UNIVERSITY OF MONTANA

February 28, 2023

Attn: Mr. Eric Sivers
Montana Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, MT 59620-0901

**RE: University of Montana-Missoula MS4 2022 Annual Report**

Dear Mr. Sivers,

The University of Montana-Missoula (UM) is pleased to submit our 2022 Annual Report and supporting documentation. 2022 was a transitional year, as several of UM's storm water management team (SWMT) either terminated employment, retired, or advanced to new job positions. Despite this upheaval, UM still managed to accomplish much in the storm water realm.

Most significantly, UM was successful in obtaining a grant for decommissioning its 2 storm water outfalls. One outfall, the West Outfall, has already been decommissioned. The other, the East Outfall, is UM's largest and a project to decommission it by adding an infiltration gallery will go to bid in 2023 with construction anticipated to be complete in 2024. UM also kicked-off a student-led art project to adorn some of UM's storm drains. Two drains were decorated for Earth Day, 2022 and we hope to do several more in the coming years. Lastly, UM was able to provide maintenance on 19 of its dry wells and catch basins. We anticipate maintaining another 10 to 15 storm water control devices this year as well.

UM and the City of Missoula have begun discussing the development of a memorandum of understanding (MOU) to better define inter-agency responsibilities and cooperative efforts for storm water management. Jurisdictions and permit compliance can be conflicting and enforcement authority prominently resides with the City. The SWMT hopes to complete this in 2023 as both parties further evolve their storm water programs.

UM is excited to be making good progress in storm water management and helping to keep the Clark Fork River clear and clean as it is Missoula premiere recreational resource. Please contact Primary SWMP Coordinator Paul Trumbley at (406) 243-2127 with any questions or concerns. Thank you for your consideration.

Sincerely,

Paula Short

Paula Short
Associate Vice President
Campus Operations, Preparedness and Response

Enclosures: 2022 Annual Report

DEQ Montana Department of Environmental Quality
Water Protection Bureau
Montana Pollutant Discharge Elimination System

| Agency Use |
|---|
| Permit No.: MTR04 |
| Date Rec'd |
| Amount Rec'd |
| Check No. |
| Rec'd By |

FORM **MS4-AR**

# Annual Report Form
# Storm Water Discharges Associated with MS4s
# MTR040000

This annual report form is to be completed by each permittee authorized under the General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Water Sewer Systems (MS4s). The completed form must be electronically submitted to DEQ by March 1st of each year starting March 1st, 2023.

**Reporting Year:** ■ 2023 ☐ 2024 ☐ 2025 ☐ 2026 *(reporting period is for the preceding calendar year, Jan 1st- Dec 31st)*

## MS4 Information

| | |
|---|---|
| Permit Number | M T R 0 4 0012 |
| Small MS4 Name | University of Montana - Missoula |
| Contact Person, *(name, title)* | Paul Trumbley, Director Facilities Services |
| Mailing Address | 32 Campus Drive |
| City, State, and Zip Code | Missoula, MT 59812 |
| Phone Number, Email Address | 406-243-2127; paul.trumbley@umontana.edu |
| Authorized as a Co-permittee? | ☐ Yes: _____ ■ No |

*(If, yes provide Co-permittee MS4 name in the blank provided. Each co-permittee must submit a separate complete annual report form.)*

Is the MS4 sharing responsibility? If yes, attach written acceptance and explanation of shared obligation(s). ☐ Yes ■ No

Attach an organizational chart identifying the primary SWMP coordinator, positions responsible for implementing requirements of the permit, and contact information for each individual. ■ Attached ☐ Not Attached

## Minimum Control Measure 1 & 2

Link to storm water website: https://www.umt.edu/facilities-services/energy-and-utilities/storm-water.php

| List of four key target audiences: | Associated Pollutants: Vehicle fluids (VF), trash (TR), landscape care(LC) | Outreach strategy: |
|---|---|---|
| University Employees | Vehicle fluids (VF), trash (TR), landscape care(LC) | Stormwater awareness training |
| Students | VF, TR, animal waste (AW) | Orientation outreach, signage, website |
| Campus Visitors | VF, TR, AW | Signage, website |
| Missoula Citizens | VF, TR, AW, LC | Signage, website |

Attach documentation of participation and/or feedback of key target audiences. ■ Attached ☐ Not Attached

**Minimum Control Measure 3** *(attach the following in the order listed)*

List of potential non-storm water discharges identified as significant contributors of pollutants (i.e. illicit discharges), associated pollutants, and any local controls or conditions placed on these discharges. ■ Attached ☐ Not Attached

Have there been updates to the MS4's storm sewer maps? ■ Yes ☐ No, the map(s) were last updated: _____

If yes, submit the maps using one of the following options:

- ☐ Electronic GIS shapefiles emailed to DEQMPDESDataManagement@mt.gov
- ■ Attached Hard copy
- ☐ Link to online maps: _____

Summary of investigations and corrective actions taken over the past year per the Illicit Discharge and Corrective Action Plan. ■ Attached ☐ Not Attached

Number of outfalls inspected during dry weather: one of one *(total number of outfalls)*

Number of high priority outfalls inspected: one of one *(total number of high priority outfalls)*

Attach a summary of any resulting actions taken from screening results. ☐ Attached ■ Not Applicable

***Year 2023 only, unless updates were made:***

A copy or link to the adopted ordinance, policy, procedure, and/ or regulatory mechanism prohibiting illicit discharges. ■ Attached or ☐ Link _____

**Minimum Control Measure 4** *(attach the following in the order listed)*

List of construction sites/projects inspected over the last year and any resulting actions. ■ Attached ☐ Not Attached

***Year 2023 only, unless updates were made:***

A copy of the construction storm water management plan review checklist. ■ Attached ☐ Not Attached

A copy of the construction site inspection form or checklist. ■ Attached ☐ Not Attached

A copy or link to the adopted ordinance, policy, procedure, and/or regulatory mechanism requiring construction storm water controls. ■ Attached or ☐ Link _____

**Minimum Control Measure 5** *(attach the following in the order listed)*

Inventory of regulated projects using offsite treatment for post-construction runoff. ☐ Attached ■ Not Applicable

Number of high priority post-construction storm water management controls inspected: 1

Attach a summary of any resulting actions taken from inspections. ☐ Attached ■ Not Applicable

***Year 2023 only, unless updates were made:***

A copy of the post-construction storm water management plan review checklist. ■ Attached ☐ Not Attached

A copy of the post-construction site inspection form or checklist. ■ Attached ☐ Not Attached

A copy or link to the adopted ordinance, policy, procedure, and/or regulatory mechanism requiring post-construction storm water controls. ■ Attached or ☐ Link _____

***Year 2025 only***: Submit a plan to modify relevant codes, ordinances, policies, and/or programs to implement LID/green infrastructure concepts. ☐ Attached ☐ Not Attached

**Minimum Control Measure 6** *(attach the following in the order listed)*

Number of SOPs evaluated: nine of twenty-two *(total number of SOPs for permittee facilities/activities)*

Summary of SOP updates made in the last year. ■ Attached ☐ Not Applicable

Records of completed trainings in conformance with section II.B. of the General Permit. ■ Attached ☐ Not Attached

***Year 2023 only, unless updates were made:***

Inventory of permittee facilities/activities with potential to contribute contaminants. ■ Attached ☐ Not Attached

Summary of inspection procedures for facilities and their structural storm water controls. ■ Attached ☐ Not Attached

## Storm Water Management Plan (SWMP)

In the last year, were any public comments received on the SWMP? ☐ Yes ■ No

If yes, attach a summary of comments received. ☐ Attached ■ Not Applicable

In the last year, have additional SWMP updates been made other than those listed above? ☐ Yes ■ No

If yes, attach a summary including the date and description of updates and rationale for decision making.
☐ Attached ■ Not Applicable

## Monitoring and Reporting *(attach the following in the order listed)*

■ I verify all outfall monitoring has been performed and recorded in conformance with section II.C. and II.D. of the General Permit. *(If not able to dependably obtain two samples a year at each monitoring location, attach a summary of rationale. Contact DEQ regarding requests for a change in monitoring locations.)*

Attach a summary of implemented BMPs used to target and reduce discharges to impaired waterbodies and a schedule for the following year's BMP implementation. ■ Attached ☐ Not Applicable

***Year 2023 only, unless updates were made:*** Attach an inventory of outfalls discharging to impaired waterbodies including associated pollutants. ■ Attached ☐ Not Applicable

**MS4s with an approved TMDL:**

***Year 2023 only:*** Submit a TMDL-related sampling plan for DEQ review. ■ Attached ☐ Not Applicable

***Years 2024, 2025, and 2026***: In the last year, were any public comments received on the sampling plan? ☐ Yes ☐ No

If yes, attach a summary of comments received and any resulting actions/modifications. ☐ Attached ☐ Not Applicable

## Certification*

**All Permittees Must Complete the Following Certification:**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. [75-5-633, MCA].

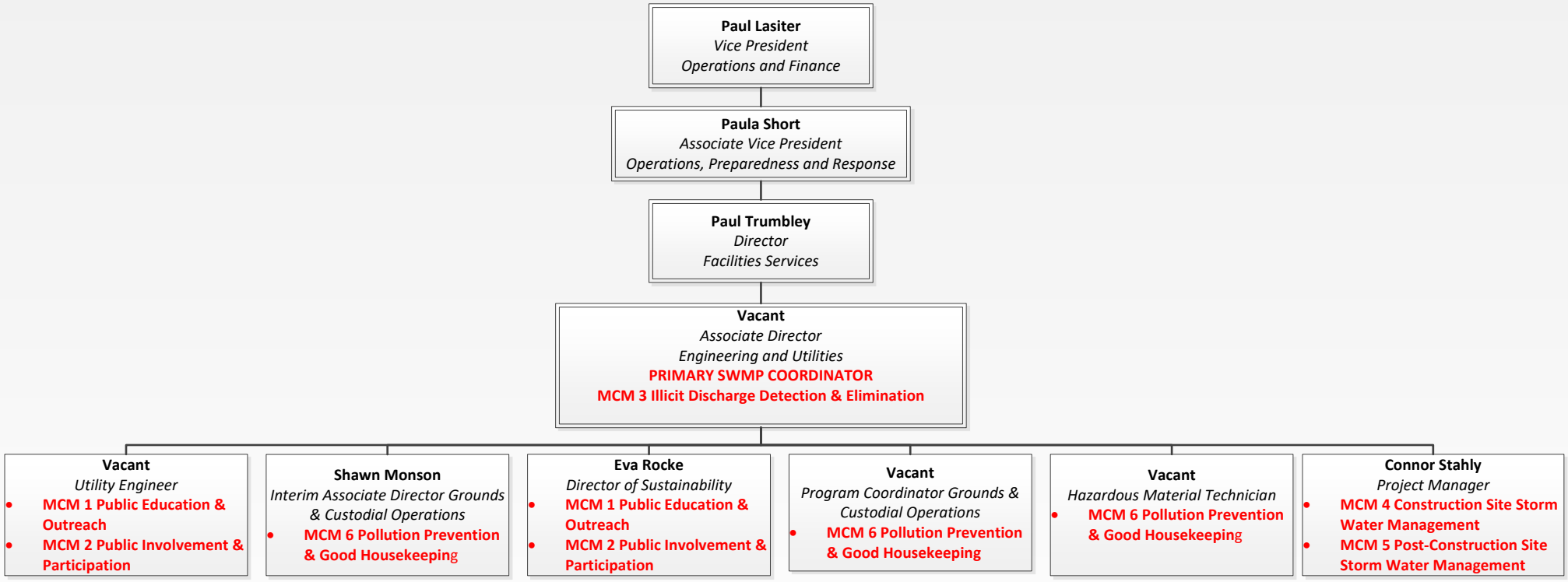
| Name (Type or Print) | |
|---|---|
| Paula Short | |
| Title (Type or Print)<br>Associate Vice President Campus Operations | Phone Number<br>406-243-5806 |
| Signature<br>Paula Short | Date Signed<br>2/28/2023 |

* This Annual Report Form must be completed, signed, and certified as follows:

- For a corporation, by a principal officer of at least the level of vice president;
- For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
- For a municipality, state, federal, or other public facility, by either a principal executive officer or ranking elected official.

# The University of Montana Small MS4 2022 Annual Report
# Table of Contents

# Small MS4 2022 Annual Report
# Attachment 1
# University of Montana – Missoula
# MS4 Storm Water Management Team




**Updated February, 2023**

# Small MS4 2022 Annual Report
# Attachment 2
# Key Target Audience Participation/Feedback

Since inception of its stormwater management, UM has endeavored to include various stakeholder groups in periodic management meetings. Groups represented include: employees, faculty, students, municipal administrators and Missoula citizens. Stakeholder group meetings occur 2 to 4 times a year. Meetings address pertinent updates to the SWMP, any related activities that have occurred since the prior meeting, updates on construction activities, and future plans and ideas as to improving best management control measures. In 2022, the stakeholder group met twice – on 3/11/2022 and 6/10/2022. Meetings were conducted as a mixture of Zoom plus in-person. Minutes are attached.

In addition to meetings, the University conducted its first storm sewer art project. Two storm grates in the high-traffic area of the Library and Student Union were decorated by University and local artists for Earth Day, 2022. The two projects were a collaborative effort. Photos attached.

The University, in collaboration with the City of Missoula and the non-profit, Watershed Education Network, host a public storm water information event once or twice a year. These are educational outreach tabling events with aquifer demonstration models and watershed quizzes (with prizes!). These are held in conjunction with other sustainability/conservation groups at the University Oval during Earth Day and a fall Sustainability Day.

Lastly, students frequently participate in stenciling the University's storm water drains during an annual "service day."

# Municipal Separate Storm Sewer Systems (MS4) Stakeholders Group
# 03/22/2022 Meeting Minutes

Agenda for 03/22/2022 Meeting:

1. 2021 Annual Report Submission
    a. Standard Operating Procedures
2. UM MS4 Permit Developments
    a. New Permit Review
3. Collaborative Public Education Events
    a. Storm Drain Art Project
    b. Earth Day 2022
4. Construction Updates
    a. Montana Museum of Art & Culture Project
    b. New Dining Hall Project
5. Low Impact Development Collaboration on intersection of Kim Williams Trail & Van Buren walking bridge
6. New dog pick-up signage
7. Stakeholders Group Continued Participation
    a. Next Meeting - Quarterly on Tuesdays, 10-11 AM. Next one is 6/14/2022
    b. Other stakeholders?

Meeting was conducted via Zoom and in-person in Facilities Service's large conference room. See attendee list below.

1. Trumbley & Kerns updated the group on UM's submission of the 2021 annual report. Trumbley encountered some difficulties in trying to upload the UM document which was very large and the DEQ designated submission system couldn't swallow it, so Trumbley sought assistance from DEQ personnel. UM submitted on 3/1/22 although the submission website showed a due date of 3/15. Kerns asked Noland if the City experience any difficulties with their submission but Noland was unaware of any issues.

2. Trumbley received documents from DEQ to apply for the new stormwater permit. A notice of intent must be received by DEQ by May 1. Several MS4's, including Missoula, had submitted comments to the DEQ critical of the requirements of the new permit. Noland said that the comments were essentially ignored by DEQ since the previous permit had been legally challenged and prevailed.

3. Kerns advised the group of a storm drain art project that UM is trying to establish. UM sophomore Terra Honaker has stepped-up with some great ideas to involve some high school teenagers and UM art students. Honaker is putting together a Call for Artists and she believes that we could get 7 to 10 installations done this year in time for Earth Day. Honaker is interested in spearheading this effort in the years to come. Trumbley met with fiscal director Jill Johns and she is familiar with how we might go about paying students for installing the artwork. UM is budgeting about $3k.
   Rocke thought that the art effort could be supported by social media, perhaps with some additional prize money. Could take photos of the art work and let folks vote on them. Rocke also stated that the Earth Day oval

tabling event is scheduled for Tuesday, 4/19, due to other activities on the Oval during the balance of the Earth Day week. The City of Missoula is interested in tabling.

Missoula County's Shane Stack joined the meeting late and so the group went around with short introductions.

4. Kerns explained the Montana Museum of Art and Culture project would remove UM's west outfall system by installing new dry wells. Trumbley mentioned that there was not adequate design to pick up drainage from the PARTV roof leaders.
   Stahly explained to the group the New Dining Center project and some of the protection devices in use, namely vehicle trackpads which attempt to capture dirt and mud on-site.

5. Kerns discussed the on-going City/UM meetings on the Kim Williams/Van Buren intersection. Tracy Campbell had visited the site with City engineers Andy and Adam and Campbell put out a email stating some of the engineers' observations which generally favored re-contouring the site to push drainage into the grassy areas.

6. UM's new dog waste signage is on the Labor Departments schedule for installation which should occur within the next few weeks.

7. Kerns ended the meeting by noting the next scheduled meeting is 6/14/22.

**Attendees:**
Missoula City: Marie Noland
Missoula Valley Water Quality District: none
Missoula County: Shane Stack
ASUM: none
UM Faculty: none
UM Sustainability Director: Eva Rocke
UM Facilities Services: Paul Trumbley, Tim Elliott, Ian Hamilton, Connor Stahly, Shawn Monson, Brian Kerns

Submitted by:
B. P. Kerns
04/11/2022

# Municipal Separate Storm Sewer Systems (MS4) Stakeholders Group
# 06/14/2022 Meeting Minutes

Agenda for 06/14/2022 Meeting:

8. Collaborative Public Education Events
    a. Storm Drain Art Project Debrief
    b. Looking forward to fall Sustainability Day, 2022
9. Construction Updates – PaveDrain installations @
    a. Montana Museum of Art & Culture Project
    b. New Dining Hall Project
10. Low Impact Development Collaboration on intersection of Kim Williams Trail & Van Buren walking bridge
11. American Rescue Plan Act (ARPA) grant
12. Stakeholders Group Continued Participation
    a. Next Meeting - Quarterly on Tuesdays, 10-11 AM. Next one is 9/6/2022

Meeting was conducted via Zoom and in-person in Facilities Service's large conference room. See attendee list below. With school out for summer, participation was light as students and most faculty were not in attendance.

8. Kerns discussed the outcome of the storm sewer art project and showed photos of the 2 works. Need to plan more in advance to get the word out to the artist community. Conducting this around Earth Day may not be the best due to end-of-semester student work loads and variable weather. May be best to conduct in fall, perhaps around the Sustainability Fair.

9. Kerns briefly discussed the installation of PaveDrain permeable pavers at the UM new dining facility and the Montana Museum of Art and Culture. Both installations are small but will provide valuable experience in their operation and maintenance.

10. Kerns discussed the on-going City/County/UM meetings on this important pedestrian/bike trail intersection. Participants and scope keep expanding. Missoula County's Shane Stack said that his crew inspected the bridge over the irrigation channel and consider the wooden understructure in good condition. The County expects to re-asphalt the bridge later this summer.

11. Campbell talked about the City's experience with the first round of ARPA grant funding. She said that while the award was made rather quickly, the fact that MEPA was required added about 1 year to the process. Trumbley asked about the stormwater consultants the City uses and Campbell replied that they issued an RFQ and selected Morrison Maierle, WGM and Herrera as their design contractors and that Morrison Maierle was previously chosen to design the Cara Park Phases 1 & 2.

12. Item not on the Agenda – Missoula College on E. Broadway is situated right on the Clark Fork riverbank and also right upon a former dump site. River bank erosion is beginning to expose some of the debris. A walkthrough is to scheduled in the next few weeks to bring together UM Grounds, Missoula Conservation District and a UM watershed expert to review the area and begin assembling a mitigation plan.

13. Item not on the Agenda – Trumbley provided the group with an outline of what the UM stormwater program hopes to accomplish in the coming year which is to re-engage with the City and Water Quality District to hammer out cooperative responsibilities regarding construction, post-construction and enforcement.

14. Kerns ended the meeting by noting the next scheduled meeting is 9/6/22.

**Attendees:**
Missoula City: Tracy Campbell
Missoula Valley Water Quality District: Todd Seib
Missoula County: Shane Stack
Clark Fork Coalition: Sam Dwyer
ASUM: none
UM Faculty: Vicki Watson
UM Sustainability Director:
UM Facilities Services: Paul Trumbley, Tim Elliott, Ian Hamilton, Connor Stahly, Shawn Monson, Brian Kerns

Submitted by:
B. P. Kerns
06/16/2022

# UM Storm Drain Art Project Photos






# Photo from Earth Day, 2022

# Small MS4 2022 Annual Report
# Attachment 3
# List of Potential Significant Contributors of Pollutants

Tables B-1 (Non-Storm Water Discharge Evaluation) and B-2 (Occasional Incidental Non-Storm Water Discharge Evaluation) in the Storm Water Management Plan (SWMP) identified 24 potential contributors of pollutants. Of these 24, only one was identified as possibly "significant" and this was "hydrant flushing." Annual testing of the University's fire hydrants is required by law. UM developed a Standard Operating Procedure #11 to manage the discharge and to redirect the flows where possible. The following is excerpted from SOP #11:

## BEST MANAGEMENT PRACTICES

1. Locate all storm drain collection structures and inlets prior to starting work.
2. Use temporary catch basin protection when necessary.
3. Know the project sites runoff patterns and the immediate area stormwater drainage system.
4. Direct hydrant flow into grassy areas or dry wells whenever possible.
5. If necessary install inlet filter to protect runoff when it enters piped storm system.

## THE FOLLOWING PROCEDURES SHOULD BE FOLLOWED FOR EACH LISTED ACTIVITY

### Fire Hydrant Testing

UM Plumbers are responsible for testing all fire hydrants at the University of Montana main campus. A variety of pollutants can be introduced to the storm water system and nearby surface waters while testing hydrants. Implement the following procedures to minimize the potential for storm water pollution during the testing process:

1. Direct hydrant flow into grassy areas and dry wells.
2. Avoid blowing hydrant into landscape beds to prevent runoff of bark and mulch beds
3. Cleanup organic material if necessary
4. If unable to direct flow away from bark and mulch beds, then install diverter plywood or similar to keep mulch in place when flowing hydrant

# Small MS4 2022 Annual Report
# Attachment 4
# Summary of Investigations of Illicit Discharges

In 2022, the University did not discover any illicit discharges in campus. There are always some spots of vehicle fluids in parking areas but these are always small and would be impossible to trace to the offending vehicle unless an active leak is witnessed (which has happened).

# Small MS4 2022 Annual Report
# Attachment 5
# Illicit Discharge Procedure

The University is located within the jurisdiction of the Missoula Valley Water Quality District (WQD) and the City of Missoula. As such, the WQD and City have jurisdiction to regulate illicit discharges and implement enforcement mechanisms for noncompliance on Campus. For instance:

1. Title 13.27.200 and 13.27.210 of the Missoula Municipal Code prohibits illicit discharges, identifies non-storm water discharges that are exempt from the requirement, and prohibits illicit connections.
2. The WQD responds to illicit discharge complaints and conducts illicit discharge investigations within the WQD boundary (WQD boundary includes the University's Campus).

Considering this information, the SWMT is conducting ongoing research and coordinating with the City and WQD to better understand their respective IDDE programs prior to further developing UM's IDDE program to address regulatory-related requirements. UM may consider developing a memorandum of understanding (MOU) with the City and WQD to better define roles and responsibilities relating to IDDE program implementation within UM's MS4-regulated area. The SWMT's planned activities to further develop the IDDE program is provided **in Table J-3 of Appendix J.**

Currently, the University provides internet links to the WQD's website where illicit discharges may be reported and investigated by the WQD.

# Small MS4 2022 Annual Report
# Attachment 6
# Construction Projects Inspected

1. Dining Facility – This project involved the demolition of parts of two buildings (Craig Residence Hall & Lommasson Center) as well as a reconfiguration of a pedestrian mall. This project was inspected monthly (January through June) by UM Utility Engineer. Construction storm water control measures were found to be adequate and no actions were taken.
2. Montana Museum of Art and Culture – This project's footprint is on top of part of Parking Lot P (UM's largest lot). It is in a high priority area as it is close to the Clark Fork River. One of UM's 2 storm water outfalls, the West Outfall, is also in the vicinity but this construction project literally sits on top of the storm drain system. Construction activities resulted in the decommissioning of the West Outfall. In place of the storm water system, additional dry wells were constructed to capture storm water runoff and infiltrate the water into the aquifer. UM has also incorporated the PaveDrain system of permeable pavers in pedestrian mall areas to capture and infiltrate storm water runoff. This project was inspected monthly (January through June) and construction storm water control measures were adequate. No actions.
3. Combined heat and power plant – An additional, adjacent pre-fab metal building is being constructed next to the University's existing heating plant. This project falls outside of the criteria established by the City of Missoula to be permitted and monitored for storm water, therefore, inspections were not conducted.
4. Knowles Residence Hall Renovation – This project is primarily an internal renovation of an existing residence hall. This project falls outside of the criteria established by the City of Missoula to be permitted and monitored for storm water, therefore, inspections were not conducted.

# Small MS4 2022 Annual Report
# Attachment 7
# Construction Management Plan Review Checklist

The University of Montana resides within the jurisdictional control of the City of Missoula for construction regulations. As such, the City exerts authority over construction projects that occur on the University campus. The City reviews, approves and issues construction permits. The University and the City recognizes that the University's MS4 permit presents a grey area as to the responsibility of oversight for construction and post-construction storm water activities. The parties are currently negotiating a Memorandum of Understanding to better define where responsibility resides for such storm water activities. The University's Storm Water Management Team reviews the Storm Water Pollution Protection Plans that the City has already reviewed and approved. A copy of the City's review checklist is attached.

rev. Feb. 4, 2021

# Erosion Control Site Plan Checklist

(to be completed by the applicant/owner)

**Date: _____**

**Project Name: _____**

**Address: _____ Zip Code: _____**

**Project Area (square feet): _____**

**Disturbance Area (square feet): _____** **Phone Number: _____**

**Applicant/Owner Name:**

**Applicant/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 storm water into drainage systems and waterbodies, including the Missoula aquifer. The regulation of storm water includes construction storm water 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 Storm Water Discharges Associated with Construction Activity.

An Erosion Control Site Plan may include the following, *as applicable* to the site and project. This checklist is intended to inform your decisions regarding applicable best management practices (BMPs) for your site.

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.

| | | | **Delineation of Work Area** |
|---|---|---|---|
| | **Applicant** | **NA** | Separate plan sheets are required to show the measures to be implemented at the grading stage (e.g., grading, foundation/retaining walls) and at the construction stage. |
| | | | Show 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. |
| | | | Show boundary lines of the entire site and vicinity of the site relative to surrounding areas. Use appropriate scale to show adequate level of detail and show north arrow. |
| | | | The location of all existing buildings, structures, easements, or underground utilities. |
| | | | 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. |
| | | | Location, width, direction of flow and approximate location of top and toes of banks of any waterbodies. |
| | | | Protect surface water locations, providing primary control measures (e.g., silt fence along outer buffer zone of creek; do not disturb riparian areas) and secondary control measures (e.g., fiber rolls) in disturbed areas sloping toward a waterbody. |

| | | | Delineation of Work Area (continued) |
|---|---|---|---|
| | **Applicant** | **NA** | Protect storm drain inlets using fiber rolls, permeable rock sacks, or other measures that keep sediment from entering the drain. Show inlet locations and protection measure details. Include that filter fabric or filter baskets shall be installed in the drains and 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. |
| | | | Location and types of existing vegetation on the site. 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. |
| | | | Maximize and protect areas to be undisturbed (including sensitive areas and buffer zones), using a vegetative buffer strip or 6-foot fence/barrier. Show the "limits of work" and barriers along the "limit". Forbid work, storage, earth moving, vegetation clearing, and other disturbances outside of the "limit". Do not use hay bales as these can easily fall apart. |
| | | | Prevent runoff to off-site areas using perimeter controls (diversion berms, silt fencing, and/or fiber rolls). Silt fencing is preferred, but fiber rolls may work in some instances. Where the site is flat or the slope is gentle, installing these measures on the property line should be adequate. On slopes greater than 3:1, the measures must be installed along contour lines. |
| | | | **Prevent Erosion of Unstable or Bare Areas** |
| | | | Areas of the site currently experiencing or susceptible to erosion problems. |
| | | | Existing drainage patterns and direction of flow. |
| | | | Show all areas that will be used for stockpiling earth and storing construction materials. |
| | | | Indicate the location and method for stabilizing disturbed bare earth areas. Use seeding and/or mulching and the following, as necessary:<br>i) For slopes less than 3:1, provide silt fencing or fiber rolls along contour lines. ii) For slopes greater than 3:1, anchored erosion blankets (rice, straw, or coconut) and fiber rolls or silt fencing at the crest are required. Jute netting is preferred when used with seeding. |
| | | | Use diversion berms to divert water from unstable or denuded areas (e.g., top and base of a disturbed slope, grade breaks where slopes transition to a steeper slope). |
| | | | Direct water from construction areas to designated temporary filtration/detention areas. Show any temporary detention areas for storm water and stabilization of those areas. |
| | | | 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. |
| | | | Location of proposed vegetative erosion control measures (e.g., temporary and final seeding and landscaping), including type, quantity, planting schedule, and irrigation. |
| | | | **Show Locations of Logistics Areas** |
| | | | Show location of office trailer(s), storage sheds, temporary power pole, scaffold footprint, and other temporary installations. Show how they will be accessed and show protection of the access routes. |
| | | | Show location of utility trenches, indicate utility types, and identify timing of installation. |
| | | | **Construction Access Routes** |
| | | | Use stabilized designated access points for entrance onto the property. If using an existing paved driveway, identify it. Where vehicles or equipment will travel from an existing paved driveway to unpaved areas within the property, a stabilized transition point is required. |
| | | | Provide designated area(s) for parking of construction vehicles, using aggregate over geotextile fabric. |

| | | | Construction Access Routes (continued) |
|---|---|---|---|
| | **Applicant** | **NA** | |

| | | | |
|---|---|---|---|
| | | | Show all access roads/ramps and access points used by excavation equipment, trucks, or fork lifts/crane access (second floor construction). For unpaved routes, use ridges running diagonally across the road that run to a stabilized outlet. The type of materials used for stabilization and their locations shall be indicated. Materials for this purpose are required to be stored on-site. |
| | | | **Containment of Construction Materials and Waste** |
| | | | Show 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. |
| | | | Show location of portable toilets away from surface water locations and storm drain inlets. |
| | | | Show storage location and containment of construction materials during work, as well as afterhours/weekends. Show the location of lumber, gravel, and materials storage areas. Show how they will be accessed and show protection of the access routes. |
| | | | Show areas and proposed protection of temporary stockpiles using anchored-down plastic sheeting in dry weather. Alternatively, in wet weather, or for longer storage, use seeding and mulching, soil blankets, or mats. |
| | | | Indicate the location of refuse piles and debris box locations. Show how they will be accessed and show protection of the access routes. |
| | | | **Construction Schedule** |
| | | | Provide an anticipated construction schedule and/or construction duration (in weeks or months). |
| | | | **Add the Following Standard Comments** |
| | | | Point of contact. (Please provide a point of contact including name, title/qualification, email, and phone number. The point of contact will be the City's main point of contact if corrections are required). |
| | | | Perform clearing and earth-moving activities only during dry weather. 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 yearround. Stabilize all denuded areas and maintain erosion prevention measures continuously between from March 1 through November 1. |
| | | | Store, handle, and dispose of construction materials and wastes properly, to prevent their contact with storm water. No materials shall be stored on the street. |
| | | | 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. |
| | | | Use sediment controls or filtration to remove sediment when dewatering site and obtain federal and state permits, as necessary. |
| | | | 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. |
| | | | Train and provide instruction to all employees and subcontractors regarding the current version of the Montana Department of Environmental Quality Field Guide for Best Management Practices. |
| | | | Placement of erosion prevention materials at these locations is required on weekends and during rain events: (List locations) |
| | | | **Standard Comments (continued)** |
| | **Applicant** | **NA** | The areas delineated on the plans for parking, grubbing, storage, etc., shall not be enlarged or "run over." |
| | | | |

| | | | |
|---|---|---|---|
| | | | Construction sites are required to have erosion prevention and sediment control materials on site during the “off-season.” |
| | | | 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. |

Notes

# Small MS4 2022 Annual Report
# Attachment 8
# Construction Site Inspection Checklist

The University of Montana resides within the jurisdictional control of the City of Missoula for construction regulations. As such, the City exerts authority over construction projects that occur on the University campus. The City reviews, approves and issues construction permits. The University and the City recognizes that the University's MS4 permit presents a grey area as to the responsibility of oversight for construction and post-construction storm water activities. The parties are currently negotiating a Memorandum of Understanding to better define where responsibility resides for such storm water activities. The University's Storm Water Management Team reviews the Storm Water Pollution Protection Plans that the City has already reviewed and approved. A copy of the City's inspection checklist is attached.

MISSOULA
PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Jan 6, 2021

Pass Fail

# Construction Site Inspection Form

**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 storm water 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 storm water 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 storm water 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-storm water discharges (e.g., wash water, dewatering) properly controlled? | ❑Yes ❑No ❑ N/A | ❑Yes ❑No ❑ N/A | |
| 14 | Are materials that are potential storm water 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

# Small MS4 2022 Annual Report
# Attachment 9
# Procedure Requiring Construction Storm Water Controls

The University of Montana resides within the jurisdictional control of the City of Missoula for construction regulations. As such, the City exerts authority over construction projects that occur on the University campus. The City reviews, approves and issues construction permits. The University and the City recognizes that the University's MS4 permit presents a grey area as to the responsibility of oversight for construction and post-construction storm water activities. The parties are currently negotiating a Memorandum of Understanding to better define where responsibility resides for such storm water activities. The University's Storm Water Management Team reviews the Storm Water Pollution Protection Plans that the City has already reviewed and approved. A copy of the City's permitting procedure is reproduced below:

Home › Departments › Public Works & Mobility › Stormwater › Construction Permits

## Construction BMP's & Permits

***** PLEASE NOTE: If your Building Permit submittal does not contain the required supplemental Stormwater documents, your Building Permit WILL BE DELAYED.*****

**If you were directed here from the Accela Citizen Access (ACA) website your project is disturbing 2,500 sqft or more of ground. Please follow the steps below to ensure you are submitting the correct supplemental documents with your Building Permit.**

**STEP 1: Review** the Stormwater Permit Instructions and Fees. ***Please do not skip this step*** *as it will answer many questions you may have about the new permitting process.*

**STEP 2: Fill out** the Stormwater Site Evaluation Form to learn your projects Site Evaluation score of Low, Medium, or High.

**STEP 3: Refer** to the list below that corresponds to your Site Evaluation Score;

# Small MS4 2022 Annual Report
# Attachment 10
# Post-Construction Storm Water Plan Review Checklist

The University of Montana resides within the jurisdictional control of the City of Missoula for construction regulations. As such, the City exerts authority over construction projects that occur on the University campus. The City reviews, approves and issues construction permits. The University and the City recognizes that the University's MS4 permit presents a grey area as to the responsibility of oversight for construction and post-construction storm water activities. The parties are currently negotiating a Memorandum of Understanding to better define where responsibility resides for such storm water activities. The University's Storm Water Management Team reviews the Storm Water Pollution Protection Plans that the City has already reviewed and approved. A copy of the City's post-construction storm water management plan review checklist is attached.

PUBLIC WORKS & MOBILITY DEPARTMENT – STORMWATER
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6357

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 | | | | |

# Small MS4 2022 Annual Report
# Attachment 11
# Post-Construction Site Inspection Checklist

The University of Montana resides within the jurisdictional control of the City of Missoula for construction regulations. As such, the City exerts authority over construction projects that occur on the University campus. The City reviews, approves and issues construction permits. The University and the City recognizes that the University's MS4 permit presents a grey area as to the responsibility of oversight for construction and post-construction storm water activities. The parties are currently negotiating a Memorandum of Understanding to better define where responsibility resides for such storm water activities.

The University's Storm Water Management Team assumes responsibility for inspecting and maintaining post-construction storm water management controls. Post-Construction devices are primarily dry wells and the following checklist has been used:

UNIVERSITY OF MONTANA
Storm Water Management Program

# Inspection Form – Dry Well and Deep Sump Catch Basin

## General Information

| | |
|---|---|
| Facility Name/Number: | Type of Best Management Practice (BMP):<br>☐ Dry Well ☐ Deep Sump Catch Basin |
| High Priority Stormwater Control? ☐ Yes ☐ No | |
| Depth of Basin (distance from top of grate to floor of structure) | |
| Design Depth: | Current Depth: |
| Latitude: | Longitude: |
| Date of Inspection: | Inspector's Name: |

Type of Inspection:

☐ Routine, dry weather ☐ Routine, Wet Weather

☐ Complaint ☐ Other

## Weather Information

Weather at time of this inspection:

☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog

☐ Snow ☐ High Winds ☐ Other: _____

Temperature: _____

Do you suspect that any physical changes or damages to the BMP may have occurred since the last inspection?

☐ Yes ☐ No

If yes, provide description of physical changes or damages:

Are there any storm water discharges at the time of inspection (i.e., discharge from an outlet)?

☐ Yes ☐ No

If yes, provide location(s) and a description of storm water 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 (i.e., chemicals, oils, or other illicit discharges flowing into the BMP)?

☐ Yes ☐ No

If yes, please provide location(s) and a description:

Inspector's Signature: _____ Date: _____

| Primary Components | Inspection Item | Desired Conditions | Maintenance Needed? | Required Corrective Action/Notes |
|---|---|---|---|---|
| General | Accessibility | Maintenance access is not obstructed. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Fix, repair, or replace.<br>☐ Other: |
| | Contaminants & Pollution | Trash and debris are not accumulated within or around the facility and there is no evidence of oil, gasoline, contaminants, or other pollutants. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Other: |
| | Erosion Control | Upstream channels show no signs of erosion. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Reseed and/or stabilize upstream channels.<br>☐ Other: |
| | Sedimentation | The contributing drainage area is stabilized and not contributing excessive amounts of sediment. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Reseed and/or stabilize drainage area.<br>☐ Other: |
| Inlet | Structural Damage | The inlet or grate is not missing, damaged, clogged, or defective. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Fix, repair, or replace.<br>☐ Other: |
| | Flow | There is evidence of flow into the well/basin. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Check whether the gutter, inlet pipe, downspout, or flow diverter is clogged.<br>☐ Clear and remove debris.<br>☐ Other: |
| Basin/Sump | Structural Damage | The basin/sump is not damaged or defective. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Fix, repair, or replace.<br>☐ Other: |
| | Drainage | Standing water is not present after the design drain time.<br>The observed drain time is approximately ____ hours. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Recheck to determine if there is standing water after 72 hours.<br>☐ Remove any sediment buildup and replace the stone fill if necessary.<br>☐ Other: |
| | Sediment / Debris | Excessive sediment or debris are not present in the inspection port. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Other: |
| | Odor | There is no odor present. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Other: |
| | Overflow | There is no overflow from the top of the well/basin. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Remove any sediment buildup.<br>☐ Other: |
| Outlet (Deep Sumps Only) | Structural Damage | The outlet pipe is not clogged or damaged. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove debris.<br>☐ Fix, repair, or replace.<br>☐ Other: |

# Photo Log

| | |
|---|---|
| [photo here] | [photo here] |
| **Photo 1. [Description]** | **Photo 2. [Description]** |
| [photo here] | [photo here] |
| **Photo 3. [Description]** | **Photo 4. [Description]** |

# Small MS4 2022 Annual Report
# Attachment 12
# Procedure Requiring Post-Construction Storm Water Controls

The University of Montana resides within the jurisdictional control of the City of Missoula for construction regulations. As such, the City exerts authority over construction projects that occur on the University campus. The City reviews, approves and issues construction permits. The University and the City recognizes that the University's MS4 permit presents a grey area as to the responsibility of oversight for construction and post-construction storm water activities. The parties are currently negotiating a Memorandum of Understanding to better define where responsibility resides for such storm water activities.

Missoula Municipal Code Chapter 13.27, the Clean Water Act, and the National Pollutant Discharge and Elimination System all require post-construction storm water controls to be inspected. Missoula Municipal Code, chapter 13.27.470 is reproduced below:

### 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.

A. When required, 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 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 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 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. 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 with submission of the Stormwater-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 stormwater system will be maintained by the owner or operator, such that the facility will function as designed in perpetuity. (Ord. 3580, 2016; Ord. 3659, 2020)

# Small MS4 2022 Annual Report
# Attachment 13
# Summary of SOP Updates in 2022

The University's Standard Operation Procedures (SOPs) were fully issued in 2021 with training on the SOPs also conducted in 2021. Given the feedback received in the training sessions, certain (listed below) were re-evaluated and revised to incorporate some of the suggestions. Below are the SOPs revised:

| SOP Type | SOP | SOP # | Date of Last Update | Update Comments |
|---|---|---|---|---|
| Facility-SOPs | Facilities Services Compound | 1 | | |
| | Motor Vehicle Shop | 2 | 6/12/2022 | Personnel, spill kit, procedures, Hazmat Team |
| | Grounds and Labor Shop | 3 | 6/12/2022 | Scope, personnel, responsibilities, Hazmat Team, CMMS |
| | Parks and Open Spaces | 4 | | |
| | Streets and Parking Lots | 5 | | |
| | Snow Storage Areas | 6 | | |
| Activity-SOPs | Building Maintenance | 7 | 6/12/2022 | Procedural edits |
| | Equipment Storage and Maintenance | 8 | 6/12/2022 | Scope increase |
| | Event Facilitation and Response | 9 | | |
| | Ground Maintenance | 10 | | |
| | Hydrant Flushing | 11 | | |
| | Recycling | 12 | | |
| | Snow Storage | 13 | 6/12/2022 | Storage locations |
| | Storage of Hazardous Chemicals | 14 | 6/12/2022 | Added pollutants, reviews, locations |
| | Storage of Salt/Sand | 15 | | |
| | Street and Parking Lot Maintenance | 16 | | |
| | Supply Well Development | 17 | | |
| | Utility Maintenance | 18 | | |
| | Vehicle and Equipment Storage | 19 | 6/12/2022 | Adjusted responsibilities, map |
| | Vehicle Maintenance | 20 | 6/12/2022 | Pollutants, edited BMPs, reporting |
| | Waste Handling and Disposal | 21 | | |
| | Winter Street and Parking Lot Maintenance | 22 | 6/12/2022 | Pollutants, procedures |

# Small MS4 2022 Annual Report
# Attachment 14
# Completed Trainings in 2022

6 newly-hired employees received Storm Water training for Field and Facility Personnel on 3/7/2022

5 newly-hired employees received Storm Water training for Field and Facility Personnel on 5/9/2022

# MGbK+ÅIÅOÅ

## TRAINING DOCUMENTATION FORM

Date: 2/7/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 15:30 Location: Facilities Services Front Conference Room

| | Name (Print) | Signature |
|---|---|---|
| 1 | Andrew Williams | |
| 2 | revoc Low | |
| 3 | Kevin Mathison | |
| 4 | Bryant | |
| 5 | ouol | |
| 6 | I-bf Sheds | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |

Instructor Signature:

Title: em-ZunUUv

**M'GbiG+Åliv0Å**

# TRAINING DOCUMENTATION FORM

Date: 2/7/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 10:30 Location: Facilities Services Front Conference Room

7

| # | Name (Print) | Signature | |
|---|---|---|---|
| 1 | Stuart Robertson | | Temp |
| 2 | Andrew Steinhauer | | |
| 3 | Larry Tarver | | Temp |
| 4 | PETER ZONDLO | | |
| 5 | KEITH SALMON | | Temp ? |
| 6 | Ryan Cooper | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 14 | | | |
| 15 | | | |

Instructor Signature:

Title: Engineer

# 7GÖi•å+ÅNOÅ

## TRAINING DOCUMENTATION FORM

Date: 5/9/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 10:30 Location: Facilities Services Front Conference Room

| | Name (Print) | Signature |
|---|---|---|
| 1 | ler; somm ws | |
| 2 | Carpenter | |
| 3 | Reilly | |
| 4 | Shane Jllec | |
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| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |

Instructor Signature: Kim P Kerns

Title: Engineer

**7GÖiå+ÅIi00Å**

**TRAINING DOCUMENTATION FORM**

Date: 5/9/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 15:30 Location: Facilities Services Front Conference Room

| # | Name (Print) | Signature |
|---|---|---|
| 1 | Moriah Wagner | |
| 2 | | |
| 3 | | |
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| 14 | | |
| 15 | | |

Instructor Signature:

Title:

# Small MS4 2022 Annual Report
# Attachment 15
# Inventory of Facilities/Activities with Potential to Pollute

| Facility Name/Category | Person Responsible for Pollution Prevention | | Activities with Potential to Release Contaminants (SOP Category)[a] | Trash | Sediment | Vehicle Fluids | Herbicides/Pesticides | Organics | Nutrients | Bacteria | Metals | Hazardous Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Department | Position | | | | | | | | | | |
| **Primary Facilities** | | | | | | | | | | | | |
| Facilities Services Compound | Facilities Services | John Grasso | Building Maintenance | X | X | | | X | X | X | X | X |
| | | | Snow Storage and Disposal | X | X | | | X | X | | X | |
| | | | Storage of Hazardous Chemicals | | | | | | | | | X |
| | | | Storage of Salt/Sand | | X | | | | | | X | |
| | | | Waste Handling and Disposal | X | | X | | | | | X | X |
| Motor Vehicle Shop | Facilities Services | Bob Peterson | Building Maintenance | X | X | | | X | X | X | X | X |
| | | | Vehicle and Equipment Storage | | | X | | | | | | X |
| | | | Vehicle Maintenance | | X | X | | | | | X | X |
| Grounds Shop | Facilities Services | Ben Carson | Building Maintenance | X | X | | | X | X | X | X | X |
| | | | Ground Maintenance | X | | X | X | X | X | | | |
| | | | Equipment Storage and Maintenance | | X | X | X | X | | | X | |
| **Dispersed Facilities** | | | | | | | | | | | | |
| Parks and Open Spaces | Facilities Services | Ben Carson | Ground maintenance | X | X | X | X | X | X | X | X | X |
| Streets and Parking Lots | Facilities Services | Mick Alva | Street and Parking Lot Maintenance | X | X | X | | X | X | X | X | X |
| | | | Winter Street and Parking Lot Maintenance | X | X | X | | X | X | | X | |
| Snow Storage Areas | Facilities Services | Mick Alva | Snow Storage | X | X | | | X | X | | X | |

[a] Activities listed are generalized activities that occur at each facility. See Table 6 for a more complete list of activities associated with each SOP category.

| SOP Category | Associated Activities with the Potential to Generate and/or Release Contaminants to the MS4 | Potential Contaminants | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Trash | Sediment | Vehicle Fluids | Herbicides/Pesticides | Organics | Nutrients | Bacteria | Chlorine | Metals | Hazardous Waste |
| Supply Well Development | Erosion and Sediment Control | | X | | | | | | | | |
| | Supply Well Development | X | X | | | | X | | | | |
| Utility Maintenance | Response to Water Main & Sanitary Main Breaks | X | X | X | | | X | | X | X | |
| Vehicle and Equipment Storage | Leaks and Spills | | | X | | | | | | | X |
| | Vehicle and Equipment Storage | | | X | | | | | | | X |
| Vehicle Maintenance | Leaks and Spills | | | X | | | | | | | X |
| | Storage and Disposal of Vehicle Fluids | | | X | | | | | | | X |
| | Vehicle Fueling | | | X | | | | | | | X |
| | Vehicle Washing | | X | X | | | | | | | |
| | Vehicle Maintenance | | | X | | | | | | X | X |
| Waste Handling and Disposal | Waste Handling and Disposal | X | X | | | | | | | X | X |
| Winter Street and Parking Lot Maintenance | De-icing | | | X | | | | | | | |
| | Snow Removal and Storage | X | X | | | X | X | | | X | |
| | Sanding | | X | | | | | | | X | |

# MGbK+ÅIÅOÅ

## TRAINING DOCUMENTATION FORM

Date: 2/7/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 15:30 Location: Facilities Services Front Conference Room

| | Name (Print) | Signature |
|---|---|---|
| 1 | Andrew Williams | |
| 2 | revoc Low | |
| 3 | Kevin Mathison | |
| 4 | Bryant | |
| 5 | ouol | |
| 6 | I-bf Sheds | |
| 7 | | |
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Instructor Signature:

Title: em-ZunUUv

**M'GbiG+Åliv0Å**

# TRAINING DOCUMENTATION FORM

Date: 2/7/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 10:30 Location: Facilities Services Front Conference Room

7

| # | Name (Print) | Signature | |
|---|---|---|---|
| 1 | Stuart Robertson | | Temp |
| 2 | Andrew Steinhauer | | |
| 3 | Larry Tarver | | Temp |
| 4 | PETER ZONDLO | | |
| 5 | KEITH SALMON | | Temp ? |
| 6 | Ryan Cooper | | |
| 7 | | | |
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| 14 | | | |
| 15 | | | |

Instructor Signature:

Title: Engineer

# 7GÖi•å+ÅNOÅ

## TRAINING DOCUMENTATION FORM

Date: 5/9/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 10:30 Location: Facilities Services Front Conference Room

| | Name (Print) | Signature |
|---|---|---|
| 1 | ler; somm ws | |
| 2 | Carpenter | |
| 3 | Reilly | |
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| 15 | | |

Instructor Signature: Kim P Kerns

Title: Engineer

**7GÖiå+ÅIi00Å**

**TRAINING DOCUMENTATION FORM**

Date: 5/9/2022 Training Topic: New-Hire Stormwater Awareness Training

Time: 15:30 Location: Facilities Services Front Conference Room

| # | Name (Print) | Signature |
|---|---|---|
| 1 | Moriah Wagner | |
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Instructor Signature:

Title:

# Small MS4 2022 Annual Report
# Attachment 16
# Summary of Inspection Procedures for Facilities' Storm Water Controls

Attached is the checklist used for the University's dry wells and catch basin storm water controls.

UNIVERSITY OF MONTANA
Storm Water Management Program

# Inspection Form – Dry Well and Deep Sump Catch Basin

## General Information

| | |
|---|---|
| Facility Name/Number: | Type of Best Management Practice (BMP):<br>☐ Dry Well ☐ Deep Sump Catch Basin |
| High Priority Stormwater Control? ☐ Yes ☐ No | |
| Depth of Basin (distance from top of grate to floor of structure) | |
| Design Depth: | Current Depth: |
| Latitude: | Longitude: |
| Date of Inspection: | Inspector's Name: |

Type of Inspection:

☐ Routine, dry weather ☐ Routine, Wet Weather

☐ Complaint ☐ Other

## Weather Information

Weather at time of this inspection:

☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog

☐ Snow ☐ High Winds ☐ Other: _____

Temperature: _____

Do you suspect that any physical changes or damages to the BMP may have occurred since the last inspection?

☐ Yes ☐ No

If yes, provide description of physical changes or damages:

Are there any storm water discharges at the time of inspection (i.e., discharge from an outlet)?

☐ Yes ☐ No

If yes, provide location(s) and a description of storm water 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 (i.e., chemicals, oils, or other illicit discharges flowing into the BMP)?

☐ Yes ☐ No

If yes, please provide location(s) and a description:

Inspector's Signature: _____ Date: _____

| Primary Components | Inspection Item | Desired Conditions | Maintenance Needed? | Required Corrective Action/Notes |
|---|---|---|---|---|
| General | Accessibility | Maintenance access is not obstructed. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Fix, repair, or replace.<br>☐ Other: |
| | Contaminants & Pollution | Trash and debris are not accumulated within or around the facility and there is no evidence of oil, gasoline, contaminants, or other pollutants. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Other: |
| | Erosion Control | Upstream channels show no signs of erosion. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Reseed and/or stabilize upstream channels.<br>☐ Other: |
| | Sedimentation | The contributing drainage area is stabilized and not contributing excessive amounts of sediment. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Reseed and/or stabilize drainage area.<br>☐ Other: |
| Inlet | Structural Damage | The inlet or grate is not missing, damaged, clogged, or defective. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Fix, repair, or replace.<br>☐ Other: |
| | Flow | There is evidence of flow into the well/basin. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Check whether the gutter, inlet pipe, downspout, or flow diverter is clogged.<br>☐ Clear and remove debris.<br>☐ Other: |
| Basin/Sump | Structural Damage | The basin/sump is not damaged or defective. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Fix, repair, or replace.<br>☐ Other: |
| | Drainage | Standing water is not present after the design drain time.<br>The observed drain time is approximately ____ hours. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Recheck to determine if there is standing water after 72 hours.<br>☐ Remove any sediment buildup and replace the stone fill if necessary.<br>☐ Other: |
| | Sediment / Debris | Excessive sediment or debris are not present in the inspection port. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Other: |
| | Odor | There is no odor present. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Other: |
| | Overflow | There is no overflow from the top of the well/basin. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove sediment and debris.<br>☐ Remove any sediment buildup.<br>☐ Other: |
| Outlet (Deep Sumps Only) | Structural Damage | The outlet pipe is not clogged or damaged. | ☐ Yes<br>☐ No<br>☐ N/A | ☐ Clear and remove debris.<br>☐ Fix, repair, or replace.<br>☐ Other: |

# Photo Log

| | |
|---|---|
| [photo here] | [photo here] |
| **Photo 1. [Description]** | **Photo 2. [Description]** |
| [photo here] | [photo here] |
| **Photo 3. [Description]** | **Photo 4. [Description]** |

# Small MS4 2022 Annual Report
# Attachment 17
# Summary of Implemented BMPs and Schedule for Next Year's BMPs

BMP #1: All new construction on the University's main campus use dry wells to collect storm water runoff from buildings and associated hardscape. There are no new connections to the existing storm water system.

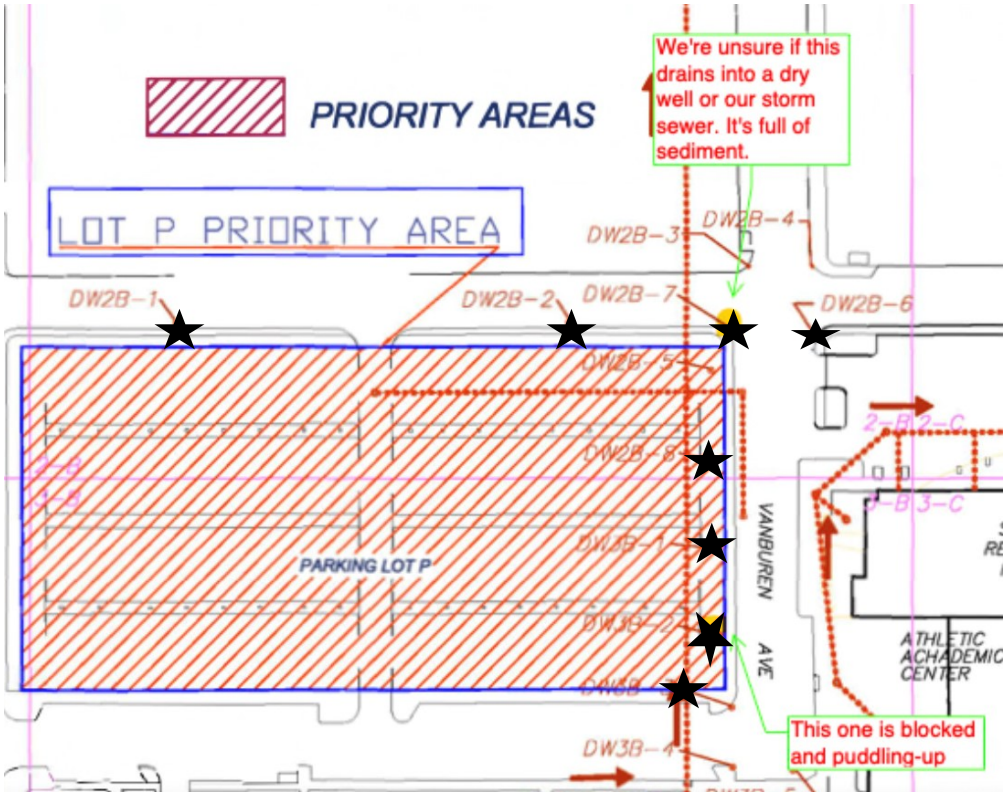
BMP #2: The University's West Outfall has been decommissioned, so there is no longer any storm water discharging into the Clark Fork river from that system. New dry wells were constructed to manage the existing storm water runoff and to handle the runoff from the new Montana Museum of Art and Culture building that is under construction.

BMP #3: The University used a vacuum-truck contractor to clean & rejuvenate 19 storm water dry wells and catch basins. See attached report.

Schedule of BMPs for 2023/2024:

BMP #1: The University has received funding to eliminate all its storm water outfalls and to improve the drainage characteristics of the Kim Williams bike/pedestrian trail the borders the north side of the University's campus and it directly next to the Clark Fork river. This project will be bid in 2023 with construction to be completed in 2024. The project anticipates using an infiltration gallery to accept all the effluent from the East Outfall system. The final engineering design is still in flux, but we anticipate also using a pre-treatment device prior to the infiltration gallery.

BMP#2: The University will continue to clean and stimulate existing dry wells on campus. Anticipate addressing 10-15 dry wells in 2023.




**DW2B-1 DW2B-2 DW2B-7**

- Cleaned out well and seems to be draining appropriately
- Cleaned out well and seems to be draining appropriately

-This was a storm drain, the sediment needed to be broken up with a sledge hammer. The manhole was only 3-4 feet deep.

**DW2B-6**

-This DW was done by mistake. It wasn't time wasted. It was full of leaves and sediment.

**DW2B-5 DW2B-8**

- Cleaned out well and seems to be draining appropriately.
- Full of asphalt and roots. We got most the asphalt out of the hole and as much of the roots as we could.

**DW3B-1**

- Full of asphalt and roots. We got most the asphalt out of the hole and as much of the roots as we could. The Drain pipes in this one seemed to be different from the rest of the DW in the parking lot. Instead of having long slats in the concrete, it had round pipes flush with the walls of the manhole. The pipes seemed to have small grates or screens.

**DW3B-2**

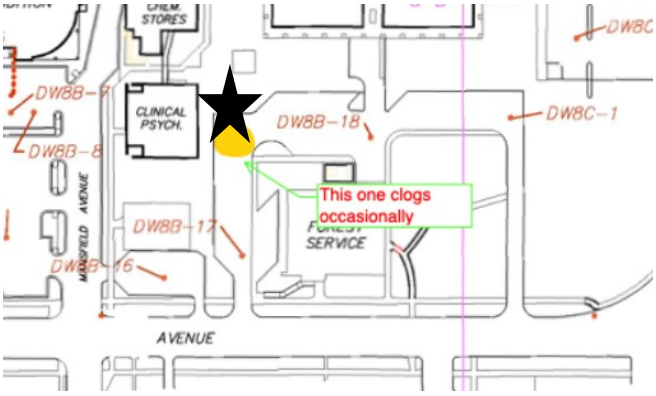
-The top of the drain had a layer of asphalt and ice. After we broke up the asphalt and ice we found roots and trash. We had a hard time getting to the bottom of the manhole after cleaning out the drains due the excessive amount of ground water flowing in.


## DW2C-(unknown)

- We cleaned around the manhole cover. Inside we removed the mass of grass and leaves. We didn't power wash the sides of the drain due to the weather. We did clean the bottom making it accessible to inspect.


## DW4A-1

- Was completely full of leaves, ice, sediment, and water. Cleaned out well and seems to be collecting ground water appropriately.




## DW8B- ( unknown )

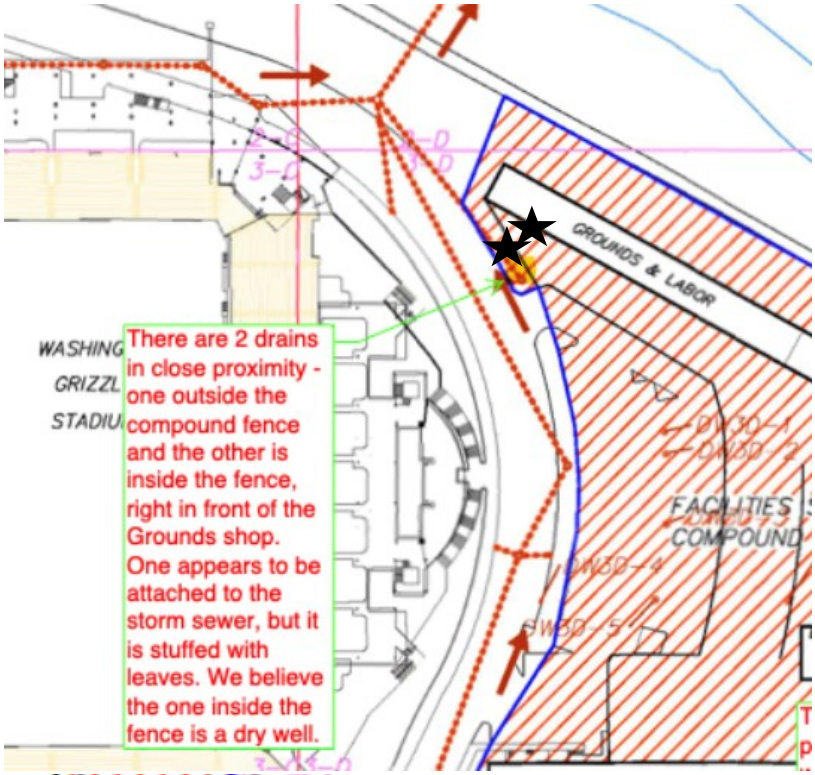
- Cleaned out and power washed the walls of the DW. Didn't see a real reason as to why it clogs. Possibly in the spring we could reassess the situation and find a solution so it can't backup.

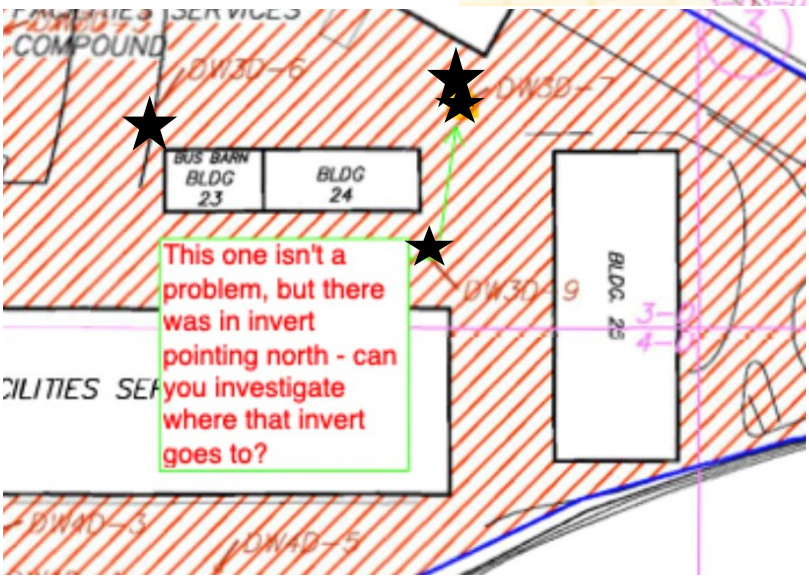
## DW3D- (unknown 1)

- This one outside the fence was full of snow and ice. I'm pretty sure we made it all the way down to the bottom. It was unusual that the bottom was frozen.

## DW3D- (unknown 2)

-The DW on the inside of the fence was full of sediment and garbage. It's only about 2 feet deep. The bottom of this one was 1/2 to 3 full rock.

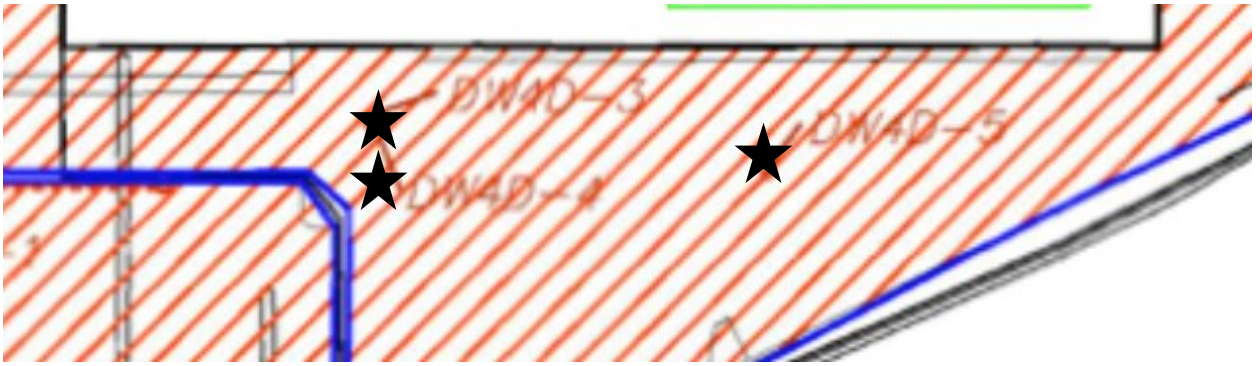



**DW3D-6** Cleaned out well and seems to be draining appropriately **DW3D-9** Cleaned out well and seems to be draining appropriately

## DW3D-7

This DW has more leaves and water in it than the other wells in the parking area. The invert pointing north seems to be a roof drain. Donald Nash said that would explain why the end of the pipe is pointing down. We have not yet had on opportunity to video the pipe yet.




**DW4D-3**

-Cleaned out well and seems to be draining appropriately

**DW4D-4**

**-**Cleaned out well and seems to be draining appropriately

**DW4D-5**

**-**Cleaned out well and seems to be draining appropriately

# Small MS4 2022 Annual Report
# Attachment 18
# Inventory of Outfalls with Pollutants

| Name | Location | Type | Receiving Waterbody |
|---|---|---|---|
| East Outfall | Latitude: 46.864888° N<br>Longitude: 113.980524° W | Concrete pipe | Clark Fork River |
| West Outfall | Latitude: 46.866459° N<br>Longitude: 113.984491° W | Concrete pipe | Clark Fork River |

NOTE: The West Outfall has been decommissioned and there is no longer any storm water discharge into the Clark Fork river from this system.

**Small MS4 2022 Annual Report**
**Attachment 18**
**Outfall Monitoring Results**

| Sample Date: | 4/23/2020 | | 10/13/2020 | | 5/20/2021 | | 9/20/2021 | | 4/21/2022 | | 12/27/2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | East Outfall | West Outfall | East Outfall | West Outfall | East Outfall | West Outfall | East Outfall | West Outfall | East Outfall | West Outfall | East Outfall | West Outfall |
| Total Suspended Solids TSS, mg/L | 61.000 | 37.000 | 17.200 | 3.400 | 3.700 | 19.200 | 30.000 | 15.200 | 8.300 | - | 227.000 | |
| Chemical Oxygen Demand COD, mg/L | 194.000 | 88.900 | 59.400 | 16.100 | 26.400 | 17.000 | 48.300 | 31.800 | 20.300 | - | 224.000 | |
| Total Phosphorus, mg/L | 0.150 | 0.078 | 0.210 | 0.074 | 0.073 | 0.080 | 0.140 | 0.110 | - | - | 0.340 | |
| Total Nitrogen, mg/L | 0.835 | 0.798 | 1.000 | 1.100 | 1.300 | 1.200 | 1.500 | 0.860 | 1.100 | - | 2.600 | |
| pH, standard units | 6.590 | 6.050 | 6.847 | 5.860 | 6.030 | 6.300 | 6.030 | 5.380 | 6.220 | - | 6.200 | |
| Total Copper, mg/L | 0.033 | 0.011 | 0.010 | 0.003 | 0.020 | 0.052 | 0.030 | 0.014 | 0.016 | - | 0.020 | |
| Total Lead, mg/L | 0.005 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0.003 | 0.001 | - | - | 7.500 | |
| Total Zinc, mg/L | 0.075 | 0.060 | 0.069 | 0.049 | 0.031 | 0.048 | 0.065 | 0.044 | 0.020 | - | 0.199 | |
| Estimated Flow, gpm | 6.8 | 3.3 | 6.8 | 3.3 | 2.0 | 2.0 | 2.0 | 2.0 | 0.9 | | 191.4 | |
| Oil and Grease, mg/L | - | - | 5.000 | - | - | - | - | - | - | - | - | |
| Total Iron, mg/L | 2.070 | 1.340 | 0.514 | 0.116 | 0.153 | 0.140 | 0.620 | 0.335 | 0.126 | - | 6.210 | |
| Total Arsenic, mg/L | - | - | 0.0007 | - | 0.0006 | 0.0006 | 0.0006 | - | 0.0006 | - | 0.0037 | |
| Total Cadmium, mg/L | 3.820 | 0.345 | - | - | - | - | - | - | - | - | 0.180 | |

# Small MS4 2022 Annual Report
# Attachment 19
# TMDL Sampling Plan

The University will bid a project to remove its one remaining outfall (East Outfall) in 2023 with construction anticipated to be completed in 2024. Once that project is finished, there will no longer be any storm water discharges from campus into the Clark Fork river and therefore no longer any need for TMDL sampling. Until then, the University will continue to sample outfall discharges in accordance with its Sampling Plan (attached).

# Sampling Plan for TMDL-Related Monitoring

UNIVERSITY OF MONTANA

Storm Water Management Program

***Prepared for:***

*University of Montana-Missoula*
*32 Campus Drive*
*Missoula, MT 59812*

***Prepared by:***

*NewFields*
*700 SW Higgins Ave Ste 15*
*Missoula, Montana 59803*
*U.S.A.*

*May 2020*

NewFields

# Table of Contents



# Tables



# Appendices

# 1 INTRODUCTION

## 1.1 Background

The University of Montana-Missoula (UM) is a non-traditional Small Municipal Separate Storm Sewer System (MS4) that operates its storm water management program (SWMP) under the authorization of the Montana Pollutant Discharge Elimination System (MPDES) General Permit for Storm Water Discharges Associated with Small MS4s (General Permit) (Montana Department of Environmental Quality [DEQ], 2016).

Storm water sampling is required under Parts III.B and IV.A of the General Permit. Part III.B, Total Maximum Daily Load (TMDL)-Related Monitoring, requires monitoring targeted at evaluating either MS4 loading to impaired receiving waterbodies or the effectiveness of best management practices (BMPs) implemented to reduce MS4 pollutant loading to impaired receiving waterbodies. Part IV.A, Self-Monitoring, requires semi-annual sampling and testing of storm water discharges for specific monitoring parameters.

## 1.2 Purpose

This sampling plan describes UM's sampling program to satisfy the requirements of Parts III.B and IV.A of the General Permit. Specifically, this document was developed to satisfy Part III.B, which requires a sampling plan for TMDL-related monitoring. UM has selected monitoring Option 2 for TMDL-related monitoring, which requires UM to use monitoring results to evaluate the effectiveness of BMPs selected for reducing MS4 loading to impaired receiving waterbodies.

# 2 UM MS4-RELATED TMDLS

## 2.1 TMDL Overview

The UM has two storm water outfalls, each of which are located in the City of Missoula's (City) MS4 boundary and discharge to the Clark Fork River (Blackfoot River to Rattlesnake Creek section). This section of the Clark Fork River is impaired for seven pollutants, as presented in **Table 1**.

**Table 1: Impairment Information: Clark Fork River, Blackfoot River to Rattlesnake Creek**

| Probable Cause | Probable Sources | Associated Uses | TMDL Completed |
|---|---|---|---|
| Arsenic | Mill Tailings | Drinking Water | Yes |
| Cadmium | Mill Tailings | Aquatic Life | Yes |
| Copper | Mill Tailings | Aquatic Life | Yes |
| Eutrophication | Industrial Point Source Discharge, Dam or Impoundment | Aquatic Life | Yes |
| Iron | Mill Tailings | Aquatic Life | Yes |
| Lead | Mill Tailings | Aquatic Life, Drinking Water | Yes |
| Zinc | Mill Tailings | Aquatic Life | Yes |

*Source: 2018 Water Quality Assessment Summary Report* (Montana Department of Environmental Quality, 2018)

Although the City's MS4 is not listed as a probable source for any of the pollutants of impairment in the DEQ's 2018 Water Quality Assessment Summary Report (**Table 1**), it has been given a waste load allocation (WLA) for arsenic, cadmium, copper, iron, lead, and zinc because DEQ estimates that the Missoula MS4 may contribute annual loads of each of these pollutants to this section of the Clark Fork River. Additionally, DEQ believes that MS4 loadings for these pollutants have significantly reduced over time as a result of implementation of storm water BMPs and that further reductions are possible through the implementation of additional storm water BMPs (Montana Department of Environmental Quality, 2014).

The WLA assigned to the Missoula MS4 is a 55 percent reduction in metals loads, applicable to arsenic, cadmium, copper, iron, lead, and zinc; however, the TMDL report notes that the WLAs are not intended to add concentration load limits to the General Permit and that DEQ assumes the WLAs will be met by adhering to the General Permit requirements and by reducing either the metals concentrations or the discharge volumes, or both. The TMDL report also calls for continued collection and evaluation of storm water samples to assess BMP performance (Montana Department of Environmental Quality, 2014).

Because the UM MS4 is located in the boundary of the City's MS4, the WLAs for arsenic, cadmium, copper, iron, lead, and zinc are also applicable to the UM's SWMP. These six pollutants are referred to as the *pollutants of concern* throughout the remainder of this document.

### 2.2 TMDL Strategies

Part III.B of the General Permit requires UM to include a section in the SWMP describing the BMPs it plans to implement, impairment priorities, long-term strategy, and completion schedule for action items for controlling the discharge of pollutants of concern. The sampling results from TMDL-related monitoring will assist UM in selecting and implementing appropriate BMPs to target pollutants of concern. In addition, monitoring results will allow UM to evaluate the effectiveness of BMPs once implemented. More detailed discussion of impairment priorities, pollutant reduction strategies, and interim milestones will be provided in the TMDL section of the SWMP.

## 3 MONITORING LOCATIONS AND STRATEGIES

### 3.1 Monitoring Locations

Monitoring will be conducted at each of the UM's outfalls (two locations), which are shown in **Appendix A** and described below.

#### *3.1.1 East Outfall - 001*

The East Outfall is a concrete pipe that discharges to the Clark Fork River upstream of Rattlesnake Creek, northeast of Washington Grizzly Stadium (see **Appendix A**). Storm water in this outfall is expected to be representative of industrial and commercial areas. The eastern side of campus includes facilities services compound, Washington Grizzly Stadium, open space/grassed areas, the heating plant, student centers and campus buildings, parking lots and streets, and one dormitory. Anticipated potential pollutants generated in the outfall's drainage area include organic materials, herbicides/pesticides, nutrients, sediment, trash, metals, oil, grease, and hydrocarbons.

#### *3.1.2 West Outfall - 002*

The West Outfall is a concrete pipe that discharges to the Clark Fork River upstream of Rattlesnake Creek, west of Vanburen Avenue (see **Appendix A**). Storm water directed to this outfall originates mainly from

campus buildings, parking lots and streets, dormitories, and parks and lawns. Storm water in this outfall is expected to be more representative of commercial and grassed/park areas. Anticipated potential pollutants generated in the outfall's drainage area include organic materials, herbicides/pesticides, nutrients, sediment, trash, metals, oil, grease, and hydrocarbons.

## 3.2 Monitoring Strategies

### *3.2.1 TMDL-Related Monitoring*

The purpose of TMDL-related monitoring is to evaluate effectiveness of BMPs selected to reduce loading of pollutants of concern to the Clark Fork River. Because the pollutants of concern are generally related to mining and milling activities, the UM believes that storm water discharges from the UM may not be contributing to loading of certain pollutants. The UM will sample for the constituents shown in **Table 2** to identify which pollutants of concern are to be prioritized for BMP implementation and identify whether certain pollutants of concern are not present within UM's storm water runoff. If certain pollutants of concern are not present for two years of sampling, the UM may propose to revise this sampling plan and remove those pollutants from the list of parameters to be analyzed.

**Table 2: TMDL-Related Monitoring Locations and Parameters**

| Name | Location | Receiving Waterbody | Sample Collection Method | Frequency | Sample Parameters |
|---|---|---|---|---|---|
| East Outfall | 46.864888 -113.980524 | Clark Fork River, Blackfoot River to Rattlesnake Creek | Grab | Semi-annual[1] | Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Temperature |
| West Outfall | 46.866459 -113.984491 | | | | |

[1]One sample collected between January 1st and June 30th, one collected between July 1st and December 31st.

### *3.2.2 Self-Monitoring*

The purpose of self-monitoring is to monitor and evaluate storm water discharges from the UM MS4 for the list of pollutants identified in Table 1 of the General Permit. The same monitoring locations used for TMDL-related monitoring will be used for self-monitoring (**Table 3**). UM has selected Self-Monitoring Option 1 in Part IV.A.3 of the General Permit. UM recognizes that Self-Monitoring Option 1 requires sampling at four discharge points, representative of both commercial/industrial areas and residential areas; however, UM will sample at only two locations because they are the UM's only storm water outfalls. Sampling locations and parameters required for self-monitoring are listed in **Table 3**.

**Table 3: Self-Monitoring Locations and Parameters**

| Name | Location[1] | Receiving Waterbody | Sample Collection Method | Frequency | Sample Parameters |
|---|---|---|---|---|---|
| East Outfall | 46.864888 -113.980524 | Clark Fork River, Blackfoot River to Rattlesnake Creek | Grab | Semi-annual[2] | Total suspended solids, Chemical oxygen demand, Total phosphorus, Total nitrogen, pH, Copper, Lead, Zinc, Estimated flow, Oil and grease |
| West Outfall | 46.866459 -113.984491 | | | | |

[1]Self-monitoring Option 1 presented in Part IV.A.3.a of the General Permit requires sampling at four discharge points; however, the UM only has two outfalls and will therefore only conduct sampling at these two locations.

[2]One sample collected between January 1st and June 30th, one collected between July 1st and December 31st.

# 4 MONITORING PROTOCOL AND REQUIRMENTS

This section describes the field sampling methods, sampling parameters and associated analytical methods, sampling frequency, and quality assurance and quality control (QA/QC) measures that will be used to evaluate usability and validity of monitoring results.

## 4.1 Sampling Methods and Parameters

UM will collect grab samples from the locations listed in Section 3.1 at the frequency specified in Section 4.2. A standard operating procedure (SOP) for surface water sampling (SOP SP-5) is provided in **Appendix B**. Equipment decontamination will be conducted as necessary for any equipment reused between sampling locations and events. Sampling parameters, listed in **Table 4**, were compiled from the self-monitoring parameters given in Table 1 of Part IV.A.2 of the General Permit and from parameters with TMDLs in the Clark Fork River between the Blackfoot River and Rattlesnake Creek (see **Table 2**). UM will sample for each of these parameters at each sample location in order to comply with both self-monitoring and TMDL-related sampling requirements.

**Table 4: Sampling Parameters and Analytical Methods**

| Sample Type | Parameter | Units | Analytical Method | Sample Container | Preservative | Maximum Holding Time |
|---|---|---|---|---|---|---|
| S | Total Suspended Solids | mg/L | SM 2540-D | 1 L plastic | Cool to ≤ 6°C | 7 days |
| S | Chemical Oxygen Demand | mg/L | SM 5220-C | 500 mL plastic | Cool to ≤ 6°C, Sulfuric acid to pH < 2 | 28 days |
| S | Total Phosphorus | mg/L | EPA 365.1 | 500 mL plastic | Cool to ≤ 6°C, Sulfuric acid to pH < 2 | 28 days |
| S | Total Kjeldahl Nitrogen | mg/L | SM 4500-NH3-G | 500 mL plastic | Cool to ≤ 6°C, Sulfuric acid to pH < 2 | 28 days |
| T | Arsenic, Total Recoverable | mg/L | EPA 200.8 | 500 mL HDPE | Nitric acid to pH < 2 | 6 months |
| T | Cadmium, Total Recoverable | mg/L | | | | |
| S,T | Copper, Total Recoverable | mg/L | | | | |
| T | Iron, Total Recoverable | mg/L | | | | |
| S,T | Lead, Total Recoverable | mg/L | | | | |
| S,T | Zinc, Total Recoverable | mg/L | | | | |
| S | Oil and Grease | mg/L | EPA 1664A | 1 L amber glass (1) | Cool to ≤ 6°C, hydrochloric acid to pH < 2 | 28 days |
| S | Estimated Flow | gpm | On-site | -- | -- | -- |
| S | pH | su | On-site * | -- | -- | 15 minutes |
| T | Temperature | °C | On-site | -- | -- | 15 minutes |

Notes: S = self-monitoring; T = TMDL-related monitoring; mg/L = milligrams per liter; gpm = gallons per minute; su = standard units; °C = degrees Celsius; On-site = parameter measured on-site, no analytical method; * procedure given in SOP SP-4; -- = not applicable.

## 4.2 Sample Frequency

Each location will be sampled at least twice per calendar year, once between January 1st and June 30th, and once between July 1st and December 31st. Part IV of the General Permit requires sampling to be conducted during a storm event with a measurable amount of discharge. This is interpreted as any storm event that results in sufficient volume and water depth for grab samples to be collected from UM's outfalls.

Storm events and precipitation will be monitored using radar managed by the National Oceanic and Atmospheric Administration's National Weather Service. These data may also be used to determine storm characteristics, if necessary, such as storm duration, intensity, and total precipitation.

### *4.2.1 Substitute Sampling*

If UM is unable to collect a sample within a six-month monitoring period, a substitute sample will be collected during the next six-month cycle, in addition to the required sample for that six-month period. The substitute sample and required sample will be collected from different storm events with at least 48 hours of no measurable precipitation between them. UM will also provide the reason(s) a sample could not be collected during the six-month period when reporting results in the Annual Report.

## 4.3 Sample Handling and Documentation

### *4.3.1 Sample Collection and Field Documentation*

Samples will be collected using standardized procedures (SOP SP-5, **Appendix B**), and equipment decontamination will be performed as necessary for equipment that is reused for multiple samples. UM will maintain a database (spreadsheet) to document each sampling event that includes, at a minimum:

- Sampling location
- Sample collection date and time
- Total rainfall measurements/estimates of storm event
- Name of sampler

The procedure for field documentation is detailed in SOP SP-1 in **Appendix B**. Storm precipitation data will be collected from the National Oceanic and Atmospheric Administration's National Weather Service and on-site or local weather stations (e.g., Missoula Airport weather station), as available.

### *4.3.2 Sample Naming Scheme*

Sample names will be assigned according to the sampling location and sampling date, and as required by Part IV.A.3.a of the General Permit. Sample locations will be referred to by the following standard nomenclature:

- East Outfall – 001
- West Outfall – 002

The sample name will consist of the above standard nomenclature followed by an underscore and the date in YYYYMMDD format, another underscore and the sample matrix code. For example, a surface water sample collected from the East Outfall on January 7, 2021 would have the sample name "001_20210107_SW". This will allow UM personnel to easily identify sample locations and differentiate between sampling events. Refer to SOP SP-2 (**Appendix B**) for further detail on sample naming.

### *4.3.3 Sample Handling*

Sample containers, preservatives, and holding times will adhere to requirements shown in **Table 4**. Sample packaging and shipment procedures will follow SOP SP-3 (**Appendix B**) to maintain sample integrity. Chain-of-custody (COC) procedures (SOP SP-2, **Appendix B**) will be followed in order to demonstrate sample integrity. The handling of all samples collected will be traceable from the time of collection, through analysis, until final disposition. A COC record will be completed and accompany every sample shipment. Each person who has custody of the samples must sign the record. The completed COC record should be put in a waterproof plastic bag and placed inside the sample cooler if the samples are to be shipped or transported to a laboratory.

### *4.3.4 Laboratory Sample Handling and Documentation*

Laboratory personnel will assess the integrity of the custody seals upon sample arrival. They will also verify and document the following information upon sample receipt:

- Condition of shipping container;
- Condition of sample container(s);
- Condition of custody seals;
- Presence/absence of sample labels;
- Agreement/non-agreement of documents;
- Cross-reference of laboratory numbers; and,
- Temperature inside shipping container.

Laboratory personnel will document any problems or discrepancies with the samples or custody documents, contact UM, and document the resolution to the problems or discrepancies.

Laboratory reports will be delivered to UM as either hardcopy or electronic digital file (e.g., .pdf) and as an electronic data deliverable (EDD). Lab reports will include the following information, at a minimum:

- Date and time of sample analysis;
- Initials or names of laboratory personnel who performed analysis;
- References or written procedures, when available, for the analytical techniques or methods used
- Results of analysis; and,
- Case narrative describing any deviations from the analytical methods or QA/QC procedures and corrective actions taken, if any.

## 4.4 Quality Assurance / Quality Control

QA/QC measures will evaluate whether data are of sufficient quality to assess the effectiveness of UM's BMPs. Data quality and usability are measured by precision, accuracy, representativeness, completeness, and comparability (PARCC). These indicators will be evaluated according to the following results and procedures:

- **Precision** – laboratory duplicates will be used to evaluate precision.
- **Accuracy** – the laboratory will run control samples, matrix spike samples, calibrations, internal standards, and surrogates as required by the analytical method.
- **Representativeness** – the laboratory will use method blank samples to assess the possibility of contamination. In addition, UM personnel will follow method requirements and collect samples using decontaminated equipment in order to reduce the possibility of introducing contamination

to the samples prior to analysis. Sample containers, preservation requirements, and holding times for each analytical method (refer to **Table 4**) will be adhered to in order to ensure results are representative of site conditions.

- **Completeness** – UM will collect samples as required by the sampling plan and the General Permit. UM personnel will review the COCs prior to submitting to the laboratory, and review results received by the laboratory to verify all required parameters are requested and reported.
- **Comparability** – UM will use consistent sample collection methods so results are comparable to other sampling events for storm water monitoring. The laboratory will use the analytical methods listed in **Table 4**.

Laboratory QA/QC, including QC sample frequency and control limit guidance, will be maintained through adherence to the laboratory's internal quality assurance protocol (LQAP) during analysis. Laboratory QC sample frequency and control limit guidelines are specified in the LQAP Manual.

Laboratory analysis all samples will include prescribed QC procedures and samples according to the published analytical method and internal laboratory QC procedures. The laboratory will conduct internal QC checks for analytical methods in accordance with their SOPs and the individual method requirements.

# 5 ANALYSIS OF RESULTS

All storm water monitoring results will be compiled into a single spreadsheet that will be maintained with current data. This spreadsheet will contain, at a minimum, sample locations, collection dates and times, total rainfall, sample parameters, numeric results, and any associated data quality notes. Analysis procedures for sampling results will be further developed as UM develops site-specific BMPs. At a minimum, the following analysis will be conducted to evaluate pollutant loading to the Clark Fork River.

The long-term median for each parameter at each location will be calculated and presented in the Annual Report. Monitoring results from the most recent monitoring year will be compared to the long-term median to evaluate how results compare to previous monitoring results.

Concentration versus time plots will also be created and maintained for all parameters at each location. These plots will help UM determine trends in water quality over time and understand effectiveness of BMPs. Decreasing water quality trends will indicate the BMPs are effective at reducing pollutant loading to the Clark Fork River. Increasing or stagnant trends will indicate that BMPs are not effective, which will assist UM in adjusting BMPs to be more effective.

# 6 REPORTING

Results of the monitoring events will be reported in the appropriate Annual Report for each calendar year of sampling. The calculated long-term median will also be presented in the Annual Report, as well as a discussion of monitoring results including the following:

- Comparison of results to long-term medians;
- Any indication of outliers in the dataset;
- Discussion of results for samples with pH less than 6.0 or greater than 9.0;
- Comparison between locations;
- Discussion of trends observed in the dataset; and
- Evaluation of BMP effectiveness and how results will inform improvements to planned BMPs, including schedule and rationale for action items.

# 7 REFERENCES

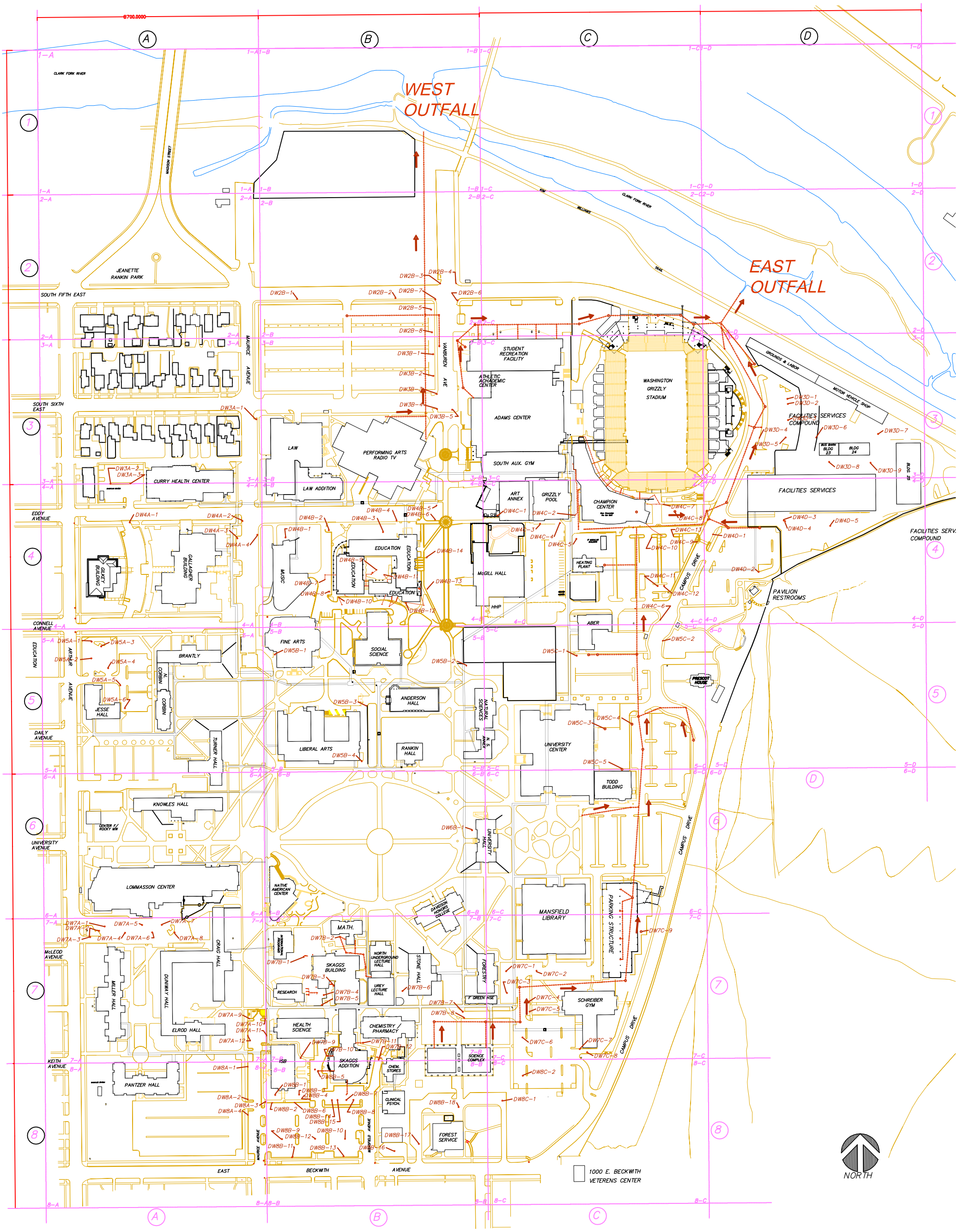
Montana Department of Environmental Quality. (2018). *CLARK FORK RIVER, Blackfoot River to Rattlesnake Creek*. Retrieved from Water Quality Assessment Summary Report: http://svc.mt.gov/deq/dst/#/app/cwaic/report/cycle/2018/auid/MT76M001_030

Montana Department of Environmental Quality (2016). General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s), Permit Number MTR040000. Issued November 30, 2016.

Montana Department of Environmental Quality. (May 2014). *Final - Silver Bow Creek and Clark Fork River Metals TMDLs.* Helena, MT: Water Quality Planning Bureau (Watershed Management Section).

# Appendix A
# University of Montana Storm Water Map

# University of Montana
# Storm Water Management Program
# MS4 Outfall Location Map



# Appendix B
# Standard Operating Procedures

| STANDARD OPERATING PROCEDURES<br>TABLE OF CONTENTS | |
|---|---|
| **SOP** | **TITLE** |
| SP-1 | Field Log Book and Field Sampling Forms |
| SP-2 | Sample Nomenclature, Documentation, and Chain-of-Custody Procedures |
| SP-3 | Sample Packaging and Shipping |
| SP-4 | Field Measurement of pH |
| SP-5 | Surface Water Sampling |

# SOP SP-1

## FIELD RECORDS AND FIELD SAMPLING FORMS

Field investigation and sampling information should be recorded on appropriate sampling forms to provide a continual record of actions taken each day on the site. Each employee is responsible for completing a record of the day's activities in field forms of sufficient detail such that someone can reconstruct the field activities without relying on the memory of the field crew. At a minimum, entries on the field log shall include:

- Project
- Purpose of the field effort
- Names of field crew leader and team members present on the site, and other site visitors
- Description of site conditions and any unusual circumstances, including weather conditions
- Details of actual work effort, particularly any deviations from the field work plan or standard operating procedures
- Location of sample site, including map reference, if relevant
- Field observations
- Field measurements made (e.g., pH, temperature)
- Date and time of initiation and cessation of work

### Purpose

Provide guidance on how to document activities completed in the field

### Goal and Objective

To provide a record of project work and decisions made in the field

### Equipment Needs

Indelible Ink Pen
Field Sampling Forms
Field Tablet

Specific details for each sample collected should be recorded using standardized field forms or electronic field applications. These field forms contain blank queries to be filled in by field personnel. Items typically recorded on field sampling forms consist of the following:

- Sample name
- Time and date samples were collected
- Number and type (media; natural, duplicate, QA/QC) of samples collected
- Analysis requested
- Sample preservative (if applicable)
- Sampling method, particularly any deviations from standard operating procedures
- Signature of sampler

All entries on the field sampling forms must be made in indelible ink (if using paper), or entered into field tablets and backed up promptly when service is available. Upon completion of the field effort, original paper field forms shall be scanned and maintained in the project file. Electronic forms will be backed up in multiple locations and saved into project folder. Photocopies of original field forms can be used as working documents.

# SOP SP-2

## SAMPLE NOMENCLATURE, DOCUMENTATION, AND CHAIN-OF-CUSTODY PROCEDURES

When completing sampling, it is critical that the process used to label and transport samples to the laboratory for analysis is sufficient to demonstrate with confidence that the samples were collected from the location indicated, and that during transport to the laboratory, no actions were taken to potentially alter the integrity of samples. Without following strict sample labeling and chain-of-custody procedures, analytical data collected at a site have little to no value.

### Purpose

Identify specific requirements for labeling and documenting sample collection

### Goal and Objective

To increase confidence in sample locations and to submit samples to the laboratory without risk of integrity loss

### Equipment Needs

Indelible Ink Pen

Chain-of-Custody Forms

Field Log Book

Field Sampling Forms

### SAMPLE NOMENCLATURE

Samples should be labeled according to the sampling location and date. The sample location will be referred to by the standard nomenclature presented in the Sampling Plan. Additional samples will be given standard names as needed. The sample date will be in YYYYMMDD format. Samples should be labeled as follows:

Sample location_sample date_sample matrix code

For example, sample 001_20200107_SW, indicates the following: a surface water (SW) sample was collected at site 001 on January 7, 2020 (20200107). Prior to initiating sampling, field personnel should familiarize themselves with the Sampling Plan and the sample nomenclature to be used for the site. The character prefixes in the table below are recommended for sample types. This list should be updated as needed for additional sample types.

### SAMPLE DOCUMENTATION

In addition to the chain-of-custody forms discussed below, field personnel must keep a list of samples collected at the field in the field log book and on appropriate field sampling forms (see SOP SP-1). This allows you to go back and verify sample locations and numbers should there be any confusion at a later time. Upon returning to the office, the field log book and forms should be scanned and maintained in the project file, and subsequent copies sent to the laboratory, or other designated parties, as needed.

Each person in the field is responsible for putting entries into the field log and sampling forms. Designating an individual from the sampling team for record keeping is fine, provided all field personnel come to an agreement as to who this will be, and the field crew leader is certain field personnel are familiar with the record keeping requirements. All entries on the log book and field sampling forms must be made in indelible ink.

| Sample Matrix Code | Sample Matrix |
|---|---|
| SW | Surface Water |
| GW | Groundwater Sample |
| SS | Surface Soil Sample |
| SBSS | Subsurface Soil Sample |

## CHAIN-OF-CUSTODY PROCEDURES

A chain-of-custody form must be generated for all samples collected in the field for laboratory analysis. Samples from more than one project should not be included on the same chain-of-custody form; however, multiple samples from a specific project can be included on the same chain-of-custody form.

Copies of the chain-of-custody form should be maintained in the project file. The sampler may use a NewFields' chain-of-custody form or a form provided by the laboratory. Sample custody records must be maintained from the time of sample collection until the time of sample delivery to the analytical laboratory, and should accompany the sample through analysis and final disposition. Information to be included on the chain-of-custody form will include, but is not limited to:

- Project number/site name
- Sampler's name and signature
- Date and time of sample collection
- Unique sample identification number or name
- Number of containers
- Sample media (e.g., soil, water, vapor, etc.)
- Sample preservative (if applicable)
- Requested analysis
- Comments or special instructions to the laboratory

Each sample must be assigned a unique sample identification number as described above. The information on the chain-of-custody form, including the sample identification number, must correspond to the information recorded by the sampler on the field forms, log book, and label on the sample container.

A sample is considered under a person's control when it is in their possession. When custody of a sample is relinquished by the sampler, the sampler will sign and date the chain-of-custody form and note the time that custody was relinquished. The person receiving custody of the sample will also sign and date the form and note the time that the sample was accepted into custody. The goal is to provide a complete record of control of the samples. Should the chain be broken (signed by the relinquisher, but not receiver, or vice versa), the integrity of the sample is lost and the resulting analytical data are suspect. Samples must be packaged and shipped to the laboratory following the procedures described in SOP SP-3. If an overnight shipping service is used to transport the samples to the laboratory, custody of the samples must be relinquished to the shipping service. If possible, have the shipping service sign the chain-of-custody form prior to placing the chain-of-custody form in the sample cooler. If this is not possible (i.e., form placed in

sealed cooler), a note should be included on the chain-of-custody that the shipping company will receive the samples with the chain-of-custody form inside the sample container.

# SOP SP-3

## SAMPLE PACKAGING AND SHIPPING

### SAMPLE PACKAGING

Samples must be packaged to preclude breakage or damage to sample containers, and shipped to comply with shipper, U.S. EPA, and U.S. DOT regulations. When packaging samples:

- Use sample labels from the laboratory whenever possible. Place the sample label on the sample container prior to collecting the sample, and use indelible ink when completing the label.
- Place labeled sample bottles in a high quality cooler. Place the samples in an upright position inside the cooler and wrap the samples with cushioning material for protection during transport. The cooler should be able to withstand tough handling during shipment without sample breakage.
- Make sure the cooler has an adequate amount of ice (secured inside sealed Ziploc® bags) to maintain a temperature of 4°C or less inside the cooler from the time the samples are placed in the cooler until they are received by the laboratory. Excess ice should be used when sampling in warm weather. Ensure the cooler drain plug is taped shut.
- Fill out the appropriate chain-of-custody forms and place them in a Ziploc bag and tape it to the inside lid of the shipping container. If more than one cooler is used per chain-of-custody form, put a photocopy of the form in the other coolers and mark them as a copy.
- Close and seal the cooler using strapping shipping tape.
- Place signed and dated sample custody seals on the outside of the cooler such that the seals will be broken when the cooler is opened. Secure the custody seals on the cooler with clear strapping tape.
- Secure a shipping label with address, phone number, and return address on the outside of the cooler where it is clearly visible.

#### Purpose

Ensure samples are properly packaged for shipment to the analytical laboratory

#### Goal and Objective

To have samples received by the analytical laboratory in good condition and within EPA temperature thresholds

#### Equipment Needs

Indelible Ink Pen
Chain-of-Custody Forms
Custody Seals
Sample Labels from Lab
Coolers and Ice
Strapping Tape
Field Sampling Forms
Ziploc Bags

### SHIPPING HAZARDOUS MATERIALS/WASTE

Transportation regulations for shipping of hazardous substances and dangerous goods are defined by the U.S. DOT in 49 CFR, Subchapter C, Part 171 (October 1, 1988); IATA and ICAO. These regulations are accepted by Federal Express and other ground and air carriers.

According to U.S. DOT regulations, environmental samples are classified as Other Regulated Substances (ORS). ORS are articles, samples, or materials that are suspected or known to contain contaminants and/or are capable of posing a risk to health, safety, or property when transported by ground or air. Samples, substances, or materials from sources other than material drums, leachate streams, and sludges should be considered as ORS or environmental samples. Materials shipped under the classification of ORS must not meet any of the following definitions:

> Class 1: explosives; Class 2: gases-compressed, liquefied, dissolved under pressure, or deeply refrigerated; Class 3: flammable liquids; Class 4: substances susceptible to spontaneous combustion; Class 5: oxidizing substances; Class 6: poisonous (toxic and infectious); Class 7: radioactive materials; and/or Class 8: corrosives.

If your samples might meet any of the above definitions, contact the project manager to obtain instructions on sample shipment.

# SOP SP-4

## FIELD MEASUREMENT OF pH

### Purpose

Provide guidelines for pH measurements in water samples

### Goal and Objective

To obtain accurate pH measurements in the field

### Equipment Needs

pH Meter

Calibration Standards (within expiration date)

Glass Container or Flow-through Cell

Extra Set of Batteries

Indelible Ink Pen

Field Sampling Form

Deionized/Distilled Water

### INSTRUMENT CALIBRATION

The pH meter must be calibrated prior to each field event and after every 10 samples during a sampling event, or more frequently if required by the project/client. Follow the manufacturer's recommendations to calibrate the meter. This typically involves the following sequence of steps:

1. Verify sensor is clean and filled with solution, then turn on meter.
2. Place in pH 7 solution, press "cal", and wait until calibration is complete.
3. Rinse sensor in deionized or distilled water.
4. Place in pH 10 (or pH 4) buffer solution, press "cal" a second time, and wait until endpoint is reached.
5. Rinse in distilled water.

Three-point calibration is the standard procedure. If the instrument is a multi-parameter meter, follow instructions for measurement of pH from the manual.

Periodically throughout the field day, place the probe in 7.0 pH buffer solution. If the measured value differs from the expected value by more than 0.1 pH units, recalibrate the meter according to the manufacturer's instructions.

### FIELD MEASUREMENT PROCEDURE

- Rinse a decontaminated glass beaker or plastic flow-through cell with sample water three times.
- Rinse the pH probe with deionized or distilled water.
- Fill the container with sample water.
- Immerse the probe in the sample and agitate it to provide thorough mixing. Continue to agitate until the reading has stabilized. Read the pH value from the meter to the nearest 0.1 standard unit (s.u.) and record on the field sampling form. If the reading is being taken in-situ or using a flow-through cell, wait until the reading stabilizes and record the final pH value.
- Note any problems such as erratic readings. If previous readings are available, compare the current measurement to previous reading to check that the current reading is within reasonable limits.
- Rinse probe with deionized or distilled water and store according to the manufacturer's instructions.

# SOP SP-5

## SURFACE WATER SAMPLING

Samples of surface water (e.g., streams, rivers, springs, ponds, and lakes) can be collected using a variety of methods, with the grab sampling method being the most common. This method is described below, along with a method of sampling free product floating on a surface water body.

### Purpose

Provide field sampling methodologies for surface water

### Goal and Objective

To ensure surface water samples are collected correctly and consistently in the field

### Equipment Needs

Decontamination Supplies

Latex or Nitrile gloves

Water Quality Meter for pH, conductivity, temperature

Coolers and Ice

Sample Bottles & Preservatives

Indelible Marking Pen

Field Sampling Form

Chain-of-Custody

### GRAB SAMPLING

- When collecting a grab sample of surface water, the sample bottles commonly are placed directly in the water body, and the container(s) are allowed to fill with the water source. Optionally, a single container, such as a clean bucket, can be filled with the water source and then the composited water used to fill the individual sample bottles (see additional description below).
- When collecting water samples from a stream or river, attempt to collect the sample at the interval in the stream which exhibits the largest volume of flow and/or highest velocity. If safely wadable, the samples can be collected away from the bank. If not, the samples should be collected from or near the bank where flow is evident. More than one depth interval may be sampled in the water body.
- When collecting water samples from a pond or lake, the water samples typically are collected from or near the bank where water depths are greater than a few inches.
- Latex or nitrile gloves should be worn when sampling surface water. Decontamination procedures typically are not required for collection of surface water samples, with the exception of meter probes used for measurement of field water quality parameters (see bullet below).
- Field parameters (pH, temperature, conductivity) should be measured in accordance with applicable SOPs prior to sample collection for laboratory analysis. Take care to collect measurements from the sample locations in the water body similar to the grab sample. Try to limit the disturbance of fine sediment on the bed of the water body while collecting samples. The intent is to prevent increasing the turbidity prior to and during sample collection. If, during sampling, fine sediment on the bed is disturbed, wait until the water clears before collecting a sample.
- Prior to collecting the water samples, the sample bottle labels should be adhered to the bottles and the sample information completed on each label with indelible ink.

- To collect a sample, submerge a sample bottle such that mouth of bottle is submerged below the water surface at least 2 to 3 inches, if possible. Initially, allow each bottle to fill partially, then rinse bottle by shaking and discharge this water away from sample site. Repeat this procedure three times. Do not rinse sample bottles if the laboratory has previously added a preservative to the container.
- Once the sample container is filled, add preservative (if necessary), and cap the container. If water is too shallow to fill directly to sample bottles, use a decontaminated container to collect sample water. Transfer water from compositing container into the individual sample bottles.
- If the water is too shallow to sample with a bottle, a peristaltic pump can be used to collect a sample. New tubing should be used to pump the shallow surface water directly into sample bottles. A peristaltic pump is also the preferred method of collecting a filtered surface water sample for dissolved constituents because the filter can be placed in-line for ease of sample collection.
- Place sample containers in a cooler with sufficient ice; sample packaging and shipping procedures are included in SOP SP-3. Sample documentation and chain-on-custody procedures are described in SOP SP-2.
- Fill out appropriate field form(s) documenting sample location, time, and other pertinent information prior to leaving sampling site (see SOP SP-1).

## SAMPLING FREE PRODUCT ON SURFACE WATER

The procedure described below is to be used when sampling for free phase organic constituents floating on top of a surface water body (e.g., sheen):

- Latex or nitrile gloves should be worn when conducting the sampling procedure.
- Using a wide-mouth jar, submerge the container in such a manner that leaves the mouth of the container half-way out of the water; allow the container to fill.
- Transfer sample from wide-mouth jar directly into sample bottles for lab analysis.
- Refer to SOP SP-2 and SOP SP-3 for information about procedures for sample documentation, chain-of-custody, and sample packaging and shipping.