Internal Operating Procedure

BMP 3.03: IDDE DRY WEATHER FIELD SCREENING
BMP 3.04: ILLICIT DISCHARGE INVESTIGATIONS AND RESPONSE
BMP 3.07: PUBLIC REPORTING

December 2017

I. Background

Generally, there should be no flow coming from an outfall during dry weather. If the flow contains pollutants, it is considered an illicit discharge and must be eliminated. Sometimes there may be dry weather flow but it does not contain pollutants, and as such is simply a discharge. Examples of allowable discharges include uncontaminated groundwater that seeps into the system naturally or is discharged from building foundation drains, air conditioner condensate, discharges specifically authorized under a NPDES permit, and water from fire-fighting activities.

EHS has previously walked accessible areas of the receiving streams adjacent to both City and East Campuses for the purpose of identifying all outfalls, regardless of size, configuration, or type. Identified outfalls have been inventoried, photographed, and uploaded to the GIS. Information in GIS includes GPS coordinates, unique identifier number, and attributes (e.g., closed pipe/open channel, material of construction, shape, and size). Dry weather inspections have been conducted at each of these outfalls annually since 2007.

Over the course of several years of dry weather inspections, a relatively small percentage (e.g., < 10%) of outfalls are typically found to be flowing, and most that are flowing are flowing at a trickle or less. These flows are usually clean and the source has generally been attributed to groundwater seepage, landscape irrigation, or air conditioner condensate. Other flows previously identified but since abated (re-directed away from the storm sewer system) include: swimming pool/fountain discharges and non-contact cooling tower water discharges. Considering UNL's campus make-up, land uses, geology, geography, and past experiences related to illicit discharges and dry weather inspections, following are the most likely sources of illicit discharges:

- Construction activities, particularly improper site dewatering activities (accumulated storm water or ground water in excavations) and concrete/masonry washout
- Wet cleaning of exterior locations prone to fouling, such as loading docks and dumpster staging areas.

II. Components of the EHS IDDE Program

The EHS IDDE program consists of the following activities:

- Regular inspections of high priority facilities and construction sites to detect and abate conditions that could lead to an illicit discharge.
- Prompt response to reports from the community of known or suspected illicit discharges.
- Dry weather inspections of outfalls.

The purpose of this SOP is to describe the manner in which EHS conducts dry weather inspections and discharge investigations. Regular inspection of high priority facilities and construction sites are beyond the scope of the IOP and are described in IOPs specific to those activities.

III. Purpose of Dry Weather Inspections

UNL's SMS4 Storm Water Management Plan contains a commitment to conduct annual dry weather inspections of all safely accessible outfalls 8" or greater in size. The purpose of these inspections is to identify and characterize dry weather flows and eliminate illicit discharges. This IOP contains the procedures used by EHS to meet this objective.

IV. Preparation for Dry Weather Inspections

Dry weather outfall inspections are typically conducted by a team of two EHS staff members. At least one of the team members shall be qualified and trained to conduct IDDE inspections. The other staff member will serve as an assistant. Prior to conducting dry weather inspections, the qualified EHS staff member shall review the prior year's dry weather inspection report for each outfall, as well as historical records for the past three years related to any discharge investigations for each outfall. Dry weather inspections are to be conducted a minimum of 48 hours after a rainfall event of 0.1" or more; up to 72 hours may be required following a very heavy precipitation event.

The EHS team shall notify EHS office staff when they will be conducting inspections and their expected time of return to the office. Many of the inspections are performed on steep terrain and injury is possible. If the team has not returned by the expected time, the informed EHS office staff will know to check on the well-being of the inspectors. Dress appropriately to enhance safety, e.g., long sleeved shirt, hat, long pants, socks, and boots. Insect repellant is also recommended for particularly difficult terrain.

Assemble the following support materials prior to setting out to conduct an inspection:

1. Digital camera or other means of capturing a digital photo of the outfall
2. Several sheets of white paper
3. Means of communication to summons help if needed (e.g., cell phone) and emergency call list
4. Tool for opening manholes
5. Several clean, clear containers
6. Several clean dippers
7. Nitrile gloves (use when collecting samples for analysis)
8. Flash light or head lamp
9. Backpack or other tote for carrying supplies
10. Clip board, Sharpie markers, pens.

11. Map of the outfall locations with their unique identifier number
12. Map of the UNL storm sewer system to assist in identifying up-gradient pipes, manhole covers, and inlets associated with outfalls that may require an illicit discharge investigation
13. Copy of the prior year's dry weather inspection for each outfall
14. Field screening meter(s), kits, or test strips, as appropriate

V. Safety Considerations

Stream banks can be slippery and terrain hazards may not be readily apparent. Wild animals may also be present. The preferred time of year for conducting dry weather inspections is early Spring when foliage is at a minimum and before spring rains, but conditions may require an extension to fall in the event there are late freezes or early spring rain. Inspectors shall never bodily enter any closed-pipe portion of the storm water conveyance system.

VI. Flow Characterization

Considering past observations and configurations of most UNL outfalls, it is sufficient to characterize flow qualitatively. Flow is characterized as: trickle, low, moderate, or high.

VII. Physical Examination

When safely accessible, don nitrile gloves and collect a sample from a flowing outfall in a clean, clear container and evaluate whether there are any indicators of potential pollutants using visual and olfactory evaluation. Sample bottles and dippers may be reused for another outfall only if rinsed clean before the next use. If the flowing outfall is not accessible, obtain a sample from the nearest, safely-accessible sampling location up-pipe from the outfall. Record observations on the inspection form.

- **Odor:** The odor expected from a clean storm sewer could be characterized as 'wet earth' or 'moss like.' It should not be offensive. Offensive odors can be characterized as:
    - Sewage – such as that detected around improperly operating septic systems.
    - Rancid/sour – similar to that of rotting food in a dumpster.
    - Petroleum – an odor like gasoline, diesel fuel or 'solvent like' that may be accompanied by a sheen.
    - Sulfide – such as the smell of natural gas or rotten eggs.
    - Other – note any other offensive odors as appropriate.
- **Color:** Note the color of the water. Place a sheet of white paper behind the sample container to assist in accurately identifying the color. The combination of color and turbidity can provide clues as to the source of the discharge. For example, a green but clear discharge may indicate anti-freeze while a gray, turbid discharge may indicate a source involving concrete or rock.
- **Turbidity:** Turbidity refers to the cloudiness of the water and usually indicates solids that are suspended in the water. A common source of turbidity is eroded soils and mud washed from vehicles in parking lots. Describe the turbidity (e.g., appearance of chocolate milk, faint white, milky appearance, etc.).

- **Sheen**: Petroleum products and oils can produce a sheen that sits on top of water, and appears shiny, iridescent, and swirly. Look for a sheen in the flow at the outfall, in the receiving water immediately below the outfall, and in the sample collected for the purpose of measuring flow. Describe the appearance of the sheen. Iron-loving bacteria can also cause a sheen. Unlike an oil sheen, a bacterial sheen will break into clumps or shatter when disturbed. Make note of how the sheen behaves when disturbed.
- **Suds/Foaming**: Excessive foaming or suds may suggest the presence of soaps or detergents. Foaming can also indicate decaying algae which may suggest a condition of excessive nutrient loading. Describe observed suds/foaming.
- **Trash**: Make note of the nature of trash observed that appears to have originated from the outfall (e.g., napkins, food containers, food waste, etc.).
- **Other**: Record any other observation that may be pertinent to the outfall evaluation or IDDE investigation.

VIII. Test Parameters

The following analytical data will be collected for outfalls identified with moderate or heavy flows that have no visual or olfactory indicators of potential pollutants. The purpose of collecting this data is to obtain sufficient data to assist in future evaluation and identification of potential sources of dry weather flows, and to evaluate whether an apparently clean dry weather flow may be "illicit."

When there are visual or olfactory indicators of potential pollutants field screening will not be conducted. Rather, the primary objective will be identification and elimination of the source as described in Section IX, Source Identification.

Test strips and a portable handheld temperature/Conductivity meter will be used for field screening. Temperature and conductivity will be measured using a meter. Test strips will be used for the following parameters:

- pH (range of 1 -14)
- Hach 5 in 1 test strip (product number 2755250), which test for free chlorine, total chlorine, total hardness, total alkalinity, pH (narrow range of 6.2 – 8.4).
- Ammonia (Hach product number 2755325), range of 0-6 ppm
- Nitrate test strips (EMD Millipor MQuant, Fisher Scientific product no. M1100200002), range 10 – 500 ppm

The Lincoln Water System 2016 annual report lists the following typical values for tap water in Lincoln, Nebraska:

- pH 7.7
- Total alkalinity 187 ppm
- Total hardness 236 ppm

Low pH indicates an acidic condition. High pH indicates a basic condition. Common sources of high pH include latex paints, cementous materials, and cleaners/detergents.

Ammonia is produced by the decomposition of plant and animal proteins and is also a main ingredient in fertilizers. The presence of ammonia in surface water usually indicates contamination from fertilizers, sanitary wastewater, or a commercial/industrial

source. Trace amounts of ammonia over time can be toxic to fish and higher ammonia concentrations can result in low dissolved oxygen concentrations and fish kills.

Chlorine is often an indicator of potable drinking water. Chlorine is often added as a disinfectant, but generally is present at 1 ppm or less. Aquatic life is sensitive to chlorine, even at levels common to potable water. Under State surface water quality standards, residual chlorine limits are in the range of 11 to 19 ppb.

Hardness is a measurement of the dissolved mineral content (primarily calcium and magnesium) of water. Hard water contains a high mineral content and soft water contains a low mineral content. In areas where hardness levels are elevated due to local geology, hardness can help distinguish between natural groundwater flows and tap water which is typically a low hardness. Natural sources of harness include limestone.

Alkalinity is a measure of the buffering capacity (ability to neutralize acids and bases) of a water body. It can be used along with pH, hardness, temperature, and conductivity, as an indicator of an industrial wash water discharge.

Conductivity is a measure of how well water can conduct an electrical current based on ionic activity and content. Saline waters will have a high conductivity, as well polluted waters. A reading greater than 2000 uS/cm may be indicative of potential pollutants.

IX. Source Identification

Inspections are conducted to identify the source of moderate or heavy flows, or flows that are suggestive of an illicit discharge through physical examination (e.g., odor, color, turbidity, sheen, suds). In general, the preferred method for conducting a follow-up investigation is to identify potential sources based on observations made at the outfall and evaluating the storm sewer map to identify areas that contribute to that particular outfall. In some cases, it may simply require driving or walking the contributing area to identify the likely source. For example, dewatering at a particular construction site may be easily associated with a turbid water discharge.

In some cases, the potential source may not be obvious and it may be necessary to sequentially inspect up-gradient inlets and manholes starting from the outfall until the source is identified.

Once the source is identified, the EHS staff member shall immediately contact the manager of the responsible department/facility/contractor and coordinate the actions necessary to eliminate present and future discharges. Present discharges shall be stopped as soon as possible. EHS staff is responsible to record all actions taken to eliminate the discharge, including dates/times of persons contacted, persons responsible for the discharge, nature of the discharge, estimates of quantity and duration of the discharge, etc. (see documentation and recordkeeping). As necessary, EHS shall initiate the Enforcement Response Plan to eliminate the discharge.

At certain points, the City of Lincoln's storm sewer system discharges into UNL's system, which then ultimately flows to an outfall. When it is determined that a discharge originates up-gradient of the point that the City's system discharges to UNL's system, EHS will contact the City of Lincoln's Watershed Management at 402-441-7548 as soon

as practicable and in no case later than 48 hours and report the discharge. EHS will ask for a courtesy notification of findings and add to file.

Analytical laboratory testing beyond that described in Section VIII generally will not be necessary. However, if such testing and analysis is deemed necessary or helpful, then samples shall be collected and analyzed in accordance with 40 CFR 136.

X. Outfall Condition - Both Flowing and Non-Flowing Outfalls

The EHS inspector will photograph each accessible outfall as part of the annual dry weather inspection. The inspector will take additional photographs as needed to document flows that have physical indicators of pollutants and receiving stream impacts. Outfall photographs will be used to document current conditions and to evaluate whether there are any new or worsening conditions associated with the outfall.

The inspector will evaluate the items described below for each outfall. Appropriate follow-up actions for newly identified/worsening conditions are also described.

- **Outfall Damage:** Wear over time is to be expected with all outfalls. Steel pipes can rust. Concrete can etch and crack. Plastic can photo-oxidize and crack. Note damage such as extreme etching or corrosion. If the damage is such that repairs may be needed, the inspector will report it to UNL's Utilities Department for their assessment and follow-up. If there is bank erosion, the inspector shall report it to the Lower Platte South Natural Resource District, and make record of this report.
- **Heavy Deposits/Stains:** Oil and paint stains are signs of an illicit discharge and need investigation. Flow lines may be a sign of illicit discharges depending on the circumstances. Rust colored or darkened moss/algae/lichen flow lines are not an issue unless they are excessive. White flow lines may indicate concrete or rock dust discharges. The inspector shall attempt to identify the source by conducting a visual inspection of up-gradient inlets/manholes as described Section IX, Source Identification. It may also be helpful to consult with other UNL Departments as appropriate (e.g., Utility Services, Building Systems Maintenance, Athletic Facility Directors, etc.).
- **Abnormal Vegetation:** Conditions to be alert to when evaluating this item are: excessive algae in the outfall or immediately below the outfall; vegetation immediately downstream of the outfall that is flourishing compared to vegetation immediately upstream of the outfall; vegetation immediately downstream of the outfall that is unexplainably stressed (denuded, burned leaves, stunted, discolored). These conditions may suggest discharge of nutrients or toxic substances. In the absence of staining/deposits and flow, it is unlikely that the source can be identified. However, the inspector shall review UNL's storm sewer maps to identify facilities that have the potential to contribute to the identified condition and consult with appropriate department representatives to determine if a condition at their particular facility may be a contributing factor. Often, it may be necessary to consult with Landscape Services to determine if any grounds keeping activities have potential to contribute to the condition observed.
- **Sediment Accumulation:** Heavy sediment accumulations shall be documented, and the inspector shall attempt to identify the source. If the likely source is

transient (e.g., construction activity), then the primary corrective action may be removal of accumulated sediment. If the likely source is permanent, then the primary corrective action will focus on removal of the source or implementation of effective BMP(s). The inspector shall involve other departments as needed to achieve appropriate corrective action(s).

XI. Documentation

The inspector shall document all follow-up actions, including the means/methods by which a discharge was investigated, date/time of the follow-up investigation, reason for delaying any investigation that was not initiated immediately after completing the outfall inspection, persons contacted and date/time of contact, sampling details, and final resolution/conclusions with the rationale used to support the final conclusions.

XII. Reports of Potential Illicit Discharges (Including Spills/Dumping)

EHS will immediately respond to reports of spills/dumping to UNL's storm sewer system. The University Operator maintains a call list and will notify EHS of such occurrences outside of normal business hours. EHS staff will respond to and investigate such reports. Other potential emergency contacts are provided in the table below.

Organization	Telephone Number	Role/Responsibility
Nebraska State Patrol (NSP)	402-471-4545	Multi-agency point of contact after normal business hours
Nebraska Department of Environmental Quality (NDEQ)	402-472-2186 (normal business hours) Contact via NSP after normal business hours	Immediate notification required for any spill, release, or dry weather flow believed to be an immediate threat to human health or the environment
University Police	402-472-2222	Primary emergency authority for events on campus (traffic control, evacuation, perimeter security, etc.)
UNL Landscape Services	402-472-1550 (normal business hours	Has heavy equipment that may be needed to mitigate on-going releases/spills
UNL Utility Services	402-472-4017 (normal business hours)	Knows location of and can access and activate utility shut-off valves. Operates and maintains UNL's storm sewer system.
UNL Operator	402-472-7211	Will initiate UNL's emergency call list after normal working hours
Lincoln Fire & Rescue HazMat Team	911 or 402-441-8494	Provide primary directives to all other emergency response personnel when there is substantial threat of harm to persons, the environment, and property; ensures the incident is controlled to the point that it is no longer an emergency.

Lincoln Police Department	911 or 402-441-6000	Coordinates with UNL under Mutual Aid Agreements; Primary emergency authority for events occurring off-campus.
US Coast Guard National Response Center	800-424-8802	Releases of hazardous substances in quantities greater than the Reportable Quantity must be reported to the NRC
Lincoln Lancaster County Health Department	402-441-8000	Assesses public health implications; advises LFR of public health implications and recommendations for evacuation and other responses; advises on remedial actions; enforcement authority for illicit discharges (LMC 28.02)
Nebraska State Fire Marshal	402-471-2027 (normal business hours) 402-471-4545	Provides expertise and instruction if there is threat of fire or explosion.

XIII. Recordkeeping

All dry weather inspections and follow-up actions must be documented either on the form included in this procedure or by other equivalent means. Paper documents and pictures will be maintained in the file room (NPDES→ BMP 3.03 Dry Weather Inspections→ Year. In addition, a pdf for each campus (East, City and Innovation) will be created that includes all outfalls. This pdf will be maintained on the server (H:\Environmental Programs\NPDES\Stormwater\Record Keeping\SMS4 Permit Year 2018-2022 Records\MCM 3 Illicit Discharge\BMP 3.03 IDDE Dry Weather Field Screening→ Year).

Records of reports of dumping/illicit discharges are to be maintained as paper documents in the file room (NPDES→ BMP 3.04 Illicit Discharges → Year). A pdf file will also be maintained on the server (H:\Environmental Programs\NPDES\Stormwater\Record Keeping\SMS4 Permit Year 2018-2022 Records\MCM 3 Illicit Discharge\BMP 3.04 Illicit Discharge Investigation and Response→ Year).

Section 1: Background Information	
Reason for Inspection: □ Dry Weather Inspection □ IDDE report (Record details- date and time of report, name of person submitting report, nature of the suspected illicit discharge, suspected source, etc.; or attach initial written report as received):	
Outfall #:	Date of Inspection:
Time (military):	Date and amount of Last Significant Precipitation:
Inspected by:	□ Flowing □ Not flowing (skip to section 5) □ Submerged
Notes:	

Section 2: Qualitative Flow Characterization
□ Trickle □ Light □ Moderate □ Heavy
Notes:

Section 3: Physical Examination of Flow
(Attach photo documentation if there are physical examination indicators of an illicit discharge, including in stream effects, if any)

Sample location:

Observed? Y/N	Parameter	Describe (including whether the condition is observed at the outfall, within the receiving stream (and distance downstream), or both)
	Odor	
	Color	
	Turbidity	
	Sheen	
	Suds/Foaming	
	Trash	
	Other	

Section 4: Screening Data
(if moderate or heavy flow, but Section 3 indicates no pollution, complete Section 4)

Sample location:

Parameter	Meter Make/Model	Result
Temperature		
Conductivity		
Parameter	Lot No. of test strips/reagents	Result
Hach 5-in-1		
Free chlorine		
Total chlorine		
Total hardness		
Total alkalinity		
pH		
Individual Test Strips		
Ammonia		
pH (1 -14 range)		
Nitrate		

Information for all tests that were not immediately conducted in the field (parameter, date/time of analysis, method of preservation, person/lab conducting the test, test method, etc.):

Section 5: Outfall Condition
(Attach photo of outfall; if a condition is noted, include additional photos as necessary to document the condition)

Observed? Y/N	Parameter	Condition observed previously?	Describe and including any changes from previous observations
	Physical Damage		
	Heavy Deposits/Stains		
	Abnormal Vegetation		
	Heavy Sediment Accumulation		

Discharge Investigation Documentation

Provide records (including maps if appropriate) describing all follow-up actions, including the means/methods by which a discharge was investigated, date/time of the follow-up investigation, reason for delaying any investigation that was not initiated immediately after completing the outfall inspection, persons contacted and date/time of contact, sampling details, and final resolution/conclusions with the rationale used to support the final conclusions