Illicit Discharge Detection and Elimination (IDDE) Plan

University of New Hampshire

Permit Year 2

EPA NPDES Permit Number NHR041000

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Illicit Discharge Detection and Elimination Plan

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1 IDDE Program Implementation Timeline

Table 1-1. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	X					
SSO Inventory	X					
Initial Outfall Ranking	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls					X	
Catchment Investigations – all Problem, High and Low Priority Outfalls						X

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

The University of New Hampshire will use the regulatory mechanism authorized by its Board of Trustees to provide the University and its Planning, Design, and Construction Guidelines with adequate legal authority to:

- Prohibit illicit discharges
- Investigate suspected illicit discharges
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system
- Implement appropriate enforcement procedures and actions.

Chapter 1 (General Priinciples) of the UNH Planning, Design, and Construction guidelines (https://www.unh.edu/facilities/chapter-1-general-principles) will meet the requirements of the 2017 MS4 Permit.

2.2 Statement of Responsibilities

The UNH Facilities Department is the lead agency or department responsible for implementing the IDDE program.

3 Stormwater System Mapping

A copy of the existing storm system map is provided in **Appendix B**.

The MS4 Permit requires the storm system map to be updated in two phases as outlined below. The University is responsible for updating the stormwater system mapping pursuant to the 2017 MS4 Permit. The University will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the information per Part 2.3.4.5.a of the MS4 Permit.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the information per Part 2.3.4.5.b of the MS4 Permit.

4 Sanitary Sewer Overflows (SSOs)

The University has no Sanitary Sewer Overflows (SSOs).

5 Assessment and Priority Ranking of Outfalls

The MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The University will complete an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking will be completed within one (1) year from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

Outfalls and interconnections will be classified into one of the following categories:

1. **Excluded outfalls**:
   - Outfalls/interconnections that do not discharge to an impaired waterbody or are not listed in Part II Summary of Receiving Waters in the NOI.
   - Outfalls/interconnections with no potential for illicit discharges including roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

2. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:

   - Olfactory or visual evidence of sewage,
   - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
   - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

   High Priority Outfalls: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

   - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds

- Determined by the permittee as high priority based on the characteristics listed in **Appendix C** .

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

Outfalls will be ranked into the above priority categories (except for excluded outfalls, which may be excluded from the IDDE program) based on the following characteristics of the defined initial catchment areas, where information is available. To prioritize initial mapping and outfall assessment work the permittee is using location-specific characteristics of water body impairments to focus initial work as included in **Appendix B**. It is understood that not all currently excluded catchments will remain excluded throughout the 10 year assessment period, however for initial outfall ranking and catchment investigations this approach will target the worst areas first.

- **Previous screening results** – previous screening/sampling results indicate likely sewer input (see criteria above for Problem Outfalls).

- **Past discharge complaints and reports.**

- **Poor receiving water quality** – the following guidelines are recommended to identify waters as having a high illicit discharge potential:
    - Exceeding water quality standards for bacteria
    - Ammonia levels above 0.5 mg/l
    - Surfactants levels greater than or equal to 0.25 mg/l

- **Density of generating sites** – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.

- **Age of development and infrastructure** – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.

- **Sewer conversion** – Contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.

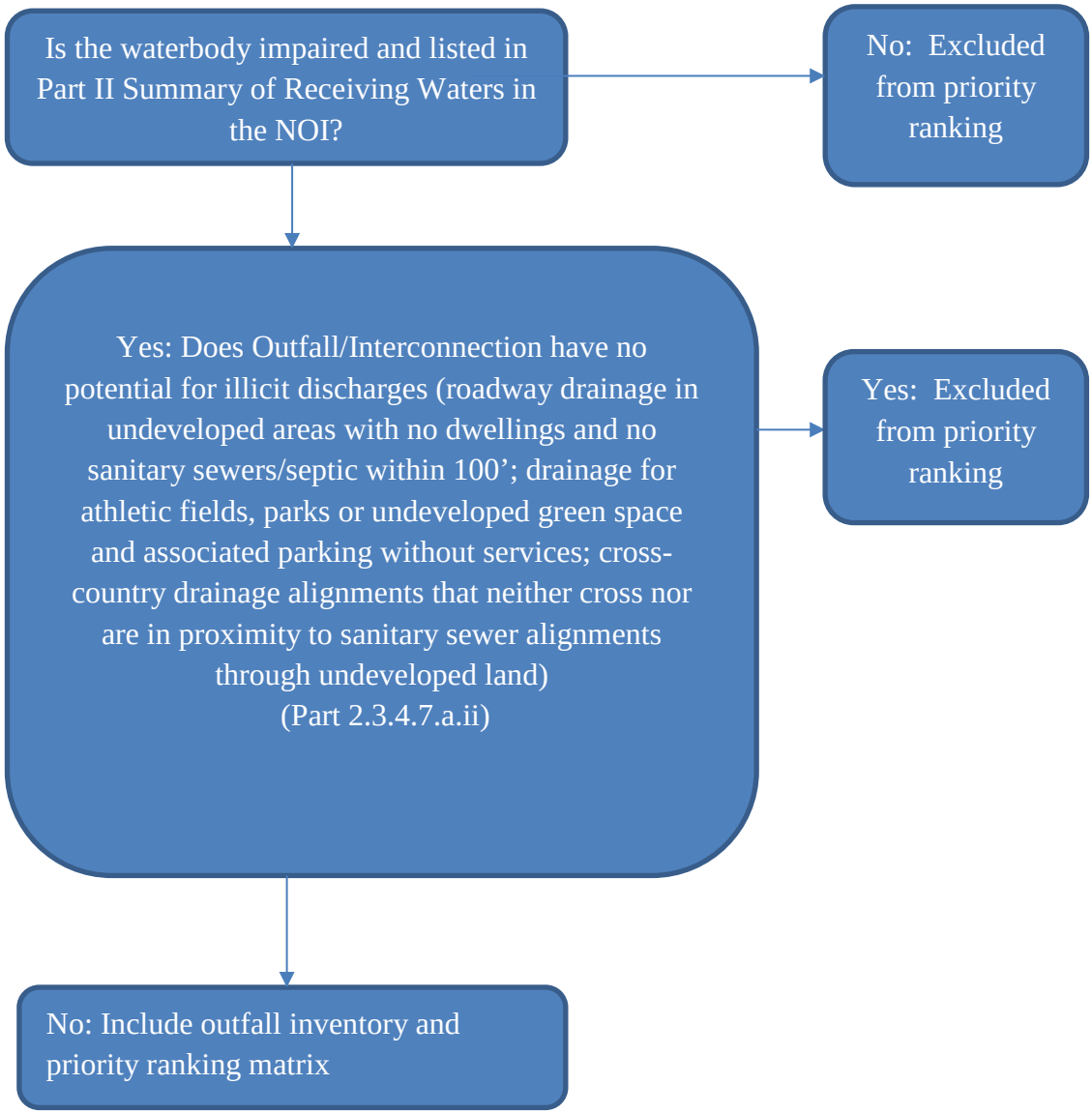
- **Historic combined sewer systems** – Contributing areas that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.

- **Surrounding density of aging septic systems** – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.

- **Culverted streams** – Any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.

- **Water quality limited waterbodies** that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

The following is an initial outfall prioritization flowchart, see Appendix C for an outfall inventory and priority ranking matrix:



6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow. The University is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section by the end of Year 3.

Dry weather outfall Screening and Sampling shall be completed in accordance with Part 2.3.4.7.b of the MS4 Permit. Plans and procedures for such screening and sampling shall be incorporated into this plan.

7 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing.

Catchment Investigations shall be completed in accordance with Part 2.3.4.8 of the MS4 Permit. A written catchment investigation procedure shall be developed and incorporated into this plan within 18 months of the permit effective date. Investigations of catchments associated with Problem Outfalls shall begin no later than two (2) years from the permit effective date and shall be completed within seven (7) years.

7.1 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the University will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed.

7.2 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to investigate the source of the potential discharge within the outfall catchment area. Common catchment investigation techniques include, but are not limited to:

- Review of maps, historic plans, and records
- Manhole inspection
- Dry and wet weather sampling
- Video inspection
- Smoke testing
- Dye testing.

This section outlines a systematic procedure to investigate outfall catchments and identify the source(s) of potential illicit discharges. Information and data collected as part of the catchment investigations will be reported in each annual report.

7.3 Map and Record Review

The UNH Facilities Department will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Prior work on the storm drains
- Health Department or other municipal data on septic system failures or required upgrades
- Records related to septic system breakouts, SSOs, and sanitary sewer surcharges

7.4 System Vulnerability Factors

Based on the Map and Records review, UNH Facilities Department will identify any of the following System Vulnerability Factors (SVFs). SVFs indicate a risk of sanitary or septic system inputs to the MS4 under wet weather conditions.
The UNH Facilities Department's SVF inventory (Appendix C) will be updated based on this information.

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages.
- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs.
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints.
- Common or twin-invert manholes serving storm and sanitary sewer alignments.
- Common trench construction serving both storm and sanitary sewer alignments.
- Crossings of storm and sanitary sewer alignments.
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system.
- Areas formerly served by combined sewer systems.
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.
- Any storm drain infrastructure greater than 40 years old in medium and densely developed areas.

7.5 Dry Weather Catchment Investigation (Manhole Inspections)

The University will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges.
The UNH Facilities Department will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.
Several important terms related to the dry weather manhole inspection program are defined by the MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect **key junction manholes** for evidence of illicit discharges and confirm or identify potential system vulnerability factors. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.
The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall and inspecting key junction manholes along the way.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.
Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. A sample field inspection form is provided in **Appendix G.**

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses, provided that they meet the minimum threshold indicator concentrations as outlined on Page 38 of the Permit (Section 2.3.4.7.b.iii.4.b). Sampling and analysis will be in accordance with procedures outlined in **Section 7**. Additional indicator sampling may assist in determining potential sources.

3. Where sampling results or visual or olfactory evidence indicate potential illicit discharges, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.

4. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges can be isolated to a pipe segment between two manholes.

5. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.6 Wet Weather Catchment Investigation (Outfall Sampling)

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The UNH Facilities Department will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.
Wet weather outfall sampling will proceed as follows:

At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.

1. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall.
    a. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.
    b. There is no specific rainfall amount that will trigger sampling, although minimum storm event intensities that are likely to trigger sanitary sewer interconnections are preferred.
    c. Sampling during the initial period of discharge ("first flush") will be avoided.

2. If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 7.**

3. If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.7 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines.

These methods are described in the sections below. Instructions and Standard Operating Procedures (SOPs) for these and other IDDE methods are provided in **Appendix E**.
Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the UNH Facilities Department will notify property owners in the affected area. Smoke testing notification will include directed communication from the University's Facilities Control Center.

7.7.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

7.7.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are place in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.
It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.7.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.
A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.
The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

7.7.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

7.7.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly, and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.8 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the University will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action
- Estimate of the volume of flow removed.

7.8.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges and SSO sources within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation. Confirmatory screening is not required in catchments where no illicit discharges or System Vulnerability Factors have been identified and no previous screening indicated suspicious flows.

7.9 Follow-up Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be scheduled for follow-up screening within five (5) years, or sooner based on the catchment's illicit discharge priority. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 7** of this document. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 8.1**. All sampling results will be reported in the annual report.

7.10 Illicit Discharge Detection and Elimination Training

The University will implement a training program, as outlined in Section 8 and **Appendix F** of the IDDE Program Plan, to employees involved in IDDE program about the program, including how to recognize illicit discharges and SSOs. The permittee shall report on the frequency and type of employee training in the annual report.

8 Training

Annual IDDE training will be made available to employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix F**. The frequency and type of training will be included in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

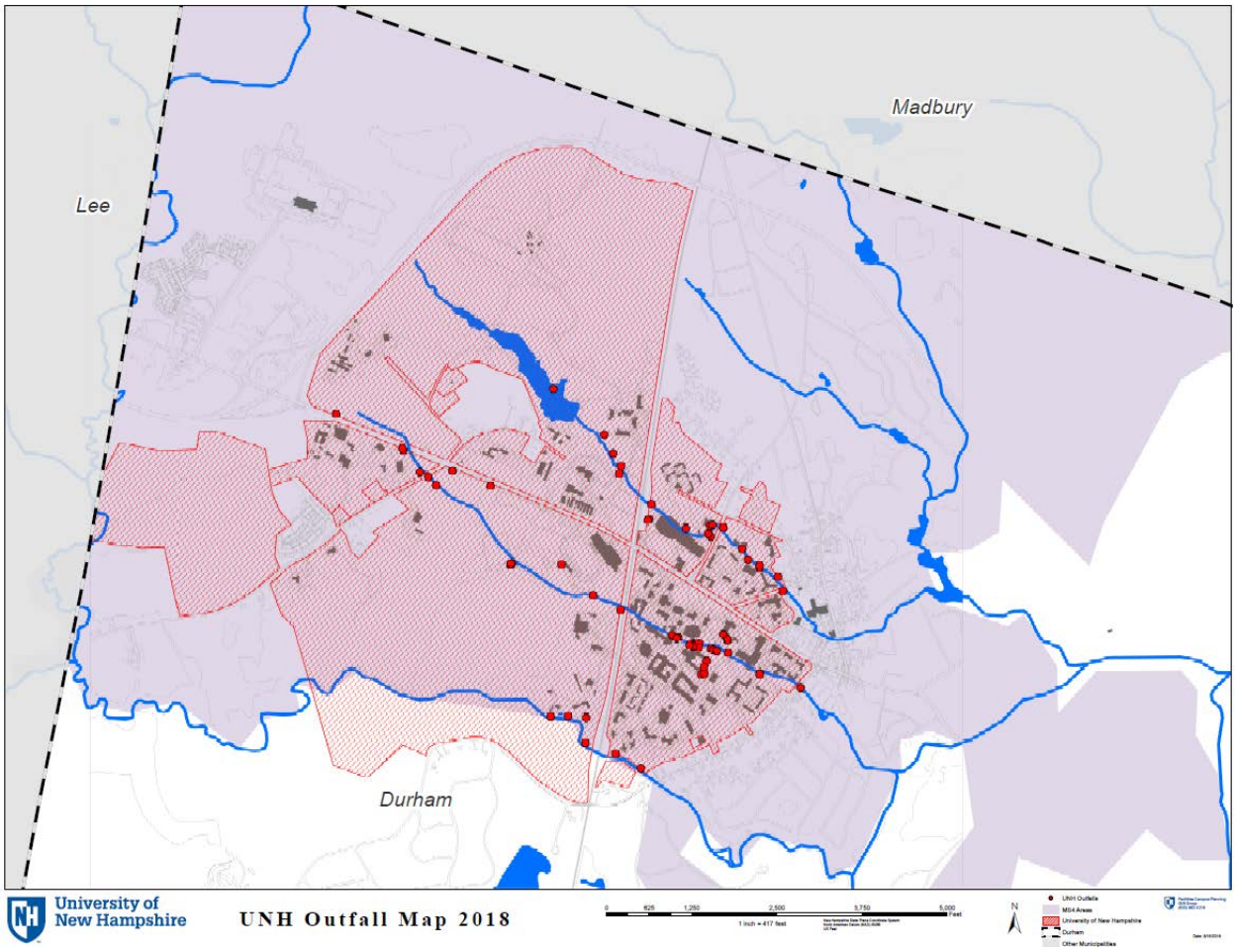
Appendix A

UNH Planning, Design, and Construction Guidelines Chapter 1:

https://www.unh.edu/facilities/chapter-1-general-principles

Appendix B

Storm System Mapping



Appendix C

Outfall Inventory and Priority Ranking Matrix

Receiving Water	Outfall ID	Previous Screening Results Indicate Likely Sewer Input? [1]	Receiving Water Body Impairment? [2]	Discharging to Area of Concern to Public Health? [3]	Frequency of Past Discharge Complaints	Density of Generating Sites [4]	Age of Development / Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Score	Priority Ranking
Information Source		Outfall inspections and sample results	Impaired Waters List	Maps	Town Staff	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria		Yes = 10 (Problem Outfall) No = 0	Yes = 10 (impairment listed as high priority in permit) No = 0	Yes = 10 No = 0	Frequent = 3 Occasional = 2 None = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	TBD		
Durham Reservoir Dam (I-05)	Outfall ID 1	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 2	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 3	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 4	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 5	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 6	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 7	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 8	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 9	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 10	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 11	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 12	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 13	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 14	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 15	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 16	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 17	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 18	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 19	0	10	0	0	1	1	0	0	0	None	12	High Priority
Reservoir Brook (R-10)	Outfall ID 20	0	10	0	0	1	1	0	0	0	None	12	High Priority
College Brook (R-09)	Outfall ID 21	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 22	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 23	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 24	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 25	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 26	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 27	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 28	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 29	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 30	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 31	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 32	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 33	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 34	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 35	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 36	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 37	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 38	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 39	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 40	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 41	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 42	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 43	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 44	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 45	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 46	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 47	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 48	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 49	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 50	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 51	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 52	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 53	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 54	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 55	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 56	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 57	0	10	0	0	1	1	0	0	3	None	15	High Priority
College Brook (R-09)	Outfall ID 58	0	10	0	0	1	1	0	0	3	None	15	High Priority
Oyster River-Chesley Brook (R-04)	Outfall ID 59	0	10	0	0	1	1	0	0	0	None	12	High Priority
Oyster River-Un named Brook (R-05)	Outfall ID 60	0	10	0	0	1	1	0	0	0	None	12	High Priority
Oyster River-Un named Brook (R-05)	Outfall ID 61	0	10	0	0	1	1	0	0	0	None	12	High Priority
Oyster River-Un named Brook (R-05)	Outfall ID 62	0	10	0	0	1	1	0	0	0	None	12	High Priority
Oyster River-Un named Brook (R-05)	Outfall ID 63	0	10	0	0	1	1	0	0	0	None	12	High Priority
Oyster River-Un named Brook (R-05)	Outfall ID 64	0	10	0	0	1	1	0	0	0	None	12	High Priority
Oyster River-Un named Brook (R-05)	Outfall ID 65	0	10	0	0	1	1	0	0	0	None	12	High Priority

Appendix D

Field Forms, Sample Bottle Labels, and Chain of Custody Forms

*Appendix to include copies of the following field sampling documents **once fully developed** in accordance with the 2017 MS4 Permit:*

- Dry weather outfall inspection/sampling form
- Wet weather outfall inspection/sampling form
- Manhole inspection form
- Example sample labels (provided by laboratory)
- Example chain-of-custody form(s) (provided by laboratory(s))

Appendix E

Water Quality Analysis Instructions, User's Manuals and Standard Operating Procedures

*Appendix to include copies of water quality analysis instructions, procedures, and SOPs for all sample parameters and all meters or field test kits that are used for analysis **once fully developed** in accordance with the 2017 MS4 Permit. This includes the manufacturer's instructions for how to use field test kits as well as the manufacturer's instructions or user's manual for any field instrumentation.*

Appendix F

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

University

Date	Type of Training	Participants
2/23/2017	Departmental Trainings of MS4 compliance and IDDE procedures	UNH Utilities Distribution Dept.
3/8/2017	Departmental Trainings of MS4 compliance and IDDE procedures	UNH Grounds and Roads Dept.
5/17/2017	Departmental Trainings of MS4 compliance and IDDE procedures	UNH Facilities Project Management Dept.

Appendix G

Source Isolation and Confirmation Methods: Instructions, Manuals, and SOPs

UNH Sample Inspection Form
DRAIN MANHOLE INSPECTION LOG **Manhole ID:**

Inspection Date: _____ Tributary Area:_____

Street: _____ Inspector: _____

Inspection: Not Found ____ Surface ____ Internal ____ Follow Up Inspection_____

Time Since Last Rain: < 48 hours _____ 48 – 72 hours _____ > 72 hours _____

Observations:

Standing Water in Manhole: Yes ____ No ____ Color of Water: Clear ____ Cloudy ____ Other _____ Flow in Manhole: Yes _____ No _____ Velocity: Slow _____ Medium _____ Fast _____ Depth of Flow: _____ in. Color of Flow: No Flow: _____ Clear _____ Cloudy _____ Suspended Solids _____ Other _____ Blockages: Yes _____ No _____ Sediment in Manhole: Yes ____ No____ If Yes: Percent of Pipe Filled: _____ % Floatables: None _____ Sewage _____ Oily Sheen _____ Foam _____ Other _____ Odor: None _____ Sewage _____ Oil _____ Soap _____Other _____

Field Testing:

Temp _____ Conductivity _____ Surfactants: Yes/No Ammonia: Yes/No Chlorine _____ Salinity _____

Lab analysis:

E. coli _____ Pollutants of Concern* _____

*For TMDLs or Water Quality Limited (WQL), refer to Appendix G of the MS4 Permit.

MH DETAILS

Location:	Material:	MH Cover size:	MH Diameter:	Invert/Flow Channel:
Roadway ☐	Brick ☐	24" ☐	48" ☐	Present Y/N ☐
Gutter ☐	Block ☐	26" ☐	60" ☐	Material:
Grass ☐	Concrete ☐	30" ☐	Other (describe below) ☐	Concrete ☐
Easement ☐	Lined ☐	36" ☐		Brick/mortar ☐
Other (describe below) ☐	Other (describe below) ☐	Other (describe below) ☐		Other (describe below) ☐

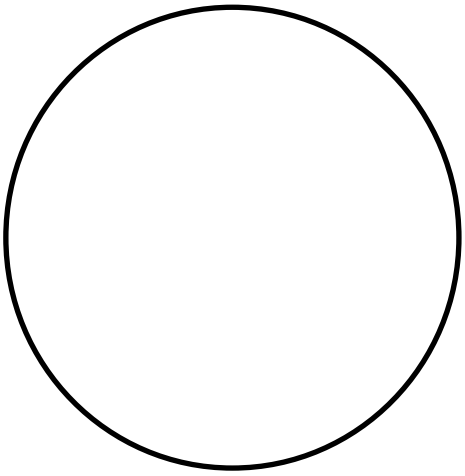
CONDITION

Cover:		Ring &Frame		Chimney:		Wall:		Rungs:	
Serviceable		Serviceable		Serviceable		Serviceable		Serviceable	
Loose		Loose		Cracked/Broken		Cracked/Broken		Unsafe	
Below Grade		Displaced		Corroded		Corroded		Missing any	
Damaged		Missing Grout		Misaligned		Misaligned		Corroded	
Sealed		Raise		Infiltration		Infiltration		N/A - no rungs	
Holes (# of holes)		Lower		Roots at Joints		Roots at Joints			

Include any pertinent notes regarding component conditions below:

MANHOLE DIAGRAM

(Outgoing pipe should be at the 6:00 position. Label all pipes with size/type and flow direction)



INSERT PHOTO(S) BELOW: