Illicit Discharge Detection and Elimination (IDDE) Plan

TOWN OF WINDHAM, NEW HAMPSHIRE

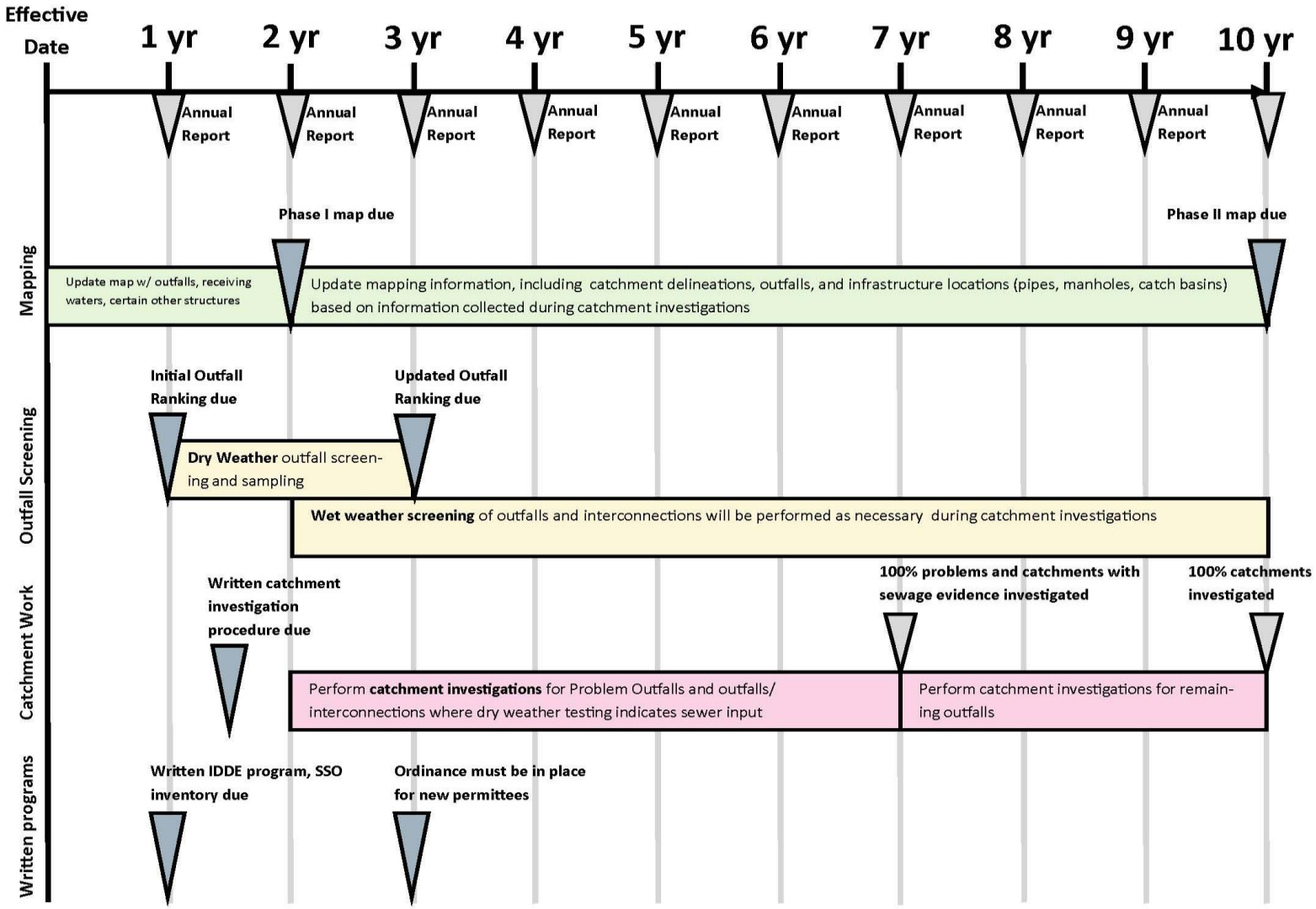
Permit Year 1

Prepared By:

Town of Windham, Seacoast Stormwater Coalition and Manchester/Nashua Stormwater Coalition

EPA NPDES Permit Number NHR041000

Original Document Date – July 1, 2019


Effective Date
1 yr
2 yr
3 yr
4 yr
5 yr
6 yr
7 yr
8 yr
9 yr
10 yr
Annual Report
Mapping
Phase I map due
Phase II map due
Update map w/ outfalls, receiving waters, certain other structures
Update mapping information, including catchment delineations, outfalls, and infrastructure locations (pipes, manholes, catch basins) based on information collected during catchment investigations
Outfall Screening
Initial Outfall Ranking due
Updated Outfall Ranking due
Dry Weather outfall screening and sampling
Wet weather screening of outfalls and interconnections will be performed as necessary during catchment investigations
Catchment Work
Written catchment investigation procedure due
100% problems and catchments with sewage evidence investigated
100% catchments investigated
Perform catchment investigations for Problem Outfalls and outfalls/ interconnections where dry weather testing indicates sewer input
Perform catchment investigations for remaining outfalls
Written programs
Written IDDE program, SSO inventory due
Ordinance must be in place for new permittees

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1 IDDE Program Implementation Introduction and Timeline

Introduction:

The Town of Windham has developed an Illicit Discharge Detection and Elimination (IDDE) program to address the requirements of the National Pollutant Discharge Elimination System (NPDES) Phase II rule, most recently updated with an effective date of July 1, 2018. The rule requires regulated operators of municipal separate storm sewer systems (MS4s) to obtain a permit to discharge stormwater runoff from their MS4, and establishes conditions they must meet to reduce the impacts of stormwater discharges.

The MS4 Permit requires that each permittee or regulated community address six (6) Minimum Control Measures. The measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development or Redevelopment (Post Construction Stormwater Management)
6. Pollution Prevention / Good Housekeeping for Permitee Owned Operations

Under Minimum Control Measure #3, the Town is required to implement an IDDE program to provide the legal authority to prohibit and eliminate illicit discharges to the MS4, find the source of any illicit discharges, eliminate those illicit discharges, and ensure ongoing screening and tracking to prevent and/or eliminate future illicit discharges. In this regard, the Town relies heavily on its General Services staff to observe and scrutinize the Town's MS4 outfalls for illicit discharges, illegal dumping and illicit connections, during their routine duties. The main methodology used involves Dry Weather Screening, which helps to ensure the integrity of the stormwater drainage system by detecting non-stormwater discharges during dry weather conditions. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.1 Purpose

The purpose of this Plan is to outline a program to systematically detect and eliminate non-stormwater illicit discharges to the Windham Municipal Separate Storm Sewer System (MS4) and waterways to improve water quality and meet the Federal Phase II Stormwater requirements. It provides the Town staff with direction as to the frequency and procedures for performing field screenings, collecting samples, equipment needed, discusses possible sources of potential pollutants, and outlines guidelines for investigating an illicit discharge.

1.2 Definitions

An “illicit discharge” is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer), and discharges resulting from firefighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.

Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor wash water or old household products, in many cases due to a lack of understanding on the part of the homeowner.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by outreach in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The permit allows the following non-stormwater discharges unless they are identified as significant sources of pollutants:

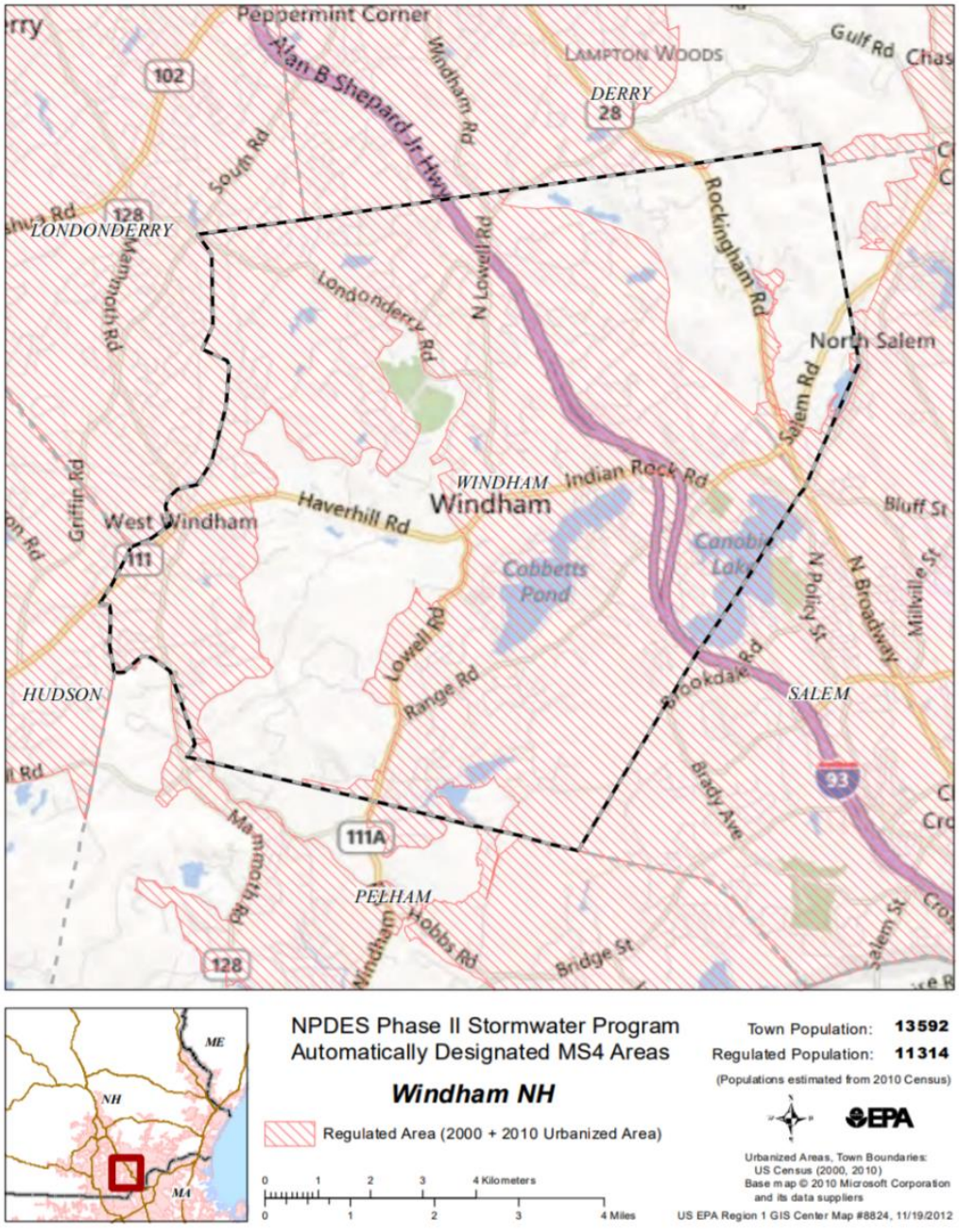
Water line flushing	Landscape irrigation
Diverted stream flows	Rising ground waters
Uncontaminated ground water infiltration*	Uncontaminated pumped ground water
Discharge from potable water sources	Foundation drains
Air conditioning condensation	Irrigation water
Springs	Footing drains
Water from crawl space pumps	Individual resident car washing
Lawn watering	De-chlorinated swimming pool discharges
Flows from riparian habitats and wetlands	Residential building wash waters w/o detergents
Street wash waters	Firefighter flows or discharges**

* As defined at 40 CFR 35.2005(20))

** Discharges or flows from firefighting activities are allowed and only need to be addressed where they are identified as significant sources of pollutants to waters of the Town of Windham or State of New Hampshire.

1.4 Urbanized Area:

The MS4 Permit requires towns to implement the IDDE program within the Urbanized Area as depicted in the Figure below:



1.5 Timeline

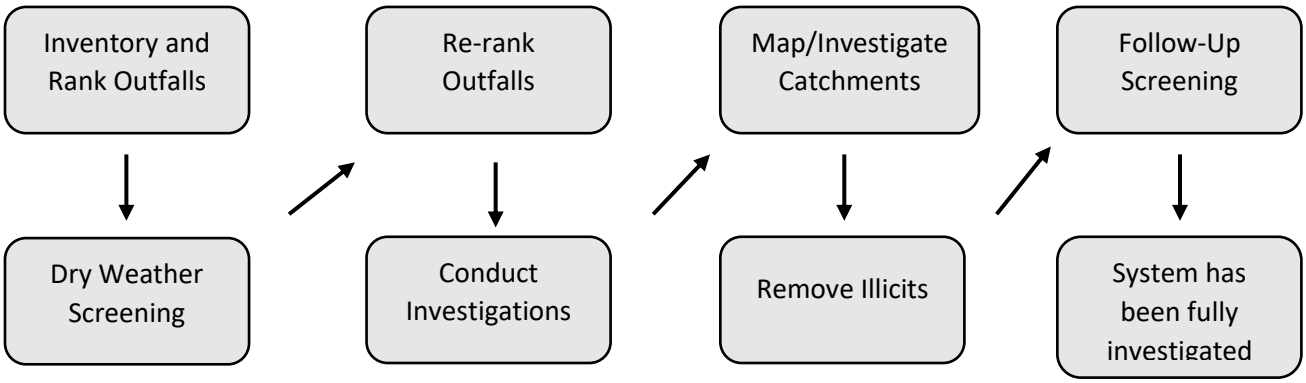


Table 1 below provides a timeline over which the Town intends to fully implement the requirements of the IDDE program.

TABLE 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					
Employee Training on IDDE Implementation	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						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 Town of Windham has adopted the Windham Stormwater Management Program (#WIN 2:06:25:11); and Site Plan Regulations (Section 701.5 Erosion and Sedimentation Control Provisions; Section 705 Design and Construction Standards for Drainage and Stormwater Management); both of which can be found in **Appendix A**, which provide the Town with the 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

The Town of Windham will review its current Stormwater Regulation and related land use regulations and policies for consistency with the 2017 MS4 Permit.

2.2 Statement of Responsibilities

The Board of Selectmen shall be responsible for the overall enforcement and implementation of the IDDE Program pursuant to the provisions of Section VI of the Windham Stormwater Management Program Ordinance. The General Services Division shall be the designated lead Town agency responsible for implementing the IDDE program in accordance with the general oversight of the Board of Selectmen. Other departments with responsibility for aspects of the program include:

- ***General Services Division*** – implementing the stormwater components of the program to include such items as dry and wet weather screenings, catch basin cleaning, street sweeping, inspection of facilities, and infrastructure maintenance; and assisting in the public relations and education components
- ***Building Inspector*** – overseeing septic system construction, enforcing plumbing codes
- ***Health Department*** – first response to notification of spills or discharges that do not pose an immediate health or safety concern and implementing the wastewater components (if any)
- ***IT Department*** – mapping services
- ***Community Development Director*** – public relations and education
- ***Planning Director*** – implementing construction site stormwater runoff control measures and post construction stormwater management components to include written procedures for site plan reviews, erosion and sediment control, development of site inspections and enforcement procedures, and street design and parking lot guidelines.
- ***Board of Selectmen*** – general oversight of the program and enforcement, signatory authority. The Board of Selectmen have the authority to issue fines.
- ***Town Administrator*** – overall coordination oversight of the program and coordination of the Stormwater Committee
- ***Town Counsel*** – taking court-related enforcement actions as directed by Town Officials
- ***Stormwater Committee*** – centrally coordinating all responsibilities and supporting actions of officials

- ***Emergency Services*** – first response to notification of spills or discharges which may pose an immediate health or safety concern

3 Stormwater System Mapping

The Town of Windham originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. A copy of the existing storm system map is provided in **Appendix B**.

The General Service Division/Highway Department and IT Department are responsible for updating the stormwater system mapping pursuant to the 2017 MS4 Permit. The Permit requires the storm system map to be updated in two phases as outlined below. The Town of Windham 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

As required under the 2003 MS4 General Permit, Windham performed system mapping of all outfalls and most of the catch basins under Phase I of the current Permit. The Town will update its mapping within two (2) years of the effective date of the permit (July 1, 2020) and will include the following information per Part 2.3.4.5.a of the MS4 Permit if it does not already exist:

- Outfalls and receiving waters
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally-owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems, bio-retention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved New Hampshire Integrated List of waters report pursuant to Clean Water Act section 303(d) and 305(b)
- Initial catchment delineations. Any available systems data and topographic information may be used to produce initial catchment delineations. For the purpose of this permit, a catchment is the area that drains to an individual outfall or interconnection.

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.

- Outfall location (latitude and longitude with a minimum accuracy of +/- 30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations shall be updated to reflect information collected during catchment investigations
- Municipal sanitary sewer system (if available)
- Municipal combined sewer system (if applicable)

4 Sanitary Sewer Overflows (SSOs)

The Town of Windham has no municipally owned sewer and therefore no (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 and related public health significance. The ranking will be used to determine the priority order for screening of outfalls and interconnections pursuant to meeting permit milestones.

5.1 Outfall Catchment Delineations

The catchments for each of the MS4 outfalls were delineated in 2019 to define contributing areas for investigation of potential sources of illicit discharges. Refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The General Services Division completed 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 2019. An updated inventory and ranking will be provided in each annual report hereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

Outfall means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

Interconnection means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

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

Outfalls that Require Screening – Generally the following types of outfalls require screening:

- Both large and small diameter pipes that appear to be part of the storm drain infrastructure
- Outfalls that appear to be piped headwater streams
- Field connections to culverts
- Submerged or partially submerged outfalls
- Outfalls that are blocked with debris or sediment deposits
- Pipes that appear to be outfalls from stormwater treatment practices
- Drop inlets from roads in culverts
- Pipes that appear to only drain roof downspouts but that are subsurface, preventing definitive confirmation

Outfalls that Do Not Require Screening – Generally the following types of outfalls DO NOT require screening:

- Cross-drainage culverts in transportation right-of-way (can see daylight at the other end)
- Parking lot drains to curbs
- Weep holes
- Flexible HDPE pipes that are known to serve as slope drains
- Pipes that are clearly connected to roof downspouts via above-ground connections

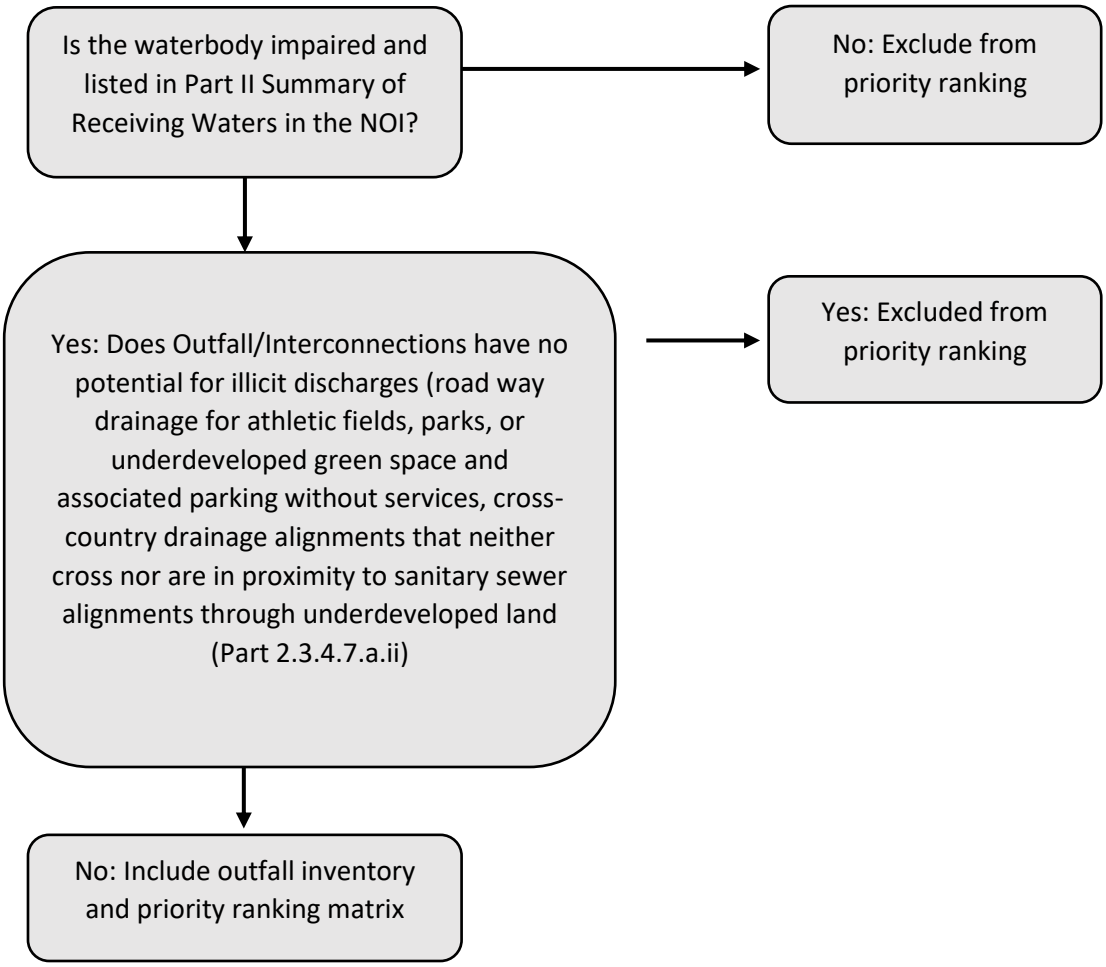
Those Outfalls and interconnections that require screening were classified into one of the following categories:

1. **Excluded outfalls:**
    - Outfalls/interconnections that are not in the Urbanized Area.
    - 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.
3. **High Priority Outfalls:** Outfalls/interconnections that have not been classified as Problem Outfalls and that are:
    - Discharging to a water quality limited waterbody
    - 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 Town as high priority based on the field investigations or other available information.
4. **Low Priority Outfalls:** Outfalls/interconnections determined by the Town as low priority based on the field investigations or other available information. Windham has further prioritized Low Priority Outfalls based on the following:
    - Outfalls that discharge to an impaired waterbody
    - Outfalls that discharge within 250 feet of a surface waterbody
    - Outfalls that discharge within 400 feet of a public water supply well; or
    - Outfalls that do not meet any of the above

FIGURE 1

Initial Outfall Prioritization Flowchart



see **Appendix D for the outfall inventory and priority ranking matrix*

Outfalls are 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, or where information is available.

- **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 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 will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low 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.

*Note: To prioritize initial mapping and outfall assessment work the Town 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.*

Appendix C lists the waterbodies that the Town of Windham MS4 discharges to inclusive of the number of outfalls discharging into it, if applicable, its NH segment ID, and any impairments.

- **Resource Waters:** There are several resource waters throughout Windham that the Town values for habitat preservation, active and passive recreational uses, and education purposes. Much of the Town is comprised of surface water or wetland areas. The primary resource waters include: Cobbetts Pond, Canobie Lake, Rock Pond, Shadow Lake, Moeckel Brook, Policy Brook, Beaver Brook, Golden Brook, Flat Rock Brook, Dinsmore Brook, and several unnamed brooks. Stormwater outfalls discharging in close proximity to these waters are more likely to adversely affect water quality than outfalls further away.
- **Public Drinking Water Supply:** The Town considers community water supplies as a priority for protection due to public health concerns. The Town ranks wellhead protection as a high priority due to the importance of maintaining a clean water supply for community wells, which include those for small residential developments, day cares, public schools, elderly housing, and

commercial buildings. A list that includes public drinking water sources and the Town's existing community wells as obtained from the NHDES are shown in Table 2 below:

TABLE 2 – List of Public Drinking Water Sources in Windham

Name	Address	Type	Population Served
Canobie Lake	Range Rd	Salem Drinking Water	~18,000
Town Hall	3 North Lowell Rd	Municipal Building Community Well	25
PEU – Golden Brook	Sharon Rd	Single Family Residences	315
PEU – W and E	West Shore Rd	Single Family Residences	523
Braemar Woods Condos	Braemar Rd	Condominiums	60
PEU – Hardwood Hts – Birch Hill	N Lowell Rd	Condominiums	167
Villages of Windham	RTE 28	Condominiums	145
Wynridge Condos	14 Wynridge Rd	Condominiums	58
McAuley Commons	37 Searles Rd	Senior Housing	25
PEU – Castle Reach	82 Searles Rd	Single Family Residences	100
PEU – Fletcher Estates	21 Corliss Rd	Single Family Residences	135
Hadleigh Woods	22 Hadleigh Rd	Senior Housing	93
PEU – Lamplighter	Mountain Village Rd	Condominiums	162
PEU – Spruce Pond Estates	11 Northland Rd	Single Family Residences	120
Camelot 111	17 Sheffield St	Single Family Residences	30
Wood Meadow Estates	1 Acadia Drive	Single Family Residences	25
Warde Rehabilitation / Nursing	21 Searles Rd	Resident Homes (Nursing, Group, Live in)	148
Windham Terrace	3 Church Rd	Resident Homes (Nursing, Group, Live in)	110
Gateway Park	Gateway Blvd	Commercial Business Park	~25

Appendix D shows the catchment areas graphically depicted as well as a tabulation that provides an initial illicit discharge potential assessment and priorities ranking based on available information. Windham will continually update this assessment and ranking annually based on new relevant information.

6 Dry and Wet 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 General Services Division: Highway Department 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 **Section 5** by the end of Year 3 (June 2021).

During a dry weather period, it is anticipated that minimal flow from stormwater outfalls will be observed. Therefore, dry weather inspections aim to characterize any/all flow observed during a dry weather period and identify potential source(s) of an illicit discharge through testing.

Dry weather outfall Screening and Sampling shall be completed in accordance with the following procedures, including sample collection, use of field kits, storage and conveyance of samples, and field data collection and storage, all of which are intended to meet the requirements as specified in Part 2.3.4.7.b. of the MS4 Permit.

6.1 Dry Weather Screening – General Procedure

Note: Screening and sampling shall proceed only when no more than 0.1 inch of rainfall has occurred in the previous twenty-four (24) hour period and no significant snow melt is occurring.

Unlike wet weather sampling, dry weather inspections are not intended to capture a "first flush" of stormwater discharge, rather they are intended to identify any/all discharges from a stormwater outfall during a period without recorded rainfall. The intent of inspections during a dry weather period is to characterize observed discharges and facilitate detection of illicit discharges.

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking.
2. Acquire the necessary staff, mapping, and field equipment (see Table 3 for list of potential field equipment).
3. Conduct the outfall inspection during dry weather (see Note above):
    a. Identify appropriate location of outfall. Observe outfall. Do not enter water below outfall as disturbance of sediments may skew sampling results.
    b. Mark and photograph the outfall.
    c. Record the inspection information and outfall characteristics using the Dry Weather Outfall Screening Form located in **Appendix E**. This form will be used for initial site inspections and to document follow-up activities should a potential illicit discharge be detected.
    d. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures. It is important to indicate the conditions visually observed at an outfall location. This includes:
        i. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
        ii. Oil sheen: result of a leak or spill
        iii. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
        iv. Color or odor: indicator of raw materials, chemicals, or sewage.
        v. Excessive sediment: indicator or disturbed earth of other unpaved areas lacking adequate erosion control measures.

vi. Sanitary waste and optical enhancers (florescent dyes added to laundry detergent and some toilet paper): indicators of illicit discharge.
vii. Orange staining: indicator of high mineral concentrations.

e. Table 4 provides some possible sources of illicit discharges based on physical parameters observed or collected during field reviews. Note that some of these indicators may occur naturally. For instance, Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Natural foam is typically persistent, light, not slimy to the touch.

4. If flow is observed, a sample of the flow shall be collected and analyzed following the procedures described in **Section 6.2**.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends and using optical brighteners.
6. Input results from screening and sampling into spreadsheet. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. The number of outfalls screened and any monitoring results must be documented each year in the Town's SWMP and in the MS4 annual report.

Note: During field screening, the presence of a dry weather flow alone is not conclusive evidence of an illicit discharge. The presence of one or more indicator parameters is needed to verify a potential illicit storm sewer discharge. Observations for color, oil sheen, surface scum (floatables), odor, clarity, and sanitary sewer evidence etc. are made of any dry weather discharge. Field or laboratory analyses are used to quantify turbidity, pH, total chorine, total copper, total phenol, and detergents (surfactants). The significance and potential source contributors of the analysts listed above are summarized in ***Appendix E****.*

TABLE 3 – Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets / Inspection Forms	Field sheets for both dry weather inspection
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
EPA approved cleaning / disinfecting agent	Rubbing alcohol-based cleaning agent of the end of the extension pole
Distilled water	For decontamination of end of extension pole if used
Waste Container	Plastic baggies for holding use testing strips

Equipment	Use/Notes
Reclosable, transparent container	For holding liquid waste materials
Watch or other time device	For recording observation times
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, Safety glasses and boots at a minimum
GPS Receiver	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter	Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine
Test Kits	To include Chlorine Testing Strips, Ammonia Testing Strips, Surfactants Testing Kit, Thermometer, pH and Conducting Testing Meter, Turbidimeter.
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Traffic Safety Cones	Safety
Paper Towels	For cleanup
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

TABLE 4 – Interpretation of Physical Observation Parameters

Parameter	Observations	Basis
Odor	Suspicious or Strong	Odors can vary widely and directly reflect the source of contamination. Sewage odors are associated with sanitary wastewater; Sulfur or rotten egg odors can indicate meat packers, canneries, dairies, and sanitary wastewater; oil and gas odors indicate petroleum refineries or facilities associated with vehicles; and spoiled food odors can indicate food preparation facilities.
Color	Yellow Brown Green Red Gray	Textile, chemical, and tanning facilities Meat packers, stone and concrete plants, fertilizers, printing facilities Textile and chemical facilities Metal works and meat packers Sewage, Dairies
Clarity	Other than clear	Lack of clarity is generally the result of suspended clay, silt, organic, and inorganic matter. Natural waters have some degree of suspended solids that affect clarity.
Floatables	Foaming Oily	Foam, soap suds, oil sheen, trash, and fecal matter are all considered floatables. Oily sheen reflects contamination from petroleum refineries and vehicle service facilities.
Deposits and Stains	Sediment - Oily -	Storage facilities, refineries, automobile service stations, and restaurants. Sanitary wastewater
Turbidity	Cloudy or Opaque	Cloudy may indicate sanitary wastewater, concrete or stone plants, fertilizers, and vehicle facilities. Opaque may indicate food processors, lumber mills, metal facilities.
Vegetation	Excessive Growth Stressed Growth	Fertilizers, food product facilities Metal and printing plants, drug manufacturing, vehicle service stations, automobile dealers

6.2 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters. The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottes and field sheets
2. Put on protective gloves (nitrile/latex/other) before sampling
3. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
4. If using a dipper or other device, triple rinse the device with distilled water then in water to be samples (not for bacteria sampling)
5. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see Table 4)
6. Place laboratory samples on ice for analysis of bacteria and pollutants of concern
7. Fill out chain-of-custody form for laboratory samples
8. Deliver samples to Town selected laboratory
9. Dispose of used test strips and test kit ampules properly
10. Decontaminate all testing personnel and equipment

In the event the outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

Field test kits or field instruments are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges.

TABLE 5 – Guidance Used for Concentrations of Non-Stormwater Discharges

Sampling Parameters	Class A Waters	Class B Waters
Ammonia1	> 0.5 mg / L	> 0.5 mg/ L
Chloride2	Acute Standard–860 mg/l Chronic Standard – 230 mg/l	
Conductivity2	Background Levels-Normal: 0-100 µS/cm (Benchmark Field Indicator >2,000 µS/cm)	
Salinity	TBD	
E. Coli4	>153 colonies/100mL in a single sample	>406 colonies/100mL in a single sample (Beach Area >88 colonies/100mL in a single sample)
Surfactants (such as MBAS)1	>0.25 mg/L	
Temperature3	No numeric standard; as natural occurs	
pH3	As naturally occurs	Outside of 6.5 and 8.0 (unless due to natural causes)
Turbidity3	No turbidity unless naturally occurring	Shall not exceed naturally occurring conditions by more than 10 NTU
Dissolved Oxygen3,7	< 6 mg / L	< 5 mg / L
Chlorophyll-a7		

1 – 2017 NH Small MS4 General Permit

2 – NHDES Volunteer River Assessment Program/Chloride Reduction Implementation Plan for Dinsmore Brook Watershed
3 – ENV-Wq1700, NHDES Surface Water Quality Regulations
4 – NH RSA 485-A:8, Water Pollution and Waste Disposal
5 – ENV-Or 600, NHDES Ambient Groundwater Quality Standards
7 – Pollutant of Concern for Windham Impaired Water Bodies

If a discharge is directly into an impaired water, the Town must also monitor for the pollutants identified as the cause of the impairment as shown in **Appendix C** – Summary of Receiving Water Bodies. If the pollutant identified as the cause of the impairment is present in the discharge efforts designed to identify the source(s) of the pollutant(s) must be undertaken and measures implemented to eliminate it. All procedures used must be documented in the SWMP and MS4 annual report.

The number of outfalls screened and any monitoring results must be documented each year in the Town's SWMP and in the MS4 annual report.

When collecting any type of stormwater sample, it is imperative that the sample is collected before the stormwater reaches the receiving water.

A new, clean pair of gloves should be worn when testing a new sample and especially when moving to a different outfall as dirty gloves could cause contamination of water samples and distort results.

6.3 Wet Weather Sampling

Wet weather analytical monitoring of all outfalls and at interconnections with another MS4 must be conducted, particularly for those that did not have flow in dry weather or those with dry weather flow that passed screening thresholds. The primary difference between dry and wet weather screening is that wet weather inspections aim to describe and evaluate the "first flush" of stormwater discharged from an outfall during a storm, representing the maximum pollutant load managed by receiving water. Ideally, the evaluation and any samples collected for wet weather screening should occur within the first thirty (30) minutes of discharge to reflect the first flush or maximum pollutant load.

A significant purpose for doing wet weather screening and sampling is to identify illicit discharges that may activate or become evident during wet weather; therefore, samples should be taken under conditions where storm event intensities are likely to trigger a septic system failure in situations such as:

- Elevated groundwater that can now cause an exchange of wastewater between cracked or broken sanitary sewers, failed septic systems, underdrains, and storm drains.
- Increase sewer volume that can exfiltrate through cracks in the sanitary piping.
- Increase sewer volume that can enter the storm drain system in common manholes or directly-piped connections to storm drains through the storm drain system in dry-weather.

In these cases, wet weather screening and sampling shall proceed during or after a storm event of sufficient depth or intensity to produce a stormwater discharge but only during the spring (March to June) when groundwater levels are relatively high.

The Town shall conduct wet weather screening on problem outfalls as soon as they are identified (no later than two (2) years from the permit effective date). A portion of remaining outfalls will be wet weather screened each year of the permit beginning in the third year (July 2020-June 20210). The chosen outfalls should begin with those that are monitored for dry weather screening to the extent practical. If not, practical the reasoning why shall be explained in the MS4 annual report. Samples should be analyzed following the same procedures and parameters as outlined in **section 6.1-6.2** for Dry Weather Screening, except for filling out the Wet Weather Outfall Inspection Survey found in **Appendix E**.

6.4 Sample Preservation

Laboratory samples should be stored in a cooler with ice or cold packs as soon as possible. Refrigeration at temperatures near freezing is the best preservation technique available, but it is not applicable to all types of samples. Table 6 gives types of containers, preferred method of preservation, and holding times for various test parameters.

TABLE 6 – Required Containers, Preservation Techniques, and Holding Times

PARAMETER	CONTAINER2	VOLUME	PRESERVATION	MAXIMUM HOLDING TIME
Ammonia	P		N/A (Field Analysis), H_2SO_4 to pH<2, Cool at 4^0C	Within 28 days[2]
Chloride, Total Residual	P or G	500 mL	Analyze Immediately	Within 15 minutes[2]
Chlorine	G	100 ml	None required	Within 15 minutes
Color, Apparent	P or G	500 ml	Cool at 4^0C (39^0F)	Within 48 hours[2]
Conductivity	P or G	500 ml	Refrigerate	Within 28 days
Cooper, Total	P or G	1000 ml	N/A (Field Analysis), Filter and HNO_3 to pH<:2 and Cool at 4^0C (39^0F) (Lab Analysis)	Within 6 months[2]
Surfactants	P or G	250 ml	N/A (Field Analysis), Cool at 4^0C (39^0F) (Lab Analysis)	Within 4 8 hours[2]
pH	P or G	50 ml	Analyze Immediately	Within 15 minutes[2]
Phenol, Total	P or G (PTFE lined cap)	500 ml	N/A (Field Analysis), Cool at 4^0C (39^0F)[3] and adjust pH < 2 with H_2SO_4 (Lab Analysis)	Within 28 days[2]

Turbidity	P or G	100 ml	N/A (Field Analysis), Store in dark up to 24 hours, refrigerate	Within 48 hours[2]

Sources: Federal Register 40 CFR. PART 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants" September 16, 2002.
Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1999. American Water Works Association
1 Polyethylene (P) or Glass (G).
2For field analysis, preserve at same temperature as outfall water by placing sample in outfall water until ready for testing.
3Or colder for testing.

6.5 Field Water Analysis

The Town shall generally follow the guidelines outlined in the EPA New England Bacterial Source Tracking Protocol. Table 8 below summarizes observations and/or tests that will be performed onsite (at the outfall) using the field test kits. Non-starred (*) analyses may be performed as long as the allowable holding times are not exceeded. Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges.

TABLE 7 – Onsite Field Analysis Options

Parameter	Method	Range	Detection Limit
Ammonia	Test Strip	0-0.50 mg/L	
*Chlorine, Total Residual	DPD, Color Disc	0-3.5 mg/L	0.5 mg/L
Specific Conductance (Conductivity)	Field Meter	0-10,000 uS/cm	
Detergents	Field Spectrophotometer	0-1 mg/L	0.05 mg/L
*pH	Platinum Electrode, Field Meter	0-14 pH	0.1 pH
Salinity	Field Meter	0-200mS	0.1 ppt
*Temperature	Thermometer	NA	0.l0C

Methods must be updated when formal procedures are developed.
** Test MUST be performed immediately at outfall site, upon sample collection (no allowable holding time-as shown in Table 6).*

6.6 Follow-up Ranking of Outfalls and Interconnections

The Town of Windham will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather screening information becomes available, but will be completed within three (3) years of the effective date of the permit (June 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources.

Such outfalls/interconnections will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening.

7 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
- Drainage 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.

7.1 Map and Record Review

The Town of Windham 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

7.2 System Vulnerability Factors

The Town of Windham does not have any public sewer and therefore, there are no defined System Vulnerability Factor (SVF) sites to be evaluated. However, per recommendations outlined in the permit, the Town of Windham will consider the following factors when evaluating overall System Vulnerability Factors (SVFs). The Town of Windham's SVF inventory will be updated based on this information.

- Any storm drain infrastructure greater than 40 years old in medium and densely developed areas.
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).
- History of multiple health department actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).

TABLE 8 – SYSTEM VULNERABILITY FACTORS

Location	Element of Concern	SVF

7.3 Dry Weather Catchment Investigation (Manhole Inspections)

The Town of Windham 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 Town of Windham 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 E**.
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 6**. 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.

7.4 Wet Weather Catchment Investigation (Outfall Sampling)

The Town of Windham does not have any public sewer and therefore, there are no sanitary sewer associated System Vulnerability Factor (SVF) sites to be evaluated. Aging stormwater infrastructure and on-site disposal system constraints will be evaluated for potential impacts to the SVF inventory. The Town of Windham 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:

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 **Appendix H** Source Isolation and Confirmation
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.

At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening (refer to Table 8, Required Containers, Preservation Techniques, and Holding Times and Table 9, Onsite Field Analysis Options).

7.5 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 H**.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Town of Windham will notify property owners in the affected area. Smoke testing notification will include site visits, hanging notifications, website notifications and email, if available for single family homes, businesses and building lobbies for multi-family dwellings.

7.5.1 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.

7.5.2 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 drain 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.

This method will only be utilized if a sanitary sewer connection to a storm sewer is suspected from a facility thought to be connected to an on-site sanitary sewage disposal system.

7.5.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and drain 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/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, 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.

7.5.4 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.

7.5.5 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.

7.5.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

7.6 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the Town of Windham 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.

7.6.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges 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.

7.7 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 6** 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 6**. All sampling results will be reported in the annual report.

7.8 Illicit Discharge Detection and Elimination Training

The Town of Windham will implement a training program, as outlined in **Section 8** and documented in **Appendix G** of the IDDE Program Plan, to employees involved in IDDE program about the program, including how to recognize illicit discharges. 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

Legal Authority (IDDE Bylaw or Ordinance)

TOWN OF WINDHAM, NEW HAMPSHIRE # WIN 2:06:25:11

ORDINANCE:
WINDHAM STORM WATER MANAGEMENT PROGRAM:

SECTION I: PURPOSE:

The purpose of this Ordinance is to mandate a storm water management program to reduce the discharge of pollutants from municipal storm water collection systems within the urbanized area of the Town of Windham, NH as mandated by the U.S. EPA Phase II National Pollutant Discharge Elimination System (NPDES) Storm Water Program.

SECTION II: AUTHORITY:

This Ordinance has been enacted pursuant to the statutory authority granted to the Town of Windham by provisions of the Clean Water Act, 33 USC 1251, under 40 CFR part 122 EPA Administered Permit Programs: The National Pollutant Discharge Elimination System.

SECTION III: DEFINITIONS:

"Regulated Storm Water": Water from rain and/or melting snow or ice, which flows over paved or unpaved surfaces to a Town of Windham storm water collection system and migrates to a State of New Hampshire water resource.

"Storm Water Conveyance System": A storm water collection mechanism and discharge point for storm water runoff.

"Impaired Waters": Waters of the State of New Hampshire that are adversely affected by non-natural impacts of contamination and have been designated as such by the State.

"Illicit Discharge": Non-storm water discharge or contaminated storm water, which is not authorized for discharge to a Windham storm water collection system.

"MS4 Plan": Municipal separate storm water sewer systems plan to control storm water pollution.

"Control Measures": Required elements within the MS4 Plan.

SECTION IV: PROGRAM CONTROL MEASURES:

Each of the six mandated Control Measures, listed below, have associated goals or "Best Management Practices (BMPs)", which shall be implemented during the term of the NPDES Permit and presented in detail in the Town's mandated MS4 Plan.

A) Public Education and Outreach.

B) Public Participation/Involvement.

C) Illicit Discharge Detection and Elimination.

D) Construction Site Runoff Control.

E) Post-Construction Runoff Control.

Storm Water Policy: Print Date, 4/1/2011 Page 1 of 3

F) Pollution Prevention/Good Housekeeping.

SECTION V: RECORD KEEPING:

Records will be kept public for period of 5 years. Records will be only submitted when requested by the permitting authority.

SECTION VI: ENFORCEMENT:

The Board of Selectmen is hereby charged to carry out the enforcement of the provisions within this Ordinance and the provisions within the MS4 Plan this Ordinance represents by statute. The Board of Selectmen may delegate such powers to one or more designees with authority to bring actions to force compliance with this Ordinance and the MS4 Plan.

SECTION VII: PENALTIES:

Any person(s) (including individuals, corporations, associations, etc.) who knowingly violate the provisions of this Ordinance and its referenced MS4 Plan shall be subject to imposition of the following:

A) Windham procedural rules regulating planning & development, construction, post-construction, and road maintenance are used in conjunction with the MS4 Plan. These rules include, but not limited to, Site Plan Regulations, Subdivision Regulations, and Zoning & Land Use Ordinance. Violations and penalties of the above regulations are levied through designated Town authorities.

B) Penalties relating to illicit discharges or improper run-off controls as referenced in the Storm Water Plan and not under the jurisdiction of Windham's Community Development Department or other regulating authority shall be levied by an agent of the Board of Selectmen. Penalties are as follows:

1. Aforesaid persons shall receive a written notification to cease and desist discharging into Windham's storm water conveyance system and shall be required to take corrective measures to permanently eliminate the illicit discharge from entering Windham's storm water conveyance system and/or correct the run-off controls within 10 days of the notification.

2. Upon non-compliance of the cease and desist notification, aforesaid persons shall be fined $1000/day until illicit discharge is eliminated from the Windham storm water conveyance system.

3. Upon 30 days of non-compliance, the New Hampshire Department of Environmental Services (NH DES) and the US EPA shall be notified for further enforcement actions.

4. In additional to the monetary fines established by this policy, the Town further reserves the right to require, with the assistance of NH DES and US EPA, aforesaid persons to remediate any infrastructure and/or environmental damages caused by the illicit discharge.

SECTION VIII : WAIVERS:

The Windham Board of Selectmen reserves the right, for good cause shown, to make special exceptions and/or waive any portion of the regulations.

SECTION IX : SEVERABILITY:

If any provision of these Regulations is held to be invalid, other provisions and sections shall not be affected, and to this end, the provisions and sections hereof are declared to be severable.

SECTION X - AMENDMENTS:

These Regulations shall be adopted, and subsequent amendments shall be adopted from time to time by the Board of Selectmen, following a public hearing, notice of which shall be posted pursuant to State and local laws in two (2) or more public places, or published in a newspaper of general circulation not less than ten (10) days prior to the public hearing.

SECTION XII - ADOPTION:

These Regulations shall take effect immediately upon adoption of the Board of Selectmen.

Approved by the Board of Selectmen this 28th day of March, 2011.

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Board of Selectmen

July 13, 2016 Adopted

Town of Windham
New Hampshire

SITE PLAN REGULATIONS

0

a minimum of one indigenous shade tree (such as oak, maple, elm, ash, linden, etc.) having a minimum caliper of 2.5 inches and branching height of not less than 8 feet at the time of planting shall be provided for each 50 feet of street frontage. Street trees shall be planted not closer than 25 feet to one another, within a public right-of-way, closer than 20 feet from the edge of pavement of any driveway or public street, nor within 20 feet of the drip line of any overhead utility lines.

704.2.2 A minimum of one deciduous or ornamental tree, having a minimum caliper diameter of 2.5 inches, per 30 feet of building perimeter shall be planted within the developed portion of any site. Trees shall be located so as to maximize the aesthetic quality of the property.

704.2.3 A minimum of one deciduous or evergreen shrub, with a minimum height and diameter of 18 inches, or a one gallon pot of perennial ornamental grass per required parking space shall be planted within the developed portion of any site. Shrubs and/or ornamental grasses shall be located so as to maximize the aesthetic quality of the site.

704.2.4 In order to promote the preservation of mature specimen trees as part of the design and construction of new sites, healthy deciduous trees having a diameter of at least 8 inches at breast height may be preserved and used to fulfill the minimum tree planting requirements of this Section.

704.3 Screening of Unsightly Site Features

704.3.1 General screening requirements. Refuse storage areas, stockpiled materials, tractor trailers used for storage and other unsightly materials and objects situated on any site subject to review and approval under these regulations, shall be located so as to be out of view from abutting properties and public streets to the extent possible. In cases where such positioning is not possible, those items shall be effectively screened. A minimum screening shall be achieved by use of landscape plantings, fencing or enclosures of a height at least as tall as the item or items to be screened.

704.3.2 Screening requirements for loading and receiving areas. Loading docks and receiving areas shall be situated so as to be out of view from abutting properties and public streets where possible. Where such provisions are not possible, the applicant shall propose a method of screening and buffering acceptable to the Planning Board.

705 Design & Construction Standards for Drainage and Stormwater Management

705.1 Analysis and Design of Improvements:

705.1.1 All analysis and corresponding calculations prepared and submitted for the purposes of demonstrating fulfillment of specific requirements of these Regulations shall be prepared and sealed by a Licensed Professional Engineer. For the purposes of these Regulations, the applicable minimum standard for stormwater analysis and design shall be identical to requirements established by the New Hampshire Department of Environmental Services, under Chapter ENV-Wq 1500 of the New Hampshire Code of Administrative Rules, whether or not an Alteration of

installed in lieu of headwalls on the discharge end of culverts and storm drains having a diameter of less than 24 inches. Appropriate outlet protection shall be provided at all stormwater discharge points.

705.2.5 Stormwater flow velocities for all ditches, stormwater conveyance channels and swales shall be checked by the design engineer. Suitable surface protection shall be provided within all ditches, channels and swales anticipated to have a flow velocity of more than 2.5 feet-per-second during the 10 year return frequency design storm.

705.2.6 In instances where stormwater detention ponds, retention basins, or infiltration basins are planned, such facilities shall be designed and constructed in accordance with recommendations contained in a publication entitled Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, published by the NHDES.

705.2.7 All stormwater treatment accommodations shall be designed and constructed in accordance with recommendations contained in a publication entitled Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, published by the NHDES.

706 Design and Construction Standards for Utilities

706.1 Subsurface Sewage Disposal (Septic) Systems: Design and construction of on-site subsurface sewage disposal systems shall conform to applicable requirements of Town of Windham Regulations Governing Sewage or Waste Disposal Systems and the New Hampshire Code of Administrative Rules, as amended.

706.2 Water Supply Systems: Design and construction of on-site water supply systems shall conform to applicable requirements of Town of Windham Water Supply Regulations and the New Hampshire Code of Administrative Rules, as amended.

706.3 Other Utilities: All proposed utilities (electric, telephone, cable T.V., etc.) shall be installed underground in accordance with the specifications of each individual utility provider and applicable code.

707 Special Flood Hazard Areas

707.1 All development proposals which contain lands designated as Special Flood Hazard Area by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for Rockingham County, New Hampshire", associated Flood Insurance Rate Maps (FIRM) and Flood Boundary and Floodway Maps dated May 17, 2005, as amended, shall conform to the requirements of this Section.

707.2 The Planning Board shall review the proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

707.3 The Planning Board shall require that development proposals identify base flood elevation if it has been established by FEMA.

Appendix B – Storm System Map

A current interactive PDF of this map can be found at the following link titled “Culverts and Outfalls Data Map”

http://www.windhamnh.gov/450/Stormwater-Managment

Appendix C – Summary of Receiving Water Bodies

Images taken from NOI.

Waterbody that receives flow from the MS4 and segment ID if applicable	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Cobbetts Pond - NHLAK700061204-01-01	2	☐	☒	☐	☐	☐	☒	☐	☐	☐	pH, Cyanobacteria hepatoxic microcystins, Non-native aquatic plants, Mercury
Cobbetts Pond - Town Beach - NHLAK700061204-01-03	1	☐	☐	☒	☐	☐	☐	☐	☒	☐	Cyanobacteris hepatotoxic microcystins, Mercury
Unnamed Brook - NHRIV700061204-14	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Canobie Lake - NHLAK700061102-02	12	☐	☐	☒	☐	☐	☐	☐	☐	☐	Mercury
Policy Brook - Porcupine Brook - NHRIV700061102-18	1	☒	☐	☐	☐	☐	☐	☐	☐	☐	Mercury, pH, Iron, Arsenic [Habitat Assessment & Benthic-Macroinvertebrate Bioassessments]
Beaver Brook - NHRIV700061203-21	8	☐	☐	☐	☐	☐	☐	☐	☐	☐	pH, Mercury
Rock Pond Smith Rd Inlet - NHRIV700061204-08	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	pH, Mercury
Connies Brook - NHRIV700061204-06	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Unnamed Brook - to Beacon Hill Estates Detention Pond - NHRIV700061203-18	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Searles School Brook - NHRIV700061102-22	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Unnamed Brook - NHRIV700061203-39	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Shadow Lake - NHLAK700061102-09-01	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	pH, Mercury
Flatrock Brook - NHRIV700061102-13	10	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Golden Brook - NHRIV700061204-03	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Rock Pond - NHLAK700061204-03	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Moeckel Pond - NHLAK700061204-04	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Golden Brook - NHRIV700061204-02	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Unnamed Brook - NHRIV700061204-15	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury

Waterbody that receives flow from the MS4 and segment ID if applicable	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Unnamed Brook to Western Embayment - NHRIV700061102-23	2	☒	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Unnamed Brook - NHRIV700061102-24	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
Dinsmore Brook - NHRIV700061204-01	1	☒	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
*See Note 1 in Section IV.		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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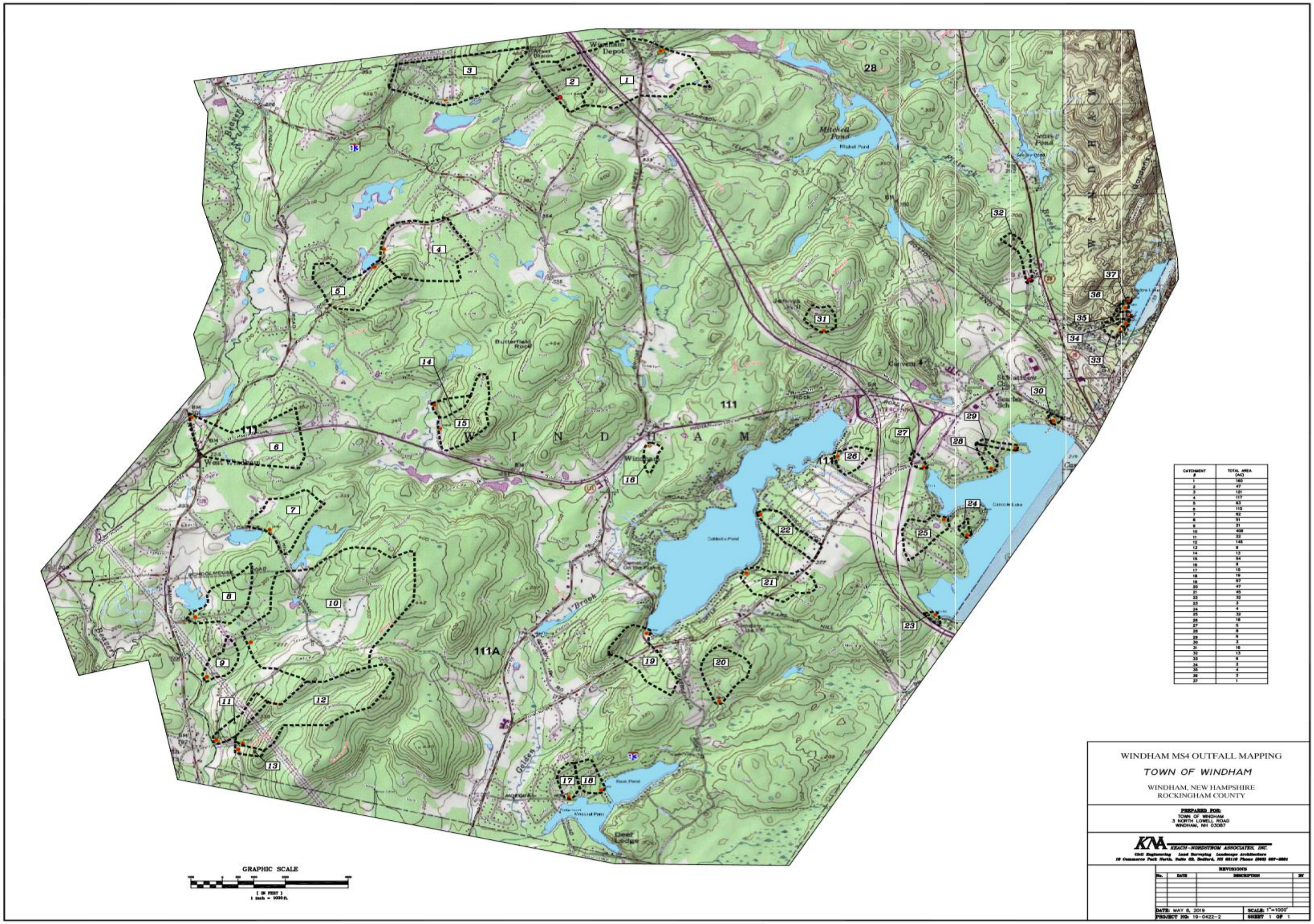
Appendix D – Outfall Inventory and Priority Ranking Matrix

Catchment #	Total Area (AC)	Address # Street	Outfall Classification →			
			Excluded	*Problem*	*High*	*Low*
1	160	Depot (Frost)				X
2	47	Beacon (S. of Tarbell)				X
3	121	Gertrude				X
4	117	Nashua (S. of Millstone)				X
5	63	Nashua (S. of Millstone)				X
6	115	Anderson (near border)				X
7	62	Castle Hill (Bancroft)				X
8	51	Glance (Mammoth)				X
9	21	Winter				X
10	408	Lancaster				X
11	22	Castle Hill				X
12	145	Castle Hill				X
13	6	Castle Hill				X
14	13	Meeting House (N. of 111)				X
15	54	Meeting House (N. of 111)				X
16	9	Fellowes				X
17	15	Rock Pond (Simpson)			X	
18	19	Rock Pond (Jordan)			X	
19	57	The Town Beach			X	
20	47	Osgood				X
21	45	Turtle Rock (Turtle Rock)			X	
22	32	Farmer (Horseshoe)			X	
23	3	South Shore (Salem)			X	
24	4	West Shore			X	
25	32	West Shore (Pine Ridge)			X	
26	18	Armstrong (York)			X	
27	5	Johnson (Woodvue)			X	
28	8	Woodvue (Edgewood)			X	
29	6	Woodvue (Cul-de-sac)			X	
30	3	Hayes Hart (Sylvestri)			X	
31	16	Gov. Dinsmore				X
32	13	Roulston (Jones south)				X
33	6	Cole (North)				X
34	2	Cole (South)			X	
35	4	Doiron (South)			X	
36	2	Doiron			X	
37	1	Doiron (North)			X	



CATCHMENT #	TOTAL AREA (AC)
1	160
2	47
3	121
4	117
5	63
6	115
7	62
8	51
9	21
10	408
11	22
12	145
13	6
14	13
15	54
16	9
17	15
18	19
19	57
20	47
21	45
22	32
23	3
24	4
25	32
26	18
27	5
28	8
29	6
30	3
31	16
32	13
33	6
34	2
35	4
36	2
37	1

Appendix E – Field Forms, Sample Bottle Labels, and Chain of Custody Forms

- Dry & Wet Weather Outfall Inspection Form

TOWN OF WINDHAM
Stormwater Outfall Inspection Form

SECTION 1: BACKGROUND DATA

Address:	Outfall ID:
Date:	Time:
Temperature:	Inspector (s):
Previous 24 Hours Precipitation: ___ Less than 1" ___ More than 1"	Type of Outlet: ___ Pipe ___ Swale
Flow Observed: ___ Yes ___ No	Photos Taken: ___ Yes ___ No
Flow Description: ___ Dry ___ Trickle ___ Moderate ___ Substantial	If yes, Photo Numbers:

SECTION 2: OUTFALL DESCRIPTION AND

GPS Location	Material	Shape	Dimension (in.)	Submerged
Latitude: _____ Longitude: _____	___ Concrete ___ Clay ___ PVC ___ HDPE ___ Steele ___ Cast Iron Other: _____	___ Circular ___ Elliptical ___ Box Other: _____	Diameter: _____ Width: _____	In water: ___ No ___ Partially ___ Fully With sediment: ___ No ___ Partially ___ Fully

SECTION 3: PHYSICAL INDICATORS

Do physical indicators suggest an illicit discharge is present?: ___ Yes ___ No	
Comments:	

Indicator	Y/N	Description	Comments
Outfall / Pipe Damage	___ Yes ___ No	___ Spalling, Cracking or Chipping ___ Peeling Paint ___Corrosion	
Deposits / Stains	___ Yes ___ No	___ Oil/Grease ___ Paint ___ Flow Line ___ Paper/Trash ___Foam ___ Heavy Sed. Other: _____	
Abnormal Vegetation	___ Yes ___ No	___ Excessive ___ Inhibited	
Pool Quality	___ Yes ___ No	___ Odors ___ Colors ___ Floatables ___ Excessive Algae ___ Oil Sheen ___ Suds Other: _____	
Pipe Algae / Growth	___ Yes ___ No	___ Brown ___ Orange ___ Green Other: _____	

Are there any non-illicit discharge concerns (e.g. trash or infrastructure repairs)?: ___ Yes ___ No
Comments:

Channel, Ditch or Swale Condition	Slope (degrees)	Outlet Structure	Discharge directly to surface water?*
___ Good ___ Clogged ___ Debris ___ Scoured or Eroded Other: _____	___ Flat ___ Moderate ___ Steep	___ Headwall ___ Riprap ___ Flared End ___ No Outlet ___ Protection Other: _____	___ Yes ___ No *If yes, provide receiving water name _____

SECTION 4: PHYSICAL INDICATORS (FLOWING OUTFALLS ONLY)

Do physical indicators (flowing) suggest an illicit discharge is present?: ___ Yes ___ No

Comments:

Indicator	Y/N	Description	Relative Severity Index (1-3)
Odor	___ Yes ___ No	___ Sewage ___ Laundry ___ Sulfide ___ Petroleum/Gas ___ Rancid/Sour ___ Chemical Other: _____	
Color	___ Yes ___ No	___ Clear ___ Brown ___ Gray ___ Yellow ___ Green ___ Orange/Res ___ Multi-color ___ Cloudy Other: _____	
Turbidity	___ Yes ___ No	See severity	
Floatables (Does Not Include Trash)	___ Yes ___ No	___ Sewage ___ Suds & Foam ___ Grease ___ Petroleum (oil sheen) Other: _____	

SECTION 5: ON-SITE SAMPLING/TESTING (FLOWING OUTFALLS ONLY)

Parameter	Result	Typical EPA Benchmarks	Equipment
Temperature			
pH			
Specific Conductivity			
Chlorine		Acute Standard – 860 mg/L Chronic Standard – 230 mg/L	
Ammonia		> 0.5 mg/L	
Surfactants		> 0.25 mg/L	
E.coli		> 153 colonies/100 mL in a single sample (class A waters) > 406 colonies/100 mL in a single sample (class B waters) > 88 colonies/100 mL in a single sample (beach area)	

Appendix F

Illicit Discharge Detection and Elimination (IDDE)

Employee Training Record

TOWN OF WINDHAM

Date	Type of Training	Participants