.0711

BOTTLE ORDER 177496

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239

Phone: (406) 542-6364

Project: Clark Fork River

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/8/2023
VIA: FedEx Ground Service

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(6 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		H2SO4		1
		E365.1	Phosphorus, Total				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E351.2	Nitrogen, Total Kjeldahl				
		E410.4	Chemical Oxygen Demand				
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total Recoverable		HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
~~1 Liter Amber Glass Narrow Mouth~~	~~1~~	~~A10200 H~~	~~Chlorophyll A~~ Not collected				1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample	1

BO#: 177496

BOTTLE ORDER 177495

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River E.Coli

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/8/2023
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(6 Sets)							
100 mL Plastic Sterile	1	A9223 B	Bacteria, Total and E-Coli Coliforms - QT	30.00 hrs			1

Comments

HNO3 - Nitric Acid
H2SO4 - Sulfuric Acid
NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate
HCl - Hydrochloric Acid
H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

December 20, 2023

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B23120408

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 12/6/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23120408-001	SW-DC-10070	12/05/23 10:30	12/06/23	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B23120408-002	SW-DC-10099	12/05/23 10:00	12/06/23	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B23120408

Report Date: 12/20/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/20/23
Project:	MS4 Permit	**Collection Date:**	12/05/23 10:30
Lab ID:	B23120408-001	**DateReceived:**	12/06/23
Client Sample ID:	SW-DC-10070	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	12/07/23 09:13 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	14	mg/L		5		E410.4	12/14/23 14:21 / jaw
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.90	mg/L		0.01		E353.2	12/07/23 13:45 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	12/08/23 10:01 / jaw
Nitrogen, Total	0.9	mg/L		0.5		Calculation	12/11/23 08:56 / rs4
Phosphorus, Total as P	0.07	mg/L		0.01		E365.1	12/07/23 16:11 / jaw
METALS, TOTAL							
Copper	ND	mg/L		0.002		E200.8	12/16/23 10:28 / jks
Lead	ND	mg/L		0.0003		E200.8	12/16/23 10:28 / jks
Zinc	ND	mg/L		0.008		E200.8	12/16/23 10:28 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	12/18/23 08:53 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/20/23
Project:	MS4 Permit	**Collection Date:**	12/05/23 10:00
Lab ID:	B23120408-002	**DateReceived:**	12/06/23
Client Sample ID:	SW-DC-10099	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	12	mg/L		10		A2540 D	12/07/23 09:13 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	20	mg/L		5		E410.4	12/14/23 14:21 / jaw
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.20	mg/L		0.01		E353.2	12/07/23 13:48 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	12/08/23 10:06 / jaw
Nitrogen, Total	1.2	mg/L		0.5		Calculation	12/11/23 08:56 / rs4
Phosphorus, Total as P	0.096	mg/L		0.005		E365.1	12/07/23 16:13 / jaw
METALS, TOTAL							
Copper	ND	mg/L		0.002		E200.8	12/16/23 10:53 / jks
Lead	0.0003	mg/L		0.0003		E200.8	12/16/23 10:53 / jks
Zinc	ND	mg/L		0.008		E200.8	12/16/23 10:53 / jks
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	12/19/23 08:47 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A										Batch: 231218A
Lab ID: MBLK2312180811		Method Blank				Run: BAL-ACCU-124_231218A				12/18/23 08:48
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2312180811		Laboratory Control Sample				Run: BAL-ACCU-124_231218A				12/18/23 08:49
Oil & Grease (HEM)		34	mg/L	5.0	85	78	114			
Lab ID: LCSD2312180811		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_231218A				12/18/23 08:49
Oil & Grease (HEM)		35	mg/L	5.0	87	78	114	2.0	18	
Lab ID: G23120159-001JMS		Sample Matrix Spike				Run: BAL-ACCU-124_231218A				12/18/23 08:50
Oil & Grease (HEM)		22	mg/L	5.0	48	78	114			S
Method: E1664A										Batch: 231219A
Lab ID: MBLK2312190808		Method Blank				Run: BAL-ACCU-124_231219A				12/19/23 08:46
Oil & Grease (HEM)		ND	mg/L	0.8						
Lab ID: LCS2312190808		Laboratory Control Sample				Run: BAL-ACCU-124_231219A				12/19/23 08:46
Oil & Grease (HEM)		33	mg/L	5.0	83	78	114			
Lab ID: LCSD2312190808		Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_231219A				12/19/23 08:46
Oil & Grease (HEM)		33	mg/L	5.0	83	78	114	0.6	18	
Lab ID: B23120408-002DMS		Sample Matrix Spike				Run: BAL-ACCU-124_231219A				12/19/23 08:47
Oil & Grease (HEM)		31	mg/L	5.0	74	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 185473	
Lab ID: MB-185473	Method Blank					Run: BAL #30_231207A			12/07/23 09:12	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.6						
Lab ID: LCS-185473	Laboratory Control Sample					Run: BAL #30_231207A			12/07/23 09:12	
Solids, Total Suspended TSS @ 105 C		105	mg/L	25	105	80	120			
Lab ID: B23120332-001B DUP	Sample Duplicate					Run: BAL #30_231207A			12/07/23 09:12	
Solids, Total Suspended TSS @ 105 C		30.8	mg/L	10				9.5	10	
Lab ID: B23120379-001C DUP	Sample Duplicate					Run: BAL #30_231207A			12/07/23 09:13	
Solids, Total Suspended TSS @ 105 C		1.00	mg/L	10					10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_231215A
Lab ID: QCS	3	Initial Calibration Verification Standard								12/16/23 07:50
Copper		0.0542	mg/L	0.010	108	90	110			
Lead		0.0514	mg/L	0.0010	103	90	110			
Zinc		0.0543	mg/L	0.0050	109	90	110			
Lab ID: CCV	3	Continuing Calibration Verification Standard								12/16/23 09:44
Copper		0.0536	mg/L	0.010	107	90	110			
Lead		0.0498	mg/L	0.0010	100	90	110			
Zinc		0.0516	mg/L	0.0050	103	90	110			
Method: E200.8										Batch: 185475
Lab ID: MB-185475	3	Method Blank				Run: ICPMS208-B_231215A				12/16/23 09:00
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-185475	3	Laboratory Control Sample				Run: ICPMS208-B_231215A				12/16/23 09:06
Copper		0.109	mg/L	0.0010	109	85	115			
Lead		0.0996	mg/L	0.0010	100	85	115			
Zinc		0.109	mg/L	0.0050	109	85	115			
Lab ID: B23120408-001BMS4	3	Sample Matrix Spike				Run: ICPMS208-B_231215A				12/16/23 10:34
Copper		0.110	mg/L	0.0050	109	70	130			
Lead		0.103	mg/L	0.0010	103	70	130			
Zinc		0.113	mg/L	0.010	106	70	130			
Lab ID: B23120408-001BMSD4	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_231215A				12/16/23 10:41
Copper		0.110	mg/L	0.0050	108	70	130	0.3	20	
Lead		0.100	mg/L	0.0010	100	70	130	3.0	20	
Zinc		0.116	mg/L	0.010	109	70	130	2.4	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_231208A			
Lab ID: ICV-184848		Initial Calibration Verification Standard							12/08/23 09:37	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: CCV-184848		Continuing Calibration Verification Standard							12/08/23 10:02	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Method: E351.2									Batch: 185477	
Lab ID: MB-185477		Method Blank				Run: FIA204-B_231208A			12/08/23 09:40	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-185477		Laboratory Control Sample				Run: FIA204-B_231208A			12/08/23 09:41	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Lab ID: B23120408-002CMS		Sample Matrix Spike				Run: FIA204-B_231208A			12/08/23 10:07	
Nitrogen, Kjeldahl, Total as N		10.8	mg/L	0.50	108	90	110			
Lab ID: B23120408-002CMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_231208A			12/08/23 10:09	
Nitrogen, Kjeldahl, Total as N		10.8	mg/L	0.50	108	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_231207A
Lab ID: ICV		Initial Calibration Verification Standard								12/07/23 12:53
Nitrogen, Nitrate+Nitrite as N		0.577	mg/L	0.010	102	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								12/07/23 13:30
Nitrogen, Nitrate+Nitrite as N		1.02	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								12/07/23 13:46
Nitrogen, Nitrate+Nitrite as N		1.03	mg/L	0.010	103	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								12/07/23 15:32
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Method: E353.2										Batch: R413395
Lab ID: MBLK		Method Blank				Run: FIA203-B_231207A				12/07/23 12:54
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_231207A				12/07/23 12:59
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_231207A				12/07/23 13:00
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: B23120382-001FMS		Sample Matrix Spike				Run: FIA203-B_231207A				12/07/23 13:34
Nitrogen, Nitrate+Nitrite as N		33.5	mg/L	0.10	105	90	110			
Lab ID: B23120382-001FMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_231207A				12/07/23 13:35
Nitrogen, Nitrate+Nitrite as N		33.4	mg/L	0.10	104	90	110	0.2	10	
Lab ID: B23120408-002CMS		Sample Matrix Spike				Run: FIA203-B_231207A				12/07/23 13:49
Nitrogen, Nitrate+Nitrite as N		2.33	mg/L	0.010	112	90	110			S
Lab ID: B23120408-002CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_231207A				12/07/23 13:50
Nitrogen, Nitrate+Nitrite as N		2.35	mg/L	0.010	115	90	110	1.1	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1									Analytical Run: FIA202-B_231207B	
Lab ID: ICV-185083		Initial Calibration Verification Standard							12/07/23 15:49	
Phosphorus, Total as P		0.479	mg/L	0.0050	96	90	110			
Method: E365.1									Batch: 185480	
Lab ID: MB-185480		Method Blank				Run: FIA202-B_231207B			12/07/23 15:53	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-185480		Laboratory Control Sample				Run: FIA202-B_231207B			12/07/23 15:56	
Phosphorus, Total as P		0.193	mg/L	0.0050	96	90	110			
Lab ID: B23120156-001CMS		Sample Matrix Spike				Run: FIA202-B_231207B			12/07/23 16:00	
Phosphorus, Total as P		5.34	mg/L	0.050	92	90	110			
Lab ID: B23120156-001CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_231207B			12/07/23 16:02	
Phosphorus, Total as P		5.41	mg/L	0.050	95	90	110	1.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B23120408 **Report Date:** 12/20/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4									Analytical Run: SPEC3_231214C	
Lab ID: CCV		Continuing Calibration Verification Standard							12/14/23 14:20	
Oxygen Demand, Chemical (COD)		46.4	mg/L	5.0	93	90	110			
Method: E410.4									Batch: 185682	
Lab ID: MB-185682		Method Blank				Run: SPEC3_231214C			12/14/23 14:20	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-185682		Laboratory Control Sample				Run: SPEC3_231214C			12/14/23 14:20	
Oxygen Demand, Chemical (COD)		24.3	mg/L	5.0	100	90	110			
Lab ID: B23120342-001CMS		Sample Matrix Spike				Run: SPEC3_231214C			12/14/23 14:21	
Oxygen Demand, Chemical (COD)		28.8	mg/L	5.0	94	90	110			
Lab ID: B23120342-001CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_231214C			12/14/23 14:21	
Oxygen Demand, Chemical (COD)		29.8	mg/L	5.0	98	90	110	3.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility   B23120408

Login completed by: Yvonna E. Smith   Date Received: 12/6/2023
Reviewed by: lleprowse   Received by: dnh
Reviewed Date: 12/11/2023   Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	6.0°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Stormwater
Contact	Tracy Campbell
Phone	406-830-5455
Mailing Address	1345 W Broadway
City, State, Zip	Missoula, MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	177497

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐NELAC ☐ EDD/EDT (contact laboratory) ☐ Other ______

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 Permit
Sampler Name	Campbell
Sampler Phone	406-830-5455
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type
- ☐ Unprocessed Ore
- ☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
- ☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Oil
DW - Drinking Water

Analysis Requested: See attached

See Attached

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-DC-10070	12/5	10:30	5	W	X		B23120408
2	SW-DC-10099	12/5	10:00	5	W	X		
3								
4								
5								
6								
7								
8								
9								

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC.

Custody Record MUST be signed						
Relinquished by (print)	MARIE L. NELSON	Date/Time 12/5 10:40	Signature Marie Nelson	Received by (print)	Date/Time	Signature
Relinquished by (print)		Date/Time	Signature	Received by Laboratory (print) Danielle Harris	Date/Time 12/6/23 0900	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check ______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

BOTTLE ORDER 177497

SHIPPED TO: **City of Missoula Storm Water Utility**

To report an issue with this order, view Safety Data Sheets, or let us know how we are doing, scan here or go to energylab.com/contact-us

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364

Project: Bitterroot River

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/8/2023
VIA: FedEx Ground Service

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(6 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365.1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		HNO3		1

Comments

Metals: Cu, Pb, Zn

HNO3 - Nitric Acid	H2SO4 - Sulfuric Acid	NaOH - Sodium Hydroxide
ZnAc - Zinc Acetate	HCl - Hydrochloric Acid	H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

Appendix C – Data Sheets

MISSOULA — THE GARDEN CITY — HUB OF FIVE VALLEYS

PUBLIC WORKS • STORM WATER UTILITY

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek	Outfall ID: SW-MH-10143_DOWN
Today's date: May 5, 2023	Time (Military): 1430
Investigators: T Campbell; M Nelson	Form completed by: T Campbell; M Nelson
Temperature (°F): 60	Rainfall (in.): Last 24 hours: 0.24 Last 48 hours: 0.24
Latitude: Longitude:	GPS Unit: GPS LMK #:
Camera: iPhone	Photo #s: 1

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____________________
- Known Industries: ____________________

Notes (e.g.., origin of outfall, if known): 44 Ranch; Downstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		9.4	°C	Multi-probe
pH		7.22	pH Units	Multi-probe
Conductivity		49.5	µS/cm	Multi-probe
Specific Conductivity		70.5	µS/cm	Multi-probe
Total Dissolved Solids		46	mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SW-MH-10146_UP	
Today's date: May 5, 2023		Time (Military): 1400	
Investigators: T Campbell; M Nelson		Form completed by: T Campbell; M Nelson	
Temperature (°F): 60	Rainfall (in.): Last 24 hours: 0.24 Last 48 hours: 0.24		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera: iPhone		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): 44 Ranch, upstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☐ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ In-Stream					
Flow Present?	☒ Yes ☒ No	*If No, Skip to Section 5*			
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		12.5	°C	Multi-probe
pH		7.34	pH Units	Multi-probe
Conductivity		103.2	µS/cm	Multi-probe
Specific Conductivity		136.3	µS/cm	Multi-probe
Total Dissolved Solids		89	mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark fork		Outfall ID: Sw-CFR-1	
Today's date: 5/17/2023		Time (Military): 10:45	
Investigators: L.Holloway, t.Campbell		Form completed by: L.holloway	
Temperature (°F): 58	Rainfall (in.): Last 24 hours: .28	Last 48 hours: .28	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera: Samsung tablet		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☒ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
Caras-Ds ☐ Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☐ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☐ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: ______	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☒ In-Stream					
Flow Present?	☒ Yes ☐ No *If No, Skip to Section 5*				
Flow Description (If present)	☒ Trickle ☐ Moderate ☒ Substantial CFR-UP 13500 cfs				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		11.4	°C	Multi-probe
pH		8.03	pH Units	Multi-probe
Conductivity		102. 5	µS/cm	Multi-probe
Specific Conductivity		138.7	µS/cm	Multi-probe
Total Dissolved Solids		90	mg/L	Multi-probe

13,500 cfs =6,059,610 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Turbid from spring runoff

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark fork	Outfall ID: Sw-dc-10055
Today's date: 5/17/2023	Time (Military): 9:20
Investigators: L.Holloway, t.Campbellll	Form completed by: L.holloway
Temperature (°F): 58	Rainfall (in.): Last 24 hours: .28 Last 48 hours: .28
Latitude: / Longitude:	GPS Unit: / GPS LMK #:
Camera: Samsung tablet	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Downstream of RR Bridge - Broadway ST

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
RR broadway ☒ **Pipe**	☐ RCP ☒ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 15"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No *If No, Skip to Section 5*				
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
■ Flow #1	Volume	.7	Gallon	Bucket
	Time to fill	.253	sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		12.9	°C	Multi-probe
pH		7.59	pH Units	Multi-probe
Conductivity		72.6	µS/cm	Multi-probe
Specific Conductivity		96	µS/cm	Multi-probe
Total Dissolved Solids		62	mg/L	Multi-probe

(.75 gal 3 sec = .25gal/s, .75 gal 2.8 sec = .268 gal/s, .6 gal 2.5 sec = .24gal/s) = .253 gal/s

0.75 gal/3 sec = 0.25 gal/sec or 15 gpm; 0.75 gal/2.8 sec = 0.268 gal/sec or 16.08 gpm; 0.6 gal/2.5 sec = 0.24 gal/sec or 14.4 gpm
15 + 16.08 + 14.4 = 45.48; 45.48/3 = average 15.16 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Undercutting and garbage issues in spillway

MISSOULA

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark fork	Outfall ID: Sw-tarts-10005-Ds SW-TRTS-10005-DS
Today's date: 5/17/2023	Time (Military): 9:55
Investigators: L.Holloway, t.Campbell	Form completed by: L.holloway
Temperature (°F): 58	Rainfall (in.): Last 24 hours: .28 Last 48 hours: .28
Latitude: 46.86907254N Longitude: 113.99687583W	GPS Unit: GPS LMK #:
Camera: Samsung tablet	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Manhole downstream of HDS

Section 2: Outfall Description

LOCATION	MATERIAL		SHAPE		DIMENSIONS (IN.)	SUBMERGED
Caras-Ds ☒ Pipe	☒ RCP ☐ PVC ☐ Steel ☐ Other: ____	☒ CMP ☐ HDPE	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ____	☒ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: 30"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____		☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ In-Stream						
Flow Present?	☒ Yes	☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☒ Trickle	☐ Moderate	☐ Substantial			

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		9.3	°C	Multi-probe
pH		7.5	pH Units	Multi-probe
Conductivity		170.1	µS/cm	Multi-probe
Specific Conductivity		242.9	µS/cm	Multi-probe
Total Dissolved Solids		158	mg/L	Multi-probe

No flow measurement - inside manhole

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark fork		Outfall ID: Sw-tarts-10005-US SW-TRTS-10005-US	
Today's date: 5/17/2023		Time (Military): 9:55	
Investigators: L.Holloway, t.Campbell		Form completed by: L.holloway	
Temperature (°F): 58	Rainfall (in.): Last 24 hours: .28	Last 48 hours: .28	
Latitude: 46.86927934N	Longitude: 113.99622066W	GPS Unit:	GPS LMK #:
Camera: Samsung tablet		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL		SHAPE		DIMENSIONS (IN.)	SUBMERGED
Caras-US ☒ **Pipe**	☒ RCP ☐ PVC ☐ Steel ☐ Other: ______	☒ CMP ☐ HDPE	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 3 mains in 24" 24" 12" 30" out	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____		☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ **In-Stream**						
Flow Present?	☒ Yes	☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle	☒ Moderate	☐ Substantial			

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☒ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		9.5	°C	Multi-probe
pH		7.45	pH Units	Multi-probe
Conductivity		169.9	µS/cm	Multi-probe
Specific Conductivity		241.9	µS/cm	Multi-probe
Total Dissolved Solids		157	mg/L	Multi-probe

No flow measurement - inside manhole

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Garbage floatable sin unit like beer cans, cigs, and nerf bullets

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek - Bitterroot	Outfall ID: SW-DC-10099
Today's date: 5/22/23	Time (Military): 11:15 AM
Investigators: L.Holloway, C. Butterfield	Form completed by: L.Holloway
Temperature (°F): 60	Rainfall (in.): Last 24 hours: .22 Last 48 hours: .22
Latitude: 46.82785 Longitude: -114.05211	GPS Unit: GPS LMK #:
Camera:	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Bitterroot Outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ____	☒ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: 54"	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☒ In-Stream					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☒ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		15.3	°C	Multi-probe
pH		7.59	pH Units	Multi-probe
Conductivity		57	µS/cm	Multi-probe
Specific Conductivity		87.8	µS/cm	Multi-probe
Total Dissolved Solids		58	mg/L	Multi-probe

No flow taken, planning on getting flow from WQ pressure transducer installed in spring 2023

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☑ Yes ☐ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☑ Yes ☐ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

First flush from storm event, very turbid discharge

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek		Outfall ID: SW-DC-10099	
Today's date: 5/22/23		Time (Military): 11:15 AM	
Investigators: L.Holloway, C. Butterfield		Form completed by: L.Holloway	
Temperature (°F): 60	Rainfall (in.): Last 24 hours: .22 Last 48 hours: .22		
Latitude: 46.84165	Longitude: -113.99605	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____________
- Known Industries: ____________

Notes (e.g.., origin of outfall, if known): Outfall above Grit Chamber

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30"	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☒ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
■ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		15.6	°C	Multi-probe
pH		7.74	pH Units	Multi-probe
Conductivity		41.8	µS/cm	Multi-probe
Specific Conductivity		50.9	µS/cm	Multi-probe
Total Dissolved Solids		33	mg/L	Multi-probe

1.88 sec 2.5 gal, 2.19 sec 2.5 gal, 2.20 sec 2.5 gal

2.5+2.5+2.5 = 7.5 gal/3 = avg 2.5 gal; 1.88+2.19+2.2 = 6.27/3 = avg 2.09 sec

2.5 gal / 2.09 sec = 1.196; 1.196 * 60 = 71.77 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

First flush from storm event, very turbid discharge

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek - Clark Fork		Outfall ID: CFR-1	
Today's date: August 21, 2023		Time (Military):	
Investigators: T Campbell;		Form completed by: T Campbell;	
Temperature (°F): 62	Rainfall (in.): Last 24 hours: 0.06 Last 48 hours: 0.06		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☒ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): CFR at Milltown State Park; 1080 cfs at USGS 12340500

Section 2: Outfall Description

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

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		16.3	°C	Multi-probe
pH		8.37	pH Units	Multi-probe
Conductivity		205.4	µS/cm	Multi-probe
Specific Conductivity		246.3	µS/cm	Multi-probe
Total Dissolved Solids		160	mg/L	Multi-probe

1080 cfs * 448.83 = 484736.4

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☑ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☑ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek	Outfall ID: SW-MH-10143_DOWN
Today's date: August 21, 2023	Time (Military): 10:30
Investigators: T Campbell;	Form completed by: T Campbell;
Temperature (°F): 61	Rainfall (in.): Last 24 hours: 0.06 Last 48 hours: 0.06
Latitude: / Longitude:	GPS Unit: / GPS LMK #:
Camera:	Photo #s:

Land Use in Drainage Area (Check all that apply):

- [ ] Industrial
- [ ] Ultra-Urban Residential (High Density)
- [x] Suburban Residential
- [ ] Commercial
- [ ] Open Space
- [ ] Golf Course
- [ ] Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): 44 Ranch; Downstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
[x] **Pipe**	[ ] RCP [ ] CMP [ ] PVC [x] HDPE [ ] Steel [ ] Other: ____	[x] Circular [ ] Elliptical [ ] Box [ ] Other: ____	[x] Single [ ] Double [ ] Triple [ ] Other: ____	Diameter/Dimensions: 30	In Water: [ ] No [ ] Partially [ ] Fully; With Sediment: [ ] No [ ] Partially [ ] Fully
[ ] **Open drainage**	[ ] Concrete [ ] Earthen [ ] rip-rap [ ] Other: ____	[ ] Trapezoid [ ] Parabolic [ ] Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
[ ] **In-Stream**					
Flow Present?	[x] Yes [ ] No	***If No, Skip to Section 5***			
Flow Description (If present)	[x] Trickle [ ] Moderate [ ] Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		18.7	°C	Multi-probe
pH		7.62	pH Units	Multi-probe
Conductivity		188.9	µS/cm	Multi-probe
Specific Conductivity		215.1	µS/cm	Multi-probe
Total Dissolved Solids		139	mg/L	Multi-probe

No flow measured; sample collected in mainhole

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SW-MH-10146_UP	
Today's date: August 21, 2023		Time (Military): 10:015	
Investigators: T Campbell;		Form completed by: T Campbell;	
Temperature (°F): 61	Rainfall (in.): Last 24 hours: 0.06 Last 48 hours: 0.06		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): 44 Ranch, upstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☐ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 42	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		18.7	°C	Multi-probe
pH		7.82	pH Units	Multi-probe
Conductivity		177.8	µS/cm	Multi-probe
Specific Conductivity		202.3	µS/cm	Multi-probe
Total Dissolved Solids		131	mg/L	Multi-probe

No flow measured, sample collected in mainhole

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek - Clark Fork	Outfall ID: CFR-1
Today's date: 11/2/2023	Time (Military): 11:45
Investigators: Marie Nelson, Lyndsey Holloway	Form completed by: Marie Nelson
Temperature (°F): 32	Rainfall (in.): Last 24 hours: .13 Last 48 hours: .13
Latitude: Longitude:	GPS Unit: GPS LMK #:
Camera:	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☒ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Milltown State Park

Section 2: Outfall Description

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

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		1.4	°C	Multi-probe
pH		8.3	pH Units	Multi-probe
Conductivity		146.4	µS/cm	Multi-probe
Specific Conductivity		266.7	µS/cm	Multi-probe
Total Dissolved Solids		172	mg/L	Multi-probe

CFS 1590

1590 * 448.83 = 713639.7

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☑ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☑ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek - Clark Fork		Outfall ID: SW-DC-10055	
Today's date: 11/2/2023		Time (Military): 12:00	
Investigators: Marie Nelson, Lyndsey Holloway		Form completed by: Marie Nelson	
Temperature (°F): 32	Rainfall (in.): Last 24 hours: .13 Last 48 hours: .13		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera: Iphone		Photo #s: 1	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ________
- Known Industries: ________

Notes (e.g.., origin of outfall, if known): Downstream of RR Bridge - W Broadway

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☐ RCP ☒ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ____	☒ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: 15	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
■ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		7.6	°C	Multi-probe
pH		7.3	pH Units	Multi-probe
Conductivity		313.5	µS/cm	Multi-probe
Specific Conductivity		469.6	µS/cm	Multi-probe
Total Dissolved Solids		305	mg/L	Multi-probe

Flow Data - 2 Gal Bucket; 5.8 sec, 4.8 sec, 4.5 sec: avg=5.03 sec

2 gal/5.03 sec = 0.3976 * 60 = 23.86 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek	Outfall ID: SW-MH-10143_DOWN
Today's date: 11/2/2023	Time (Military): 10:45
Investigators: Marie Nelson, Lyndsey Holloway	Form completed by: Marie Nelson
Temperature (°F): 37	Rainfall (in.): Last 24 hours: .13 Last 48 hours: .13
Latitude: / Longitude:	GPS Unit: / GPS LMK #:
Camera: iPhone	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): 44 Ranch; Downstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ In-Stream					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	_____' _____"	Ft, In	Tape measure
	Measured length	_____' _____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		5.2	°C	Multi-probe
pH		7.73	pH Units	Multi-probe
Conductivity		177.2	µS/cm	Multi-probe
Specific Conductivity		285.5	µS/cm	Multi-probe
Total Dissolved Solids		185	mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

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Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SW-MH-10146_UP	
Today's date: 11/02/2033		Time (Military): 10:30	
Investigators: Marie Nelson, Lyndsey Holloway		Form completed by: MarieNelson	
Temperature (°F): 37	Rainfall (in.): Last 24 hours: .13 Last 48 hours: .13		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera: iPhone 12		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): 44 Ranch, upstream of Vortechs

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☐ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☒ No ☒ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ______	☐ Trapezoid ☐ Parabolic ☐ Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
☐ In-Stream					
Flow Present?	☒ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☒ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		5.4	°C	Multi-probe
pH		7.55	pH Units	Multi-probe
Conductivity		151.2	µS/cm	Multi-probe
Specific Conductivity		241.6	µS/cm	Multi-probe
Total Dissolved Solids		157	mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek - Bitterroot	Outfall ID: SW-DC-10099
Today's date: 12/5/23	Time (Military): 10:20
Investigators: Campbell and Nelson	Form completed by: Nelson
Temperature (°F):	Rainfall (in.): Last 24 hours: 0.13 Last 48 hours: snowmelt
Latitude: 46.82785 Longitude: -114.05211	GPS Unit: GPS LMK #:
Camera:	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space ☐ Golf Course
- ☐ Institutional
- Other: ____________
- Known Industries: ____________

Notes (e.g.., origin of outfall, if known): Bitterroot Outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 54"	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☒ In-Stream					
Flow Present?	☒ Yes ☐ No	*If No, Skip to Section 5*			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☒Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		4.3	°C	Multi-probe
pH		8.21	pH Units	Multi-probe
Conductivity		332	µS/cm	Multi-probe
Specific Conductivity		550	µS/cm	Multi-probe
Total Dissolved Solids		357	mg/L	Multi-probe

X-section 1: depth 3.5" + 5" + 5" + 3" = 16.5 / 3 = avg 5.5" (0.458'); width 3'3": 0.458*3.25=1.49sf

X-section 2: depth 2"+ 4" + 4" + 3.5" = 13.5 / 3 = avg 4.5" (0.375'); width 4'3":0.375*4.25=1.59sf

avg=(1.49+1.59)/2 = 1.54sf; Length: 30': 28.13 sec+28.44 sec+28.39 sec=84.96/3=avg 28.32 sec

30'/28.32 sec = 1.06 fps; 1.54 sf * 1.06 fps * 0.8 roughness =2.43 cfs *448.83=1090.7gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek - Bitterroot		Outfall ID: SW-DC-10099	
Today's date: 12/5/2023		Time (Military):	
Investigators: Campbell and Nelson		Form completed by: Nelson	
Temperature (°F): 43	Rainfall (in.): Last 24 hours: 0.13	Last 48 hours: snowmelt	
Latitude: 46.84165	Longitude: -113.99605	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ____
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Outfall above Grit Chamber

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ____	☒ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: 30"	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☒ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
■ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		6.9	°C	Multi-probe
pH		8.2	pH Units	Multi-probe
Conductivity		429.8	µS/cm	Multi-probe
Specific Conductivity		657	µS/cm	Multi-probe
Total Dissolved Solids		428	mg/L	Multi-probe

4.5 quarts (1.125 gal), 3.15 sec; 5.5 quarts (1.375 gal), 3.76 sec; 5.5 quarts (1.375 gal), 3.55 sec

1.125+1.375+1.375 = 3.875 gal/ 3 = avg 1.29 gal; 3.15+3.76+3.55 = 10.46/3 = avg 3.49 sec

1.29 gal / 3.49 sec = 0.37; 0.37 * 60 = 22.2 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek-Clark Fork		Outfall ID: SW-TRTS-10005-DS	
Today's date: 12/5/2023		Time (Military): 09:20	
Investigators: T. Campbell, M. Nelson		Form completed by: M. Nelson	
Temperature (°F): 40	Rainfall (in.): Last 24 hours: .13	Last 48 hours: snowmelt	
Latitude: 46.86923	Longitude: -113.99635	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: ______
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Caras Park, mainhole downstream of HDS

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ______	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ______	☒ Single ☐ Double ☐ Triple ☐ Other: ______	Diameter/Dimensions: 30	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ In-Stream					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		10.2	°C	Multi-probe
pH		7.82	pH Units	Multi-probe
Conductivity		205.4	µS/cm	Multi-probe
Specific Conductivity		285.2	µS/cm	Multi-probe
Total Dissolved Solids		187	mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only
Are Any Physical Indicators Present in the flow? ☐ Yes ☑ No *(If No, Skip to Section 5)*

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

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls
Are physical indicators that are not related to flow present? ☐ Yes ☑ No *(If No, Skip to Section 6)*

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek-Clark Fork	Outfall ID: SW-TRTS-10005-US
Today's date: 12/5/2023	Time (Military): 09:20
Investigators: T. Campbell, M. Nelson	Form completed by: M. Nelson
Temperature (°F): 40	Rainfall (in.): Last 24 hours: .13 Last 48 hours: snowmelt
Latitude: 46.86927934 N / Longitude: 113.99622066 W	GPS Unit: / GPS LMK #:
Camera:	Photo #s:

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: __________
- Known Industries: __________

Notes (e.g.., origin of outfall, if known): Caras Park, mainhole upstream of HDS

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ Pipe	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: ____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: ____	☒ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: 3 mains in 24"; 24", 12" 30" out	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ In-Stream					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		9.1	°C	Multi-probe
pH		7.93	pH Units	Multi-probe
Conductivity		255.5	µS/cm	Multi-probe
Specific Conductivity		370.0	µS/cm	Multi-probe
Total Dissolved Solids		241	mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

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

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

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

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

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

Section 6: Overall Outfall Characterization for Illicit Discharge

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

Section 7: Data Collection

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

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

Appendix J

Municipal Standard Operating Procedures

Standard Operating Procedures for Preventing Pollution Associated with Municipal Activities

General Permit MTR040007

City of Missoula
Public Works & Mobility Department
Stormwater Utility Division
City of Missoula
1345 West Broadway Street
Missoula, Montana 59802

February 2024

CONTENTS

TABLES

FIGURES

ABBREVIATIONS

BMP – Best Management Practice
C – City of Missoula Cemetery Division
City – City of Missoula
County – Missoula County
CPDI – Community Planning, Development, and Innovation
FS – City of Missoula Facilities Services
FV – City of Missoula Facility & Vehicle Maintenance Division
GIS – Geographic Information Systems
IT – Information Technologies
MCM – Minimum Control Measure
MDEQ – Montana Department of Environmental Quality
MPDES – Montana Pollutant Discharge Elimination System
MPO – Missoula Planning Organization
MRA – Missoula Redevelopment Agency
MS4 – Municipal Separate Storm Sewer System
MSGP – Multi-Sector General Permit
S – City of Missoula Streets Operations & Maintenance Division
SOPs – Standard Operating Procedures
SW – Stormwater Division SWPPP – Storm Water Pollution Prevention Plan
W – City of Missoula Water Division
WW – Wastewater Division
P – City of Missoula Parks and Recreation Department

1. Introduction

The City of Missoula (City) is designated as a Municipal Separate Storm Sewer System (MS4) owner and operator under the Montana Pollutant Discharge Elimination System (MPDES) Phase II Stormwater Program. Each MS4 owner or operator must submit an application to the Montana Department of Environmental Quality (MDEQ) in order to discharge stormwater into state waters. The City discharges stormwater to the Missoula Valley aquifer, Clark Fork River, Bitterroot River, Pattee Creek, Grant Creek, Miller Creek, and Rattlesnake Creek.

The General Permit for Stormwater Discharges Associated with Small MS4s outlines six Minimum Control Measures (MCMs) to ensure compliance with the Clean Water Act. MCM 6, Pollution Prevention/Good Housekeeping for Permittee Operations, requires the City to identify an operation and maintenance program, to prevent or reduce pollutant runoff from permittee-owned/operated facilities and field activities. This MCM lists several conditions that must be met by the MS4 operator:

- Maintain an inventory of permittee-owned/operated facilities and activities that have the potential to release contaminants to the MS4, including possible contaminant(s) from each facility/activity and the local department(s)/position(s) responsible for pollution prevention with each facility/activity.
- Develop Standard Operating Procedures (SOPs) to prevent or reduce the amount of stormwater pollution generated by municipal operations and conveyed into receiving state waters.
- Train employees on procedures to incorporate pollution prevention/good housekeeping techniques into municipal operations.

This document is a summary of City facilities, field operations, Best Management Practices (BMPs), and training procedures that will be used, to reduce the potential for polluting or negatively affecting state waters from stormwater runoff.

The intent of the SOPs provided herein is to ensure that municipal practices are performed in ways that will minimize contamination of stormwater discharges to state waters. As the permittee, it is important that a municipality’s own operations minimize contamination of stormwater discharges and serve as a model for the entire regulated area. This manual is outlined to provide pollution awareness to municipal employees regarding operations and maintenance activities.

2. City Facilities

The City of Missoula owns and operates multiple facilities. This section identifies City facilities that have the potential to introduce contaminants to the MS4 and the specific possible pollutant sources at each facility. Facilities operated primarily by one department are organized under their respective departments: Public Works and Mobility, Parks and Recreation, and Missoula Fire Department. Facilities shared by multiple departments are organized under the "Shared Facilities" section. Table 1, located below, is an organizational table showing how City facilities are organized in this section.

Table 1. City facilities organizational table

City Department Responsible	Facility
2.1 Public Works and Mobility	2.1.1 Missoula Cemetery
	2.1.2 Missoula Resource Recovery Facility
	2.1.3 Missoula Water Building
	2.1.4 Well and Pump Facilities
	2.1.5 Scott Street Public Maintenance Facility
2.2 Parks and Recreation	2.2.1 City parks
	2.2.2 100 Hickory Facility
	2.2.3 Fort Missoula Facility
	2.2.4 Currents Aquatic Center
	2.2.5 Splash Montana Waterpark
2.3 Missoula Fire	2.3.1 Fire Stations
2.4 Shared Facilities	2.4.1 City Hall
	2.4.2 Ryman and Pine Buildings
	2.4.3 Missoula Art Museum

2.1 Public Works and Mobility

2.1.1 Missoula Cemetery

The Missoula Cemetery is located at 2000 Cemetery Road and is drained by dry wells. The cemetery is maintained with small machinery that pose a possible risk for pollution to state waters. Also, dirt is commonly being excavated and moved which can enter the stormwater infrastructure at the cemetery. Leaves, lawn clippings, and dirt are composted near the dirt stockpiles (Figure 1). This compost is used throughout the facility. New and used oil are stored in the main garage in 55-gallon drums and hydraulic fluid is stored in 5-gallon buckets. Landscape paint, touch up paint, wax paint, camp fuel, antifreeze, break cleaner, and muriatic acid are stored in a fire-proof case inside the main garage.

The main garage drains into an isolated catch basin, which would collect liquid in the event of a spill. There is a spill kit located near the garage. There are two 80-gallon diesel tanks stored outside. Pesticides and fertilizers are stored inside the stone room in 2.5-gallon jugs. Mowers and other small machinery are stored in the side garage. Fuel jugs of approximately 2 gallons are also stored inside the side garage. Table 2 summarizes the facility activities, potential pollutants, and associated City departments. The Cemetery has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Spill kits
    - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. The Cemetery Supervisor is responsible for implementing and maintaining this.
2. Cover Dumpsters
    - All trash receptacles must be covered with leakproof lids to prevent stormwater from entering. The Cemetery Supervisor is responsible for implementing and maintaining this.
3. Liquid bulk storage
    - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The main garage counts as secondary containment because 110% of all the stored liquid would be contained in the building in the event of a spill. The diesel fuel tanks located outside have an asphalt berm that provides secondary containment. The Cemetery Supervisor is responsible for implementing and maintaining this.
4. Inspections
    - Weekly inspections of the facility should be performed by the Cemetery Supervisor. Leaks, spills, and other deficiencies should be identified and fixed immediately.
5. Sediment
    - Sediment pollution should be prevented by not allowing dirt to enter the street when moving earth materials. If dirt does enter the street, street sweeping should occur within 24 hours, or before the next expected precipitation/melt event. The Cemetery Supervisor is responsible for implementing and maintaining this.
6. Leaves
    - Leaves should be swept off the street in fall and should not enter the stormwater system.

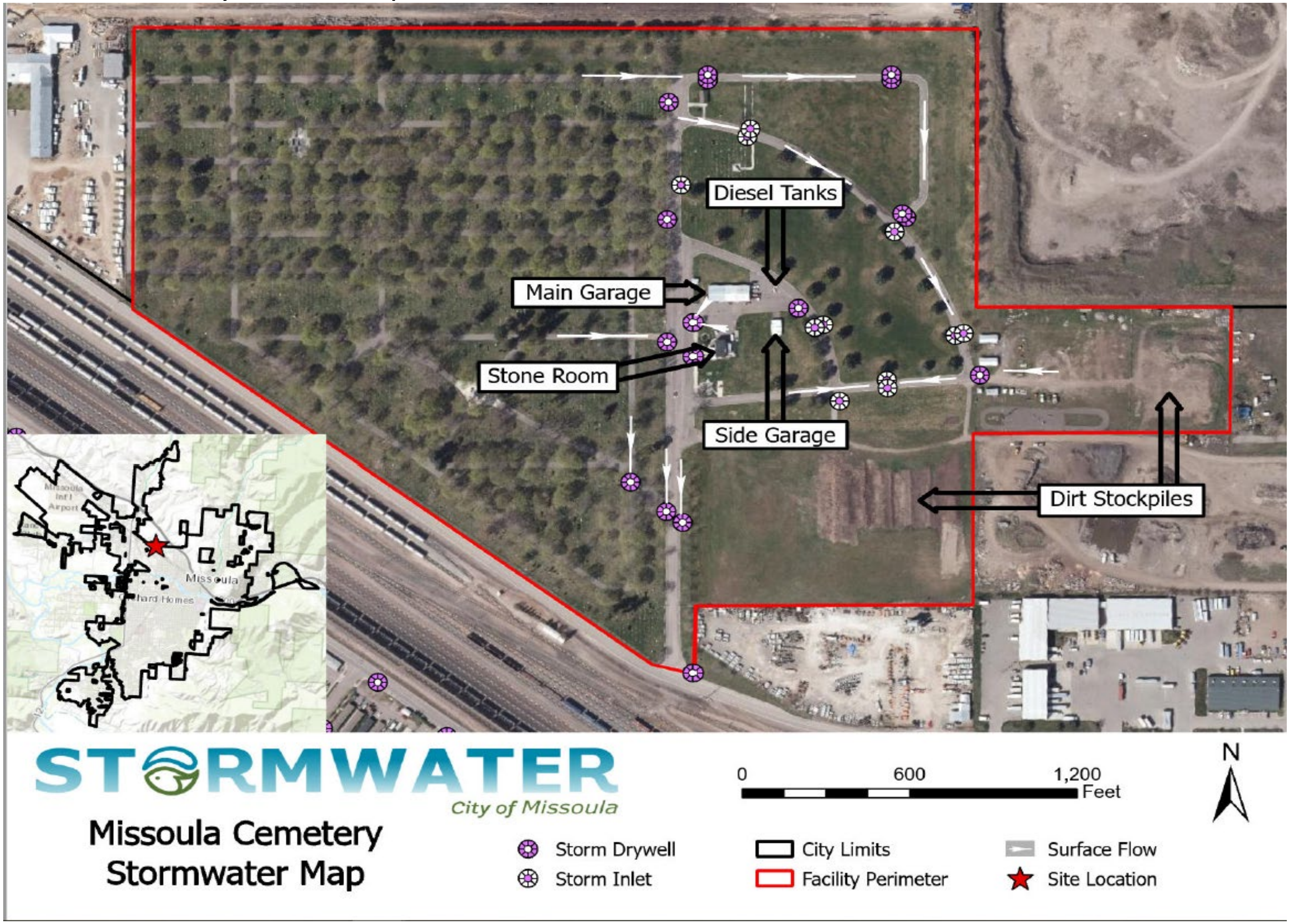
7. Pesticide and fertilizer application
    - While applying pesticides and/or fertilizers, the manufacturer's instructions for each specific product should be followed exactly.
8. Annual Review
    - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Cemetery Supervisor and the Stormwater Program Coordinator.
9. Employee Training
    - Conduct annual employee training on municipal pollution prevention BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 2. Missoula Cemetery potential pollutants and responsible City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	C
Spill Prevention and Response						X		X	X	C
Secondary Containment of Regulated Substances						X		X	X	C
Equipment Fueling						X	X		X	C
Equipment Maintenance and Repair				X		X	X		X	C
Parking Lot Maintenance	X		X	X		X	X		X	S
Vehicle and Equipment Washing	X			X		X	X		X	C
Outdoor Container Storage						X				C
Outdoor Storage of Raw Materials	X	X	X	X	X	X	X	X	X	C
Hazardous Material Management						X			X	C
Landscape Maintenance	X	X			X		X	X		C

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Cemetery (C)

Figure 1. Missoula Cemetery Stormwater Map



2.1.2 Missoula Resource Recovery Facility

The Missoula Resource Recovery Facility consists of the Wastewater Treatment Plant and Garden City Compost, which are both under the jurisdiction of the Wastewater Division. This joint facility operates under a Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity issued by the Montana Department of Environmental Quality (Permit #MTR000707). These facilities are adjacent to the Clark Fork River. There are no point source stormwater discharges from the facilities to the Clark Fork River. However, during large rain events there is a potential for sheet flow runoff to discharge from the nonindustrial portions of the facility to the Clark Fork River. The main stormwater concerns at this facility are nutrients and other pollutants from compost and sediment entering groundwater through leachate and direct injection (dry wells).

The Wastewater Treatment Plant, located at 1100 Clark Fork Ln, treats raw sewage (Figure 2). The effluent is used as irrigation for the City of Missoula Hybrid Poplar Tree Project, which includes 90,000 hybrid poplar trees that absorb trace amounts of nitrogen and phosphorus from the Wastewater Treatment Plant. The poplar trees are directly adjacent to Garden City Compost (Figure 3). The Garden City Compost facility is located at 1125 Clark Fork Lane, right next to the Clark Fork River. At this facility, treated bio-solids from the Wastewater Treatment Plant are incorporated into compost products. Surface flow has the potential to direct water into the Clark Fork River from this facility during large rain events (Figure 3). Table 3. Missoula Resource Recovery Facility potential pollutants and associated City departments summarizes the pertinent facility activities, potential pollutants, and associated City departments. The Missoula Resource Recovery Facility has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Stormwater Pollution Prevention Plan (SWPPP)
   - The operations of the Missoula Resource Recovery Facility are classified under the Administrative Rules of Montana as industrial and are subject to permitting requirements for stormwater discharge associated with industrial activity. Therefore, a SWPPP was prepared as part of meeting the Multi-Sector General Permit (MSGP) requirements for industrial stormwater discharges. This SWPPP is a work in progress document that details what the Resource Recovery Facility is doing to prevent stormwater pollution. Procedures such as employee training, street sweeping, spill response, hazardous material storage, inspections, stormwater sampling, and a variety of other BMPs are described in the Resource Recovery Facility SWPPP. The Treatment Facility Superintendent and the Stormwater Superintendent are responsible for maintaining and implementing this document. Visit Appendix B to view the SWPPP document.
2. Cover Dumpsters
   - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Treatment Facility Superintendent is responsible for implementing and maintaining this.
3. Impermeable Surface Under Compost Facility
   - ARM 17.50.1703(3) requires a low permeability work pad to control leachate and stormwater. The compost facility currently is on pervious ground which endangers groundwater and nearby surface water. An impermeable surface should be installed to control leachate, protect ground water, and control stormwater. The necessary funding has been acquired to renovate the

compost facility with an impermeable work pad, and preliminary designs are in progress. The Treatment Facility Superintendent is responsible for implementing this.

4. Inlet Protection
   - Any dry well or inlet that consistently takes sediment latent discharge should have inlet protection that prevents dirt and sediment from entering the dry well. The Treatment Facility Superintendent is responsible for implementing this.
5. Employee Training
   - Conduct annual employee training on municipal pollution prevention/best management practices for facility activities. The Treatment Facility Superintendent and the Stormwater Program Specialist will be responsible for conducting this training.
6. Annual Review
   - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Treatment Facility Superintendent and the Stormwater Program Coordinator.
7. Liquid Bulk Storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The Treatment Facility Superintendent is responsible for implementing this.

Table 3. Missoula Resource Recovery Facility potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department**[2]
Building Maintenance and Repair			X	X		X	X		X	WW
Spill Prevention and Response		X			X	X	X		X	WW
Secondary Containment of Regulated Substances		X				X	X		X	WW
Park and Open Space Maintenance	X	X	X	X	X	X	X		X	WW
Solid Waste Handling and Exposure	X	X	X	X	X	X	X	X	X	WW
Equipment Fueling						X	X		X	WW
Parking Lot Maintenance	X		X	X		X	X		X	S
Vehicle Maintenance and Repair				X		X	X		X	WW
Vehicle and Equipment Washing	X			X		X	X		X	WW
Outdoor Container Storage	X	X	X			X	X		X	WW
Outdoor Storage of Raw Materials	X	X	X	X	X	X	X	X	X	WW
Hazardous Material Management						X			X	WW

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Wastewater Division (WW)

Figure 2. Missoula Resource Recovery Facility Wastewater Treatment Works stormwater map

Missoula Resource Recovery Facility
Wastewater Treatment Works
Stormwater Site Map

Legend

- Native Grass Area for Infiltration (Potential for Sheet Flow)
- Drywell Drainage Sump
- Direction of Drainage Slope on Impervious Surfaces
- Q Identification of Industrial Activities
- Facility Perimeter

A. Septic dumping station.
B. Headworks influent pump building containing grit removal and screenings.
C. Grit vortex structure and grit slurry pump building that concentrates grit from the wastewater and pumps it to the Headworks building for removal.
D. Primary pump building.
E. Three primary clarifiers that remove settable organics.
F. The Administration building with a Lobby, Offices, Laboratory and Shop.
G. Fermenter for generating volatile fatty acids to enhance nutrient removal.
H. Sludge Holding Tank that accumulates digested sludge prior to dewatering.
I. Primary Digester that anaerobically digests biosolids.
J. Solids Handling Building for dewatering sludge.
K. Thickened Waste Activated Sludge (TWAS) holding tank that accumulates TWAS prior to dewatering.
L. Secondary Treatment Side 1 Building housing aeration blowers, Dissolved Air Flotation Thickening (DAFT) and attached Bioreactor basins.
M. Three Secondary Clarifiers for water / solids separation.
N. Secondary Treatment Side 2 Return Activated Sludge (RAS) Building.
O. Secondary Treatment Side 2 Bioreactors
P. Secondary Treatment Side 2 Secondary Clarifiers for water / solids separation.
Q. Cogeneration which uses methane generated on site to create heat and electricity.
R. Drying Beds.
S. Two truck barns.
T. UV Disinfection.

Figure 3. Missoula Resource Recovery Facility Garden City Compost stormwater map

GARDEN CITY COMPOST

Missoula Resource Recovery Facility
Garden City Compost
Stormwater Site Map

Legend

- Native Grass Area for Infiltration (Potential for Sheet Flow)
- Groundwater Pond
- Infiltration Pit
- Direction of Drainage Slope
- Q Identification of Industrial Activities
- Facility Perimeter

A. Green Waste Inspection Station.
B. Compost Loading Area.
C. Green Waste Storage Pile.
D. Grinding.
E. Ground Material Storage Area.
F. Bio-Solids Bunker.
G. Raw Compost Mixer.
H. Bunkers For Aerated Static Pile Composting,
I. Finished Compost Screening,
J. Finished Compost Curing And Storage.
K. Glass Recycling Bunker.
L. Quonset Hut For Equipment Storage.
M. Administration Building With Shop, Offices and Break Room.

2.1.3 Missoula Water Building

The Missoula Water Building is located at 1345 W Broadway Street, 500 feet north of the Clark Fork River. This facility's site includes a large office and garage building (main building), an emergency generator building, and a fuel storage facility (Figure 5). The main building has two stories and a loft, which are divided into a partial basement, the main floor, the lean-to, and a small loft within the garage. The garage houses water fleet vehicles along with various tools related to water maintenance. It drains to a catch basin in the basement that is periodically pumped into the sewer. The lean-to houses water fleet vehicles and a diesel tank with proper secondary containment. The fuel storage facility consists of nine diesel storage tanks that all have secondary containment in a reinforced concrete containment basin designed to accommodate more than 110% of the largest fuel tank (Figure 6). The fuel in these tanks is used by the Street Division vehicles and for powering mobile generators in the event of a power outage.

Fueling of the Street Division fleet vehicles takes place over an inlet that passes through a sand and oil separator and connects with the City Sewer. Diesel generators are stored in the yard over secondary containment metal pans. Also, an additional diesel generator is stored in the emergency generator building with proper secondary containment, along with another diesel tank. Various trucks and personal vehicles park on-site in the parking lot which is drained by dry wells that surround the property (Figure 4). Table 4 summarizes the facility activities, potential pollutants, and associated City departments. The Missoula Water building has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Spill Prevention Control and Countermeasure Plan (SPCCP)
   - The Missoula Water SPCCP document details what the Missoula Water Utility is doing to prevent stormwater pollution at the Missoula Water Building. Procedures such as employee training, spill response, hazardous material storage, equipment fueling, inspections, and a variety of other BMPs are described in the SPCCP. The document is reviewed and updated every 5 years. The Water Operations Superintendent is responsible for maintaining and implementing this document.
2. Cover Dumpsters
   - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Water Operations Superintendent is responsible for implementing and maintaining this.
3. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. All diesel tanks on-site need to have secondary containment. The guidelines regarding the diesel storage tanks detailed in the SPCCP must be followed. The Water Operations Superintendent is responsible for maintaining and implementing secondary containment on everything except the diesel tanks. The Streets Deputy Public Works Director is responsible for maintaining the secondary containment on the diesel tanks.
4. Spill kits
   - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. The Water Operations Superintendent is responsible for maintaining and implementing this.

5. Employee Training
    - Annual employee training should be conducted on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.
6. Annual Review
    - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with Water Operations Superintendent and the Stormwater Program Coordinator.
7. Inspections
    - Monthly inspections of the Missoula Water Building should be performed. Leaks, spills, and other deficiencies should be identified and fixed. The Water Operations Superintendent is responsible for implementing and maintaining this.

Table 4. Missoula Water Building potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	W
Spill Prevention and Response		X			X	X	X		X	W+S+SW
Secondary Containment of Regulated Substances		X				X	X		X	W+S
Solid Waste Handling and Exposure	X	X	X	X	X	X	X	X	X	W+SW
Equipment Fueling						X	X		X	S
Parking Lot Maintenance	X		X	X		X	X		X	S
Vehicle Maintenance and Repair				X		X	X		X	W
Vehicle and Equipment Washing	X			X		X	X		X	W+SW
Outdoor Container Storage	X	X	X			X	X		X	W
Outdoor Storage of Raw Materials	X	X	X	X	X	X	X	X	X	W
Hazardous Material Management						X			X	W+S

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Missoula Water (W), City of Missoula Stormwater (SW)

Figure 4. Missoula Water Facility Stormwater Map

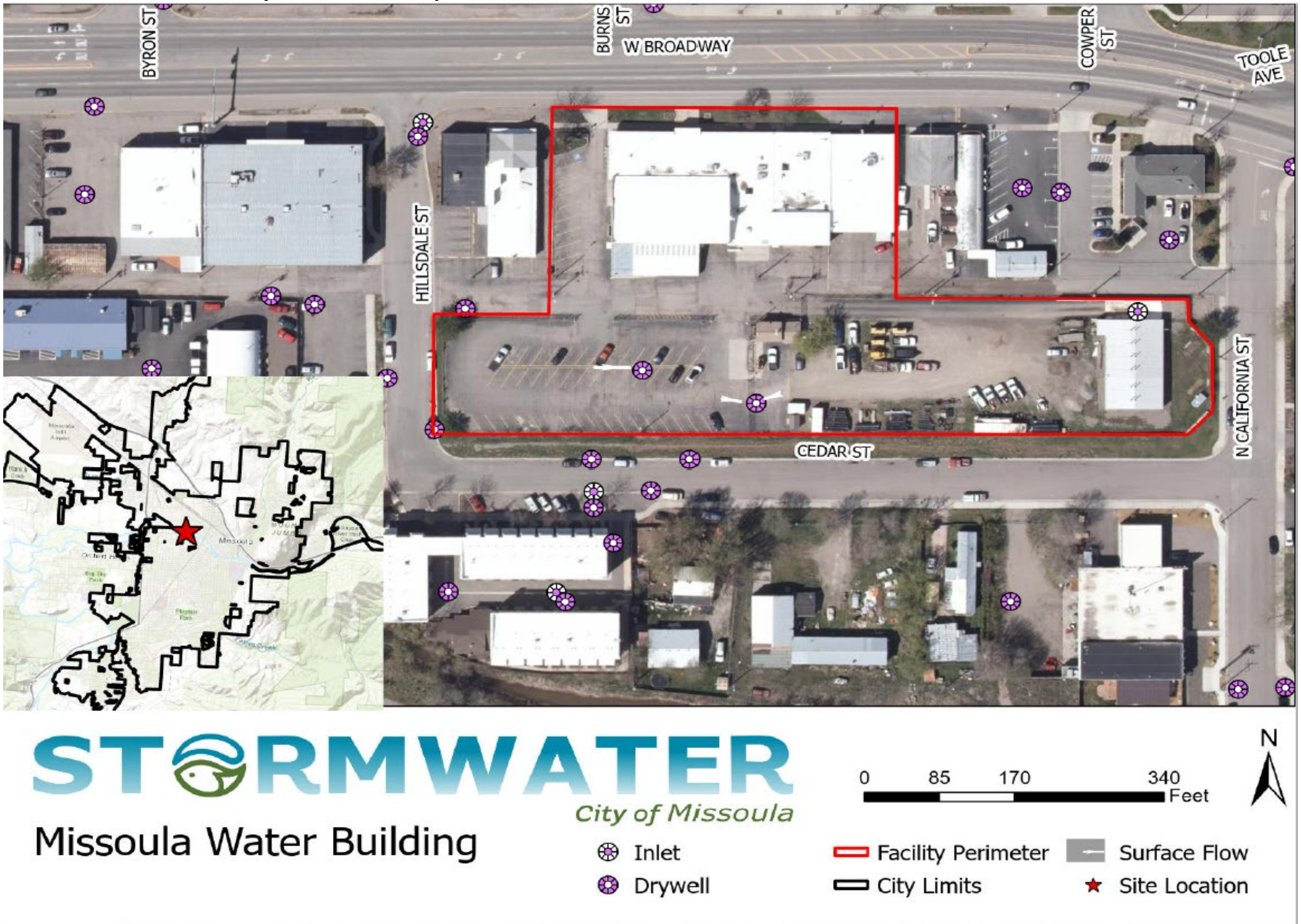


Figure 5. Missoula Water Building site plan

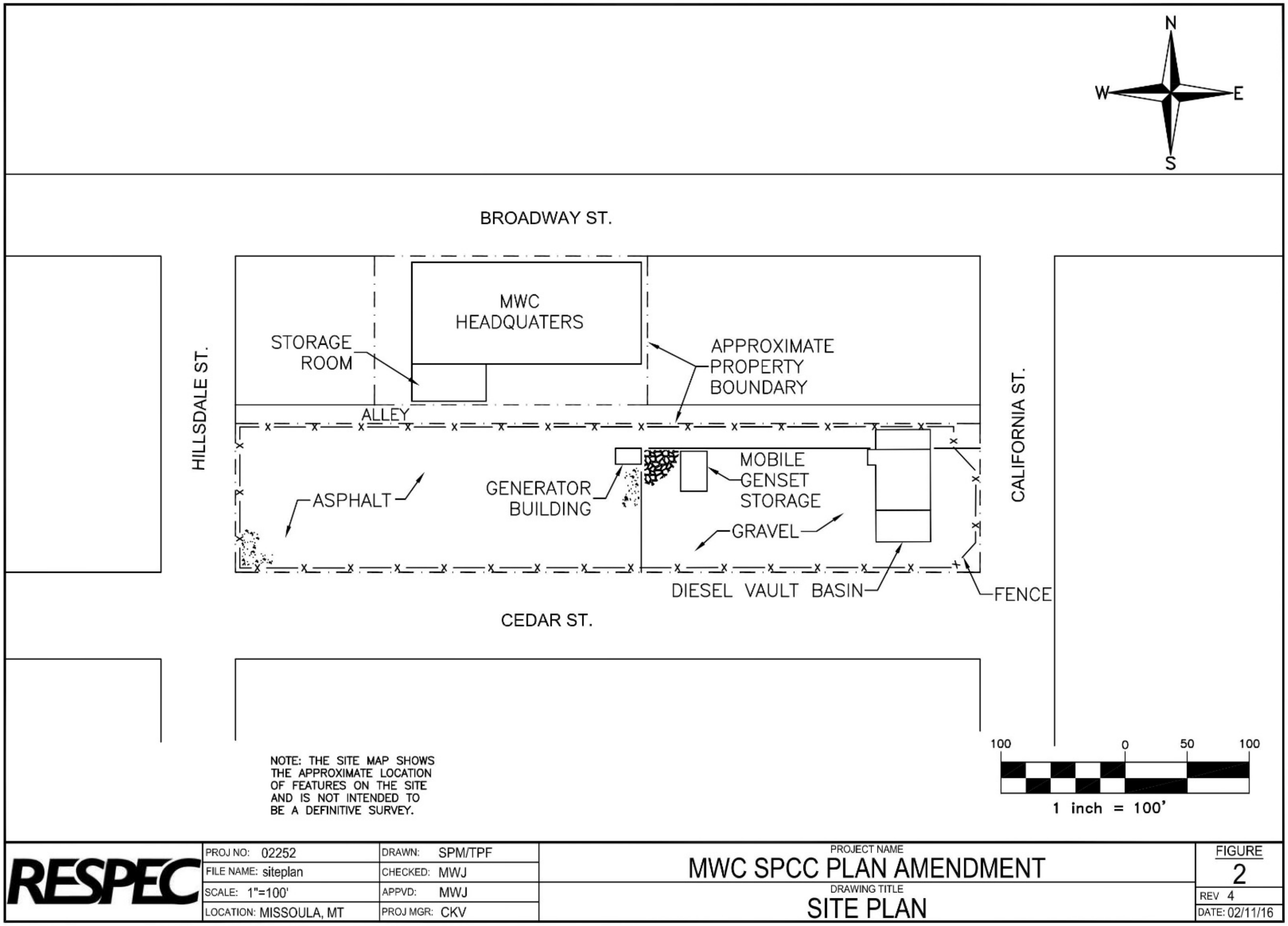
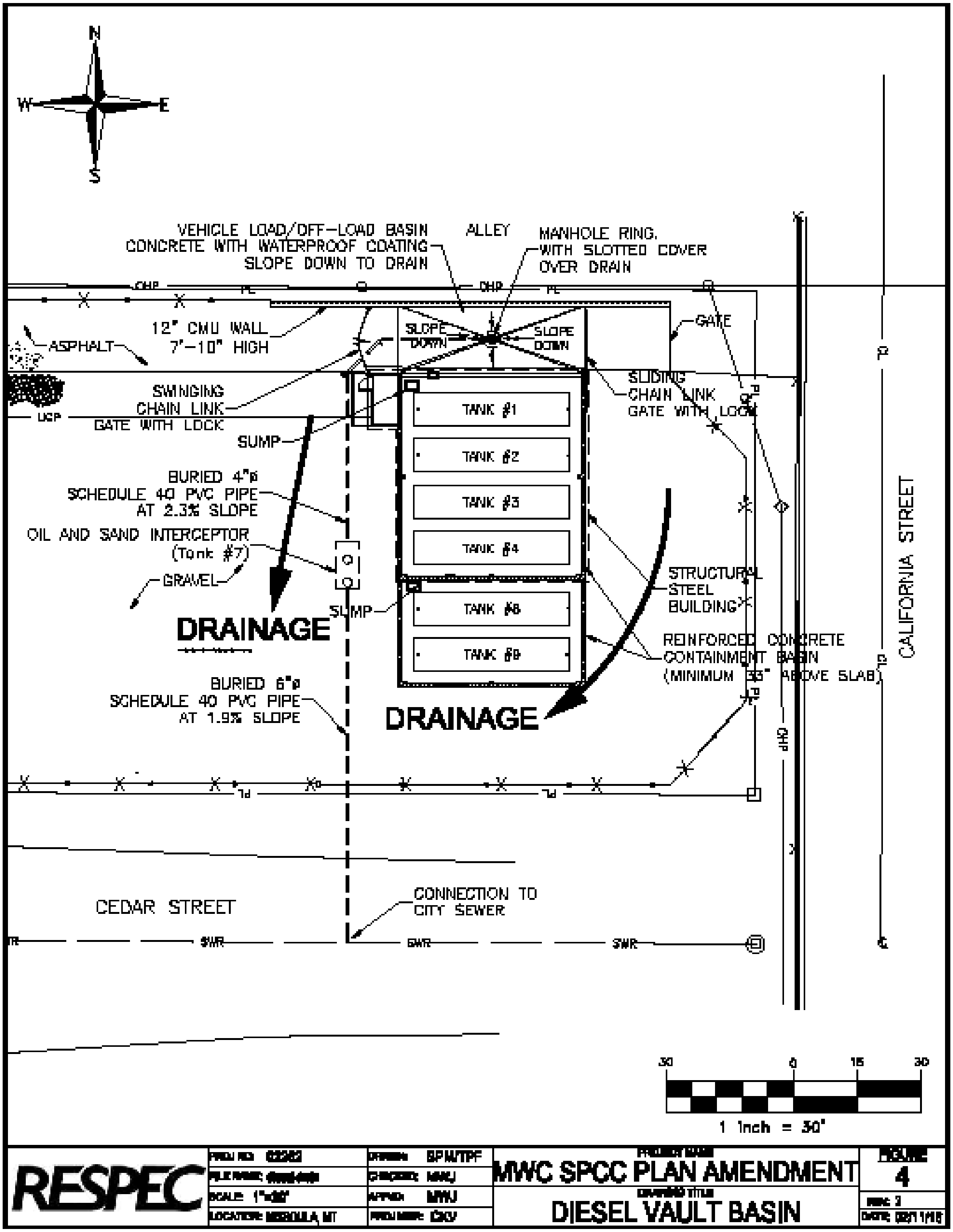


Figure 6. Missoula Water Building diesel vault basin



2.1.4 Well and Pump Facilities

There are 40 wells in Missoula that provide the City with drinking water, irrigation, and fire protection (Figure 7). Each one of these wells pump water from the aquifer and treats it with chlorine. The water is then pumped into pipes that connect with residential houses, commercial buildings, and irrigation pipes/ditches. Table 5 summarizes the facility activities, potential pollutants, and associated City departments. The Well and Pump Facilities have multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The chlorine containers on site need secondary containment. The Water Operations Superintendent is responsible for maintaining and implementing this.
2. Spill kits
   - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. The Water Operations Superintendent is responsible for maintaining and implementing this.
3. Annual Review
   - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Water Operations Superintendent and the Stormwater Program Coordinator.
4. Inspections
   - Monthly inspections of each well and pump facility should be performed. Leaks, spills, and other deficiencies should be identified and fixed. The Water Operations Superintendent is responsible for implementing and maintaining this.
5. Employee Training
   - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

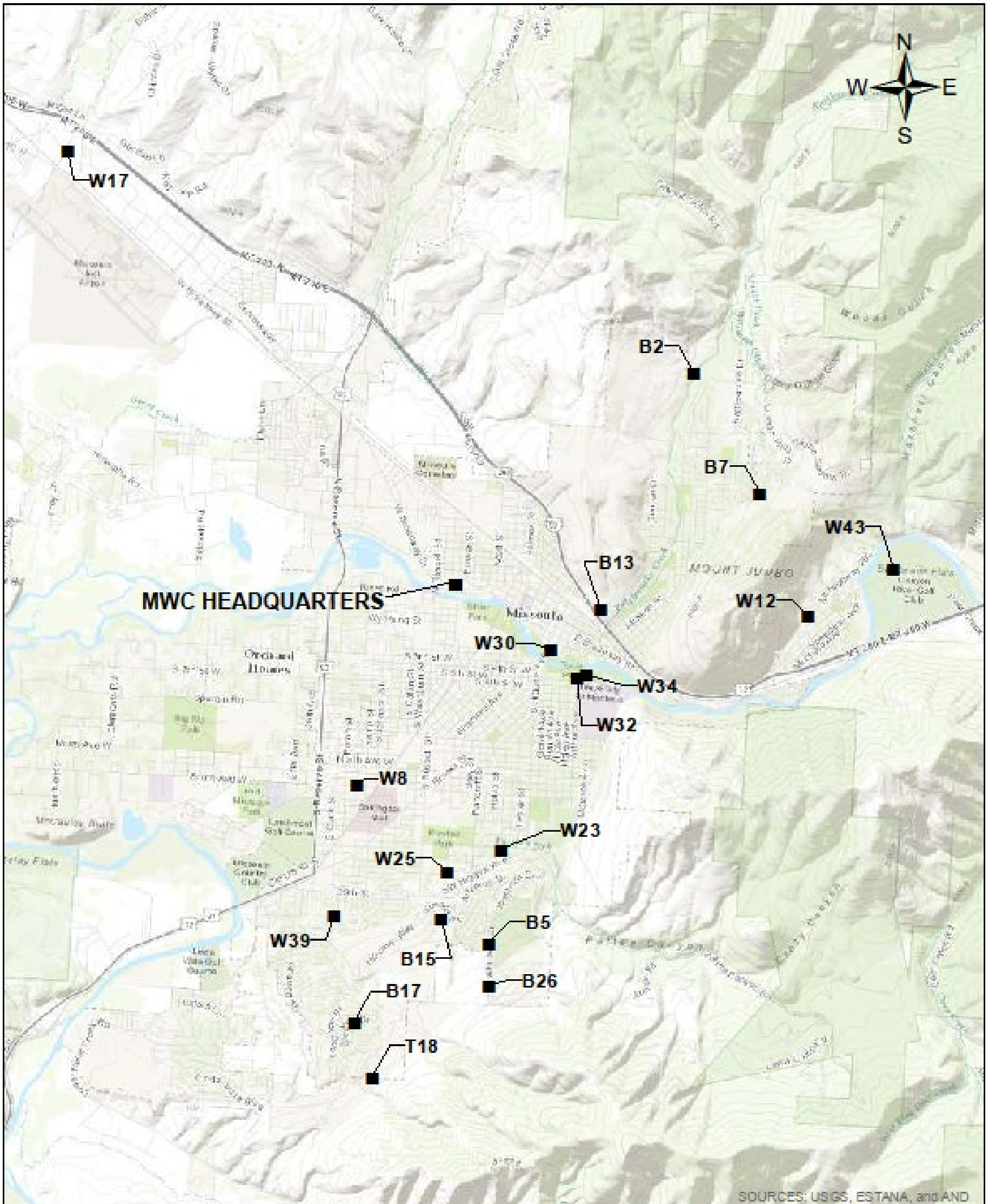
Table 5. Missoula Well and Pump Facility potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department**[2]
Building Maintenance and Repair			X	X		X	X		X	W
Spill Prevention and Response									X	W
Secondary Containment of Regulated Substances									X	W
Parking Lot Maintenance	X		X	X		X	X		X	S
Outdoor Storage of Raw Materials	X	X	X	X	X	X	X	X	X	W
Hazardous Material Management						X			X	W
Chlorinated Water Handling									X	W

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Wastewater Division (WW)

Figure 7. Missoula Well and Pump Facilities map



RESPEC	PROJ NO: 02252	DRAWN: TPF	PROJECT NAME MWC SPCC PLAN AMMENDMENT	FIGURE 3
	FILE NAME: GENSITE ID	CHECKED: MWJ		REV: 2
	SCALE: 1 " = 6,000 '	APPVD: MWJ	DRAWING TITLE DISPERSED GENSET SITES	DATE: 2/23/2016
	LOCATION: MISSOULA, MT	PROJ MGR: CKV		

2.1.5 Scott Street Public Maintenance Facility

The Scott Street Public Maintenance Facility is located at 1305 Scott Street. The stormwater runoff from this facility drains into five different dry wells on-site and to a grass swale on the north end of the site (Figure 8). Two different City Departments occupy this complex: The Street Operations & Maintenance Division and The Facility & Vehicle Maintenance Division.

The Facility & Vehicle Maintenance Division oversees a variety of vehicle maintenance activities in the main City Shop building which drains to a catch basin that connects with the City Sewer. For example, oil changes, electronic work, vehicle washing, etc., are all done inside. Bulk storage of oil, paint, and aerosols is in this building, all with secondary containment.

The Street Operations & Maintenance Division oversees the Signals, Streetlights & Communications Shop, which is responsible for maintaining traffic signals, pedestrian crossing signals, and flashing lights at school crossings throughout the city. Also, the decorative City-owned streetlights and the communication systems in City-owned vehicles are maintained in this shop. All these activities are done inside the main City Shop building. Those activities pose little to no risk to stormwater because they are not exposed to weather and are contained within a building.

The Street Operations & Maintenance Division has bulk storage of street paint and aerosols that are stored outdoors where they are under cover in the “truck and equipment storage” section of the facility. The street paint is not oil-based, and therefore does not need secondary containment. There is also bulk storage of liquid magnesium deicer that is in secondary containment in the “deicer” section of the facility. A new asphalt cleanout facility is currently being built outside and under cover. This area will have a containment structure/pit where pavement trucks are cleaned out. The material will sit in the pit until it is solidified, and then it will be transported to the landfill. Table 6 summarizes the facility activities, potential pollutants, and associated City departments. The Scott Street Public Maintenance Facility has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

- Floor Drains
  - All floor drains must drain to the sewer and not connect with the surrounding dry wells. The Streets Deputy Public Works Director is responsible for investigating the floor drains and ensuring that they drain to the sewer.
- Cover Dumpsters
  - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.
- Raw Material Management
  - Raw material such as sand, gravel, mulch, and asphalt should have a signed designated area in the yard. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.
- Waste Material Management
  - Waste material such as yard waste, concrete, waste asphalt, tires, empty containers, and sweepings should have a signed designated area in the yard. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.

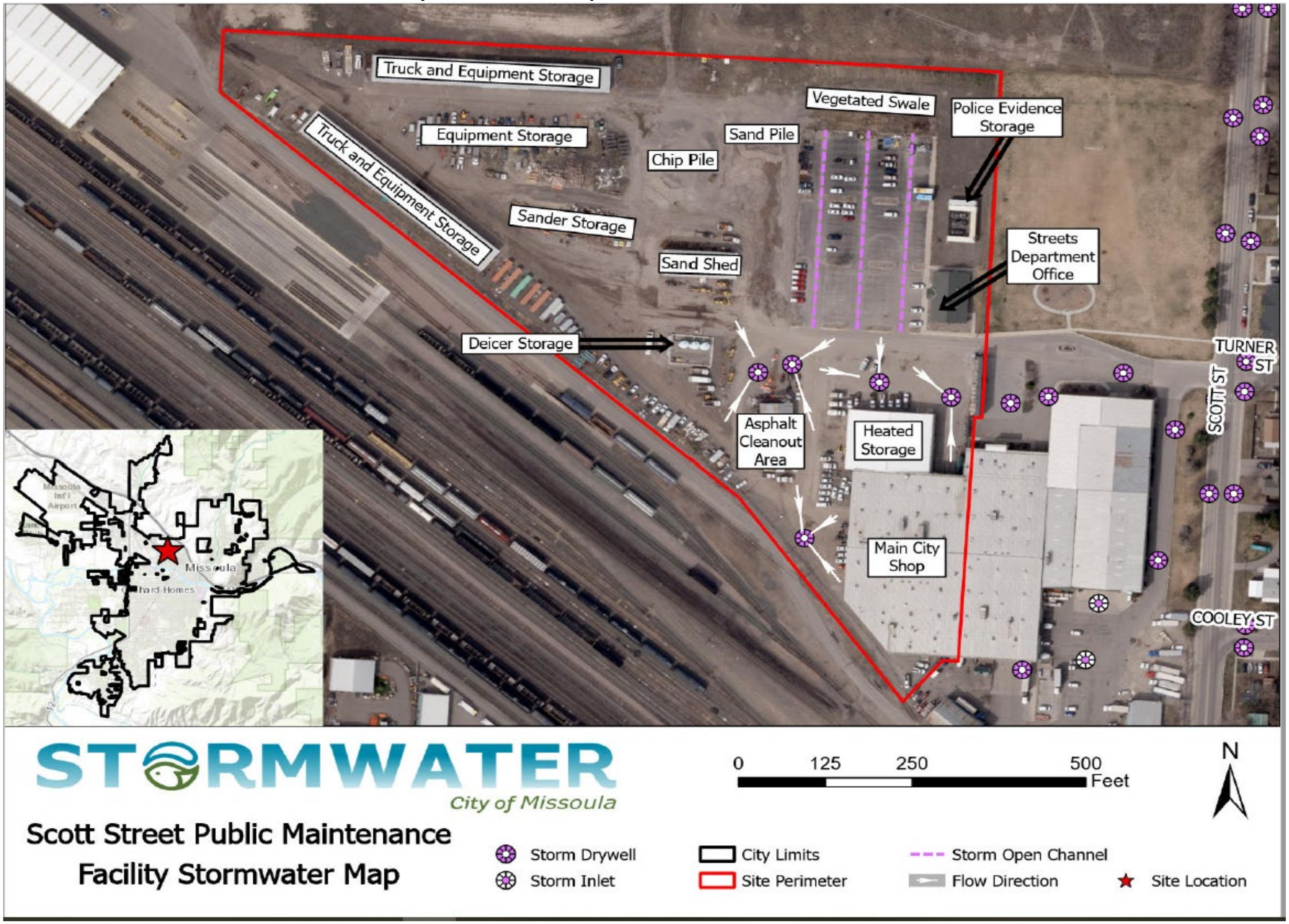
- Liquid bulk storage
  - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.
- Outdoor asphalt cleanout and equipment washout
  - The cover above the asphalt cleanout area should be repaired. Also, a secondary containment structure for the asphalt washout area should be constructed. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.
- Catch basin maintenance
  - The main City Shop building catch basin should be maintained every three months by replacing the absorbent bag placed in the basin. The Fleet Manager of the Vehicle Maintenance Division is responsible for implementing and maintaining this.
- Spill kits
  - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. Spill kits should be in convenient and easy to access locations that are dispersed throughout the facility. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.
- Inspections
  - Weekly inspections of each department's area should be performed by the appropriate department supervisor. Leaks, spills, and other deficiencies should be identified and fixed.
- Stormwater Pollution Prevention Plan (SWPPP)
  - The Vehicle Maintenance Division is responsible for maintaining a Stormwater Pollution Prevention Plan. Procedures such as employee training, spill response, hazardous material storage, inspections, and a variety of other BMPs are described in the Vehicle Maintenance Division SWPPP. The Fleet Manager is responsible for maintaining and implementing this document. Visit appendix A to view the SWPPP document.
- Annual Review
  - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Deputy Public Works Director and the Stormwater Program Coordinator.
- Employee Training
  - Annual employee training should be conducted on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 6. Scott Street Public Maintenance Facility potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	S
Spill Prevention and Response						X		X	X	S+FV
Secondary Containment of Regulated Substances						X		X	X	S+FV
Park and Open Space Maintenance										S
Equipment Fueling						X	X		X	S+FV
Equipment Maintenance and Repair				X		X	X		X	S+FV
Parking Lot Maintenance	X		X	X		X	X		X	S
Vehicle Maintenance and Repair				X		X	X		X	S+FV
Vehicle and Equipment Washing	X			X		X	X		X	S+FV
Outdoor Container Storage						X				S
Outdoor Storage of Raw Materials	X	X	X	X	X	X	X	X	X	S
Hazardous Material Management						X			X	S+FV
Concrete Mixing and Equipment Cleaning	X						X		X	S
Landscape Maintenance	X	X			X		X	X		S

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), Facility & Vehicle Maintenance Division (FV)

Figure 8. Scott Street Public Maintenance Facility Stormwater Map



2.2 Parks and Recreation

2.2.1 City Parks

Missoula has a total of 4,200 acres of city parkland across 75 parks (Figure 9). Parks in Missoula consist of some combination of the following facilities: baseball/softball field, basketball court, dog park, fishing access, horseshoe court, public art, interpretive feature, picnic shelter, soccer field, multi-use field, swimming pool, tennis court, volleyball court, commuter trail, and recreation trail. Various chemicals and machines are routinely used to maintain the parks in Missoula. Park maintenance is the most significant potential pollutant source for Missoula City Parks. Table 7 summarizes the facility activities, potential pollutants, and associated City departments. The operations and maintenance activities required to run City Parks have the potential to pollute state waters. To prevent this pollution, the following best management practices should be implemented:

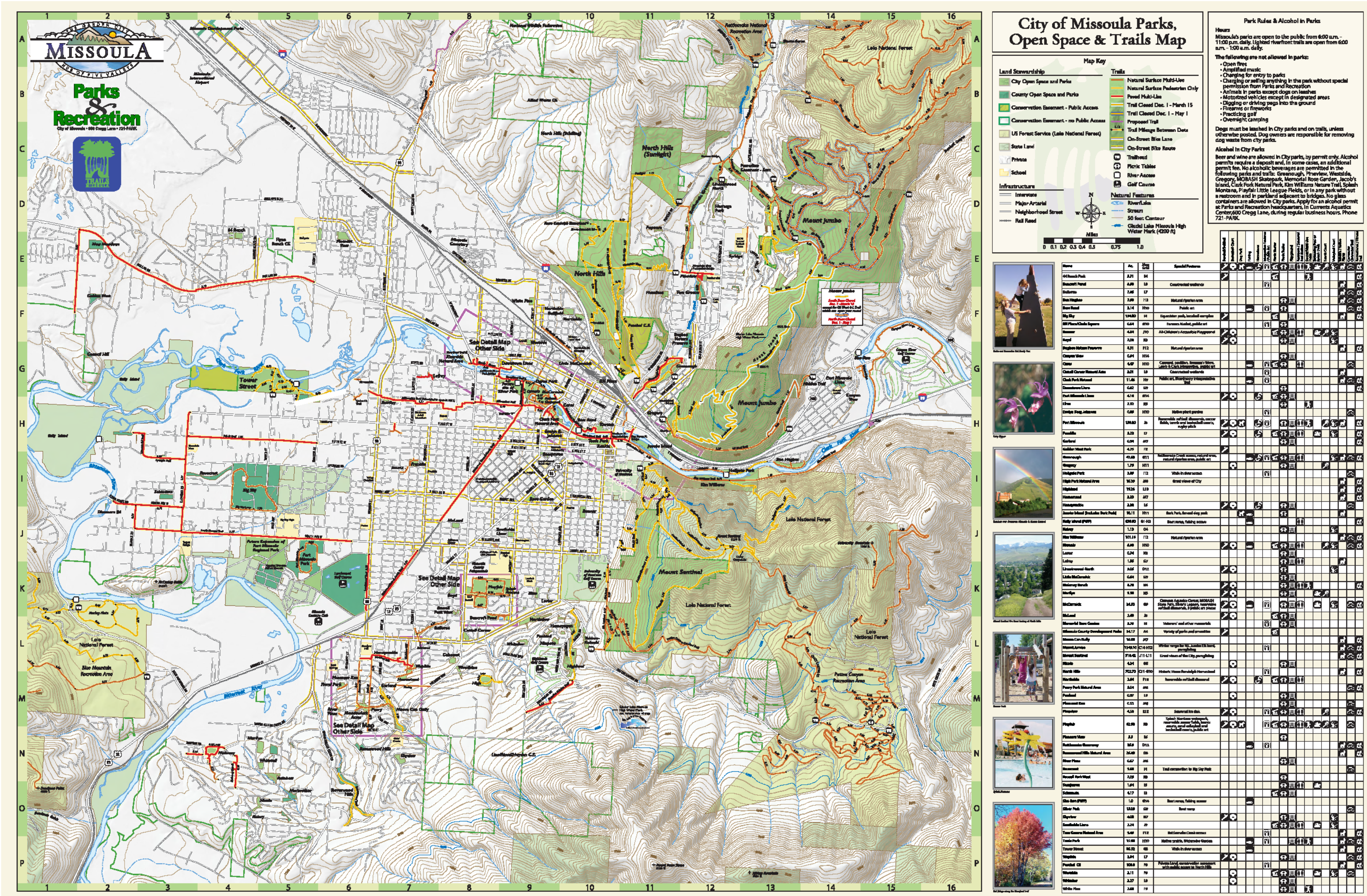
1. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The Parks and Trails Superintendent is responsible for implementing and maintaining this.
2. Cover Dumpsters
   - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Parks and Trails Superintendent is responsible for implementing and maintaining this.
3. Employee Training
   - Annual employee training should be conducted on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.
4. Spill kit
   - Spill kits should be in every Parks and Recreation Vehicle, in every structure that stores hazardous material, and wherever equipment maintenance and repair take place. The Parks and Trails Superintendent is responsible for implementing and maintaining this.
5. Pesticide and fertilizer application
   - While applying pesticides and/or fertilizers, the manufacture instructions for each specific product should be followed exactly. Appropriate employees should maintain a valid Government Applicator license. The Parks and Trails Superintendent is responsible for implementing and maintaining this.
6. Annual Review
   - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Parks and Trails Superintendent and the Stormwater Program Coordinator.

Table 7. City Parks potential pollutants and associated City departments

Best Management Practices[1]	Sediment	Nutrients	Trash	Metals	Bacteria	Oil, Grease, Hydrocarbons	Organics	Pesticides	Hazardous Waste	Department[2]
	Potential Pollutants									
Building Maintenance and Repair			X	X		X	X		X	P
Spill Prevention and Response		X				X		X	X	P
Secondary Containment of Regulated Substances						X		X	X	P
Tree Removal	X	X					X			P
Park and Open Space Maintenance						X		X	X	P
Equipment Fueling						X	X		X	P
Equipment Maintenance and Repair				X		X	X		X	P
Parking Lot Maintenance	X		X	X		X	X		X	S
Landscape Maintenance	X	X			X		X	X		P

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Parks and Recreation Department (P)

Figure 9. City Parks map



2.2.2 100 Hickory Facility

The 100 Hickory Facility houses a variety of Parks and Recreation equipment including welding gear, power tools, sprinkler maintenance equipment, lawnmowers, weedwhackers, backhoes, skid steers, UTVs, pressure washers, excavators, trucks, cars, and other various small machinery. Some of the equipment is stored indoors and some is stored outdoors. During winter, most of the equipment is brought inside. The main building has office space, conference rooms, and other indoor facilities for Parks and Recreation employees. The southeast end of the facility is directly adjacent to an irrigation ditch (Figure 10). When washing equipment over the grass near this area, no water should enter the ditch.

The main building also has 5 garages that are drained by a connected pipe system which passes through a sand and oil interceptor before it connects with the sewer. Four of the garages are used to store equipment and various chemicals like paint, herbicides, and hydraulic oil. During the summer, two of the four storage garages are used as break rooms for Parks and Recreation staff. The final main building garage is used as a welding shop.

Apart from the main building, there is a covered tool shed which houses small lawn maintenance tools, a covered wood shop, a covered Conservation Lands Management Bay which stores herbicides and fuel with secondary containment, a covered greenhouse, a covered sprinkler room which has sprinkler parts, a covered fuel shed, and an open raw material storage area (Figure 10). Table 8 summarizes the facility activities, potential pollutants, and associated City departments. The 100 Hickory Facility has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Cover Dumpsters
   - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
2. Spill kits
   - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. There needs to be a designated spill kit for the Conservation Lands Bay. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
3. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The main garage counts as secondary containment because 110% of all the liquid would be contained in the building in the event of a spill. A secondary containment structure is needed for the fuel shed. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
4. Used Container Management
   - Used containers should have a designated location on site and they should be disposed of regularly and promptly. The Trails and Parks Superintendent is responsible for implementing and maintaining this.

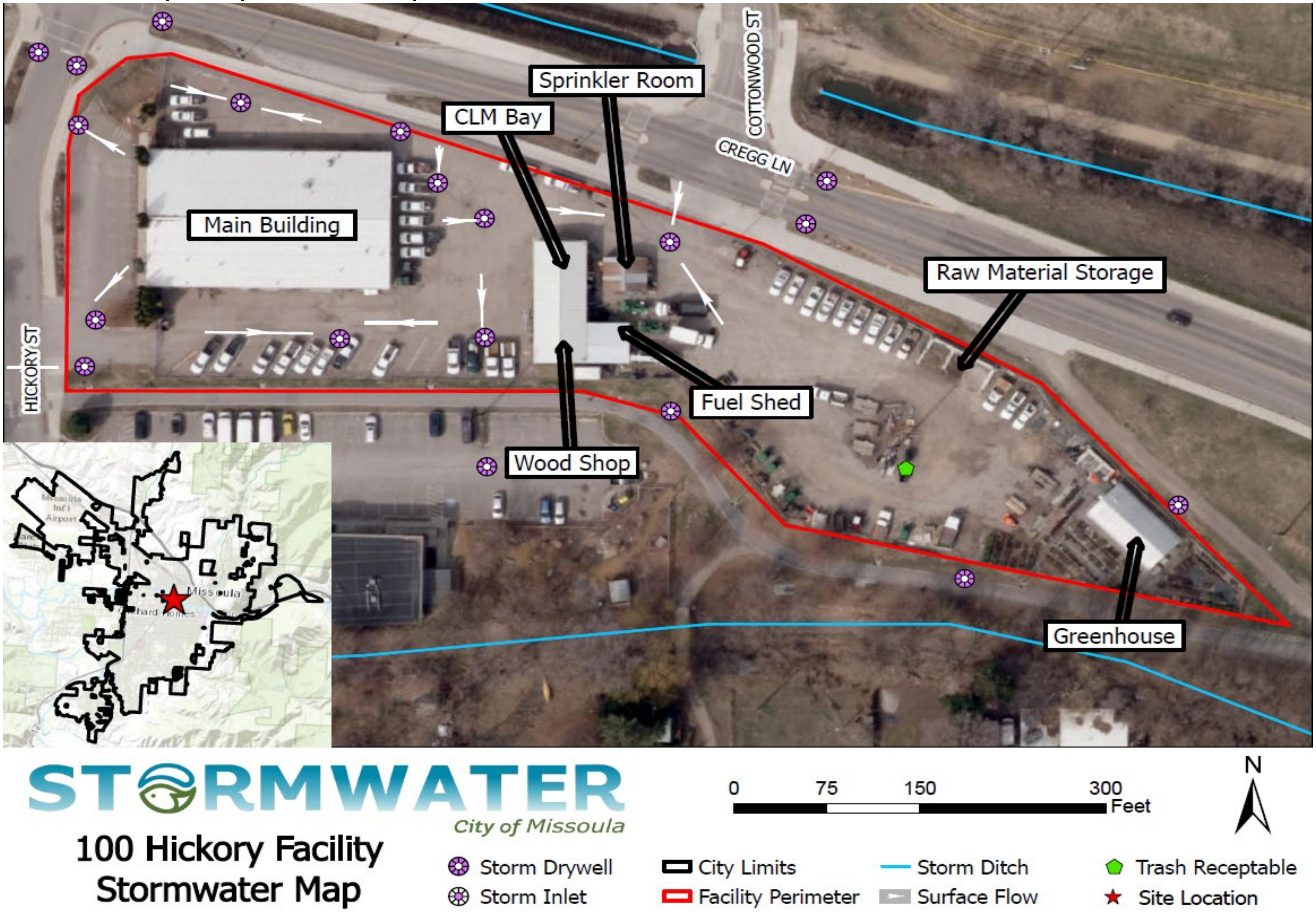
5. Vehicle and Equipment washing
   - Equipment and vehicles should not be washed over dry wells. Washing should take place over an inlet that connects with the sewer. If this is not possible, washing should take place over a vegetated area where runoff is unable to make it to any water bodies or stormwater infrastructure. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
6. Inspections
   - Weekly inspections of the facility should be performed by the Trails and Parks Superintendent. Leaks, spills, and other deficiencies should be identified and fixed.
7. Annual Review
   - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Trails and Parks Superintendent and the Stormwater Program Coordinator.
8. Employee Training
   - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 8. 100 Hickory Facility potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	P
Spill Prevention and Response						X		X	X	P
Secondary Containment of Regulated Substances		X				X		X	X	P
Tree Removal	X	X					X			P
Park and Open Space Maintenance						X		X	X	P
Equipment Fueling						X	X		X	P
Equipment Maintenance and Repair				X		X	X		X	P
Parking Lot Maintenance	X		X	X		X	X		X	S
Vehicle and Equipment Washing	X			X		X	X		X	P
Hazardous Material Management						X			X	P
Landscape Maintenance	X	X			X		X	X		P

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Parks and Recreation Department (P)

Figure 10. 100 Hickory Facility Stormwater Map



2.2.3 Fort Missoula Facility

The Fort Missoula Facility has one main building with an indoor garage where equipment, paint and other chemicals are stored (Figure 11). This garage has multiple floor drains that pass through a sand and oil interceptor before they connect with the sewer. The rest of the main building consists of office space, conference rooms, and other indoor facilities for Parks and Recreation employees.

Outside the main building, there is a raw material storage location right next to the parking lot where trucks and other equipment (pressure washers, skid steers, etc.) is stored. There is also a gated sports storage area to the northeast of the facility. Table 9 summarizes the facility activities, potential pollutants, and associated City departments. The Fort Missoula Facility has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Floor Drains
   - All floor drains must drain to the sewer and not connect with the surrounding dry wells. The Trails and Parks Superintendent is responsible for investigating the floor drains and ensuring they drain to the sewer.
2. Cover Dumpsters
   - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
3. Raw Material Storage
   - Raw material must not drain into the dry well on site. The Trails and Parks Superintendent is responsible for implementing an effective mitigation technique for preventing this from happening.
4. Spill kits
   - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. A spill kit is needed in the central garage of this facility. The Parks and Trails Superintendent is responsible for implementing and maintaining this.
5. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The main garage counts as secondary containment because 110% of all the liquid would be contained in the building in the event of a spill. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
6. Inspections
   - Weekly inspections of the facility should be performed by the Trails and Parks Superintendent. Leaks, spills, and other deficiencies should be identified and fixed.
7. Vehicle and Equipment Washing
   - Equipment and vehicles should not be washed over dry wells. There either needs to be a wash bay installed, or the equipment needs to be washed over a vegetated area. The Trails and Parks Superintendent is responsible for implementing and maintaining this.

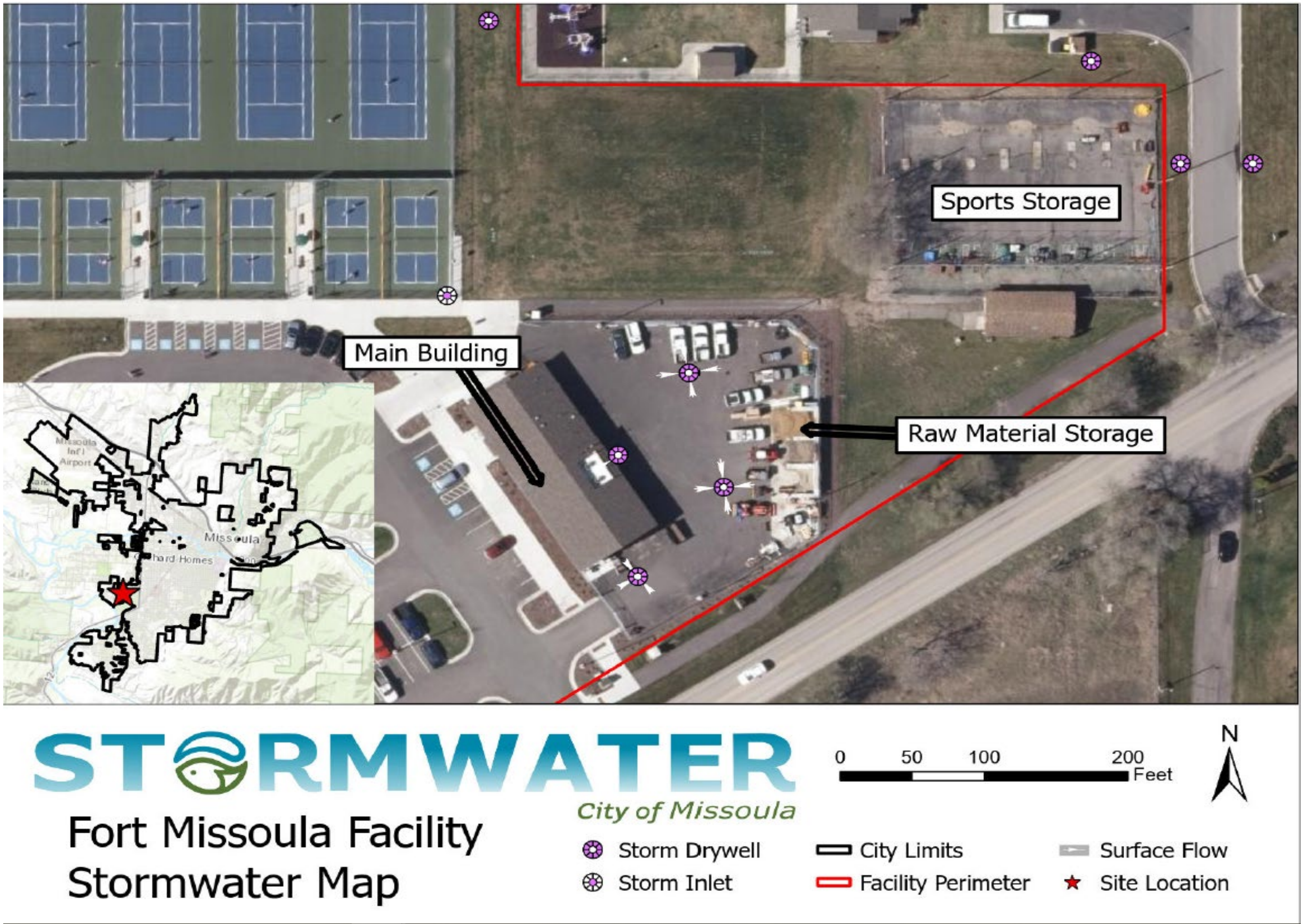
8. Pesticide and Fertilizer Application
    - While applying pesticides and/or fertilizers, the manufacture instructions for each specific product should be followed exactly (See Section 3.11 Park and Open Space Maintenance for details). Appropriate employees should maintain a valid Government Applicator license. The Trails and Parks Superintendent is responsible for implementing and maintaining this.
9. Annual Review
    - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Trails and Parks Superintendent and the Stormwater Program Coordinator.
10. Employee Training
    - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 9. Fort Missoula Facility potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	P
Spill Prevention and Response						X		X	X	P
Secondary Containment of Regulated Substances		X				X		X	X	P
Tree Removal	X	X					X			P
Park and Open Space Maintenance						X		X	X	P
Equipment Fueling						X	X		X	P
Equipment Maintenance and Repair				X		X	X		X	P
Parking Lot Maintenance	X		X	X		X	X		X	S
Vehicle and Equipment Washing	X			X		X	X		X	P
Hazardous Material Management						X			X	P
Landscape Maintenance	X	X			X		X	X		P

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Parks and Recreation Department (P)

Figure 11. Fort Missoula Facility stormwater map



2.2.4 Currents Aquatic Center

Currents Aquatics is an indoor water park located at 600 Cregg Lane and features a children's water playground, fitness pool, waterslides, and a spa, which are all located in the pool building (Figure 12). To the south of the building, there is a pond used for recreation. The office building has a front desk admissions area, office spaces, and conference rooms. Water used for recreation at this facility is treated with chlorine and acid in the pumphouse. The chlorine is stored in the pumphouse with adequate secondary containment. Chlorinated water is created inside by mixing water and chlorine tablets and any potential chlorine spills will drain to the floor drains that connect with the sewer. Since their acid supply is stored in a closet with outdoor access, it needs proper secondary containment for potential discharging. Table 10 summarizes the facility activities, potential pollutants, and associated City departments. The Currents Aquatics Center has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Cover Dumpsters
   - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Aquatics Manager is responsible for implementing and maintaining this.
2. Spill kits
   - A spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. The Aquatics Manager is responsible for implementing and maintaining this.
3. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. A secondary containment structure is not needed for the acid room because the hydrochloric acid is stored at a volume (150 gallons) beneath the threshold quantity. Gas cans should be stored inside and not left outdoors. The Aquatics Manager is responsible for implementing and maintaining this.
4. Inspections
   - Weekly inspections of the facility should be performed by the Aquatics Manager. Leaks, spills, and other deficiencies should be identified and fixed.
5. Used Container Management
   - Used containers should have a designated location on site and they should be disposed of regularly and promptly. The Aquatics Manager is responsible for implementing and maintaining this.
6. Annual Review
   - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Aquatics Manager and the Stormwater Program Coordinator.
7. Employee Training
   - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

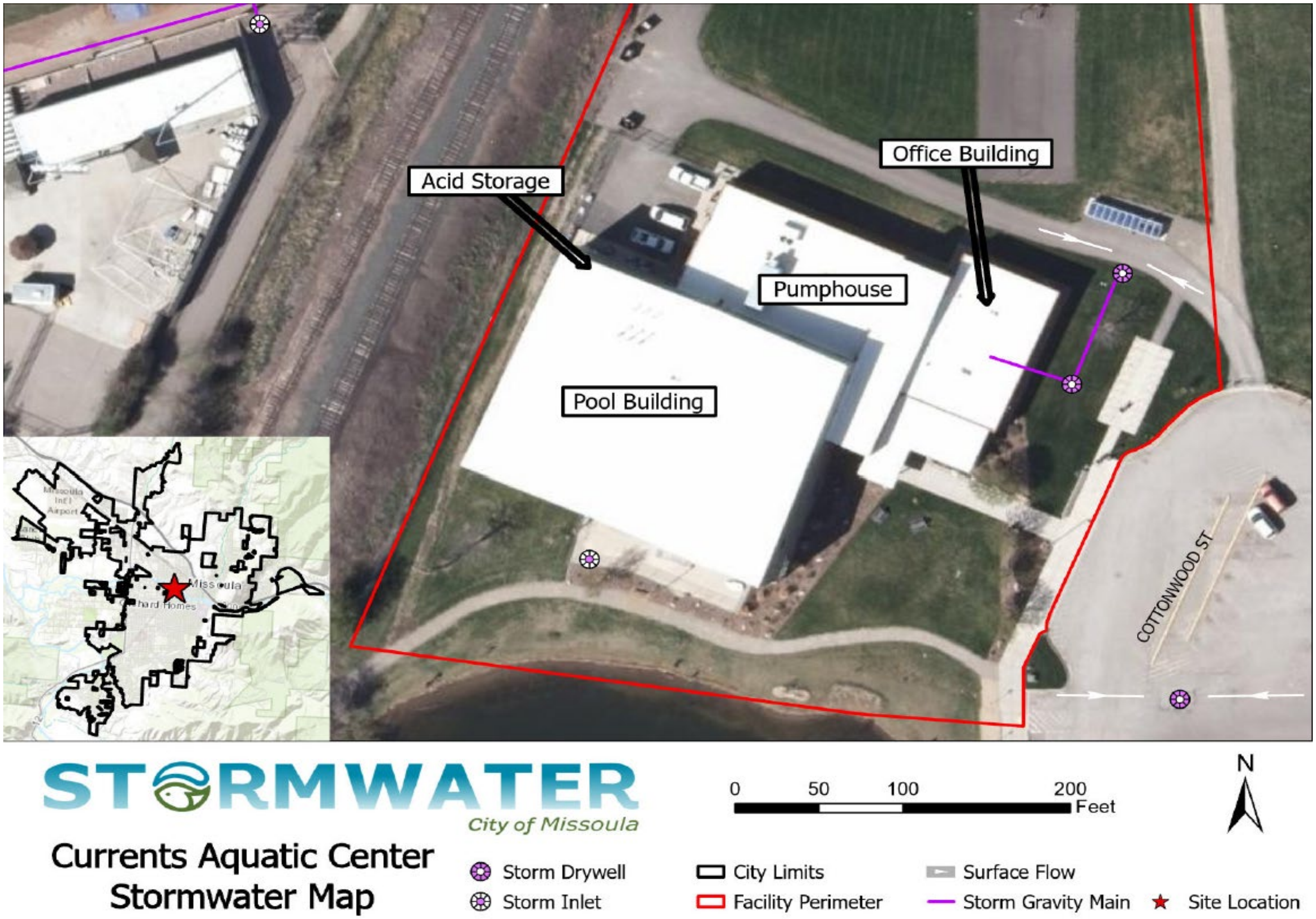
Table 10. Currents Aquatic Center potential pollutants and associated City departments

Best Management Practices[1]	Potential Pollutants									
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil, Grease, Hydrocarbons	Organics	Pesticides	Hazardous Waste	Department[2]
Building Maintenance and Repair			X	X		X	X		X	P
Spill Prevention and Response						X		X	X	P
Secondary Containment of Regulated Substances		X				X		X	X	P
Parking Lot Maintenance	X									
Hazardous Material Management	X		X	X		X	X		X	S
Chlorinated Water Handling									X	P

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Parks and Recreation Department (P)

Figure 12. Currents Aquatic Center Stormwater Map



2.2.5 Splash Montana Waterpark

Splash Montana Waterpark is located at 3001 Bancroft Street and features waterslides, a lazy river, a grill, and an Olympic-sized pool (Figure 13). The admissions booth consists of office spaces and an indoor area to admit customers into the facility. The Locker Building has locker rooms, changing rooms, bathrooms, and equipment storage closets. On the south side of this building, there are closets that store paint and chemicals. These rooms are adequate secondary containment structures.

The pumphouse consists of a pump room, a mechanical closet, a chlorine room, an acid room, and a water heater room. Small amounts of kerosene and diesel (5-gallon containers) are stored in the mechanical closet in the pumphouse. This closet had adequate secondary containment. Water used for recreation at this facility is treated with chlorine and acid in the pumphouse. Chlorinated water is created inside the chlorine room by mixing water and chlorine tablets. The chlorine room and acid room at this facility can create spills that can potentially reach a nearby dry well, therefore, both need secondary containment. Table 11 summarizes the facility activities, potential pollutants, and associated City departments. The Splash Montana Waterpark has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

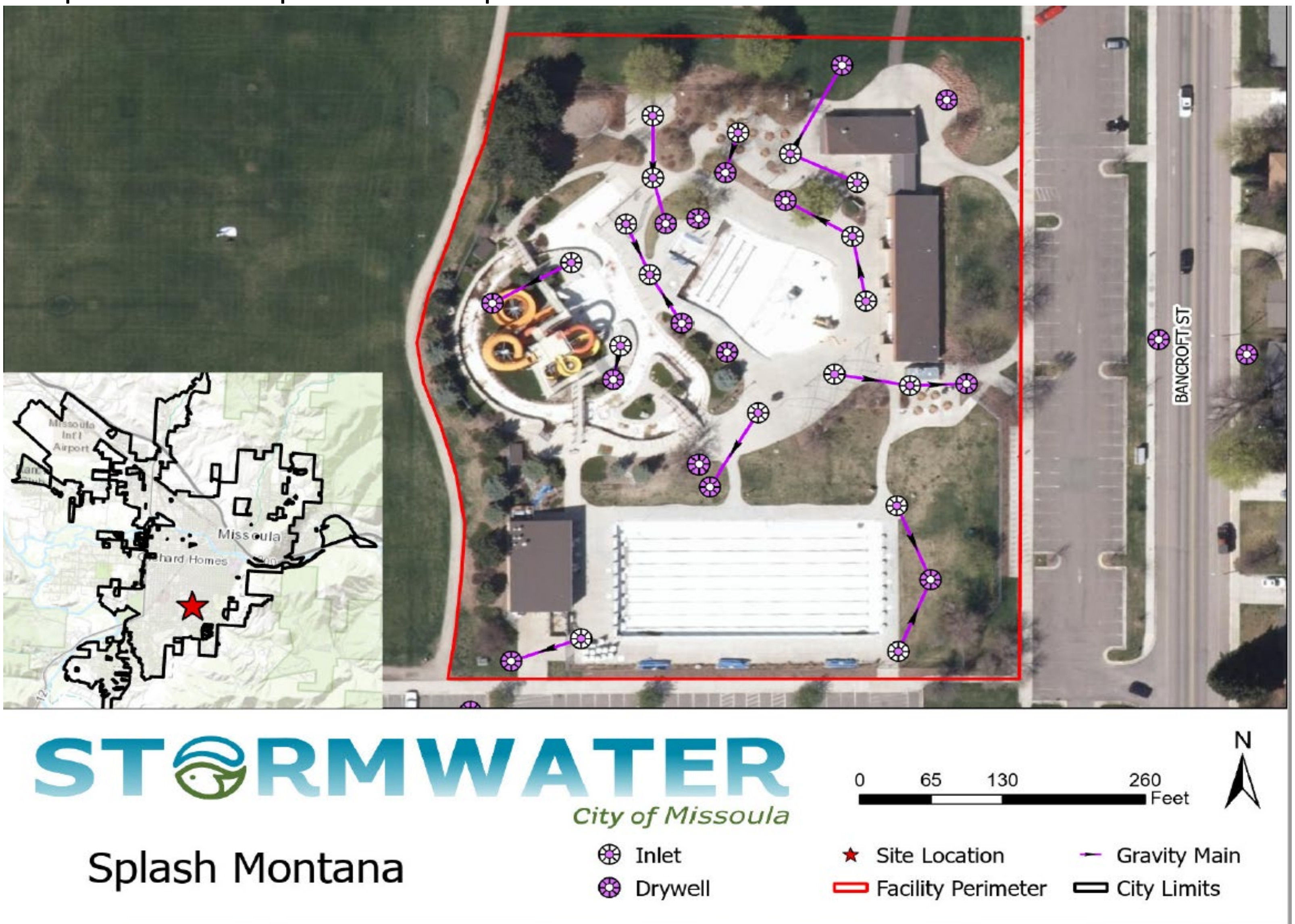
1. Cover Dumpsters
    - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Aquatics Manager is responsible for implementing and maintaining this.
2. Spill kits
    - spill kit should be located near where hazardous materials are stored or used. Employees should be aware of where the spill kits are located and how to use them. The Aquatics Manager is responsible for implementing and maintaining this.
3. Liquid bulk storage
    - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. A secondary containment structure is not needed for the acid room because the hydrochloric acid is stored at a volume (150 gallons) beneath the threshold quantity. A secondary containment structure should be built for the chlorine room to prevent regular overflow spills from exiting the room. The Aquatics Manager is responsible for implementing and maintaining this.
4. Inspections
    - Weekly inspections of the facility should be performed by the Aquatics Manager. Leaks, spills, and other deficiencies should be identified and fixed.
5. Annual Review
    - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Aquatics Manager and the Stormwater Program Coordinator.
6. Employee Training
    - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 11. Splash Montana Waterpark potential pollutants and associated City departments

Best Management Practices[1]	Sediment	Nutrients	Trash	Metals	Bacteria	Oil, Grease, Hydrocarbons	Organics	Pesticides	Hazardous Waste	Department[2]
	Potential Pollutants									
Building Maintenance and Repair			X	X		X	X		X	P
Spill Prevention and Response						X		X	X	P
Secondary Containment of Regulated Substances		X				X		X	X	P
Parking Lot Maintenance	X									S
Hazardous Material Management	X		X	X		X	X		X	S
Chlorinated Water Handling									X	P

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Parks and Recreation Department (P)

Figure 13. Splash Montana Waterpark Stormwater Map



2.3 Missoula Fire

2.3.1 Fire Stations

The City of Missoula owns and operates five fire stations. Each fire station has a covered apparatus bay where fire trucks are stored and washed. The apparatus bay at every station drains to a sand and oil interceptor which connects to the sewer. Vehicle maintenance can occur in this area, but it predominantly takes place in the covered maintenance shop. The maintenance shop drains to an oil and grease separator which connects to the sewer. A variety of vehicle maintenance occurs inside. Mock fire training is one the main potentials sources of stormwater pollution at the fire stations.

Fire Station #1

Fire station #1 is located at 625 East Pine Street (Figure 14). The apparatus bay at this location drains to a sand and oil interceptor which goes to the City sewer. Floor dry and pig mats are in the northwest corner of the apparatus bay. Table 12 summarizes the facility activities, potential pollutants, and associated City departments.

Fire Station #2

Fire station #2 is located at 247 Mount Avenue (Figure 15). The apparatus bay at this location drains to a sand and oil interceptor which goes to the City sewer. Floor dry and pig mats are in the southwest corner of the apparatus bay. Table 13 table summarizes the facility activities, potential pollutants, and associated City departments.

Fire Station #3

Fire station #3 is located at 1501 39th Street (Figure 16). The apparatus bay at this location drains to a sand and oil interceptor which goes to the City sewer. Floor dry and pig mats are in the southeast corner of the apparatus bay. There are two 500-gallon double walled fuel tanks outside. One stores gasoline and the other stores diesel. Table 14 summarizes the facility activities, potential pollutants, and associated City departments.

Fire Station #4

Fire station #4 is located at 3011 Latimer (Figure 17). The apparatus bay and maintenance shop at this location both drain to separate sand and oil interceptors that go to the City sewer. Floor dry and pig mats are in the northwest corner of the apparatus bay and in the southwest corner of the maintenance shop. There are two 500-gallon double-walled fuel tanks outside – one to store gasoline, and the other diesel. This is the only fire station where mock fire drills take place. Table 15 summarizes the facility activities, potential pollutants, and associated City departments.

Fire Station #5

Fire station #5 is located at 6425 Lower Miller Creek Road (Figure 18). The apparatus bay at this location drains to a sand and oil interceptor which goes to the City sewer. Floor dry and pig mats are in the southwest corner of the apparatus bay. Table 16 summarizes the facility activities, potential pollutants, and associated City departments.

The Missoula Fire Stations have multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Employee Training
   - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.
2. Equipment Fueling
   - Every fire station must have a fueling station that follows the P2 permit.
3. Material Safety Data Sheets (MSDS)
   - MSDSs provide a variety of reference information, including physical properties and handling procedures for chemicals. Suppliers are required to provide this information to their customers, and facilities should maintain current copies of them as ready reference for employees and emergency responders. The Master Mechanic is responsible for implementing and maintaining this.
4. Liquid bulk storage
   - If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. If there is more than 100 gallons of gasoline or 200 gallons of diesel stored on site, a P2 permit is required. Fire stations #4 and #3 both have a P2 permit that they must follow. The Master Mechanic is responsible for implementing and maintaining this.
5. Parking Lot Maintenance
   - Proper parking lot maintenance practices should take place at each fire station The Master Mechanic is responsible for implementing and maintaining this.
6. Fire Fighting Response Practices
   - When firefighting response practices are taking place, proper BMPs should be implemented. The Master Mechanic is responsible for implementing and maintaining this.
7. Spill kits
   - Spill kits are required at each fire station that all employees should be aware of and use in case of an emergency spill. In addition, every active fire truck should always carry a spill kit. The Master Mechanic is responsible for implementing and maintaining this.
8. Annual Review
   - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Master Mechanic and the Stormwater Program Coordinator.
9. Inspections
   - Every outdoor fuel tank should be inspected once a week and each fire station should be inspected monthly. Leaks, spills, and other deficiencies should be identified and fixed. The Master Mechanic is responsible for implementing and maintaining this.

Table 12. Fire Station #1 potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	F
Spill Prevention and Response						X			X	F
Parking Lot Maintenance	X		X	X		X	X		X	S
Hazardous Material Management						X			X	F
Vehicle and Equipment Washing	X		X	X		X	X		X	F

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Fire Department (F)

Table 13. Fires Station #2 potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	F
Spill Prevention and Response						X			X	F
Parking Lot Maintenance	X		X	X		X	X		X	S
Hazardous Material Management						X			X	F
Vehicle and Equipment Washing	X		X	X		X	X		X	F

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Fire Department (F)

Table 14. Fires Station #3 potential pollutants and associated City departments

Best Management Practices[1]	Sediment	Nutrients	Trash	Metals	Bacteria	Oil, Grease, Hydrocarbons	Organics	Pesticides	Hazardous Waste	Department[2]
Building Maintenance and Repair			X	X		X	X		X	F
Spill Prevention and Response						X			X	F
Secondary Containment						X				F
Equipment Fueling						X				F
Parking Lot Maintenance	X		X	X		X	X		X	S
Hazardous Material Management						X			X	F
Vehicle and Equipment Washing	X		X	X		X	X		X	F

Potential Pollutants: Sediment through Hazardous Waste.

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Fire Department (F)

Table 15. Fires Station #4 potential pollutants and associated City departments

Best Management Practices[1]	Sediment	Nutrients	Trash	Metals	Bacteria	Oil, Grease, Hydrocarbons	Organics	Pesticides	Hazardous Waste	Department[2]
Building Maintenance and Repair			X	X		X	X		X	F
Spill Prevention and Response						X			X	F
Secondary Containment						X				F
Equipment Fueling						X				F
Parking Lot Maintenance	X		X	X		X	X		X	S

Table 15 (continued).

Hazardous Material Management						X			X	F
Vehicle and Equipment Washing	X		X	X		X	X		X	F
Chlorinated Water Handling									X	F

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Fire Department (F)

Table 16. Fires Station #5 potential pollutants and associated City departments

	Potential Pollutants									
Best Management Practices[1]	Sediment	Nutrients	Trash	Metals	Bacteria	Oil, Grease, Hydrocarbons	Organics	Pesticides	Hazardous Waste	Department[2]
Building Maintenance and Repair			X	X		X	X		X	F
Spill Prevention and Response						X			X	F
Parking Lot Maintenance	X		X	X		X	X		X	S
Hazardous Material Management						X			X	F
Vehicle and Equipment Washing	X		X	X		X	X		X	F

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Fire Department (F)

Figure 14. Missoula Fire Station #1 Stormwater Map

Figure 15. Missoula Fire Station #2 Stormwater Map

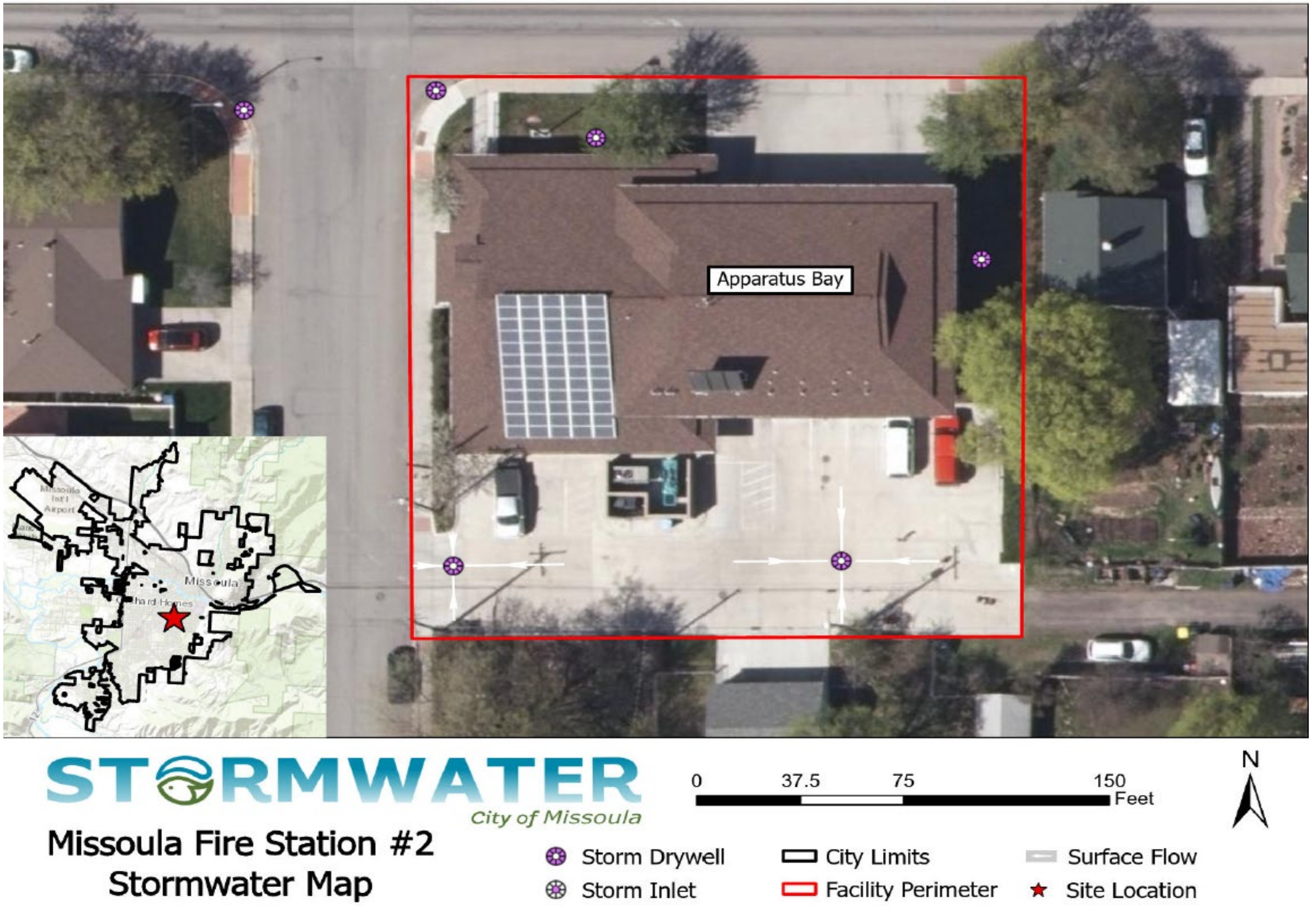


Figure 16. Missoula Fire Station #3 Stormwater Map

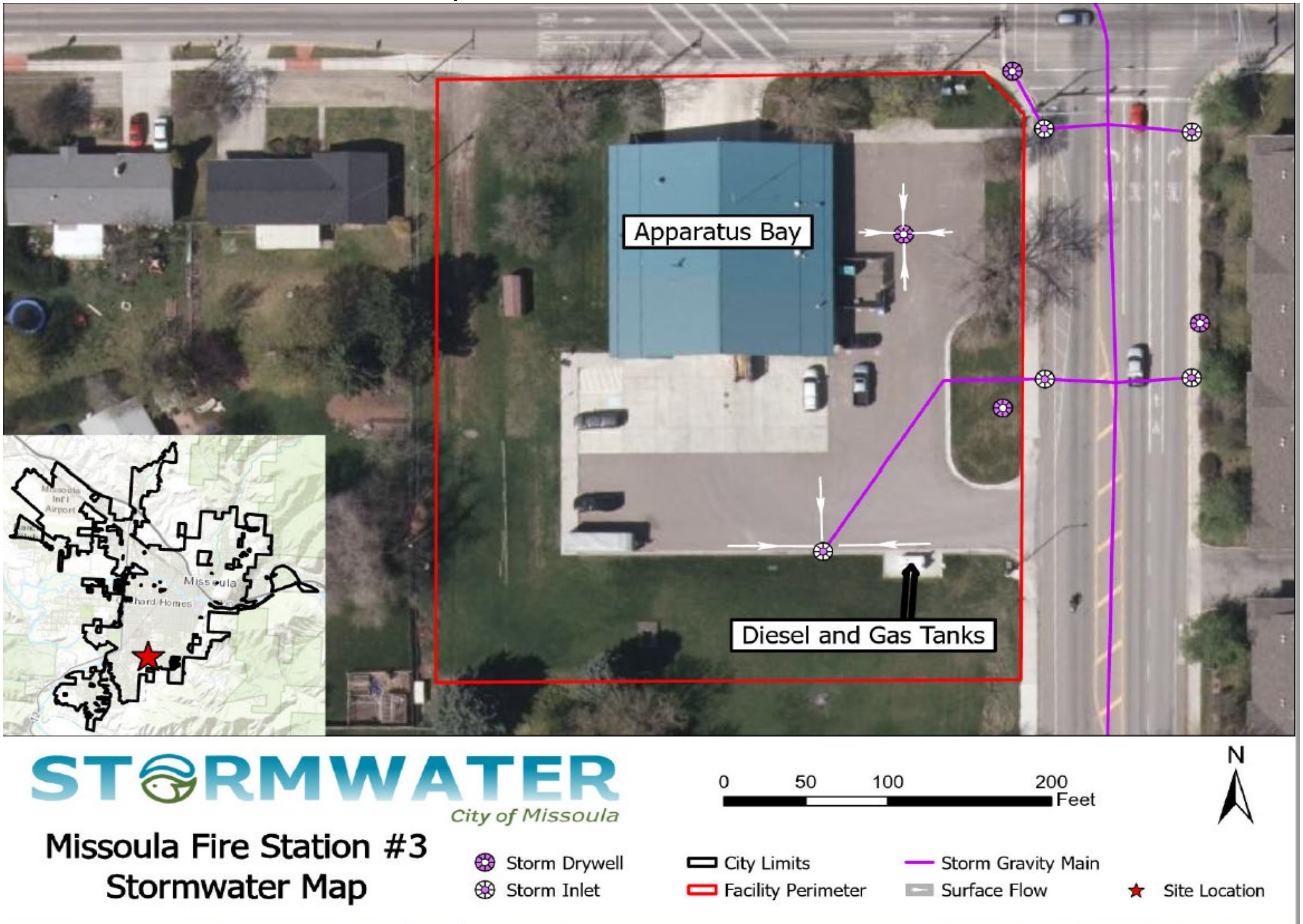


Figure 17. Missoula Fire Station #4 Stormwater Map

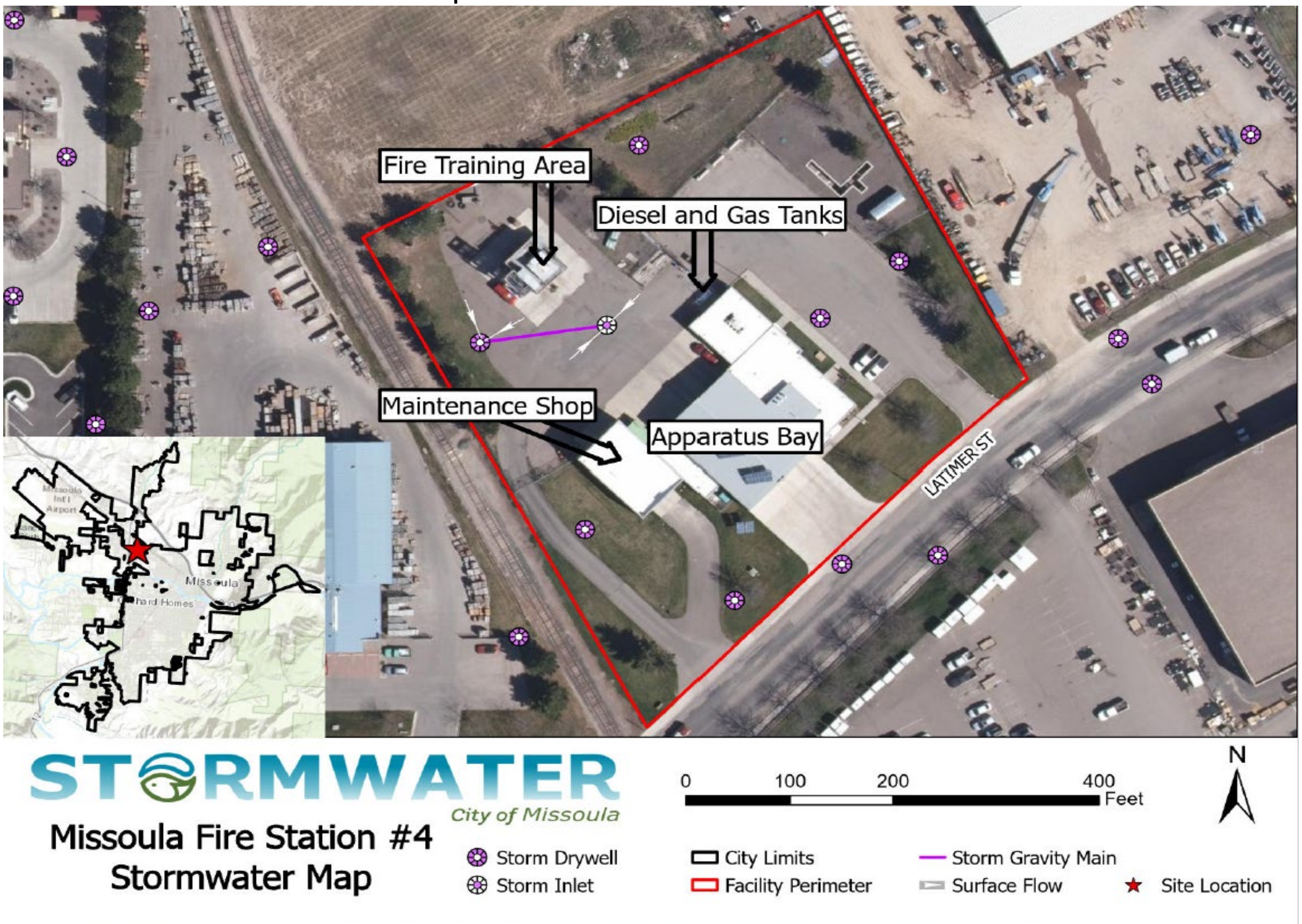
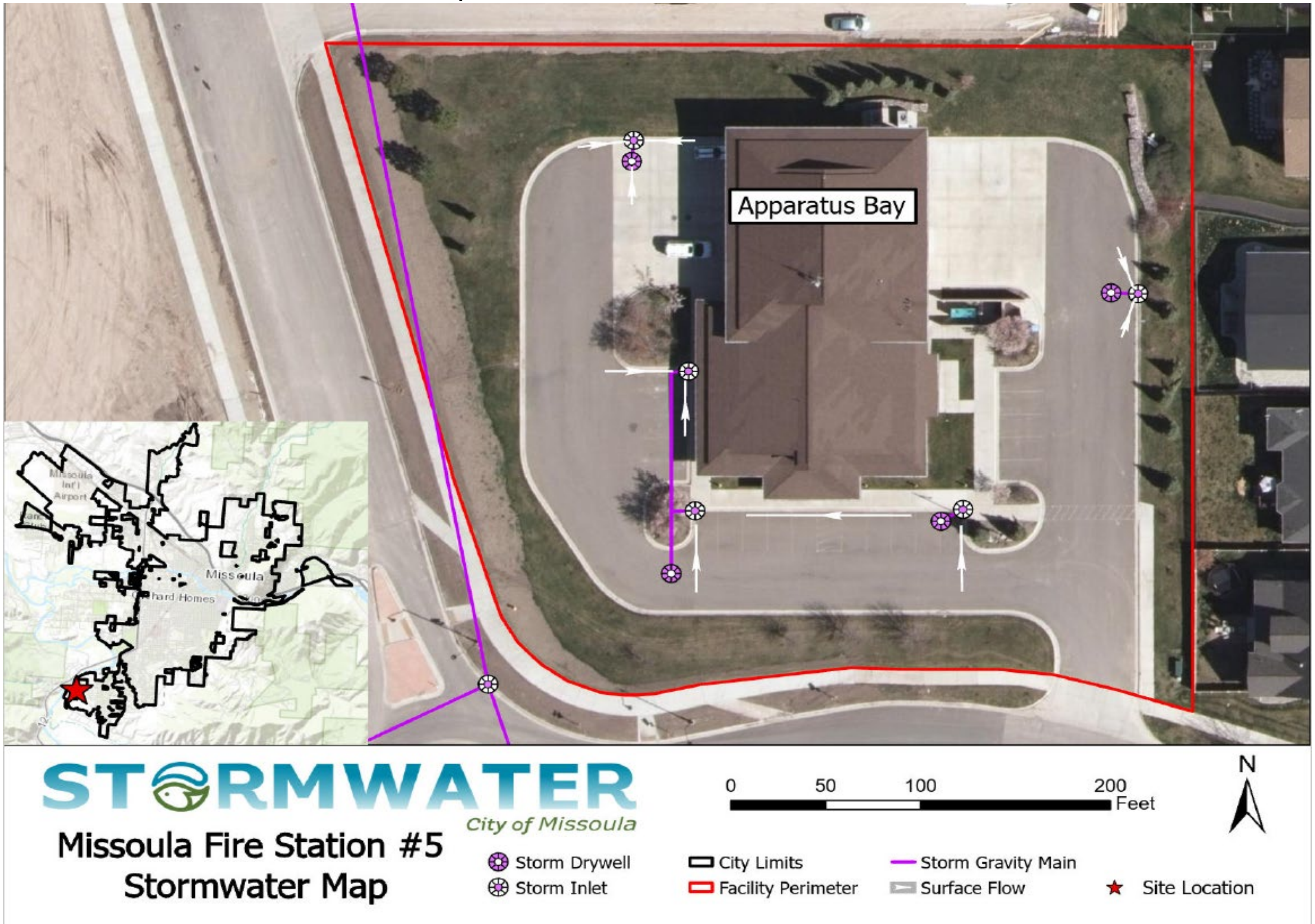


Figure 18. Missoula Fire Station #5 Stormwater Map



2.4 Shared Facilities

2.4.1 City Hall

City Hall consists of one main building that has three floors and multiple extensions (Figure 19). The basement has office spaces on the east side for the Community Planning, Development, & Innovation (CPDI) Department and the Missoula Planning Organization (MPO). On the west side of the basement, there is a police academy and gun range. There are three boiler rooms in the basement with floor drains that connect with the sewer. Also located in the basement, the Facilities Shop stores small amounts of cleaning chemicals and paint and is considered secondary containment. The main floor has more offices used by CPDI, the Police Department, and the Municipal Court. An air handling unit is located on the main floor in the air handler room, along with a deicer. The third floor of City Hall houses the Mayor's Office, the City Attorney's Office, the Human Resources Department, the Finance Department, and more offices for CPDI.

There are multiple condensers on the roof of City Hall that discharge condensation to roof drains that drain to the nearby stormwater infrastructure. In the main parking lot, two dumpsters are located where trash is collected and stored, in addition to a double-walled diesel generator. Near the southeast corner of the building, there is a sprinkler system drain that discharges directly to this area. On the north side of the building, there is a pipe that discharges chilled water from the air handler unit to grass cover near the front entrance. A combination of dry wells and inlets drain the surrounding area and parking lot. Floor dry is stored in various locations throughout, with one central spill kit recommended for the facility's use. Table 17 summarizes the facility activities, potential pollutants, and associated City departments. City Hall has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

1. Cover Dumpsters
    - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Facilities Services Maintenance Supervisor is responsible for implementing and maintaining this.
2. Spill kits
    - City Hall should have one central spill kit. Employees need to know where this spill kit is and how to use it properly. The Facilities Services Maintenance Supervisor is responsible for implementing and maintaining this.
3. Inspections
    - Weekly inspections of the facility, including the parking lots, should be performed by the Facilities Services Maintenance Supervisor. Leaks, spills, and other deficiencies should be identified and fixed.
4. Annual Review
    - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Facilities Services Maintenance Supervisor and the Stormwater Program Coordinator.

5. Employee Training
   - Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.
6. Pesticide and Fertilizer Application
   - While applying pesticides and/or fertilizers, the manufacture instructions for each specific product should be followed exactly (See Section 3.11 Park and Open Space Maintenance for details). Appropriate employees should maintain a valid Government Applicator license. The Trails and Parks Superintendent is responsible for implementing and maintaining this.

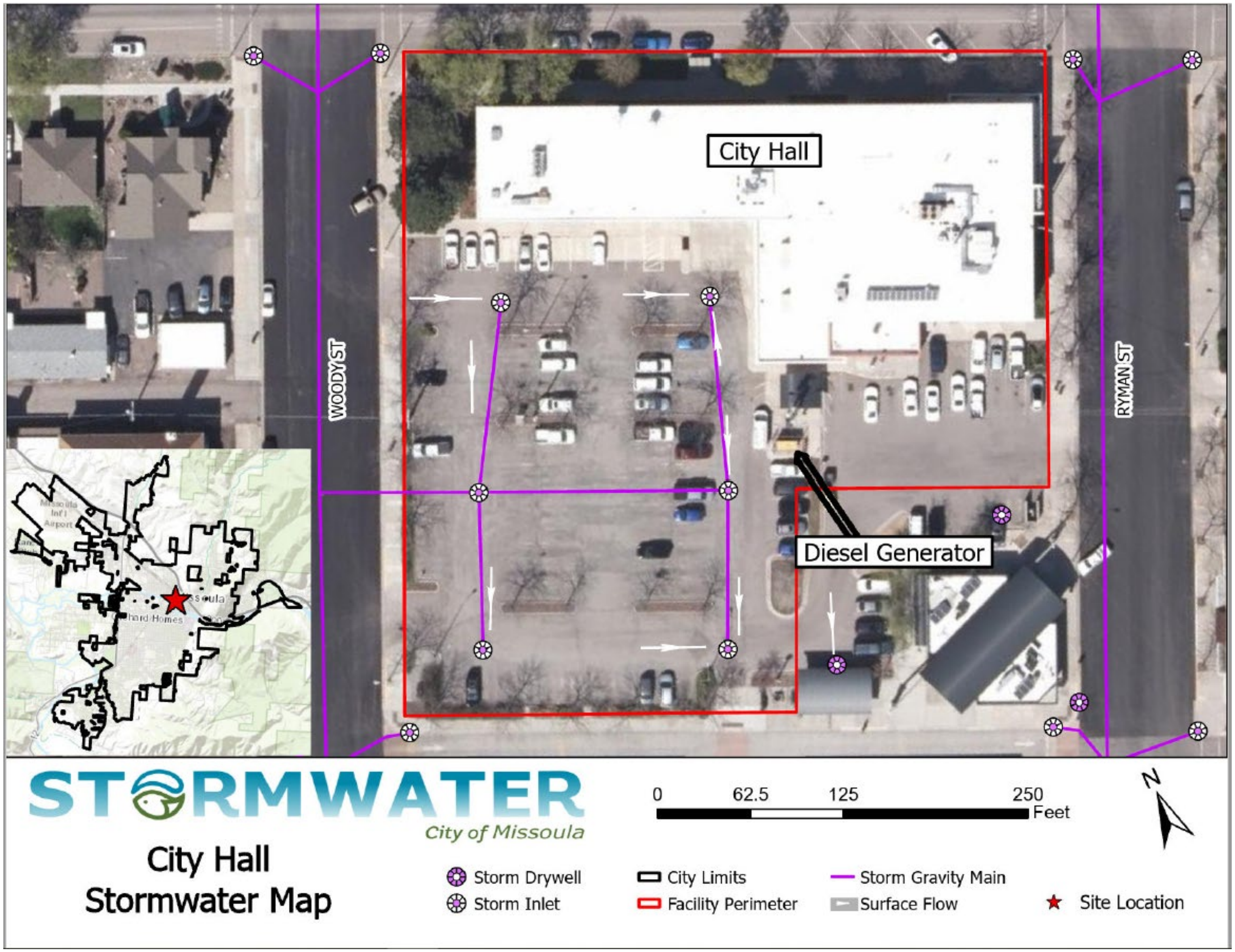
Table 17. City Hall potential pollutants and responsible City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	FS
Spill Prevention and Response						X		X	X	FS
Secondary Containment of Regulated Substances						X		X	X	FS
Parking Lot Maintenance	X		X	X		X	X		X	FS+S
Hazardous Material Management						X			X	FS
Landscape Maintenance	X	X			X		X	X		FS

[1]Best Management Practices (Described in Section 3)

[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Facilities Services (FS)

Figure 19. City Hall Stormwater Map



2.4.2 Ryman and Pine Buildings

The city utilizes three buildings that are directly northeast of the Ryman and Pine Street intersection (Figure 20). The first building has three addresses: (1) 412 Ryman, (2) 414 Ryman, and (3) 416 Ryman. This building has three floors, heated by a forced air furnace, and has roof drains that connect with the nearby stormwater infrastructure. The basement is used as an office storage space and has four floor drains that drain to the sewer. The main and top floor have office spaces for the Facility Maintenance Division and Municipal Court Department. The Mayor’s Conference Room is located on the main floor of this building. The 400 Ryman building has offices for the Information Technologies (IT) department and for Geographic Information Systems Services (GIS). This building has one main floor and is heated by a forced air furnace.

The 140 West Pine building houses Council Chambers and the Missoula Redevelopment Agency (MRA) on the main floor. The basement of this building is used as a document storage space and has a floor drain that drains to the sewer. The 140 West Pine building shares a roof with the 400 Ryman building with drains that connect with the nearby stormwater infrastructure. Table 18 summarizes the facility activities, potential pollutants, and associated City departments. The Ryman and Pine Buildings have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

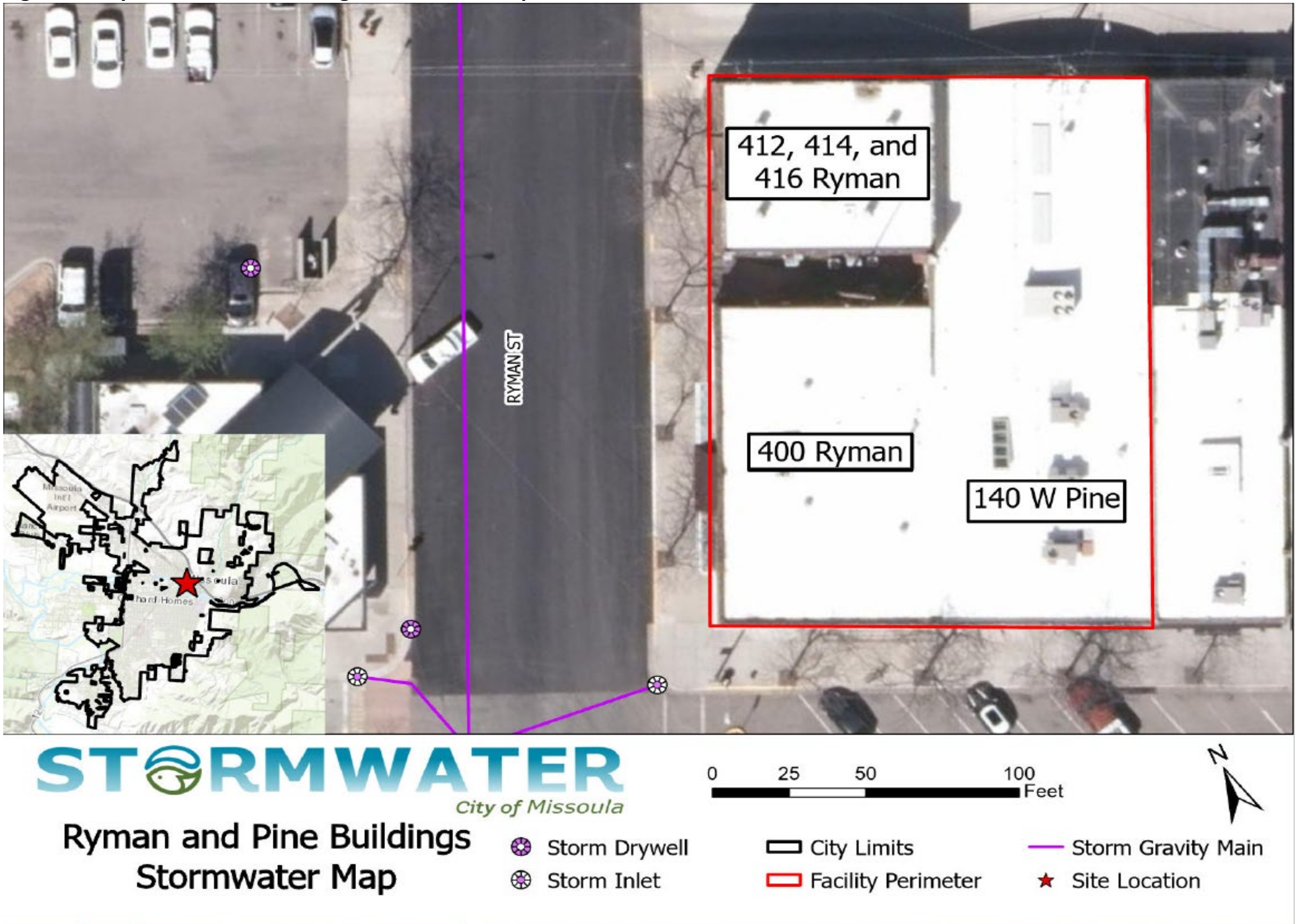
1. Cover Dumpsters
    7. All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Facilities Services Maintenance Supervisor is responsible for implementing and maintaining this.
2. Inspections
    8. Weekly inspections of the facility should be performed by the Facilities Services Maintenance Supervisor. Leaks, spills, and other deficiencies should be identified and fixed.
3. Annual Review
    9. The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Facilities Services Maintenance Supervisor and the Stormwater Program Coordinator.
4. Employee Training
    10. Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 18. Ryman and Pine Buildings potential pollutants and responsible City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	FS
Spill Prevention and Response						X		X	X	FS

[1]Best Management Practices (Described in Section 3)
[2]City of Missoula Facilities Services (FS)

Figure 20. Ryman and Pine Buildings Stormwater Map



2.4.3 Missoula Art Museum

The Missoula Art Museum is located at 335 Pattee Street and is supported by the City of Missoula and Missoula County. City of Missoula Facilities Services are responsible for maintaining this building (Figure 21). The building has three floors and is heated by a forced air furnace. The top two floors are reserved for art exhibits and the bottom floor is used for art storage. There is also a mechanical room in the basement. There is a generator on the roof. The roof drains to a gutter system that discharges to the parking lot directly west of the building, which flows to the alley way south of the building and then west to an inlet. There is a fire sprinkler outlet that drains to the alley directly south of the building. Trash is disposed of in two small garbage receptacles in the ally to the south of the building. Table 19 summarizes the facility activities, potential pollutants, and associated City departments. The Missoula Art Museums has the potential to pollute state waters. To prevent this pollution, the following best management practices should be implemented:

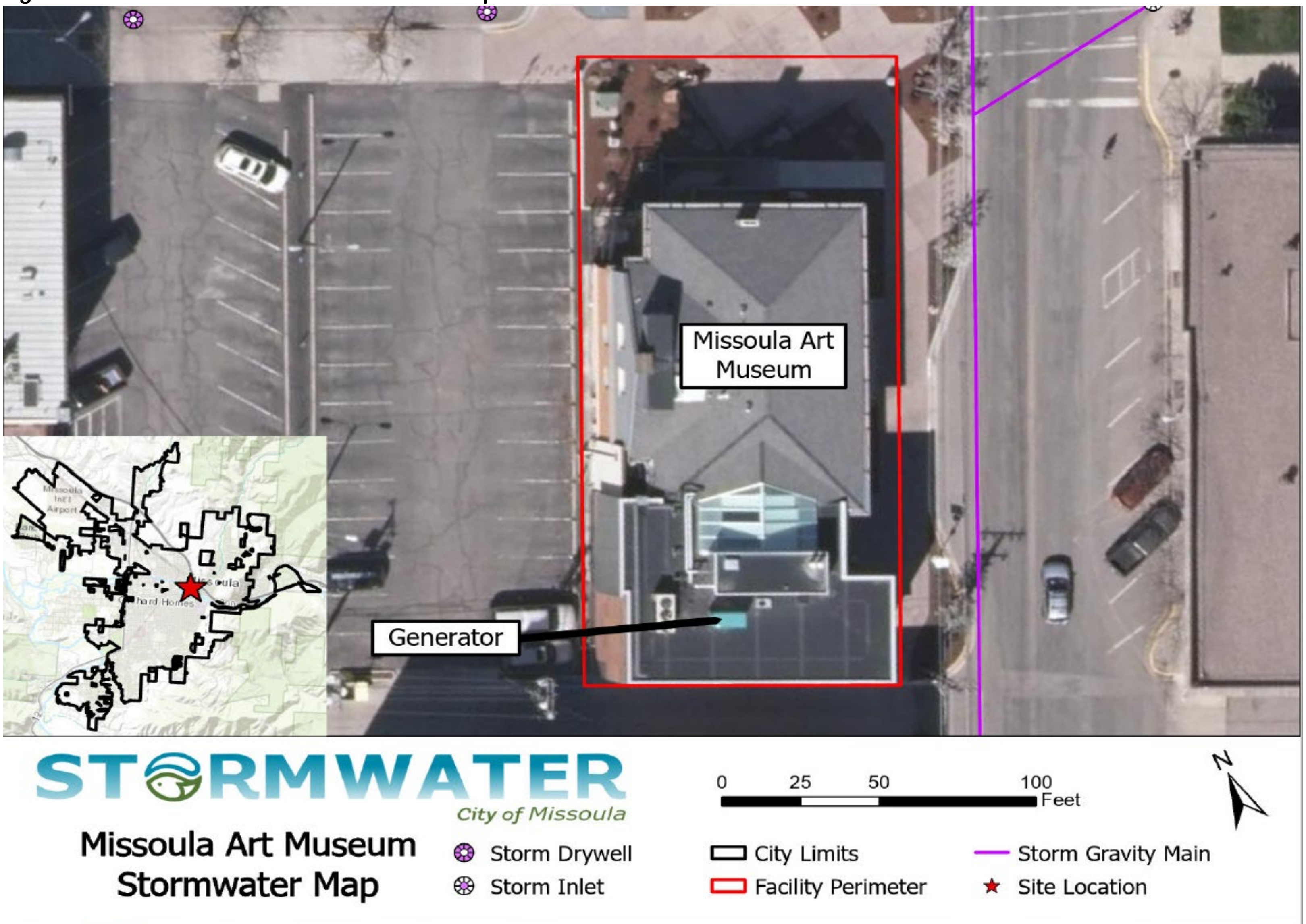
1. Cover Dumpsters
    - All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Facilities Services Maintenance Supervisor is responsible for implementing and maintaining this.
2. Pigeon Waste Management
    - Many pigeons currently live on the roof of the Missoula Art Museum. This is not only a health hazard to City employees who conduct maintenance on the roof, but it’s also a continual source of bacteria and excess nutrients in stormwater discharge. This problem needs to be solved with a multi-tiered approach. First, the pigeons need to be killed so they will not return. Next, the roof needs to be cleaned fully without washing pigeon waste down into the roof drain. Finally, anti-nesting equipment should be installed to prevent this from happening in the future.
3. Inspections
    - Weekly inspections of the facility should be performed by the Facilities Services Maintenance Supervisor. Leaks, spills, and other deficiencies should be identified and fixed.
4. Annual Review
    - The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Facilities Services Maintenance Supervisor and the Stormwater Program Coordinator.
5. Employee Training
    - Conduct annual employee training on municipal pollution prevention / best management practices for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 19. Missoula Art Museum potential pollutants and responsible City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair		X	X	X		X	X		X	FS
Spill Prevention and Response						X		X	X	FS

[1]Section 3 Best Management Practices (Described in Section 3)
[2]City of Missoula Facilities Services (FS)

Figure 21. Missoula Art Museum Stormwater Map



2.5 Police Department

2.5.1 Catlin Police Station

The Catlin Police Station is located at 109 North Catlin Street. This facility is comprised of two buildings. The main building has one floor with office spaces, briefing rooms, and evidence storage rooms. The second building is located directly west of the main building and is used for storage (Figure 22). Within the evidence storage area, there is a drug processing room where equipment/evidence is cleaned. This room drains to a catch basin that is sealed and does not drain to groundwater.

The building is heated and cooled by multiple forced air rooftop furnaces. There is a riser room that houses a water heater. The roof drains into pipes that connect with the dry wells in the parking lot used for Police Department vehicle storage. These dry wells are the sole means to drain the area. There is a double-walled diesel generator in the parking lot that runs every week for testing. Dumpsters are also in the front parking lot. Floor dry is stored in the facility, but one central spill kit is recommended. Table 20 summarizes the facility activities, potential pollutants, and associated City departments. The Catlin Police Station has multiple facility activities that have the potential to pollute state waters. To prevent this pollution, the following BMPs should be implemented:

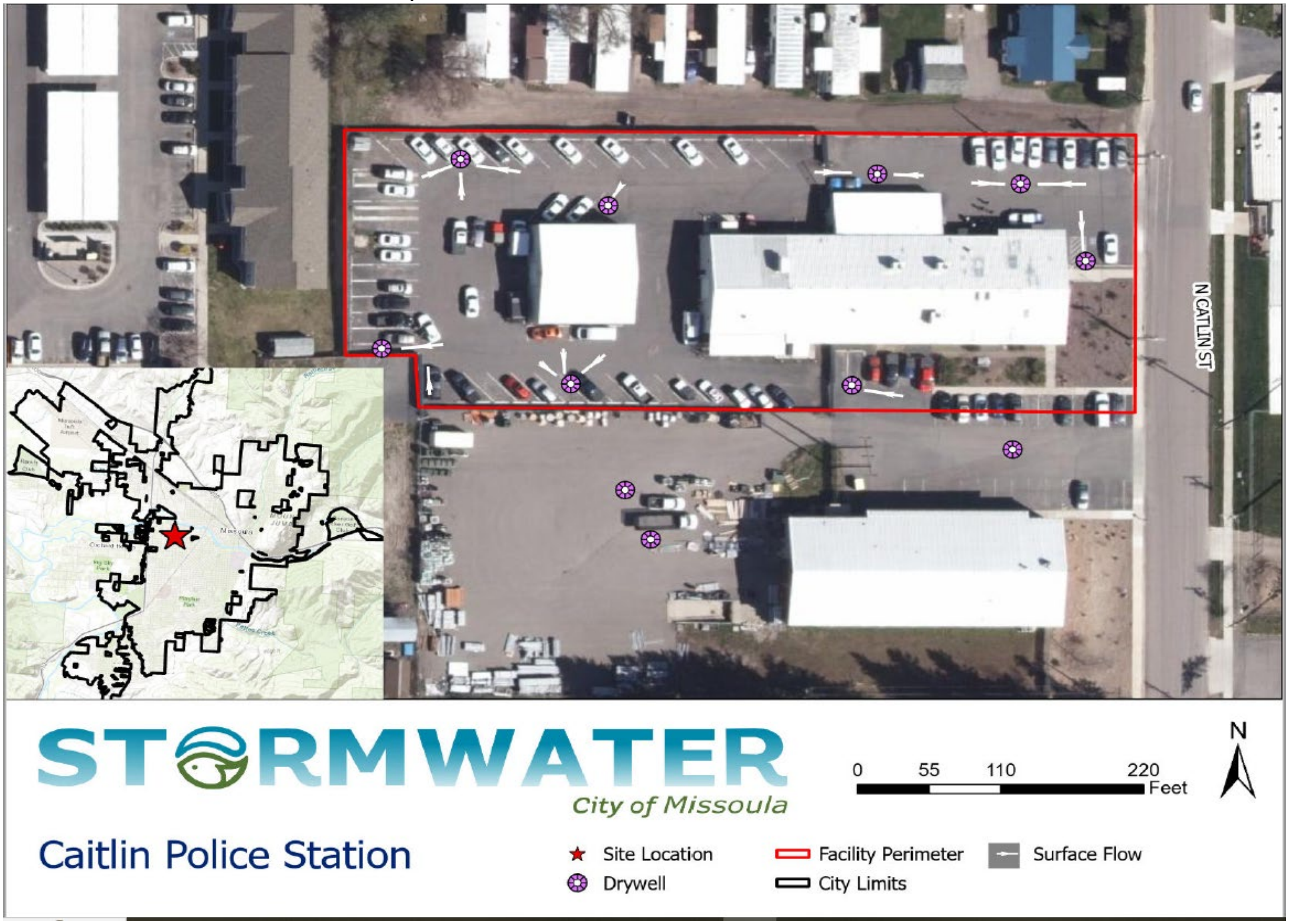
1. Cover Dumpsters
    11. All trash receptacles must be covered with leak proof lids to prevent stormwater from entering. The Facilities Services Maintenance Supervisor is responsible for implementing and maintaining this.
2. Spill kits
    12. The Catlin Police Station should have one central spill kit. Employees need to know where this spill kit is and how to use it properly. The Facilities Services Maintenance Supervisor is responsible for implementing and maintaining this.
3. Inspections
    13. Weekly inspections of the facility, including the parking lots, should be performed by the Facilities Services Maintenance Supervisor. Leaks, spills, and other deficiencies should be identified and fixed.
4. Annual Review
    14. The Standard Operations and Procedures Manual should be reviewed and updated annually. This should be done in collaboration with the Facilities Services Maintenance Supervisor and the Stormwater Program Coordinator.
5. Employee Training
    15. Conduct annual employee training on municipal pollution prevention/BMPs for facility activities. The Stormwater Program Specialist will be responsible for conducting this training.

Table 20. Catlin Police Station potential pollutants and responsible City departments

	Potential Pollutants									
Best Management Practices[1]	**Sediment**	**Nutrients**	**Trash**	**Metals**	**Bacteria**	**Oil, Grease, Hydrocarbons**	**Organics**	**Pesticides**	**Hazardous Waste**	**Department[2]**
Building Maintenance and Repair			X	X		X	X		X	FS
Spill Prevention and Response						X		X	X	FS
Secondary Containment of Regulated Substances						X		X	X	FS
Parking Lot Maintenance	X		X	X		X	X		X	FS+S
Hazardous Material Management						X			X	FS
Landscape Maintenance	X	X			X		X	X		FS

[1]Section 3 Best Management Practices
[2]City of Missoula Streets Operations & Maintenance Division (S), City of Missoula Facilities Services (FS)

Figure 22. Catlin Police Station Stormwater Map



3. Best Management Practices (BMPs)

The BMPs described below include procedures and activities municipalities perform to prevent or minimize pollutant discharge into state waters. BMPs seek to reduce or eliminate pollutants being added to runoff through analysis of pollutant sources, implementing proper handling and disposal practices, implementing regular maintenance schedules, employee education, and other actions.

In general, they are involved in keeping the municipal infrastructure clean and orderly, storing materials under a roof whenever possible, and handling materials and wastes in a manner that minimizes risk and potential pollutant runoff.

A variety of BMPs have been developed to reduce or eliminate runoff pollutants. These practices, and their applications, are summarized below.

3.1 Facility Yard Sweeping

Description
This applies to all facilities operated and leased by the City. Stormwater runoff from facility yards can be contaminated with hydrocarbons, solvents, suspended solids, heavy metals, waste debris, trash, and corrosive agents. Surface runoff water from yards contains pollutants that can wash into the stormwater system and eventually reach state waters. The Streets Deputy Public Works Director is responsible for implementing and maintaining facility yard sweeping.

Pollution Prevention Approach
- Educate employees
- Perform regular inspections of facilities
- Sweep facility yards weekly

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills promptly; keep spill kit nearby (See Section 3.5 for details).
3. Sweep Municipal Facility Yards weekly or more if needed to collect loose particles on paved surfaces.

3.2 Building Maintenance and Repair

Description of Pollutant Source
Stormwater runoff from building maintenance activities can be contaminated with hydrocarbons in solvents, suspended solids, heavy metals, waste debris, trash, and corrosive agents. Waste wash water from building cleaning activities contains pollutants that can wash into the stormwater system.

Pollution Prevention Approach
- Educate employees
- Perform regular inspections of facilities
- Sweep facility yards weekly
- Cover and/or contain the maintenance activity
- Convey waste wash water to sanitary sewer
- Store waste debris and trash in designated area or in solid waste container
- Recycle residual paint, solvents, lumber, and other material as much as possible
- Implement good housekeeping spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills promptly; keep spill kit nearby.
3. Choose cleaning agent that can be recycled.
4. Use non-toxic chemicals for maintenance when possible.
5. Cover dumpsters or keep them undercover to prevent the entry of stormwater. Replace or repair leaking garbage dumpsters. Keep dumpster lids closed.
6. Sweep paved area regularly to collect loose particles and wipe up spills with rags and other absorbent materials immediately; do not hose down the area to the stormwater system (See Section 3.5 for details).
7. Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward the stormwater system.

Pressure Washing of Buildings and Other Larger Objects
1. Cleaning methods other than pressure washing will be used when feasible. If pressure washing needs to be used the following practices will be followed: When the surrounding area is paved, use wastewater collection devices or filters that enable collection of wash water and associated solids. To collect runoff and loose materials, a sump pump and wet vacuum can be used. A filter can consist of filter fabric or a small mesh screen. When the surrounding area is grassed, runoff must be dispersed as sheet flow. The wash runoff must remain on the grass and not contact the stormwater system.

Painting
1. Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
2. Clean paintbrushes and tools covered with water-based paint in sinks connected to sanitary sewer. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinners, turpentine, etc.) for recycling or proper disposal.

Inspection
Facilities and storage areas are entered and inspected daily to ensure pollutants sources are contained and BMPs are in place.

3.3 Stormwater System Maintenance

Description
Stormwater conveyance systems collect and transport urban runoff that contains pollutants such as sediment, oils, metals, and nutrients. Routine cleaning and maintenance of storm utilities can prevent the discharge of pollutants that pose a threat to state waters. The Stormwater Program Specialist is responsible for implementing and maintaining stormwater system maintenance.

Pollution Prevention Approach
- Educate employees
- Perform regular inspections and cleaning of the stormwater system including inlets, gravity mains, dry wells, basins, and culverts.
- Implement a regular cleaning schedule of the stormwater system
- Implement good housekeeping and spill response methods (See Section 3.5 for details).
- Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

Best Management Practices
A stormwater system inspection and cleaning program will be developed and implemented to ensure the following goals:
1. All catch basins, drywells, and piped conveyance are cleaned and/or inspected once every 10 years.
2. Catch basins, storm inlets, and other conveyance structures in high pollutant load areas are identified.
3. Dry wells are cleaned before they are 40% full.
4. During routine maintenance and inspection, staff will note the following:
   a. Note the condition and identify areas that need repair or maintenance.
   b. Note evidence of illegal discharge or illicit connections and report signs to supervision:
      i. Is there evidence of spills such as paint, discoloring, etc.?
      ii. Are there any odors associated with the stormwater system?
      iii. Is there evidence of an oil sheen?

Asphalt and Concrete Cutting
1. When feasible, install storm drainage inlet protection prior to starting saw cutting activity within the project area.
2. Spray water on saw during cutting activity to minimize dust.
3. Clean up excess slurry left on curb, gutter, and street. Dispose of in waste stockpile or solid waste container.
4. Remove protection from storm inlets immediately after project site is swept.

Excavation and Stockpiling
1. Know the project site's runoff patterns and the immediate stormwater system.
2. If required, install storm drain inlet protection prior to excavation.
3. Place excavated material in a location that will not impact the stormwater system.
4. If excavated material is placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
5. If the excavated material will not be used for backfilling, haul as much of the material away without

storing in the right of way.

6. Sweep the project site the day the project is complete. If a sweeper cannot be obtained, use hand brooms and shovels. Clean up excess material left in curb, gutter, boulevard, and street.
7. Remove protection from storm inlets immediately after project site is swept.

3.4 Sanitary Sewer Field Operations

Description

Operations and maintenance of sanitary sewer utilities can result in the discharge of pollutants that can pose a threat to state waters. The Collections Superintendent is responsible for implementing and maintaining the following BMPs for sanitary sewer field operations.

Pollution Prevention Approach

- Educate employees
- Implement a regular cleaning schedule of the sewer lines.
- Educate employees
- Implement good housekeeping and spill response methods.

Best Management Practices

1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (See Section 3.5 for details).

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Sanitary Sewer Maintenance:

1. Clean sewer lines on a regular basis to remove grease, grit, and other debris that may lead to sewer backups.
2. During routine maintenance and inspections note the condition of the sanitary sewer and identify areas that need repairs or maintenance.
3. Dispose of sanitary sewer at the Wastewater Treatment Plant.

Sanitary Sewer Spills:

1. When spills, leaks, or overflows occur in a disinfected sewage-contaminated area, take every effort to ensure that the sewage, disinfectant, and the sewage-treated disinfectant are not discharged to the stormwater system. Methods include:
    a. Blocking storm inlets and catch basins.
    b. Containing and diverting sewage and disinfectant away from stormwater systems (examples include sandbags, booms, etc.).

Inspection:

Conduct inspections of the project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system. Inspections will be performed by designated City personnel.

3.5 Spill Prevention and Response

Description
Spills and leaks, if not properly controlled, can adversely impact state waters. Due to the type of work or the material involved, many activities that occur either at a municipal facility or as a part of municipal field activities have the potential for accidental spills and leaks.
In the event of a spill, depending upon the volume and characteristic of the material released, it will warrant a Minor Spill Response or a Major Spill Response. The Stormwater Program Specialist is responsible for organizing annual municipal training for all City employees on spill prevention, response, and containment procedures.

Spill Prevention
1. If possible, move material handling indoors, under cover, or away from stormwater systems.
2. Properly label all containers so that the containers are easily identifiable.
3. Berm storage areas so that if a spill or leak occur, the material is contained.
4. Cover outside storage areas either with a permanent structure or with a seasonal one such as a tarp so that rain cannot come into contact with the materials.
5. Check containers often for leaks and spills. Replace containers that are leaking, corroded, or otherwise deteriorating with containers in good condition. Collect all spilled liquids and properly dispose of them.
6. Store, contain, and transfer liquid material in such a manner that if the container is ruptured or the contents spilled, they will not discharge or be washed into the stormwater system, surface waters, or groundwater.
7. Place drip pans or absorbent material beneath all mounted taps and at all potential drip and soil locations during the filling and unloading of containers.
8. For field programs, only transport the minimum amount of material needed for the daily activities.
9. Any regulated substance stored at or above its threshold quantity needs to have secondary containment (see Section 3.6 for details).
10. Know the location of the spill kits and replace any materials that have been used.

Minor Spill
A minor spill is defined as one that poses no significant threat to human health or the environment. These spills involve less than 5 gallons and can usually be cleaned up by City personnel. Other characteristics of a minor spill include:
- The spilled material is easily stopped or controlled at the time of the spill
- The spill is localized
- The spilled material will not reach surface, groundwater, or any stormwater infrastructure
- There is little danger to human health
- There is little danger of explosion

Procedure
The following procedures will be used in response to a minor spill:
1. The facility superintendent or senior on-site employee will be notified of the spill.
2. If necessary, the spill will be physically contained to prevent further migration from the facility or project site.

3. The spill will be cleaned up using absorbent material or rags. Absorbent material will be stored at a spill kit location.
4. Brooms or a shovel will be used for the general cleaning of dry materials.
5. Place used absorbent material in dumpsters only once they have dried out. Do not place absorbent material in dumpsters if they are still soaked with the spilled substance.
6. The spill should be reported to the Missoula Valley Water Quality District if the release is over 25 gallons or if any amount of regulated substance reaches stormwater infrastructure or state waters.

Major Spill

A major spill is defined as one involving a spill that cannot be safely and/or adequately controlled, or cleaned up by on-site personnel. Characteristics of a major spill include:

- The spill is large enough to spread beyond the immediate area
- The spill material has a high likelihood of entering surface water, groundwater, or any stormwater infrastructure (regardless of the size)
- The spill requires special training and equipment to cleanup
- The spill material is a threat to human health
- There is a danger of fire or explosion

Procedure

The following procedures will be used in response to major spills:

1. If the spilled material is a threat to human health, all workers shall immediately evacuate the spill site to a safe distance away from the spill.
2. The facility superintendent or senior on-site employee will be notified of the spill and details regarding the spill. If the superintendent or senior on-site employee is not immediately available, 911 should be called.
3. If necessary, the superintendent will contact the Fire Department to notify the Hazardous Response Team.
4. If necessary, the superintendent will coordinate cleanup with the Hazardous Response Team.
5. The spill should be reported to the Missoula Valley Water Quality District if the release is over 25 gallons or if any amount of regulated substance reaches stormwater infrastructure or state waters.

Emergency Telephone Numbers	
Contact	**Phone Number**
Fire Department	911
Police Department	911
Missoula Valley Water Quality District	406-258-4890

3.6 Secondary Containment of Regulated Substances

Description

A regulated substance is any liquid substance, semi-liquid substance, or soluble solid on the most current Superfund Amendments and Reauthorization Act (SARA), Title III List of Lists published by the Office of Pollution Prevention and Toxic Substances, U.S. Environmental Protection Agency, Washington D.C., any petroleum product, any hazardous waste, or any other substances that may threaten contamination of the Missoula Valley Aquifer, excluding substances used for personal household use. If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment. The following quantities of regulated substances (excluding products in vehicle fuel tanks, aerosol spray cans, products used for research at educational institution laboratories, and substances sold for retail in a container equal to or less than 5 gallons capacity) handled at a facility at any one time, regardless of location, number of containers, or method of storage, shall constitute the Threshold Quantity:

a.) For those Regulated Substances specifically listed in the Superfund Amendments and Reauthorization Act (SARA) Title III List of Lists and for those Regulated Substances which are listed hazardous waste defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be the reportable quantity published in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 40 CFR 302, Table 302.4 or the Superfund Amendments and Reauthorization Act (SARA) Section 355, Appendix A.

b.) For those Regulated Substances that are characteristic hazardous wastes defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be based on the substance contained in the waste with the lowest threshold quantity.

c.) For those Regulated Substances not listed in the Superfund Amendments and Reauthorization Act Title III List of Lists, and for those Regulated Substances that are not a hazardous waste, the following quantities of qualifying substances at a facility at any one time shall constitute a Threshold Quantity:

(i) Waste oil – 1000 pounds or 100 gallons.
(ii) Gasoline – 250 pounds or 25 gallons
(iii) Diesel/Jet Fuel/Kerosene – 500 pounds or 50 gallons
(iv) New Motor Oil – 2,000 pounds or 200 gallons

d.) For those substances that are mixtures of one or more Regulated Substance, the threshold quantity shall be based on the substance contained in the mixture with the lowest threshold quantity.

Pollution Prevention Approach

- Employee education
- Regular inspections
- Proper design, implementation, and maintenance of secondary containment

Best Management Practices

1. All regulated substances stored at or above their threshold quantities need secondary containment.
2. Secondary containment must be external to and separate from the primary container adequate to prevent the release of Regulated Substances to native soil, surface water, or groundwater. The secondary containment structure or cell must:
   a.) Be non-reactive and resistant to the materials contained

b.) Prevent infiltration of any Regulated Substance into the ground in the event of a release from the primary storage container
c.) Isolate the Regulated Substance from soils, injection wells, floor drains, or any other potential surface and groundwater entry point
d.) Contain at least 110% of the volume of the largest container, or 10% of the aggregate volume of all containers, whichever is greater
A covered building or structure may fulfill the secondary containment requirements provided the building or structure has an impermeable floor and walls and the release of a Regulated Substance would remain in the building or structure.

3. All secondary containment structures should be inspected at least monthly. Leaks and other deficiencies should be fixed immediately after they are discovered.

3.7 Tree Removal

Description
Tree removal field activities that have the potential to pollute stormwater consists of excavating and stockpiling, stump grinding, and managing tree waste.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Do not hose down the area to the stormwater system.
3. Clean up the site by the end of each day, including removal of debris material, branches, wood chips and pieces, and remediate any disturbed areas.
4. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system.

Stump Grinding
1. The stump grinder creates large amounts of small wood chips. Sweep the project site the day the project is complete. If a sweeper cannot be obtained use hand brooms and shovels. Clean up excess material left in curb, gutter, boulevard, and street.
2. Remediate areas disturbed by the stump grinder.
3. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly. Report large spills to the supervisor.

Excavation and Stockpiling
1. Know the site's stormwater system. If required, cover storm inlets with inlet protection prior to excavation.
2. Place excavated material in a location that will not impact the stormwater system.
3. If excavated material is placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
4. If the excavated material will not be used for backfilling, haul as much of the material away without storing in the right of way.
5. Sweep the project site the day the project is complete. If a sweeper cannot be obtained use hand brooms and shovels. Clean up excess material left in the curb, gutter, boulevard, and street.
6. Remove filter fabric from storm inlets immediately after project site is swept.

Inspection
Conduct inspections of the project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system. Inspections will be performed by designated City personnel.

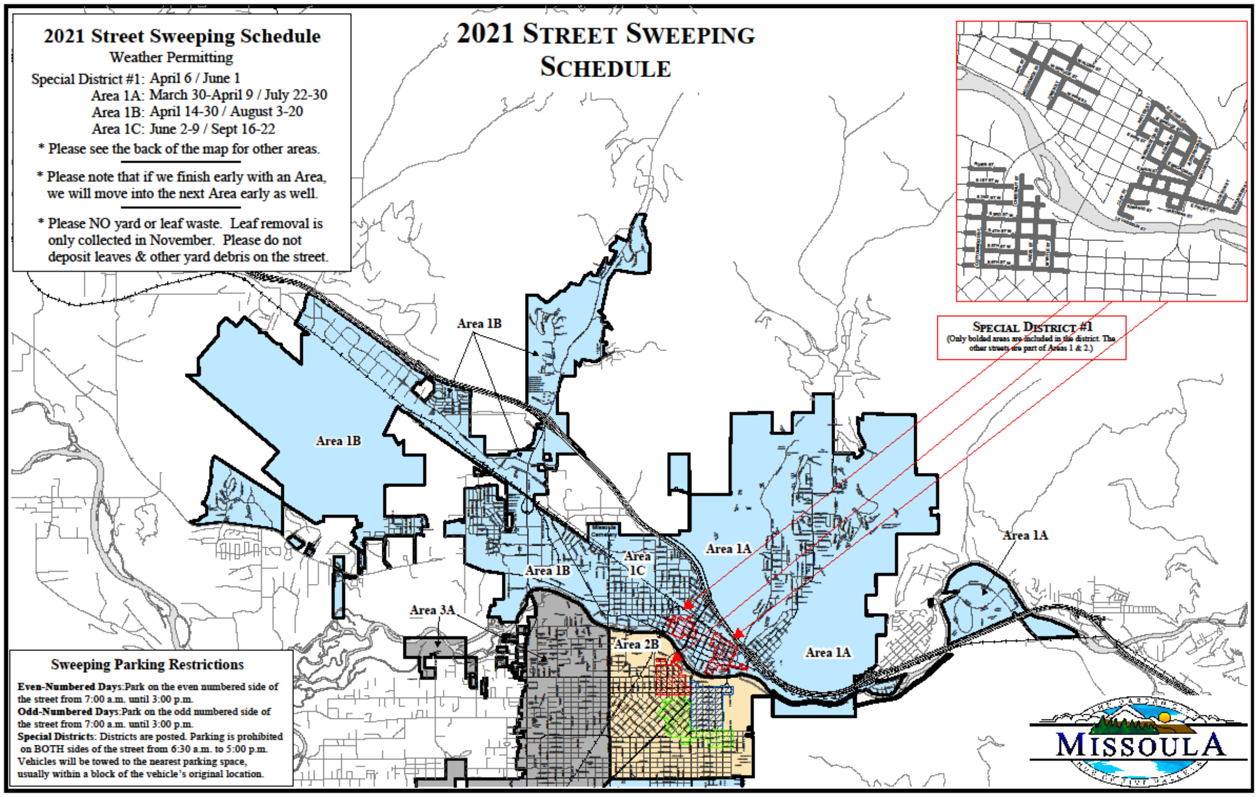
3.8 Street Sweeping

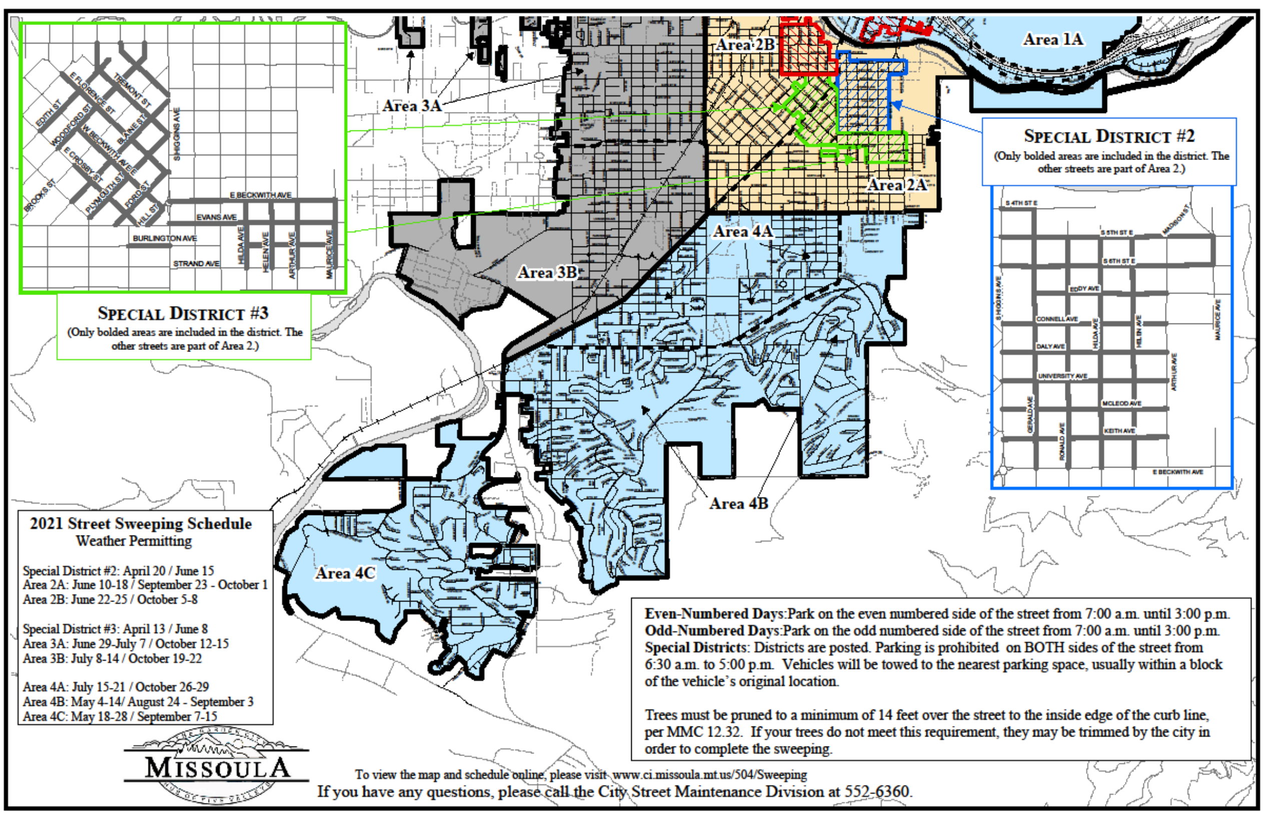
Description
Pollutants from the roads and streets of Missoula discharge to state waters. Routine street sweeping can reduce this by collecting and containing sediments, oil and grease waste, organics, and metals. The Street Operations & Maintenance Division's sweeping program runs annually from April through August (Figure 23). Residential streets within the City are swept two times per year, and commercial downtown streets are swept once a week. Winter street cleaning occurs when temperatures rise above 32 degrees. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.

Pollution Prevention Approach
- Employee education
- Maintain regular sweeping schedule of streets

Best Management Practices
1. Missoula streets are swept on a routine basis.
2. After snow melt, streets are swept more often to collect winter sanding material.
3. Routine sweeping practices include the following:
   a) Operating sweeper to get optimal debris removal. This includes adjusting sweeper speed, brush alignment, and sweeping pattern.
   b) If a certain section of the stormwater system is routinely plugged or polluted, schedule additional sweeping in that area.
   c) Schedule sweeping immediately after street repairs and utility projects.
   d) Schedule sweeping immediately after special events like street fairs, art shows, and parades.

Figure 23. Street Sweeping Schedule





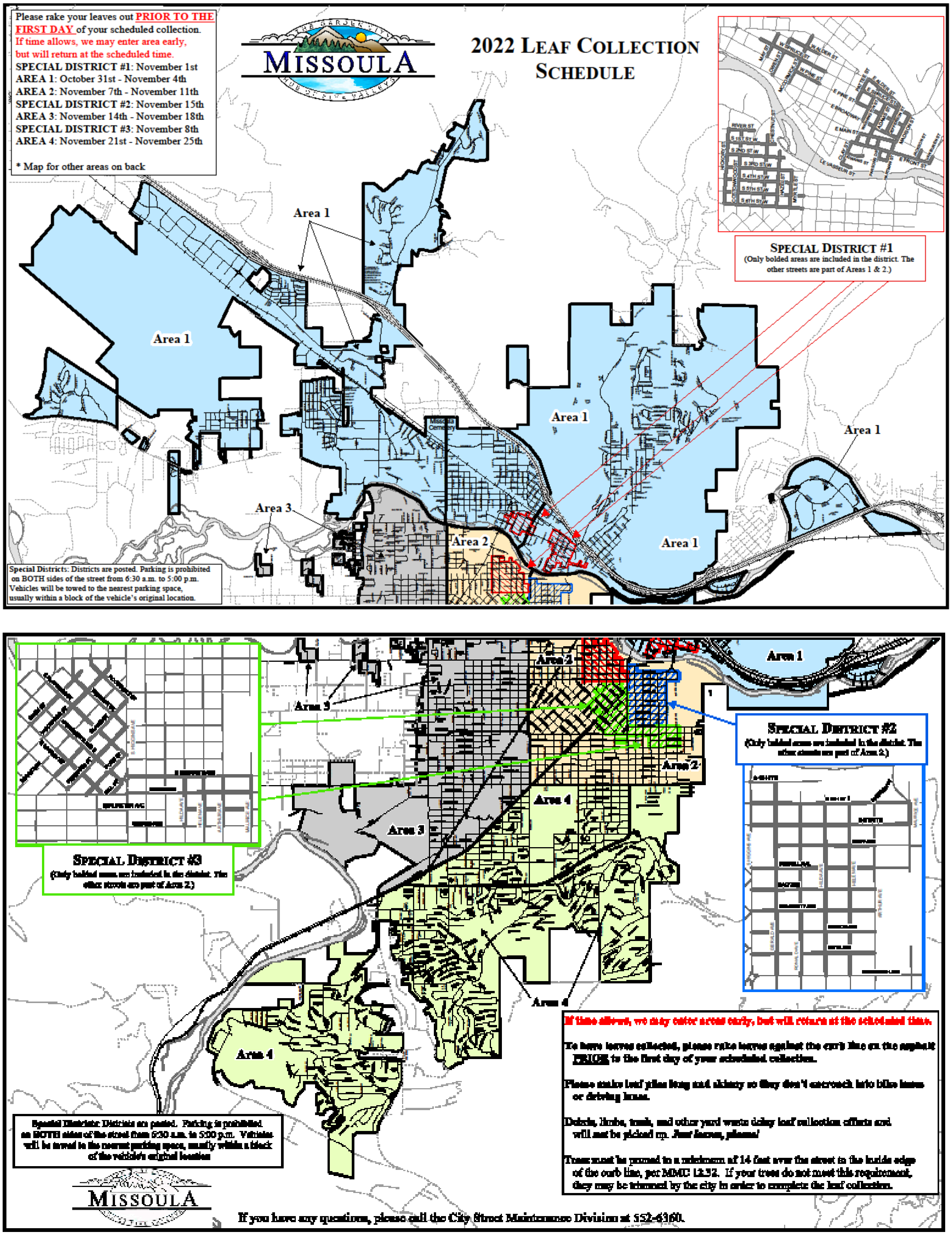
3.9 Leaf Collection

Description
Fall leaves are a significant source of pollution in stormwater discharges. Leaf collection removes leaves and debris which contain nutrients and organics that are transported by stormwater runoff to state waters. In fall, the Missoula Street Operations & Maintenance Division goes down every street in Missoula with loaders and dump trucks to pick up leaves (Figure 24). The leaves are then delivered to Garden City Compost. If the air temperature is above 32 degrees, a street sweeper follows the leaf collection truck. The Streets Deputy Public Works Director is responsible for implementing and maintaining this.

Pollution Prevention Approach
- Employee education
- Maintain regular sweeping schedule of streets

Best Management Practices
1. Leaves are removed from streets and roads within the City and delivered to Garden City Compost.
2. Public service announcements are sent to inform Missoula citizens of the correct leaf collection method.

Figure 24. Leaf Collection Schedule



3.10 Illicit Discharge Management

Description of Pollutant Source

Discharges into storm conveyance systems often include wastes and wastewater from non-storm sources. A portion of these dry weather flows are from illicit and/or inappropriate discharges and connections to the storm conveyance systems. Illicit discharges enter the system through either direct connection (e.g., wastewater piping either mistakenly or deliberately connected to the stormwater system), or indirect connection (e.g., infiltration into the stormwater system from cracked sanitary systems, spills collected by storm inlets, paint or used oil dumped directly into a storm inlet). The results are untreated discharges that contribute high levels of pollutants, including heavy metals, toxins, oil and grease, solvents, nutrients, viruses, and bacteria to receiving water bodies. The Stormwater Program Specialist is responsible for implementing and maintaining the illicit discharge management program.

Pollution Prevention Approach

- Employee education
- Report, investigate, and eliminate illicit discharge
- Routinely test stormwater discharges from high priority outfalls for pollutants

Best Management Practices

1. Illicit discharge education is provided to staff yearly.
2. Regular testing is conducted at stormwater outfalls to screen for illicit discharge.

3.11 Park and Open Space Maintenance

Description
Stormwater runoff from grounds maintenance activities can be contaminated with hydrocarbons, suspended solids, heavy metals, oils and grease, trash, and nutrients.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Encourage proper landscaping and pest management techniques
- Encourage proper onsite reuse and recycling of yard waste material
- Dry cleanup methods
- Implement good housekeeping spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills promptly; keep spill kit nearby (see Section 3.5 for details).
3. Use less toxic chemicals for maintenance when possible.
4. Sweep paved areas regularly to collect loose particles and wipe up spills with rags and other absorbent materials immediately; do not hose down the area to the stormwater system.
5. Do not dump any toxic substance or liquid waste on the pavement, the ground, or towards the stormwater system.
6. Maintain solid waste containers. Empty on-site solid waste containers weekly. Do not over fill the container capacity.
7. Use Bioplus lubricant when operating machinery close to a water body.
8. Pick up and dispose of debris and trash around at the facility.
9. Inspect parking lots regularly for signs of leaking vehicles. Fix vehicle leaks promptly.

Landscaping Management Activities
1. Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters.
2. Dispose of grass clippings, leaves, sticks or other collected vegetation as garbage or compost. Do not dispose of collected vegetation into waterways, stormwater systems, or onto any impervious surface.
3. Check irrigation schedule so chemicals will not be washed away and to minimize non-stormwater discharge.
4. Check the weather forecast; do not apply chemicals within 24 hours of a rain event.
5. Use mulch or other erosion control measures when soils are exposed.
6. Place temporary stockpile material away from any waterbodies and the stormwater system. Install a berm around stockpiles or cover stockpiles to prevent release to the stormwater system.
7. Use hand or mechanical weeding where practical.

Fertilizer and Pesticide Management
1. Follow manufacturer's recommendations and label directions.
2. Do not apply pesticide or fertilizers within 10 feet of surface waters.
3. Do not apply pesticides or fertilizers within 24 hours of a rain event.
4. Calibrate fertilizer distributors to avoid excessive application.
5. Apply pesticides only when wind speed in the area is low.

6. Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
7. Irrigate slowly to prevent runoff.
8. Dispose of empty pesticide containers according to the instructions on the container label.

Parking Lot Management

1. Keep the parking areas clean and orderly. Remove debris in a timely fashion.
2. Use dry cleaning methods such as sweeping and vacuuming to prevent pollutants from entering the stormwater conveyance system.
3. Sweep all parking lots before the spring wet season and prior to winter snow.
4. When cleaning heavy oily deposits, use absorbent materials prior to sweeping. Dispose of used absorbent material in a solid waste container.

Inspection

Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.12 Solid Waste Handling and Disposal

Description
Improper storage and handling of solid waste can allow toxic compounds, oils and grease, heavy metals, nutrients, suspended solids, trash, and other pollutants to enter the stormwater system.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Cover storage containers
- Store waste debris and trash in designated area or in solid waste container
- Recycle materials whenever possible
- Implement good housekeeping spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills promptly; keep spill kit nearby.
3. Cover storage containers with leak proof lids, cover all waste piles and use a berm when required to prevent runoff into stormwater systems.
4. Inspect storage container for leaks and replace any that are leaking, corroded, or otherwise deteriorated.
5. Sweep and clean the storage area regularly. Do not hose down the area to the stormwater system.
6. Dispose of rinse and wash water from cleaning waste containers into sanitary sewer. Do not discharge waste wash water to the street or the stormwater system.
7. Take special care when loading or unloading waste to minimize losses. Pick up fallen waste and place in waste container.
8. Provide enough solid waste containers for the facility.
9. Keep waste collection areas clean by sweeping and cleaning up spills immediately.
10. Do not fill waste container with washout water or any other liquid.
11. Place solid waste containers in areas that do not directly drain into the stormwater system.
12. Prohibit littering by workers and visitors.
13. Do not allow trash containers to overflow.

Inspection
Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.13 Equipment Fueling

Description
Fueling over the Missoula Valley Aquifer presents significant risk to the environment. Some toxic components of fuel are highly mobile in the environment. 'Drive-offs' with hoses still inserted into tanks can happen. Large releases can also occur during transfer of fuel from a fuel tanker to an underground storage tank (UST). Stormwater dry wells located nearby can deliver spilled fuel to the groundwater which is the sole source of Missoula's drinking water. Some storm inlets are piped to outfalls that discharge directly into nearby state waters and a spill can heavily impact that water body. Dry wells drain directly to the Missoula Valley Aquifer which is also at risk from fueling spills.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Designated onsite equipment fueling locations
- Implement good housekeeping spill response methods

Fueling Area Design
1. Above ground storage tanks must meet minimum BMPs described in the secondary containment section of the Missoula Valley Water Quality District BMP Manual (pg.24).
2. Sites with underground storage tanks are required to comply with all DEQ UST requirements.
3. Design stormwater collection such that stormwater does not discharge directly to the stormwater system from the vehicle fueling area, aboveground storage tank (AST) filling area, or tank fueling area (if applicable).
4. Provide fueling island(s) with a fueling pad. Drainage on the fueling pad must be directed to a sealed vault or through a sand and oil separator and into a properly maintained vegetated swale or retention pond. Design must prevent stormwater run-on and run-off.
5. Design stormwater collection system to allow vaults and sand and oil separators to operate at full capacity during storm events (e.g. canopies, tank sizing, etc.).
6. Install breakaway hoses and nozzles on fuel dispensers.
7. Incorporate automatic pump shut-off thresholds to prevent fuel releases during drive-offs.

Best Management Practices
1. Keep sufficient absorbent materials (e.g. Oil-Dri, absorbent pads, absorbent booms, etc.) on-site and in a location convenient for staff access.
2. Absorb small spills and overfills with absorbent (Oil-Dri, kitty-litter, etc.) by working the granules into the spill and then sweeping them up immediately and disposing of properly.
3. When fueling in the field, always put fuel cans in secondary containment and refill equipment over the secondary containment to prevent drips from hitting the ground.
4. Train staff and maintain protocols for responding to small and large spills
5. If equipped with a fueling pad, self-inspect the pad to check for containment of stormwater brought onto the pad with vehicles or by wind. Also check for blockages to gutters and cover drains to allow unobstructed flow through the system. Periodically test for water tightness of all components, pipe perforations, and piping joints.
6. Do not top off any fuel tanks.
7. Always provide secondary containment for fuel cans (see Section 3.6 for details).

8. If equipped with ASTs, periodically self-inspect AST integrity (e.g. record gauge readings or dip the interstitial space in an above ground double-walled tank).
9. Know the project site's runoff patterns and the immediate stormwater system.
10. Sweep and clean the storage area regularly. Do not hose down the spill area or absorbent material into the stormwater system.
11. Routinely inspect vehicles for leaks and fix them immediately upon discovery.

Inspection

Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.14 Equipment Maintenance and Repair

Description

Equipment maintenance and repair is a significant source of stormwater pollution due to the wastes created that are harmful to humans and the environment. Pollutant sources include parts cleaning, spill/leaks of equipment liquids, replacement of fluids, equipment washing, and outdoor storage of batteries.

Pollution Prevention Approach

- Employee education
- Facility inspections
- Designated on-site equipment maintenance locations
- Recycle used motor oil, diesel oil, other maintenance liquids, and batteries
- Control leaks and spills using good housekeeping spill response, cover, and containment practices

Best Management Practices

1. Place any toxic liquid containers in secondary containment.
2. Know the project site's runoff patterns and the immediate stormwater system.
3. Perform equipment maintenance inside when possible.
4. Do not perform maintenance and repair activities directly over or next to a stormwater system.
5. Designate a location for equipment maintenance and repair to take place. The location should not have any connection to the stormwater system or direct connection to the sanitary sewer. The area should allow for easy cleanup of drips and spills and be under a cover whenever feasible.
6. Store idle equipment containing fluids under a cover.
7. Do not pour materials into the stormwater system or hose work areas; use dry absorbent and sweeping.

Material and Waste Handling

1. Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separated.
2. Do not dispose of oil and gas filters in trash cans or dumpsters. Drain excess oil before disposal. Oil filters can be recycled.
3. Store cracked or dead batteries in a non-leaking covered secondary container and recycle.

Maintenance and Repair Activities

1. Provide a designated area for equipment maintenance.
2. If temporary work is being conducted outside: Use a tarp, ground cloth, or drip pans beneath the equipment to capture all spills and drips. The collected drips and spills must be disposed, reused or recycled properly. If possible, perform all fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills. Keep a drip pan underneath equipment that might leak while work is being performed. Promptly transfer used fluids to the proper waste or recycle drums.
3. If equipment is being stored outdoors, oil and other fluids should be drained first.
4. Monitor equipment closely for leaks and place pans under any leak to collect the fluids for proper disposal or recycling.

5. Do not mix dissimilar or incompatible waste liquids stored for recycling.

Parts Cleaning

1. Clean vehicle parts without using liquid cleaners whenever possible to reduce waste.
2. Perform all liquid cleaning at a central designated station so the solvent and residual stay in one place.

Inspection

Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.15 Parking Lot Maintenance

Description of Pollutant Source

Vehicle parking and storage areas can contribute pollutants to the stormwater system such as trash, suspended solids, hydrocarbons, oils and grease, and heavy metals. Spills and leaks that occur are collected in the runoff and transported to the stormwater system.

Pollution Prevention Approach

- Employee education
- Facility inspections
- Implement good housekeeping spill response methods

Best Management Practices

1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (See Section 3.5 for details).
3. Sweep and clean the storage area regularly. Do not hose down the spill area or absorbent material into the stormwater system.
4. Routinely inspect vehicles for leaks and fix them immediately upon discovery.
5. If equipment is being stored outdoors for long periods of time, oil and other fluids should be drained.
6. Monitor vehicles closely for leaks and place drip pans under any leak to collect the fluids for proper disposal or recycling.
7. Keep the parking and storage areas clean and orderly.
8. Sweep all parking areas a minimum of once a month.

Inspection

Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.16 Vehicle Maintenance and Repair

Description
Vehicle maintenance and repair is a significant source of stormwater pollution due to the hazardous materials involved. Pollutant sources include parts cleaning, spills and leaks of equipment liquids, replacement of fluids, equipment washing, and outdoor storage of batteries.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Perform vehicle maintenance in designated areas
- Recycle used motor oil, diesel oil, other maintenance liquids, and batteries
- Control leaks and spills using good housekeeping spill response, cover, and containment practices

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Do not perform maintenance and repair activity directly over or next to the stormwater system.
3. Vehicle maintenance and repair should take place inside at the Scott Street Public Maintenance Facility.
4. Store idle vehicles containing fluids under a cover to limit exposure to rain.
5. Do not pour materials down drains or hose work areas; use dry absorbent and sweeping.
6. Minimize the use of solvents. Clean parts without using solvents whenever possible.
7. Recycle used motor oil, diesel oil, and other vehicle fluids and parts.
8. Inspect all incoming vehicles, parts, and equipment that are stored temporarily outside for leaks. Store vehicles needing repair in areas where leaking fluids will not reach the ground surface or stormwater conveyances. If stored outdoors, use drip pans or other catchment devices.
9. Store drums and buckets of waste fluid inside at the Scott Street Public Maintenance Facility or other area protected from precipitation.

Material and Waste Handling
1. Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separated.
2. Liquid bulk storage: If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment (see Section 3.6 for details).
3. Drain and replace motor oil, coolant, and other fluids at the Scott Street Public Maintenance Facility.
4. Clean sand-oil interceptors every six months or more often if needed.
5. Do not dispose of oil and gas filters in trash cans or dumpsters. Drain excess oil before disposal. Oil filters can be recycled.
6. Store cracked or dead batteries in a non-leaking covered secondary container and recycle.
7. Drain all fluids from wrecked vehicles immediately. Ensure that the drain pan or drip pan is large enough to contain drained fluids.

Maintenance and Repair Activities
1. If temporary work is being conducted outside: Use a tarp, ground cloth, or drip pans beneath the vehicles to capture all spills and drips. The collected drips and spills must be disposed, reused, or recycled properly.
2. If possible, perform all fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills:

   a. Keep a drip pan underneath equipment that might leak while work is being performed.
   b. Promptly transfer used fluids to the proper waste or recycle drums.
3. If vehicle parts are being stored outdoors, oil and other fluids should be drained first.
4. Monitor equipment closely for leaks and place pans under any leak to collect the fluids for proper disposal or recycling.
5. Do not mix dissimilar or incompatible waste liquids stored for recycling.

Parts Cleaning

1. Clean vehicle parts without using liquid cleaners whenever possible to reduce waste.
2. Perform all liquid cleaning at a central designated station so the solvent and residual stay in one place.

Inspection

Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.17 Vehicle and Equipment Washing

Description
During a car wash, dirty water containing soap and detergents, residue from exhaust gas, motor oils, paint, gasoline, sediment, and other debris washes off the cars and flows to the stormwater system. Water that flows into dry wells flows through soil and into the Missoula Valley Aquifer.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Conduct washing activity at designated vehicle wash areas
- Implement good housekeeping spill response methods

Best Management Practices
1. Vehicles and equipment should not be washed on impervious surfaces that drain to the stormwater system. Fleet vehicles should be washed at a car wash or over a drain that connects with the sewer. Landscape equipment should be washed over a drain that connects with the sewer, or over a vegetated area that has no possibility of draining to the stormwater system or a water body.
2. All wash water from permanent facilities should drain to the public sewer and use an appropriate pretreatment system (e.g., a sand and oil separator) as required by the Missoula and Lolo Wastewater Treatment Plants.
3. Wash water from mobile steam machines should be disposed of through a sanitary sewer or licensed waste hauler. Use an appropriate pretreatment system (e.g., a sand and oil separator) as required by the Missoula and Lolo Wastewater Treatment Plants. Be sure to consult the Wastewater Treatment Plant prior to planning any sanitary discharge.
4. Collect and dispose of the wastewater in a lined lagoon (when public sanitary sewer is unavailable). The system must be designed by a civil engineer licensed in Montana and the design must be approved by the District prior to use. The wastewater must be pre-treated through an oil/water separator prior to discharge to the lagoon. The lagoon must be lined with an impermeable liner and must be capable of containing and treating the entire volume of wastewater produced at the facility. The design life of the system must be specified by the engineer. The system will not be allowed to operate beyond this specified design life, unless its performance is evaluated by a civil engineer and certified by the engineer as meeting the original performance criteria. The lagoon and oil/water separator must be regularly maintained, which includes removal and proper disposal of all sediments, oils, and/or sludge which accumulates in the system. Records of any maintenance performed, as well as waste disposal manifests must be kept and be accessible to regulatory officials.
5. Recycle the wash water.

Inspection
Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.18 Outdoor Container Storage

Description
Materials spilled, leaked, or lost from storage containers may accumulate in soils or on other paved surfaces and be carried away by runoff into storm conveyance systems. Leaks and spills of materials during handling and storage are sources of pollutants.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Keep an accurate, up-to-date inventory of the material delivered and stored on-site
- Keep materials in their original containers and labeled
- Designate specific areas for material delivery and storage
- Provide secondary containment around liquid containers
- Implement good housekeeping spill response methods
- Properly label product in each container

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Store containers on asphalt or concrete surface.
3. Install secondary containment (storage) for containers. Secondary containment systems can consist of using dikes, liners, vaults, jersey barriers, or double-walled tanks. The secondary containment should be sloped to drain into a system designed for the collection of leaks and small spills.
4. Keep containers tightly sealed after use.
5. Place drip pans beneath all container taps and at all potential drip and spill locations during filling and unloading of containers. Drip pans must be cleaned periodically, and all collected liquid and soiled absorbent materials must be reused, recycled, or properly disposed.
6. Inspect container storage areas for corrosion, structural failure, spills, leaks, over fills, and failure of piping systems.
7. Replace containers as needed.
8. Clean up spills promptly; keep spill kit nearby.
9. Store containers in a designated area, which is covered, bermed or diked, and impervious.
10. Raise the container off the ground by use of pallets or a similar method, with provision for spill control and secondary containment.
11. Cover dumpsters or keep them undercover to prevent the entry of stormwater. Replace or repair leaking garbage dumpsters.
12. Drain dumpster pads to sanitary sewer. Keep dumpster lids closed.

Inspection
Conduct weekly inspections of storage areas. Inspections will be performed by designated City personnel.

3.19 Outdoor Storage of Raw Materials

Description
The improper storage of materials outdoors can directly lead to the pollution of state waters. Raw material, by-products, and products such as gravel, sand, salts, topsoil, compost, sawdust, wood chips, building materials, concrete, and metal products are typically stored outside in large piles and stacks. Stormwater can become contaminated when material washes off or dissolves into stormwater.

Pollution Prevention Approach
- Employee education
- Facility Inspections
- Manage inventory of raw material
- Site management of raw material with signs and material designated locations

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Store raw material under cover and bermed, or enclosed and bermed, to prevent stormwater contact. Physical barriers such as curbs, silt fencing, or jersey barriers can be used to prevent material migration to the stormwater system. For large stockpiles that cannot be covered, implement containment practices at the perimeter of the site to prevent discharge of the material offsite or to the stormwater system.
3. Store raw material in an area where direct runoff from the material will not enter the stormwater system. Do not store raw material on any streets, sidewalks, or anywhere close to the stormwater system.
4. Keep storage areas swept and dry. Sweep areas regularly for collection and disposal of loose solid materials.
5. Cover treated wood products and metal products with tarps or store indoors.
6. Prevent run-on of uncontaminated stormwater from adjacent areas from contacting raw material.
7. Store materials in designated signed areas at the facilities.

Inspection
Conduct weekly inspections of the storage areas. Inspections will be performed by designated City personnel.

3.20 Hazardous Material Management

Description
The improper disposal, handling, and storage of used oil, solvents, paints, antifreeze, batteries, and cleaners can allow runoff to encounter pollutants and discharge into the stormwater system.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Recycle used motor oil, diesel oil, other maintenance liquids, and batteries
- Designate hazardous material storage locations
- Reduce the amount of waste generated by using source controls
- Control leaks and spills using good housekeeping spill response, cover, and containment practices

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Designate a location for waste storage and disposal areas. The location should not have any connection to the stormwater system or direct connection to the sanitary sewer. The area should allow for easy cleanup of drips and spills and be under a cover whenever feasible.
4. Do not pour materials down drains or hose work areas; use dry absorbents and sweeping.
5. Minimize the use of waste material. Manage waste amounts by buying only the amount needed to complete the activity.
6. Recycle used motor oil, diesel oil, and batteries.

Storage
1. Segregate potentially hazardous waste from nonhazardous waste.
2. Keep chemicals in appropriate containers and under cover.
3. Ensure all containers are properly labeled and secure. All containers containing used products should be clearly and correctly labeled, identifying the material stored within the container.
4. Do not mix dissimilar or incompatible waste liquids stored for recycling.
5. Inspect containers for leaks and ensure that lids are on tightly. Immediately replace any containers that are leaking, corroded, or otherwise deteriorating.
6. Store chemicals away from stormwater infrastructure.
7. If a regulated substance is stored at or above the corresponding threshold quantity, it needs to have secondary containment (see Section 3.6 for details).
8. Waste vehicle and equipment batteries should be stored in a recycling area.
9. Used oil from vehicle and equipment maintenance and repair should be stored in a "Used Oil" recycle container.
10. Used antifreeze from vehicle and equipment maintenance and repair should be stored for recycling in a "Used Antifreeze" recycle container.
11. Fuel filters should be stored in a recycling container.

Material and Waste Handling
1. Minimize water usage during paint wash-up. Dispose of paint wash water with other liquid waste. Do not dispose of wash water in or near stormwater infrastructure.

2. Retain and use all products such as paint, thinners, etc. until supplies are depleted.
3. Allow water-based paint rollers, drop clothes, and cans that are less than one-third full to completely dry before they are discarded in a solid waste container.
4. Any minor spill of wastes or product that occurs during transfer to storage containers should be cleaned up immediately.

Inspection

Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.21 Concrete Mixing and Equipment Cleaning

Description
Perceptions of risk for groundwater contamination in this industry are often skewed by the fact that asphalt/sealer, concrete, deicing fluids, sand/gravel, etc. are put on the ground in the normal course of their use and construction. However, there are proven risks from repeated release of these chemicals that should not be overlooked. Continual spills and leaks of asphalt and sealer during tank and truck filling can result in water-soluble asphalt product entering the soil, dry wells, and potentially groundwater. Concrete is a mixture of cement, water, and aggregate material. Portland cement is made by heating a mixture of limestone and clay containing oxides of calcium, aluminum, silicon, and other metals in a kiln and then pulverizing the resulting clinker. The fine aggregate particles are usually sand. After concrete is poured at a construction site, the chutes of ready mixed concrete trucks, hoppers of concrete pump trucks, wheelbarrows, and tools must be washed out to remove the remaining concrete before it hardens. Concrete washout water is a caustic slurry (pH near 12) containing toxic metals that can harm water resources.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Conduct concrete mixing and washing activity at designated areas
- Implement good housekeeping spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Conduct concrete mixing at one of the following locations:
   a. In a signed and designated area. The washout area shall be lined with plastic. Once the product is dry, collect the waste and plastic and dispose in a solid waste container. Waste wash-water shall not be discharged to the stormwater system.
   b. In the field near the project site in a designated waste wash area. The designated waste wash area should be lined with plastic and easily disposed of to a solid waste container.
   c. In the field where areas are prepared for new concrete pouring.
4. Do not dispose of excess waste or wash equipment near a storm drain or on hard surfaces which directly runoff to stormwater systems.
5. Do not spray out asphalt/sealer hoses onto a bare ground surface. Asphalt cleanout shall occur at the Scott Street Public Maintenance Facility designated location.
6. Schedule concrete work for dry weather. Do not conduct these activities during or immediately after a rainfall.
7. Protect nearby storm inlets from maintenance work (e.g., preparing the surface for an asphalt cap, chip sealing, concrete breaking or saw cutting). Place appropriate inlet protection around or over inlets to protect them from entry of wastes, dusts, overspray, or slurry.
8. When saw cutting concrete, use the minimum amount of water. Let the waste slurry dry and then sweep or vacuum it up before leaving the location.
9. Pick up the wet slurry immediately after cutting is complete.
10. Collect concrete washout in a lined pit, tank, or other container.

Inspection
Conduct weekly inspections of the facility. Inspections will be performed by designated City personnel.

3.22 Landscape Maintenance

Description
Landscape maintenance activities include vegetation removal, herbicide and insecticide applications, fertilizer and pesticide application, grading, excavations, and watering. Multiple landscape maintenance activities have the potential to contribute pollutants to the stormwater system.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Encourage proper landscaping and pest management techniques
- Encourage proper on-site reuse and recycling of yard waste material
- Implement good housekeeping spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills promptly; keep spill kit nearby (see Section 3.5 for details).
3. Use less-toxic chemicals for maintenance activities when possible.
4. Sweep paved areas regularly to collect loose particles and wipe up spills with rags and other absorbent materials immediately; do not hose down the area to the stormwater system.
5. Do not dispose of collected vegetation into waterways or the stormwater system.
6. Dispose of grass clippings, leaves, sticks or other collected vegetation by composting or in the garbage.
7. Store raw material in an area where direct runoff from the material will not enter the stormwater system. Do not store raw material close to storm inlets or by any watercourse.

Landscaping Management Activities
1. Dispose of grass clippings, leaves, sticks or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or the stormwater system.
2. Check the irrigation schedule so chemicals will not be washed away and to minimize non-stormwater discharge.
3. Use mulch or other erosion control measures when soils are exposed.
4. Use hand or mechanical weeding where practical.
5. Sweep area around the excavation site to remove sediments from asphalt and concrete surfaces.

Fertilizer, Herbicide, and Pesticide Management
1. Follow manufacturer's recommendations and label directions for application rates and dosage.
2. Provide secondary containment for chemicals during transport.
3. Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters.
4. Do not apply pesticide, herbicide, or fertilizers within 10 feet of surface waters, including ditches and drains.
5. Check the weather forecast; do not apply chemicals within 24 hours of a rain event.
6. Calibrate fertilizer distributors to avoid excessive application.
7. Apply pesticides only when wind speed in the area is low.
8. Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.
9. Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
10. Irrigate slowly to prevent runoff.

11. Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

Conduct weekly inspections of parking and landscape management areas. Inspections will be performed by designated City personnel.

3.23 Chlorinated Water Handling

Description

Chlorine acts as a disinfectant primarily through the oxidizing action of hypochlorous acid. However, because of its reactivity, chlorine is also very toxic to fish and aquatic life. Sediment transfer to storm systems and surface water can also be a risk whenever water is released at high pressure or volume to the ground.

Pollution Prevention Approach

- Employee education
- Facility inspections
- De-chlorinate pool water prior to discharging
- Implement good housekeeping spill response methods

Best Management Practices

1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Ensure chlorine storage has adequate secondary containment.
4. Planned discharges to conveyances connected to surface waters must be dechlorinated to below .01 ppm. Per the Montana DEQ-issued General Permit for De-chlorination Water and Hydrostatic Testing, the daily effluent limit for Total Residual Chlorine (TRC) is 0.011 mg/L and the limit of detection for TRC is 0.1 mg/L. Accordingly, analytical results showing concentrations less than or equal to .1 mg/L TRC are in compliance with this policy.
5. Chlorinated water discharges to dry wells or the ground surface are acceptable without de-chlorination if not in direct contact with groundwater.
6. Use appropriate sediment trapping techniques for chlorinated or dechlorinated discharges. Discharge to swales, use end-of-pipe energy dissipators, employ lower discharge rates, or use other applicable BMPs to prevent water discharge from transporting sediment into stormwater conveyances or surface waters.

3.24 Street and Alley Repair and Maintenance

Description
Street and alley repair and maintenance field activities which have potential to pollute stormwater consists of Chip Sealing, Pavement Grinding, Paving, Pothole Repair, excavating in the Right of Way, and stockpiling in the Right of Way.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Use less-toxic chemicals for maintenance activities when possible. Sweep the project area regularly to collect loose particles.
4. Do not hose down the area to the stormwater system.
5. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Chip Seal Asphalt Surface
1. Install storm drainage inlet protection prior to applying seal coating along the project area.
2. Sweep excess chip from project site.
3. Remove inlet protection from storm inlets immediately after sweeping the project area.

Pavement Grinding
1. Install storm drainage inlet protection prior to beginning the grinding activity.
2. Sweep excess grinding from project site, and stockpile in a predetermined designated area. If needed, berm and cover stockpile to minimize contact with stormwater.
3. Remove inlet protection from storm inlets immediately after field operation is complete.

Asphalt and Concrete Cutting
1. When feasible, install storm drainage inlet protection prior to starting the saw cutting activity within the project area.
2. Spray water on saw during cutting activity to minimize dust.
3. Clean up excess slurry left on curb, gutter, and street. Dispose of in waste stockpile or solid waste container.
4. Remove inlet protection from storm inlets immediately after project site is swept.

Resurfacing Asphalt and Concrete
1. Install storm drainage inlet protection prior to starting resurfacing activity within the project area.
2. Clean up excess asphalt and concrete left in curb, gutter, and street. Dispose of in waste stockpile or solid waste container.
3. Equipment Cleaning:

a.) Clean hand equipment over work area and use the minimum amount of cleaning agent.
b.) Clean equipment over work areas when feasible. If cleaning cannot take place over work area, collect excess waste wash in a container and dispose of properly.
c.) Clean equipment in a designated area and collect excess waste wash for proper disposal. Ensure cleanup area will not contribute pollutants to the stormwater system.
d.) DO NOT clean any equipment near or over the stormwater system or sanitary sewer.

4. Remove inlet protection from storm inlets immediately after resurfacing is complete.

Pothole Repair

1. Clean up excess asphalt remaining in curb, gutter, and street. Dispose of waste in designated stockpile or solid waste container.

Excavation and Stockpiling

1. Know the project site's runoff patterns and the immediate stormwater system.
2. If required, install inlet protection prior to starting excavation.
3. Place excavated material in a location that will not impact the stormwater system.
4. If excavated material is placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
5. If the excavated material will not be used for backfilling, haul as much of the material away without storing in the Right of Way.
6. Sweep the project site the day the project is complete. If a sweeper cannot be obtained use hand brooms and shovels. Clean up excess material remaining in the curb, gutter, boulevard, and street.
7. Remove inlet protection from stormwater inlets immediately after project site is swept.

Inspection

Conduct inspections of project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.25 Sidewalk and Public Space Cleaning

Description
Pollutants on sidewalks and in public spaces typically come from littering and sediment accumulation throughout the year.

Pollution Prevention Approach
- Employee education
- Use dry cleaning methods for surface cleaning
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Do not use soaps or solvents for cleaning sidewalks.
4. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Surface Sweeping and Washing
1. Dry clean first by sweeping, collecting, and disposing of sediment, trash, and debris. Sweep away from storm drains.
2. Use absorbents to pick up oil; then sweep up absorbent.
3. Block the storm inlets or contain the runoff when cleaning with water. Discharge collected water to a tank or pump it to a landscape area. Storm drains can be bermed with a fiber roll around the top of the inlet grate.
4. Schedule street sweeper to sweep and vacuum sediment, trash, and debris from curb and street immediately after washing the sidewalks.
5. Remove berm and filter inlet protectors.

Inspection
Conduct inspections of project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system. Inspection will be performed by designated City personnel.

3.26 Winter Street Operations

Description
Pollutants from winter street operations include sediment from street sanding, chemicals from deicing activities, and various contaminants from snowmelt storage.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Street Sanding
1. Employ street sweepers to collect excess sanding material during thaw events.
2. Once the sanding operations are complete for the year, sweep every street to collect excess sanding material. Set up a routine route to ensure all areas are swept.

Snow Removal and Storage
1. Store plowed snow in locations where runoff can be infiltrated into the ground or filtered prior to flowing into the stormwater system. Snow removed from city streets is only stockpiled at approved sites where the snow is put on vegetated land that does not drain to the stormwater system or to surface water. The approved sites include the following:
    a.) the City's north side stockpile yard located directly west of the intersection of Shakespeare Street and Rodgers Street;
    b.) on the north side of the Hellgate High School Soccer and Softball Fields in the Rattlesnake; and
    c.) in the grass field located directly southeast of the Russell Street and Fairview Avenue intersection at the Missoula County Fairgrounds.
2. There shall be no dumping of snow into any surface water by City snow removal crews.
3. If a snow pile contains excess amounts of trash, debris, or sediment, place a berm around the pile to contain the melting runoff.
4. Sweep and clean snow storage areas once snow has melted.

Street Deicing
1. Mix deicing solution per manufacturer's specifications.
2. Only spray the required amount onto the streets.
3. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
4. Apply deicers in such a manner and at such a rate that pure product (liquid or solid) remains on the roadway.
5. Apply deicers using trucks equipped with ground-speed controllers.
6. When applying deicers for anti-icing purposes prior to or during a storm event, apply at a rate not to exceed 30 gallons per lane mile.

7. Whenever snow accumulations on the road are equal to or greater than 2 inches, apply deicers after snow plowing to improve the effectiveness of a deicer and to reduce the amount applied.
8. Keep daily records for locations and amounts of deicer applied.
9. Maintain records for yearly volumes of deicer applied.

3.27 Curb Painting

Description
Curbs are exposed, spray washed, and painted routinely for traffic safety. Paint, sediment, and trash are pollutants of concern for curb painting field operations.

Pollution Prevention Approach
- Employee education
- Use dry cleaning method for surface cleaning
- Protect stormwater inlets to prevent pollutants from entering
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Do not use soaps or solvents for cleaning curbs.
4. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Curb Cleaning
1. Dry clean first by sweeping, collecting, and disposing of sediment, trash, and debris. Sweep away from the stormwater system. Swept material can be:
    a.) collected and placed in a container and transported off-site; or
    b.) swept to the street lane and collected by a City Sweeper.
2. Use absorbents to pick up oil; then sweep up absorbent.
3. Do not wash down curb material into the stormwater system. Block the storm inlets or contain the runoff when cleaning with water. Discharge the collected water to a tank or pump it to a landscape area. Storm drains can be bermed with a fiber roll around the top of the inlet grate. Wash water can be filtered using a filter product
4. Schedule street sweeper to sweep and vacuum sediment, trash, and debris from curb and street immediately after washing the curbs.
5. Remove berm and filter inlet protectors.

Curb Painting
1. Check the weather; do not perform curb painting on wet weather days.
2. Minimize painting area as much as possible.
3. Do not paint wet curb; pay attention to irrigation schedules during painting activities.
4. Do not spray paint directly over the grated storm inlet.
5. Only paint the top face and back of curb. Do not paint the curb flowline.

Inspection
Conduct inspections of project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.28 Street Sign/Traffic Pole Maintenance and Replacement

Description
Street sign and traffic pole maintenance and replacement field activities that have potential to pollute stormwater consist of asphalt and concrete cutting, resurfacing, and excavating and stockpiling in the right of way.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Asphalt and Concrete Cutting
1. Install inlet protection prior to saw cutting activity within the project area.
2. Spray water on saw during cutting activity to minimize dust.
3. Clean up excess slurry left on curb, gutter, and street. Dispose of the slurry in a waste stockpile or a solid waste container.
4. Remove inlet protection immediately after project site is swept.

Excavation and Stockpiling
1. Know the project site's runoff patterns and the immediate stormwater system.
2. If required, install storm drain inlet protection prior to excavation.
3. Place excavated material in a location that will not impact the stormwater system. If possible, place it outside of the right of way.
4. If excavated material must be placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
5. If the excavated material will not be used for backfilling, haul as much of the material away without storing in the right of way.
6. Sweep the project site the day the project is complete. If a sweeper cannot be obtained use hand brooms and shovels. Clean up excess material left in curb, gutter, boulevard, and street.
7. Remove inlet protection from stormwater inlets immediately after project site is swept.

Resurfacing Asphalt and Concrete
1. Install stormwater inlet protection prior to starting resurfacing activity within the project area.
2. Clean up excess asphalt and concrete left in the curb, gutter, and street. Dispose of in waste stockpile or solid waste container.
3. Clean equipment at the Scott Street Public Maintenance Facility only in a designated area and collect excess waste wash for proper disposal. Ensure cleanup area will not contribute pollutants to

the stormwater system. DO NOT clean any equipment near or over the stormwater system or sanitary sewer.

4. Remove inlet protection immediately after resurfacing is complete.

Inspection

Conduct inspections of project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.29 Concrete Removal and Installation

Description
Street and alley repair and maintenance field activities that have potential to pollute the stormwater system include chip sealing, pavement grinding, paving, pothole repair, excavating in the right of way, and stockpiling in the right of way.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Excavation and Stockpiling
1. Know the project site's runoff patterns and the immediate stormwater system.
2. If required, cover storm inlets with inlet protection prior to excavation.
3. Place excavated material in a location that will not impact the stormwater system. If possible, place it outside of the right of way.
4. If excavated material must be placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
5. If the excavated material will not be used for backfilling, haul as much of the material away without storing in the right of way.
6. Sweep the project site the day the project is complete. If a sweeper cannot be obtained, use hand brooms and shovels. Clean up excess material left in curb, gutter, boulevard, and street.
7. Remove filter fabric from storm inlets immediately after project site is swept.

Concrete Installation
1. Clean up excess concrete left in curb, gutter, and street. Dispose of in a waste stockpile or in a solid waste container.
2. If possible, dump waste and wash water into areas prepared for new concrete pouring.
3. Clean equipment at the Scott Street Public Maintenance Facility only in a designated area and collect excess waste wash for proper disposal. Ensure cleanup area will not contribute pollutants to the stormwater system. DO NOT clean any equipment near or over the stormwater system or sanitary sewer.

Inspection
Conduct inspections of the project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.30 Water Utility Operation and Maintenance

Description
Operations and maintenance of public water utilities may not be considered chronic sources of stormwater pollution; however, some activities can result in the discharge of pollutants that can pose a threat to water quality.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system:

Planned Discharges
1. Planned discharges include hydrant testing, dewatering water mains for maintenance, and flushing water lines.
2. If possible, discharge water to land that is not hydraulically connected to the stormwater system or surface waters.
3. The only discharges that can go to the stormwater system or surface waters are clean water discharges such as from a water main, water storage, and hydrant flushing.
4. Prior to discharge, inspect discharge flow path and clear/clean up any debris or pollutants found i.e., remove trash, leaves, sediment, and wipe up liquids, including oil spills.
5. Inspect flow path of discharged water. Identify erodible areas which may need to be repaired.

Unplanned Discharges (breaks)
Unplanned discharges can occur from water line breaks, sheared fire hydrants, and equipment malfunction. The following steps outline the response for an obvious break in a water line.
1. Stop the discharge as quickly as possible.
2. Check valves for operation. Turn off water supply to the affected line.
3. Use a vacuum truck to remove water from the trench/excavation area; if water cannot be turned off, keep the vacuum truck on site and continue to remove dirty water.
4. Protect the nearby drains and prevent sediment-laden discharge from entering the stormwater system.
5. Install weighted waddles around nearby drains.
6. Use a vacuum truck to remove standing water from the excavation. Discharge the dirty water at the City's drying beds.
7. Inspect the flow path of the discharged water. Identify eroded areas which may need to be repaired.
8. Remove debris from the ROW (using a street sweeper or push brooms), ensure it does not enter the stormwater system.
9. Remove inlet protection and waddles.

10. If any dirty water entered storm drains, clean out the stormwater system after the break is fixed.

Unplanned Discharges (leaks)

Water line leaks can cause unplanned discharges. Leaks can be detected by monitoring reservoir levels and comparing usage rates to historic averages. The following steps outline the response for an identified water line leak.

1. Ensure that all emergencies and hazards are addressed.
2. Consult the map and look at ditch cards. Identify the cause of the leak (main line or service line). If the leak is on a service line, knock on the door and inform the customer and/or send a letter.
3. Inform the supervisor or lead of the situation. Inform dispatch of the situation.
4. Contact an excavator for availability and request locates for the area. Paint the excavation area in white.
5. Before excavation begins, protect the nearby stormwater drains.
6. Check valves for operation. Turn off water supply to the affected line.
7. Begin excavation and fix the leak. During excavation, prevent sediment-laden discharge from entering the stormwater system.
8. If needed, use a vacuum truck to remove standing water from the excavation. Discharge the dirty water at the Cit's drying beds.
9. Inspect the flow path of the discharged water. Identify eroded areas which may need to be repaired.
10. Remove debris from the ROW (using a street sweeper or push brooms), ensure it does not enter the stormwater system.
11. Remove inlet protection and waddles.
12. If any dirty water entered storm drains, clean out the stormwater system after the break is fixed.

Asphalt and Concrete Cutting

13. When feasible, install storm inlets protection prior to saw cutting activity within the project area.
14. Spray water on saw during cutting activity to minimize dust.
15. Clean up excess slurry left on curb, gutter, and street. Dispose of in waste stockpile or solid waste container.
16. Remove storm drain inlet protection immediately after project site is swept.

Excavation and Stockpiling

1. Know the project site's runoff patterns and the immediate stormwater system.
2. If required, install storm drain inlet protection prior to excavation.
3. Place excavated material in a location that will not impact the stormwater system.
4. If excavated material is placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
5. If the excavated material will not be used for backfilling, haul as much of the material away without storing in the right of way.
6. Sweep the project site the day the project is complete. If a sweeper cannot be obtained use hand brooms and shovels. Clean up excess material left in curb, gutter, boulevard, and street.
7. Remove storm drain inlet protection immediately after project site is swept.

Inspection

Conduct inspections of the project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.31 Sanitary Sewer Utility Operation and Maintenance

Description
Operations and maintenance of sanitary sewer utilities can result in the discharge of pollutants that can pose a threat to water quality.

Pollution Prevention Approach
- Employee education
- Clean sewer lines on a regular basis to prevent sewer backups
- Implement good housekeeping and spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly. Report spills to the supervisor and the Missoula Valley Water Quality District (MVWQD).
3. Check the weather; do not perform field activities that will contaminate the stormwater runoff on rainy days.

The following field activity procedures shall be implemented to prevent pollutants from entering the stormwater system.

Sanitary Sewer Maintenance
1. Clean sewer lines on a regular basis to remove grease, grit, and other debris that may lead to sewer backups.
2. During routine maintenance and inspection, note the condition of the sanitary sewer and identify areas that need repairs or maintenance.
3. Use the City vacuum truck to perform maintenance activities on sanitary sewer lines.
4. Dispose of sanitary sewer at the Wastewater Treatment Facility.
5. Wash out equipment at designated location.
6. Do not discharge waste wash water from sanitary sewer activities to the stormwater system.

Sanitary Sewer Spills
1. When spills, leaks, or overflow occurs and when disinfecting a sewage contaminated area, take every effort to ensure that the sewage, disinfectant, and sewage treated with the disinfectant is not discharged to the stormwater system. Methods include:
    a.) Blocking storm drain inlet and catch basins.
    b.) Containing and diverting sewage and disinfectant away from stormwater systems; use sandbags or plastic berms.

Asphalt and Concrete Cutting
1. When feasible, install storm drain inlet protection prior to saw cutting activity within the project area.
2. Spray water on saw during cutting activity to minimize dust.
3. Clean up excess slurry left on curb, gutter, and street. Dispose of in waste stockpile or solid waste container.
4. Remove protection from storm inlets immediately after project site is swept.

Excavation and Stockpiling

1. Know the project site's runoff patterns and the immediate stormwater system.
2. If required, install storm drain inlet protection prior to excavation.
3. Place excavated material in a location that will not impact the stormwater system.
4. If excavated material is placed in the curb and gutter and left overnight, berm or cover the stockpiled material. Place a pipe under the pile parallel to the curb to allow surface flow through the blocked curb.
5. If the excavated material will not be used for backfilling, haul as much of the material away without storing in the right of way.
6. Sweep the project site the day the project is complete. If a sweeper cannot be obtained use hand brooms and shovels. Clean up excess material left in curb, gutter, boulevard, and street.
7. Remove inlet protection from storm inlets immediately after project site is swept.

Inspection

Conduct inspections of project site prior to leaving the area. Ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.32 Pump and Lift Station Maintenance

Description
Pump and Lift station maintenance entails the maintenance and operation of the pump and sewer lift stations and the immediate surrounding areas. Oils and hydrocarbons from equipment maintenance and pesticide and herbicides for vegetation removal have the potential to contribute pollutants to the stormwater system.

Pollution Prevention Approach
- Employee education
- Facility inspections
- Encourage proper weed and pest management techniques
- Implement good housekeeping spill response methods

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills promptly; keep spill kit nearby.
3. Clean up spills with rags and other absorbent materials immediately and dispose in solid waste containers.
4. Use less-toxic chemicals for field activities when possible.
5. Do not dispose of collected vegetation into waterways or stormwater systems.
6. Dispose of grass clippings, leaves, sticks, or other collected vegetation by composting, if feasible.
7. Designate a location for equipment maintenance and repair to take place. The location should not have any connection to the stormwater system or direct connection to the sanitary sewer. The area should allow for easy cleanup of drips and spills and be under a cover whenever feasible.
8. Store idle equipment containing fluids under a cover.

Pump and Lift Station Maintenance
1. Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separated.
2. Do not dispose of oil and gas filters in trash cans or dumpsters. Drain excess oil before disposal. Oil filters can be recycled.
3. If work is being conducted outside: Use a tarp, ground cloth, or drip pans beneath the equipment to capture all spills and drips. The collected drips and spills must be disposed, reused, or recycled properly.
4. If possible, perform all fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills:
    a. Keep a drip pan underneath equipment that might leak while work is being performed.
    b. Promptly transfer used fluids to the proper waste or recycle drums.
5. Monitor equipment closely for leaks and place pans under any leak to collect the fluids for proper disposal or recycling.
6. Clean equipment parts without using liquid cleaners whenever possible to reduce waste.

Landscaping Management Activities
1. Dispose of grass clippings, leaves, sticks or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or stormwater systems.
2. Use mulch or other erosion control measures when soils are exposed.
3. Use hand or mechanical weeding where practical.

4. Sweep area around project site to remove sediments and debris from asphalt and concrete surfaces.

Fertilizer, Herbicide, and Pesticide Management

1. Follow manufacturer's recommendations and label directions for application rates and dosage.
2. Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters.
3. Do not apply pesticide, herbicide, or fertilizers within 10 feet of surface waters.
4. Check the weather forecast; do not apply chemicals within 24 hours of a rain event.
5. Calibrate distributors to avoid excessive application.
6. Apply pesticides and herbicides only when wind speed in the area is low.
7. Irrigate slowly to prevent runoff.
8. Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

Conduct inspections of project site prior to leaving the area. Ensure areas are cleaned and no contaminants can be washed into the stormwater system.

3.33 Construction Dewatering

Description
Construction dewatering is a necessary operation for construction sites that trap rainwater or groundwater within the excavation. For construction projects, this water needs to be removed before certain operations can be performed or to keep work conditions safe. It is typical to use pumps to dewater these trenched areas. The pumped water often finds its way to stormwater systems. Any site that is actively dewatering needs to have a dewatering plan and permit on site.

Pollution Prevention Approach
- Employee education
- Prevent the discharged water from eroding soil on the site
- Choose the best location for discharge
- Remove sediment from the collected water
- Preserve down gradient natural resources and property

Best Management Practices
1. Know the project site's runoff patterns and the immediate stormwater system.
2. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly (see Section 3.5 for details).
3. The discharge areas should be chosen with careful consideration to the down gradient water resources and the landscape ability to treat water flows from the dewatering process.
4. The discharge should be stopped immediately if the receiving area is showing any sign of instability or erosion.
5. If the collected runoff is contaminated with sediment, oil, grease, or other petroleum products, stop the discharge, and implement a filtration mechanism for discharge.
6. Clean groundwater discharge can be discharged to the stormwater system.

Dewatering excavated areas must be in two distinct phases:
1. the removal of the collected water within the excavation and;
2. the treatment of the collected water.

Physical Dewatering
The removal of water from the excavated area can be accomplished by numerous methods. The most common of these are: gravity drain through daylight channels, mechanical pumping, siphoning, and using the bucket of construction equipment to scoop and remove water from the excavation.
1. Channels dug for discharging water from the excavated area need to be stable. If flow velocities cause erosion within the channel, then a ditch lining should be used.
2. Never discharge to areas that are bare or newly vegetated.
3. Bucketed water should be discharged in a stable manner to the sediment removal area. A splash pad of riprap underlain with geotextile may be necessary to prevent scouring of the soil in the basin.
4. Dewatering in periods of intense, heavy rain, when the infiltrative capacity of the soil is exceeded, should be avoided.

Sediment Removal
Many methods of settling or filtering sediment are available for consideration:
1. Flow to the sediment removal structure may not exceed the sediment removal structure's capacity

to settle and filter flow or the structure's volume capacity.
2. Removal Basins should discharge wherever possible to a well-vegetated buffer through sheet flow and should maximize the distance to the nearest water resources and minimizing the slope of the buffer area.
3. Temporary enclosure should be constructed with hay bales, silt fence, or both.
4. Direct discharge of slightly sediment bearing water may be able to go directly into well drained areas with a 0-2% slope as long as there is an available method of spreading the flow into sheet flow.
5. Discharge to a manufactured/pre-made structure specifically designed for sediment removal, like a Silt Sak, Silt Bag, or other similar product.
6. Concrete or steel settling chambered systems for sediment removal.
7. For bermed sedimentation ponds or structures, side slopes should be no greater than 2 to 1, or with a combined interior and exterior slope of no greater than 5 to 1.

Inspection

Conduct inspections of project site during dewatering process. Special attention should be paid to the buffer area for any sign of erosion and concentration of flow that may compromise the buffer area. Observe the visual quality of the effluent and determine if additional treatment can be provided. Prior to leaving the site, ensure areas are swept, cleaned, and no contaminants can be washed into the stormwater system.

3.34 Fire Fighting Response Practices

Description of Pollutant Source
The wastewater from firefighting can contain a variety of contaminates. Stormwater can also be contaminated with organics from car and engine fires. These contaminants can discharge into surface water or ground water near the fire if wastewater is allowed to enter stormwater systems.

Pollution Prevention Approach
- Employee education
- Implement good housekeeping and spill response methods

Best Management Practices
1. If hazardous materials are suspected, contact the Missoula Valley Water Quality District or 911.
2. When possible, block storm inlets. Use covers, sandbag dams, or inlet filter protectors. Sweep up area around inlet prior to leaving the site.
3. If cars are to be used during firefighting response practices, they should be entirely drained of fluid.
4. During training exercises and equipment testing, NO contaminated wastewater can discharge to the stormwater system. The discharge areas should be chosen with careful consideration to the down gradient water resources and the landscape ability to treat water flows from the process.
    a.) Fire extinguisher training: Spray extinguisher only in areas where the foam can be collected. Sweep up any spilled foam and dispose of properly.
    b.) Building burning training: Know the project site's runoff patterns and the immediate stormwater system. Install inlet protection, collect wastewater runoff, and dispose of properly. Disposal can consist of discharging to sanitary sewer if allowed or sprayed on a field with no direct runoff to a surface water or stormwater system.
    c.) Hose Testing: Know the project site's runoff patterns and the immediate stormwater system. Install inlet protection, collect contaminated water runoff, and dispose of properly. Disposal can consist of discharge to sanitary sewer. If allowed, spray on a field with no direct runoff to a surface water or stormwater system, or water reuse for irrigation.
    d.) Hydrant Testing: Know the project site's runoff patterns and the immediate stormwater system. Install inlet protection and sweep the down gradient runoff areas or collect contaminated water runoff and dispose of properly. Disposal can consist of discharge to sanitary sewer. If allowed, spray on a field with no direct runoff to a surface water or stormwater systems, or water reuse for irrigation.
5. Clean up spills and leaks promptly; know the spill kit locations. Spills are not cleaned up until the absorbent is picked up and disposed of properly. Report spills to the Missoula Valley Water Quality District or 911 and the department supervisor.
6. Vehicle accident response: Protect stormwater systems when feasible.
    a) If hazardous materials are suspected or there is a large spill contact the Missoula Valley Water Quality District or 911.
    b) Block storm inlets and entry to drainage ditches, spread absorbent on minor spills, and sweep up absorbent material.

3.35 Sand and Oil Interceptor Maintenance

Description of Pollutant Source
Sand and oil separators are designed to remove and contain floatable contaminants such as oil, gasoline, and grease from a wastewater or stormwater stream. As the waste stream passes slowly through the separator, these lighter contaminants can float to the surface and become contained by the 'T' outlets and absorbent pillows. If the separator is not maintained, it will not function properly and will discharge pollutants.

Pollution Prevention Approach
- Employee education
- Implement regular maintenance

Best Management Practices
1. Sand and oil separators must be inspected and maintained regularly to remain effective. Inspect the tank at a minimum of once every 3 months (quarterly).
2. Absorbent pillows placed inside chambers reduce contaminated levels of hydrocarbons in water. These should be replaced as needed when saturated.
3. Inspect the unit frequently to assess the oil and sludge layers. Determine the oil/water interface using a gauge stick and water finding paste. The separator should be pumped when ¼ inch or more of material (oil, fuel) can be detected on top of the water and/or when sludge accumulation is 25% of the total volume. Sludge depth can be determined by using a measuring stick and marking when contact is made with top layer of sludge and again when stick reaches the bottom of the tank. An oil level sensor can be used in place of manual detection.
4. Any standing water removed should be replaced with clean water to prevent oil carry-over through the outlet
5. Wastes must be hauled by a qualified hazardous waste hauler to an approved destination. Keep all receipts/records onsite. Petroleum products can adhere to suspended solids and sediment, but some sludges may not qualify as hazardous waste. Toxicity characteristic leaching procedure (TCLP) analysis, paint filter test, or total petroleum hydrocarbon (TPH) testing may be required prior to disposal at a solid waste management facility.

4. Employee Training

As a designated MS4 under the MPDES Phase II Stormwater Program, Missoula is required to develop a pollution prevention/good housekeeping program to control and reduce stormwater pollution generated by municipal operations. The municipality is also required to train employees on how to incorporate pollution prevention/good housekeeping techniques into municipal facility and field operations. All employees of an MS4 owner, operator, and leaser whose activities can potentially impact surface waters are required to receive training regarding stormwater quality and municipal operation at least once per year. The Stormwater Program Specialist is responsible for organizing and conducting this training.

4.1 Annual Training Recipients

Annual training will be provided to the following City of Missoula employees, operators in the following departments.

1. Water Division
2. Wastewater Division
3. Streets Maintenance Division
4. Traffic Services
5. Traffic Signal & Communication Shop
6. Parks and Recreation
7. Engineering

4.2 Annual Training Programs

Annual training will be provided through the following programs:

1. Online Employee Training will be conducted through a Missoula specific pollution prevention course: https://rise.articulate.com/share/c1WGfdhiY0jktPRucn0BE9C26TESMJVs.
2. In Person Employee Training will be conducted in collaboration with Clean Water Technologies. This training will focus on spill prevention/response, sediment control, and construction site management.

Appendix K
Post-Construction

STORMWATER
City of Missoula

Green Infrastructure and Community Resiliency

What is green infrastructure?

Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. Green practices like bioretention and grassy swales can effectively treat stormwater before it enters the stormwater system. We call this 'pretreatment'. Green infrastructure can enhance the resiliency of our community by improving water quality, reducing flooding, and providing climate adaptability.

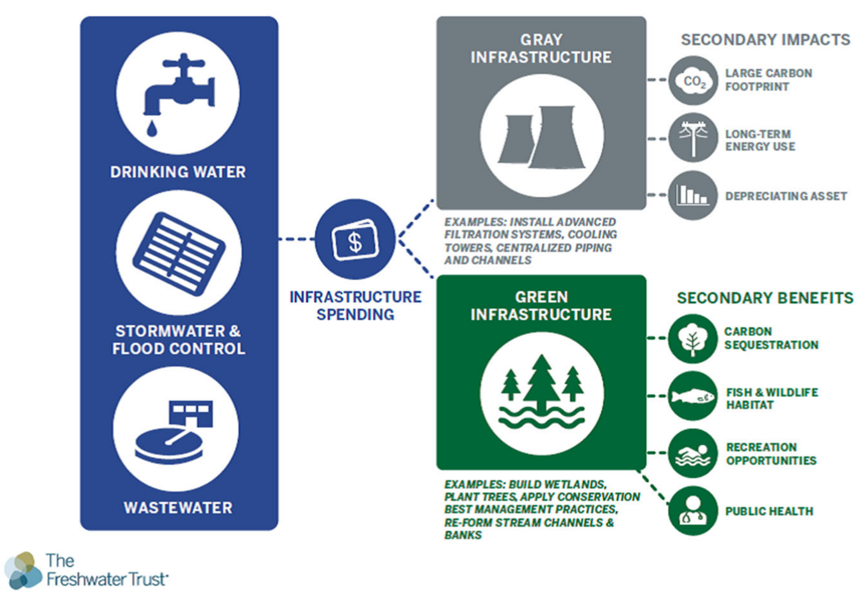
Why treat stormwater?

Stormwater runoff is a form of nonpoint source pollution: the number one cause of water quality issues in Montana and across the U.S. Stormwater is not treated at the Wastewater Treatment Plant! Most of the City's stormwater drains to dry wells, which discharge untreated runoff directly to the Missoula Valley Aquifer—our sole source of drinking water. Our soils are free draining and do not provide much treatment for stormwater prior to reaching groundwater. Implementing green infrastructure will not only protect our aquifer, but will also protect local waterways because they are all hydrologically connected.

Local Support for Green Infrastructure
(Details on the back)

- Our Missoula City Growth Policy 2035
- Missoula Downtown Master Plan
- Design Excellence Overlay
- Climate Ready Missoula
- Missoula Municipal Code
- Public Works Standards and Specifications Manual

Green vs. Gray Infrastructure




Bioswale with dry well at Southgate Mall

Low Impact Development and Green Parking

Low Impact Development (LID) stormwater techniques (also known as Best Management Practices, or BMPs) manage stormwater on-site, reducing negative impacts on receiving waters and municipal stormwater management systems. These controls attempt to mimic the pre-development ecological and hydrological processes. New and redevelopment offer an opportunity to use modern design standards to protect water quality. One of the most straightforward approaches is to begin incorporating green standards for parking lots. Green parking also helps reduce the urban heat island effect.

Cost Considerations

Gray infrastructure without pretreatment must be replaced at least twice as often as facilities with pretreatment. While some green infrastructure materials have higher construction costs than conventional development materials, implementing green techniques can lead to lower maintenance and stormwater management costs.

Green Infrastructure and Community Resiliency

Putting plans and codes into action!

Our Missoula City Growth Policy 2035

- Protect the community's existing distinctive qualities, including natural resources
- Conserve and protect resources, such as the sole source aquifer
- Build infrastructure that is sustainable and adaptable
- Infrastructure services which are guided by a principle of resource conservation and best practices to mitigate and adapt to climate change
- Support sustainable, "green" initiatives for new development and redevelopment within the city
- Actively reduce the need to manage stormwater from impervious surfaces in new and currently developed areas

Missoula Downtown Master Plan

- Incorporate green infrastructure features in all new public and private development to capture and treat all associated stormwater runoff

Design Excellence Overlay

- Integrate low impact development (LID) features to minimize impacts to the municipal stormwater system and area watersheds
- Include a stormwater management feature, such as a bioretention area or rain garden, as a site amenity
- Use permeable surfaces and paving systems that allow water infiltration
- Use landscaping to absorb site runoff and filter water

Climate Ready Missoula

- Preserve water quality through improved stormwater management, prioritizing green infrastructure over traditional methods
- Implement low-impact development standards to encourage fewer impervious surfaces
- Improve and expand stormwater facilities, via new land use regulations or other methods

Missoula Municipal Code (MMC)

- MMC 13.27.300.D: The City supports and encourages the use of post-construction stormwater management controls that rely on low-impact development and green infrastructure techniques. In addition to reducing and delaying runoff volumes, these techniques can also reduce pollutant levels in stormwater, enhance aquifer recharge, protect surface water from stormwater runoff, increase carbon sequestration, mitigate urban heat islands, and increase wildlife habitat.
- MMC 20.60.010.A.2: The provisions of this chapter are also intended to help protect the public health, safety and general welfare by...c) Providing methods to reduce the amount of impervious surfaces in parking areas and adequate drainage structures in order to reduce the environmental impacts of stormwater runoff.
- MMC 20.65.010.5: Protect water quality by providing vegetated areas that minimize and filter stormwater runoff.
- MMC 21.01: Form-Based Code
    - §4.6.A.3: Design of landscape should maximize use of green infrastructure stormwater Best Management Practices (BMPs) such as pervious paving, bioretention systems, rain gardens, bioswales, and stormwater planters to slow and treat stormwater runoff while providing multiple additional community benefits.
    - §4.6.C.1: Use of the provided landscaped open space for vegetated stormwater quality management is allowed and encouraged.
    - §4.7.C.5: Bioretention systems, rain gardens, bioswales, tree filters, and other vegetated stormwater management systems are encouraged for treatment of stormwater runoff from streets, parking lots, plazas, and other impervious surfaces.
    - Table 4-6: Light Imprint Storm Drainage
    - §5.11.B.5: Reduce required setback by 20% for projects that implement low impact development

Missoula City Public Works Standards and Specifications Manual

- §6.2.1.H.1. Low Impact Development/Green infrastructure is highly prioritized by the City of Missoula.

Flood Control Works
2023

Annual Inspection Report

Clark Fork Area III Levee
Clark Fork Area V Levee
Grant Creek Levee
and
South Hills Stormwater System
(Pattee Creek Levee and Playfair Park High-Hazard Dam)

City of Missoula
Public Works and Mobility Department
Stormwater Utility
1345 West Broadway
Missoula, Montana 59802

May 2023

Contents

List of Photos

1. Clark Fork – Area III (Madison to Orange)

Inspectors: Tracy Campbell, Lyndsey Holloway
Date: May 8, 2023

1.1 General

1. Growth of sod, willows, and brush is encouraged. Growth of trees is prevented.
   All trees on the riverward slope were removed in March 2021; the stumps were treated with Garlon to prevent resprouting. Riverward regrowth was removed and treated in 2022. Trees were removed on the landward side in March 2023.
2. Fences crossing levee are properly gated and keys to locked gates are made available to the superintendent.
   Fences immediately downstream of the Madison footbridge on both sides of levee have been noted by the USACE in the past (Station 35+00 to 37+00). They are considered Acceptable, based on past USACE inspection reports.

1.2 Levee

1. Burrowing animals present
   Marmots were observed near the orange street bridge (Station 0+00). No burrowing evidence was observed on the levee.
2. Grass and weeds in need of mowing
   Consistent and proactive weed treatment began in the summer 2021 and has occurred annual since then. Annual weed treatment is scheduled for June 2023The landward side of the levee is mostly maintained sod/turf, managed by the City Parks & Recreation Department.
3. Wild growth or drift deposits present
   Due to active vegetation removal, limited areas of wild growth are present and if present, they do not prevent inspectors from observing levee conditions. No drift deposits were observed.
4. Damage from erosion or other forces
   No notable damage from erosion was observed. Some erosion noted from pedestrian foot paths. Noted in photos 11 and 12 for Stations 11+00 through 13+00. Some of these Foot paths will be addressed in the upcoming Parks and Recreation project.
5. Unusual settlement, sloughing, or material loss of grade or levee cross section.
   Loss of riprap and loss of grade observed on the riverward slope, adjacent to the apartments downstream of the Madison footbridge (Station 35+00).
6. Caving on either the land side or the river side of the levee which might affect the stability of the levee section
   An area of caving was observed on the riverward slope between Clark Fork Manor and Dragon's Hollow Park (Station 05+00).
7. Seepage, saturated areas, or sand boils
   No seepage, saturated areas, or sand boils were observed.

8. Drains through the levees and gates on said drains are in good working condition
   All outfalls were inaccessible during the inspection due to high water.
9. Revetment work or riprap has not been displaced, washed out, or removed
   Multiple areas of erosion and displaced riprap were observed, due to social trails on the riverward slope, photos 11 and 12.
10. Action taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod
    None
11. Access roads to and on the levee are being properly maintained
    The levee occurs in an urban setting with well-maintained roads.
12. Crown of levee is shaped so as to drain readily, and roadway thereon is well shaped and maintained
    The levee crown also serves as a paved trail; it is generally well maintained and drains readily.
13. Unauthorized vehicular traffic on the levee
    None
14. Encroachments on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency
    There is a Northwestern Energy substation directly east of the Higgins bridge in Caras Park (Station 16+00). This substation installed multiple guy wires and one telephone pole on the levee (photos 11-12).

1.3 Floodwall

1. Seepage, saturated areas, or sand boils
   No seepage, saturated areas, or sand boils were observed.
2. Undue settlement which affects the stability of the wall or its water tightness
   No undue settlement was observed.
3. Presence of trees, the roots of which might extend under the wall and offer accelerated seepage paths
   All trees on the riverward slope were removed in March 2021; the stumps were treated with Garlon to prevent resprouting. More trees removed and treated on the riverward side.
4. Cracking, chipping, or breaking of concrete to an extent which might affect the stability of the wall or its water tightness
   Some cracking noted at station 20+00, photo 10.
5. Encroachments upon the right-of-way, which might endanger the structure or hinder its functioning in time of flood
   There are several areas where riprap has been piled up against the wall. Residents presumably do this to be able to climb over the wall. Yard waste has also been deposited on the riverward side of the wall.
6. Fires being built near wall
   No fire pits were observed

7. Bank caving conditions riverward of the wall which might endanger its stability
   No bank caving was observed.

1.4 Drainage Structures

1. Trash, drift, and debris accumulated near drainage structures
   No trash, drift, or accumulated debris was observed.
2. Flap gates and manually operated gates and valves on drainage structures examined, oiled, and trial-operated
   Due to high water, the gates were not manually operated.
3. Pipes, gates, operating mechanism, riprap, and headwalls are in good condition
   Although we could not see them, there was no interior flooding, so it is assumed that the gates are in effective operating condition.
4. Erosion occurring adjacent to the structure which might endanger its water tightness or stability
   No erosion adjacent to any structures was observed.

1.5 Miscellaneous Items

None


Photo 1. Remaining stump of landward tree removal (Clark Fork Area III Station 37+00)


Photo 2. Riverward pedestrian trail (Clark Fork Area III Station 37+00)


Photo 3. New pavement fixing previous asphalt depression (Clark Fork Area III Station 37+50)


Photo 4. Stumps from trees removed (Clark Fork Area III Station 37+50)

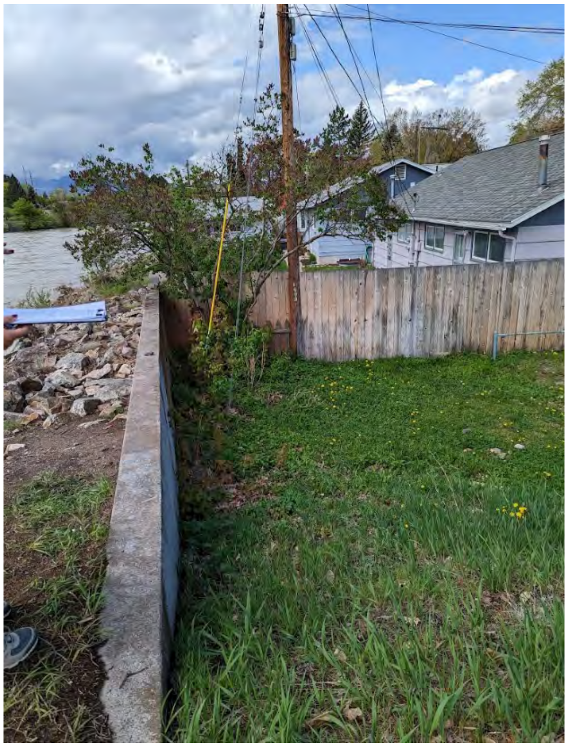


Photo 5. Landward tree removed (Clark Fork Area III Station 29+00)

Photo 6. Landward tree removed (Clark Fork Area III Station 29+50)

Photo 7. Floodwall displacement (Clark Fork Area III Station 26+00)

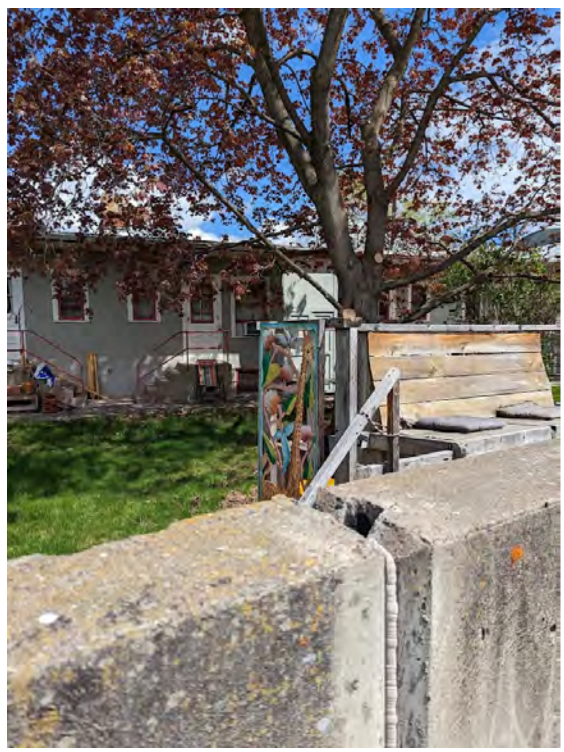


Photo 8. Top view of floodwall displacement (Clark Fork Area III Station 26+00)

Photo 9. Landward tree removal (Clark Fork Area III Station 24+00)

Photo 10. Cracking (Clark Fork Area III Station 20+00)

Photo 11. Northwestern Energy substation and telephone poles (Clark Fork Area III Station 16+00)

Photo 12. Northwestern Energy Substation and telephone Poles (Clark Fork Area III Station 15+00)

Photo 13. Pedestrian trails (Clark Fork Area III Station 13+00)

Photo 14. Pedestrian trails (Clark Fork Area III Station 10+00)

2. Clark Fork – Area V (California to Russell)

Inspectors: Marie Nelson, Carver Butterfield
May 5, 2023

2.1 General

1. Growth of sod, willows, and brush is encouraged. Growth of trees is prevented.
   All trees on the riverward slope was removed in February 2020 and March 2021; the stumps were treated with Garlon to prevent resprouting. The trees on the landward side of the levee were removed in March 2021. Regrowth was removed and treated in 2022 and 2023. All stumps were retained due to budgetary constraints.
2. Fences crossing levee are properly gated and keys to locked gates are made available to the superintendent.
   The Flynn Lowney Ditch has been permanently shut off. The ditch on the landward side of the levee will no longer be used to convey water. The gates are locked, and keys are available.

2.2 Levee

15. Burrowing animals present
    Marmots have been observed burrowing on this levee. Marmots and other burrowing animals were trapped and removed in 2022. Trapping continues in 2023.
16. Grass and weeds in need of mowing
    Noxious weeds have been treated in 2021 and 2022. Annual weed treatment is scheduled in June 2023.
17. Wild growth or drift deposits present
    No wild growth or drift deposits were observed.
18. Damage from erosion or other forces
    Approximately 300 linear feet of bank from Station 10+00 to 13+00 was damaged by flooding. Displaced riprap and material loss of grade had occurred. This section was rebuilt as part of the PL84-99 program in fall 2022.
19. Unusual settlement, sloughing, or material loss of grade or levee cross section.
    No unusual settlement, sloughing, or material loss of grade.
20. Caving on either the land side or the river side of the levee, which might affect the stability of the levee section.
    No caving on either side of levee.
21. Seepage, saturated areas, or sand boils
    No seepage, saturated areas, or sand boils were observed.
22. Revetment work or riprap has not been displaced, washed out, or removed
    The riprap has not been displaced or washed out.
23. Action taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod.

None

24. Access roads to and on the levee are being properly maintained
    The levee occurs in an urban setting with well-maintained roads.
25. Crown of levee is shaped to drain readily, and roadway thereon is well shaped and maintained
    The levee crown also serves as a paved trail; it is generally well maintained and drains readily.
26. Unauthorized vehicular traffic on the levee
    None
27. Encroachments on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.
    No encroachments that might affect the efficient function of the levee were observed.

2.3 Miscellaneous

None

Photo 15. Recent seeding efforts on levee slope (Clark Fork Area V Station 12+00**)**

Photo 16. Gate valve on landward side (Clark Fork Area V Station 12+00)

Photo 17. Wildlife and pedestrian trails on newly constructed (Clark Fork Area V Station 11+00)

Photo 18 Root wad and stump from vegetation removal (Clark Fork Area V Station 9+00)**.**

Photo 19. Riverside slope monitored for erosion and scour (Clark Fork Area V Station 2+00)

3. Grant Creek Levee

Inspectors: Marie Nelson, Tracy Campbell
Date: May 10th, 2023

3.1 General

3. Growth of sod, willows, and brush is encouraged. Growth of trees is prevented.
   There are many trees near the levee that need to be removed. Some of the trees are decomposing and will fall soon. A large hollow tree, located on the crown, has created a hole approximately 6 feet below the ground (station 4+00). One fallen tree is on the waterward side of the levee, which could be problematic during emergency situations (Station 5+00).
4. Fences crossing levee are properly gated and keys to locked gates are made available to the superintendent.
   No fencing along this levee.

3.2 Levee

28. Burrowing animals present
    None were observed.
29. Grass and weeds in need of mowing
    Grass needs mowing all along the waterward slope of the levee.
30. Wild growth or drift deposits present
    None were observed.
31. Damage from erosion or other forces
    There are many sections of the levee that are negatively impacted from erosion and caving. Station 5+00 has erosion at the riverward toe and scour for approximately 100 feet. Upstream. Station 8+00 has erosion near the bridge for approximately 50 feet, impacting toe of the riverward slope, some small trees (less than 6"DBH) have been uprooted.
32. Unusual settlement, sloughing, or material loss of grade or levee cross section.
    None was observed.
33. Caving on either the land side or the river side of the levee which might affect the stability of the levee section
    Caving is occurring at multiple locations on this levee.
34. Seepage, saturated areas, or sand boils
    No seepage, saturated areas, or sand boils were observed. However, there are depressions along the levee that can lead to saturated soils (Station 5+00)
35. Revetment work or riprap has not been displaced, washed out, or removed
    Riprap has been displaced near station 23+00. Multiple areas of erosion and displaced riprap were observed, due to social trails on the riverward slope.

36. Action taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod
    None
37. Access roads to and on the levee are being properly maintained
    The levee occurs in an urban setting with well-maintained roads.
38. Crown of levee is shaped so as to drain readily, and roadway thereon is well shaped and maintained
    Depressions are present on levee crown (Station 5+00)
39. Unauthorized vehicular traffic on the levee
    None
40. Encroachments on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency
    None

3.3 Miscellaneous Items

None

Photo 20. Bank conditions downstream of Stonebridge Rd (Grant Creek Station 13 +00

Photo 21. Pedestrian trail downstream of Stonebridge Rd (Station 13 +00)

Photo 22. Large trees downstream of Stonebridge Rd (Station 13 +50)

Photo 23. Directly downstream of Stonebridge Rd (Station 14 +00)

Photo 24. Bank conditions upstream of Stonebridge Rd (Station 16 +00

Photo 25. Upstream of Stonebridge Rd showing 3 large cottonwoods on slope prism (Station 17 +00)

Photo 26. Thick vegetation from trees and shrubs (Station 24 +00)

Photo 27. Pedestrian trail (Station 25 +00 **)**

4. Pattee Creek Levee

Inspectors: Carver Butterfield (Stormwater Utility)
Date: May 12th, 2023

4.1 General

5. Growth of sod, willows, and brush is encouraged. Growth of trees is prevented.
   There are many trees near the levee, but none are on the slopes of the structure. Sod cover where present is in good condition.
6. Fences crossing levee are properly gated and keys to locked gates are made available to the superintendent.
   The fencing right next to the levee is heavily damaged from tree fall.

4.2 Levee

41. Burrowing animals present
    None were observed.
42. Grass and weeds in need of mowing
    Grass along the waterward slope of the levee was not long enough to obstruct the inspection.
43. Wild growth or drift deposits present
    None were observed.
44. Damage from erosion or other forces
    No notable damage from erosion was observed.
45. Unusual settlement, sloughing, or material loss of grade or levee cross section.
    None was observed.
46. Caving on either the land side or the river side of the levee which might affect the stability of the levee section
    None was observed.
47. Seepage, saturated areas, or sand boils
    No seepage, saturated areas, or sand boils were observed.
48. Revetment work or riprap has not been displaced, washed out, or removed.
    None
49. Action taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod
    None
50. Access roads to and on the levee are being properly maintained
    The access road to the levee was maintained in 2022. Potholes are beginning to come back, but they are not excessively large yet.
51. Crown of levee is shaped to drain readily, and roadway thereon is well shaped and maintained
    Minor rutting on the levee crown due to vehicle access.

52. Unauthorized vehicular traffic on the levee
    None
53. Encroachments on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency
    A sewer manhole is present on the levee crown (Station 13+00). Dead trees on fence and waterward slope of levee and a considerable debris pile from limbs (Station 16+00) (Photo 1 and Photo 2)

Miscellaneous Items

None

Photo 28. Debris pile on riverward side of levee (Station 16+00)

Photo 29. Debris pile on riverward side of levee (Station 16+00)

5. South Hills Drainage Maintenance and Inspection Checklist

Maintenance Item	Maintenance Frequency	Date Inspected	Date Completed
Retention Basin Embankments			
Inspect for erosion/fill in any gullies found	Annual	5/23/2023	
Inspect for/Remove rodents	Annual	5/23/2023	Maintained by parks
Maintain grass cover	Routine		Maintained by parks
Remove brush	Annual		Maintained by parks
Inspect for seepage	Annual	5/23/2023	
Inspect condition of concrete structures	Routine	5/23/2023	
Grit Chamber Embankments			
Inspect for/Fill erosion gullies	Annual	5/23/2023	
Remove rodents	Annual		June 2023
Maintain grass cover	Routine	5/12/2023	June 2023
Remove brush	Annual		June 2023
Retention Basin Outlets			
Test slide gates	Annual	5/23/2023	
Lubricate slide gates	Annual		
Remove debris from around slide gates	Routine		
Remove debris from overflow structures	Routine		
Grit Chamber Outlets			
Test and inspect slide gates	Annual	April 2023	
Lubricate slide gates	Annual		
Remove debris from around slide gates	Routine		
Remove debris from overflow structures	Routine		
Grit Chamber			
Remove sediment (gravels and sand)	Annual and after flood events	5/12/2023	Fall 2023
Inspect for seepage	Annual	5/12/2023	
Inspect slide gage operation	Annual	5/12/2023	
Inspect condition of concrete structures	Routine	5/12/2023	
Storm Sewer System			
Remove sediment in pipes and inlets	As required		Throughout 2023
Remove leaves and branches from inlet grates	Annually in the fall and after flood events		Fall 2023
Honeysuckle Swales			
Remove debris from swale	Annual		
Inspect functionality	Annual	5/31/2023	

DAM OWNER'S INSPECTION CHECKLIST

NAME OF DAM:	Playfair Park
DATE INSPECTED:	05/23/2023
INSPECTED BY:	Tracy Campbell - Stormwater Superintendent Carver Butterfield - Program Coordinator Lyndsey Holloway - Environmental Technician

Reservoir Data at Time of Inspection *(Note in comments if unavailable or estimated)*	**Comments**
Water Surface Elevation *(feet)*	N/a
Distance Below Dam Crest *(feet)*	N/a
Storage *(acre feet)*	N/a
Inflow *(cfs or gpm)*	N/a
Outflow *(cfs or gpm)*	N/a

General Comments on overall dam condition
(excellent, good, fair, poor, maintenance needed)

Overall condition is good. No maintenance reqiured imminently. Detention Basins have never been activated since they were constructed in 2003

Item	**Y**	**N**	**Remarks**
A. Embankment Crest			
(1) Any visual settlements or low areas?		N	minor depressions along trail, no maintenance required
(2) Any misalignments?		N	
(3) Any cracking?		N	
(4) Any traffic damage ruts or puddles?		N	
(5) Other (describe)	YMCA fence creating erosion on crest slope		
B. Embankment Upstream Face			
(1) Any erosion?		N	
(2) Any settlement, sloughing, slumps, depressions or bulges?	Y		Very minor depressions on trail and use of pedestrian trials
(3) Trees or brush growing on slope?		N	
(4) Any stone deterioration?		N	
(5) Sinkholes?		N	
(6) Debris on the dam face?		N	
(7) Adequate grass cover?		Y	
(8) Animal burrows?		N	
(9) Other (describe)			

Item	Y	N	Remarks
C. Embankment Downstream Face/ Toe/Abutments			
(1) Any erosion?		N	
(2) Any cracking?		N	
(3) Any visual settlement, sloughing, slumps, depressions or bulges?		N	
(4) Any traffic or animal damage?		N	
(5) Adequate grass cover?	Y		
(6) Trees or Brush growing on slope?		N	
(7) Describe seepage areas.	None		
(8) Describe amount and type of vegetation on dam	Developed park with maintained grass/sod		
(9) Other (describe)			

Item	Y	N	Remarks
D. Outlet Works (visible elements)			
(1) Any settlement or tilting of outlet structures?		N	
(2) Do concrete surfaces show spalling, cracking, erosion or exposed reinforcement?		N	
(3) Metal components – corrosion or breakage?		N	
(4) Trash rack condition good? Anchor system secure?	Y		
(5) Seepage, undermining or erosion near conduit?		N	
(6) Describe condition of conduit.	Functioning		
E. Gates			
(1) Controls operational?	Y		
(2) Controls lubricated?	Y		
(3) Leakage around gates?		N	
(4) Other (describe)			

Item	Y	N	Remarks
F. Spillways			
(1) Any problems with spillway? *(Alignment, movement, undermining, slides, slumps, erosion, excessive vegetation)*		N	
(2) Any spalling, exposed reinforcement or cracking in concrete *(if present)*		N	
(3) Any obstructions in channel or approach area?		N	
(4) Any problems with discharge area or downstream channel? *(obstructions, erosion, undercutting)*		N	
(5) Other (describe)	Manhole lid for intake wielded closed		

Item	Y	N	Remarks
G. Instrumentation and Monitoring			
(1) Is instrumentation read periodically?			N/a
(2) Is data available? Note location of data and frequency of measurement. Attach datasheet if possible			N/a
(3) TOE DRAINS: Describe condition (*flowing, recently flowed, dry, damaged, clogged, etc.)*	N/a		
(4) WEIRS/FLUMES: Describe condition (*flowing, recently flowed, dry, damaged, obstructions, vegetation)*	N/a		
(5) MONITOR WELLS: Describe any problems encountered with obtaining measurements	N/a		
(6) Other (describe)			

H. Maintenance Deficiencies *List deficiencies and schedule for repair*
- Rock piles near Wier

I. Operational Problems *List operational problems and recommendations for improvement*

J. Summary of Key Items *Notes to follow-up with engineer*

Photo 30. Spillway at southwest corner of Eastern Detention Basin, looking southwest

Photo 31. Patched concrete crack at western boundary of Western Detention Basin

Photo 32. Patched concrete crack at western boundary of Western Detention Basin

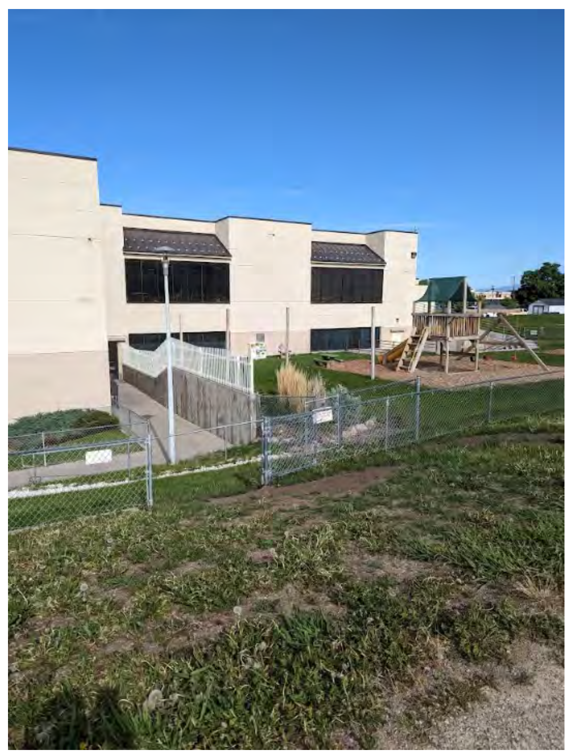


Photo 33. New fence installed at the base of western boundary of Western Detention Basin

Photo 34. Eroded slope from pedestrian trail to fence gate

Photo 35. Minor depression along western walking trail for Western Detention Basin

Photo 36. Northeast corner of Western Detention Basin looking south

Photo 37. Patched concrete wall on Western Detention Basin

Photo 38. Fence along the embankment upstream face

Photo 39. Rock piles located in weir between Western and Eastern Basins

Photo 40. More rock piles and sheds at the center of Western Detention Basin

Photo 41. Wapikiya Park, SW-INL-10455. Missing gate reattached at inspection

Photo 42. Wapikiya Park, SW-GWN-13080

Photo 43. Honeysuckle Swale, west of 23rd Ave. Pedestrian trail at toe slope

Photo 44. Honeysuckle Swale, looking east across 23rd Ave.

Photo 45. Honeysuckle Swale, west across 24th St, Vegetative growth maintained by Parks department

Photo 46. Honeysuckle Swale, looking west across S. Reserve St., SW-INL-10456

Appendix L

Public Participation

2023 PUBLIC EDUCATION and PARTICIPATION

Date	Event Name	Educational Material/ Topics Presented	Employee Facilitator(s)	# of Community Members Reached	# of Quizzes Taken	Volunteer Hours (Total)
3/1/2023	Lewis & Clark Neighborhood Council	Spring flooding and stormwater runoff - contact numbers	Marie Nelson	4		
3/2/2023	Local Governement Acadamy: Session 4	stormwater stickers and pet waste bags	Logan McInnis	30		
3/14/2023	University District Neighborhood Meeting	Spring flooding and stormwater runoff - contact numbers	Marie Nelson	9		
3/16/2023	University of Montana - Global Water Crises Course - Stormwater Guest Lecture	Stormwater management in Missoula - the good and the bad	Carver Butterfield	8		
4/25/2023	UM Sustainability Fair	NPS Pollution and Watershed Education	Lyndsey Holloway and Carver Butterfield	28		
4/22/2023	CFC Earth Day Clean Up	River discharge at Grafitti Wall	Lyndsey Holloway, Marie Nelson, Tracy Campbell	23		33
5/2/2023	Big Sky Highschool Eng class	LID design and impact of green infrastructure	Marie Nelson			
5/20/2023	Clark Fork River Market #1 - succulent giveaway	General stormwater knowledge and personalized stormwater quiz	Marie Nelson, Lyndsey Holloway	77	45	
6/10/2023	Clark Fork River Market #2 - succulent giveaway	General stormwater knowledge and personalized stormwater quiz	Marie Nelson, Carver Butterfield	52		
6/22/2023	City Chats - Franklin Park	Stormwater and aquifer general knowledge	Marie Nelson	8		
6/24/2023	Clark Fork River Market #3 - pet waste focus	Pet waste specific with game and candy. Stormwater quiz optional	Marie Nelson, Carver Butterfield, Lyndsey Holloway	206	10	
7/26/2023	City Chats - Bonner Park	General stormwater knowledge	Lori Hart	15		
8/2/2023	SWPPP Meeting at 44 Ranch with local builders	BMP usage and options for perimeter control - BMP Pocket guides	Marie Nelson, Lyndsey Holloway, Will and Aaron	8		
8/2/2023	Friends of Pattee Creek	Riparian health and citizen involvement	Marie Nelson, Lyndsey Holloway	18		
8/11/2023	Public Radio - City Talk	Stormwater questions from the public	Tracy Campbell	unknown		
8/20/2023	Sunday Streets Missoula	Pet waste specific with game and candy. General sw education.	Marie Nelson, Lyndsey Holloway	301		
8/22/2023	City Chats - Westside Park - cancelled	General stormwater knowledge	Lori Hart	12		
8/26/2023	Clark Fork River Market #4 - succulent giveaway	Stormwater quiz and general individual stormwater actions	Marie Nelson, Lyndsey Holloway	79	60	
9/9/2023	Clark Fork River Market #5	Riparian health - riparian buffer bracelets	Marie Nelson, Lyndsey Holloway	115		
9/14/2023	Moose Can & 39th Neighborhood Leadership Meeting	Cattail Corner project, how to report drainage, springs in the hills	Marie Nelson	7		
9/15/2023	Pattee Creek Project Planting	Riparian Health	Marie Nelson, Lyndsey Holloway, Tracy Campbell	8		32
9/18/2023	Pattee Creek Planting with Lewis & Clark 5th Grade Classes	General Stormwater and riparian health	Marie Nelson, Lyndsey Holloway	78		
9/27/2023	Missoula eyes on the water event - Jacobs Island	Pet Waste and Eco Friendly yard care	Marie Nelson, Lyndsey Holloway, Tracy Campbell	42		
10/14/2023	Clark Fork River Market #7	Yard debris, leaf pick up, winter water quality - free compostable leaf bags	Marie Nelson, Lyndsey Holloway	41		
11/3/2023	Big Sky Highschool Eng class (All)	Climate resiliency with stormwater infrastructure	Marie Nelson	98		
				1267	115	65

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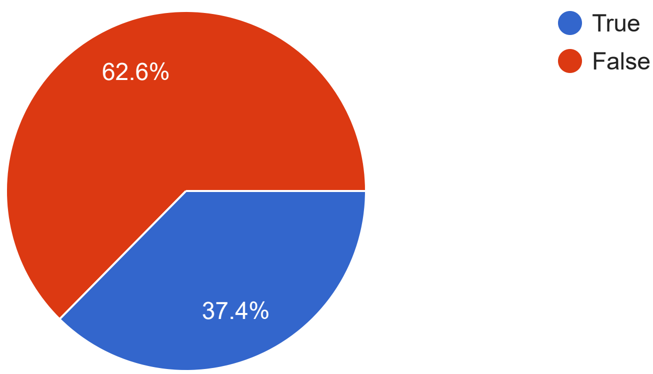
hdcurtis34@gmail.com

Stormwater from street curbs and gutters goes to the wastewater treatment plant for treatment.

Copy

115 responses



The best way to clean up an oil spill is to scrub it with detergent and hose it off into the gutter.

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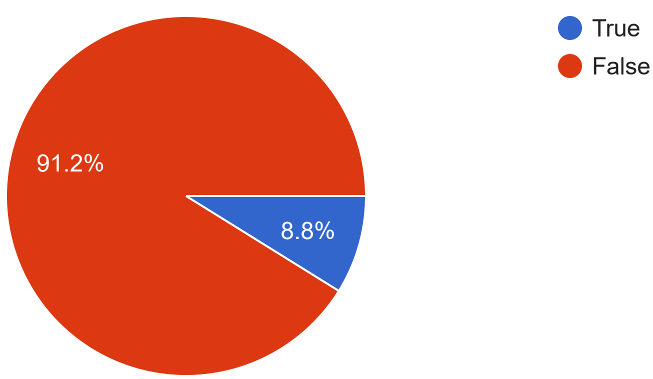
113 responses



Landscaping your yard can help reduce stormwater runoff.

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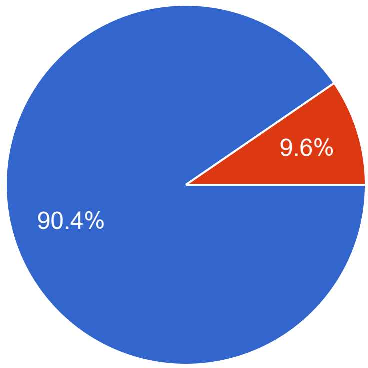
115 responses



Wastewater systems and Stormwater systems are the same thing.

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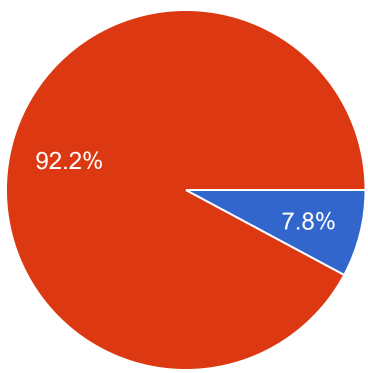
115 responses



Do you know which Missoula watershed you live in?

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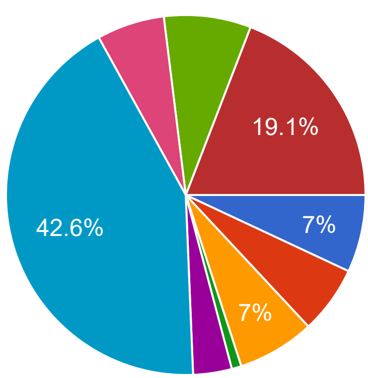
115 responses



Is it illegal to dump waste or water containing soaps, paint, cleaning products, or grease and oil into streets or storm drains?

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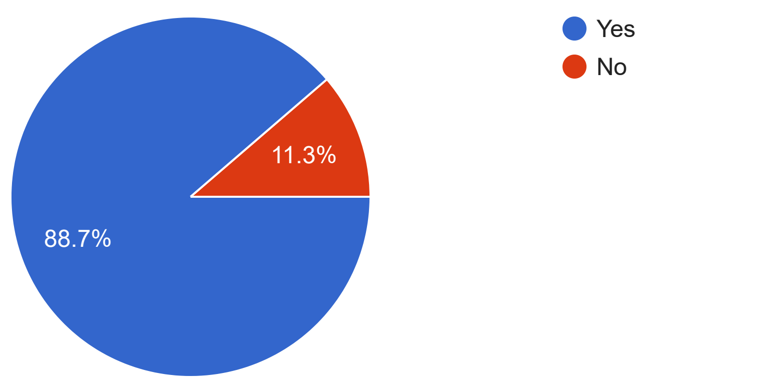
115 responses



Do you know where the stormwater drain near your home goes?

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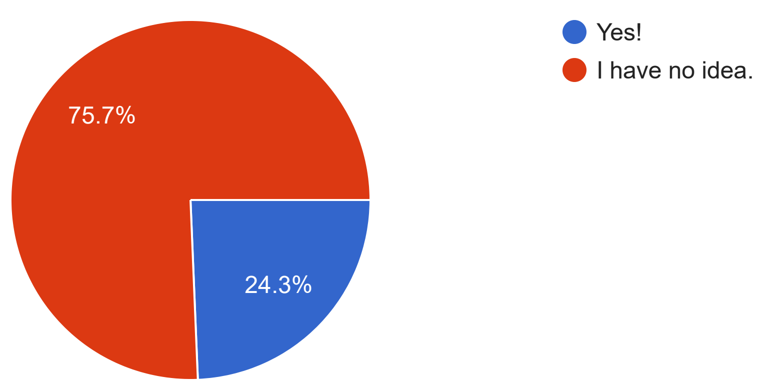
115 responses



Have you ever done or are currently doing any of the following?

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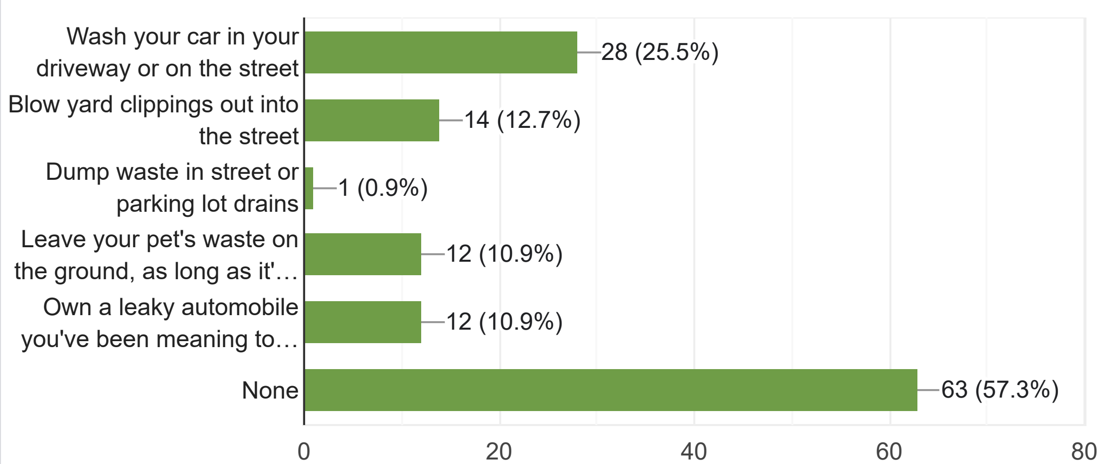
110 responses



Which of the following are major contributors to water pollution?

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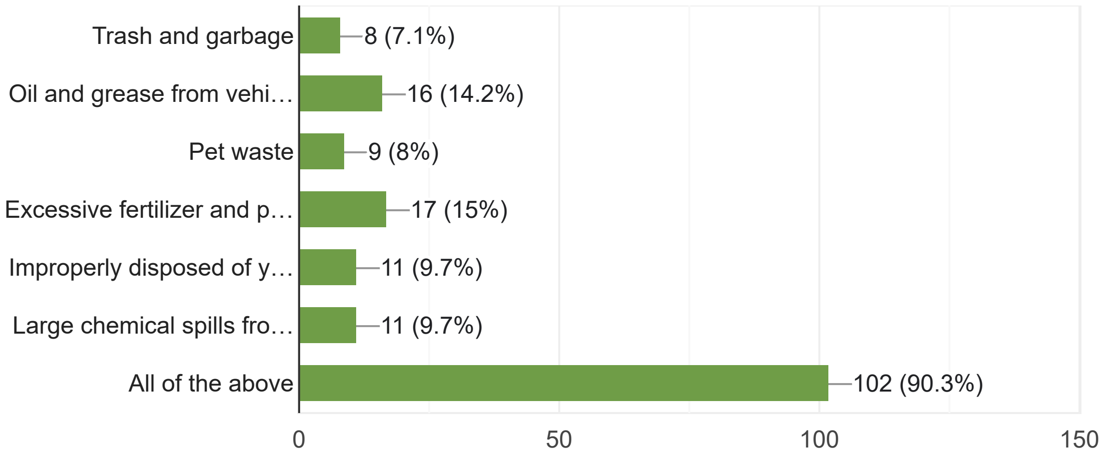
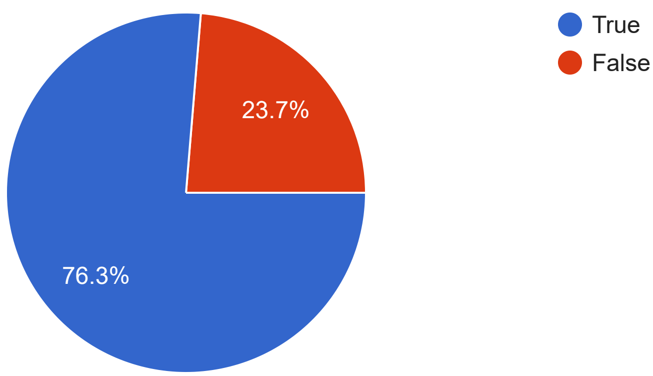
113 responses



Stormwater is the number one pollutant of waterways in Montana.

Copy

114 responses



Thank you for taking this survey and helping us make a difference for local water quality!