ARCADIS Design & Consultancy for natural and built assets

City of Fitchburg, Massachusetts

ILLICIT DISCHARGE DETECTION & ELIMINATION (IDDE) PLAN

DRAFT

June 2019

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ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
CCTV	Closed Circuit Television
CMRSWC	Central Massachusetts Regional Stormwater Coalition
CWA	United States Environmental Protection Agency's Clean Water Act
DEP	Massachusetts Department of Environmental Protection
DPW	Department of Public Works
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MCM	Minimum Control Measure
MS4	Municipal Separate Storm Sewer System
MS4 Permit	General Permit for Small Municipal Separate Storm Sewer Systems
NPDES	National Pollutant Discharge Elimination System
NOAA	National Oceanic Atmospheric Administration
PPE	Personal Protective Equipment
SSO	Sanitary Sewer Overflow
SOP	Standard Operating Procedure
SVF	System Vulnerability Factor
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USGS	United States Geological Survey
WQS	Water Quality Standards

1 INTRODUCTION

The City of Fitchburg (City) owns, operates, and maintains a Small Municipal Separate Storm Sewer System (MS4) which conveys and discharges stormwater runoff to surface waters of the United States. The 2016 National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small MS4's (MS4 Permit) issued by the United States Environmental Protection Agency (EPA) and made effective July 1, 2018 requires all permittees, or regulated communities to create a Stormwater Management Program that addresses six minimum control measures (MCMs):

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

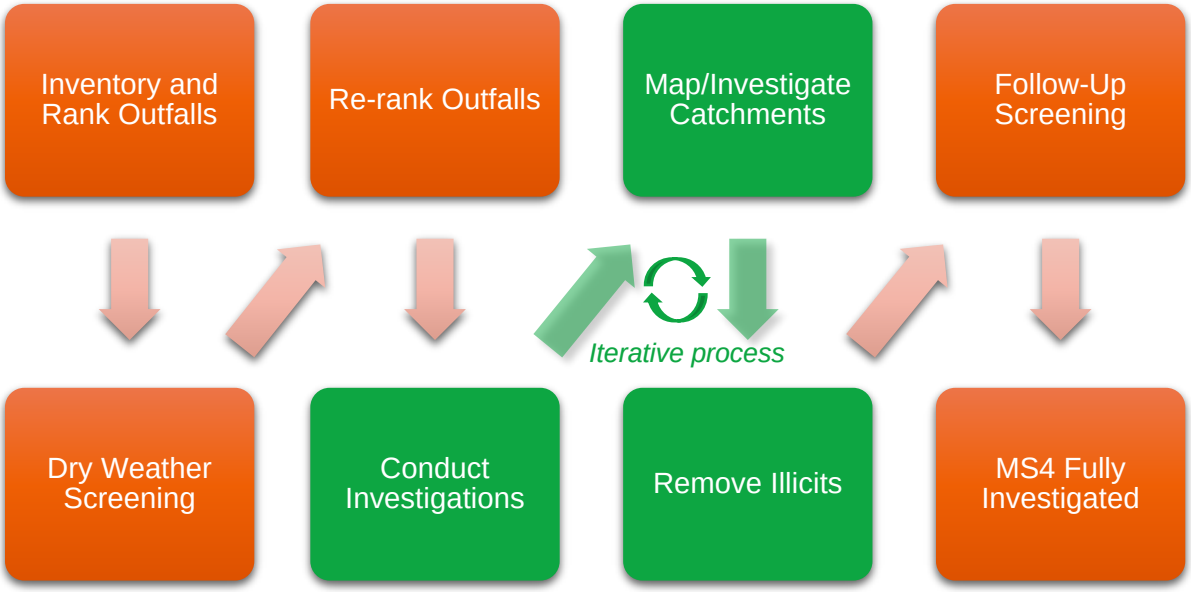
Under MCM 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.1 IDDE Program Goals, Framework, and Timeline

The goals of this written IDDE plan include the major components as outlined in the MS4 Permit to find and successfully eliminate illicit discharges to the MS4:

- Identification of legal authority and regulatory mechanism to prohibit illicit discharges and enforce this IDDE program;
- An assessment of the current mapping of the MS4 and protocols for the continual improvements and addition to the mapping of the MS4;
- Inventory and ranking of outfalls;
- Dry weather outfall screening protocols and procedures;
- Catchment investigations protocols and procedures;
- Methods for the identification/confirmation of illicit source;
- Follow-on screening; and,
- Employee training.

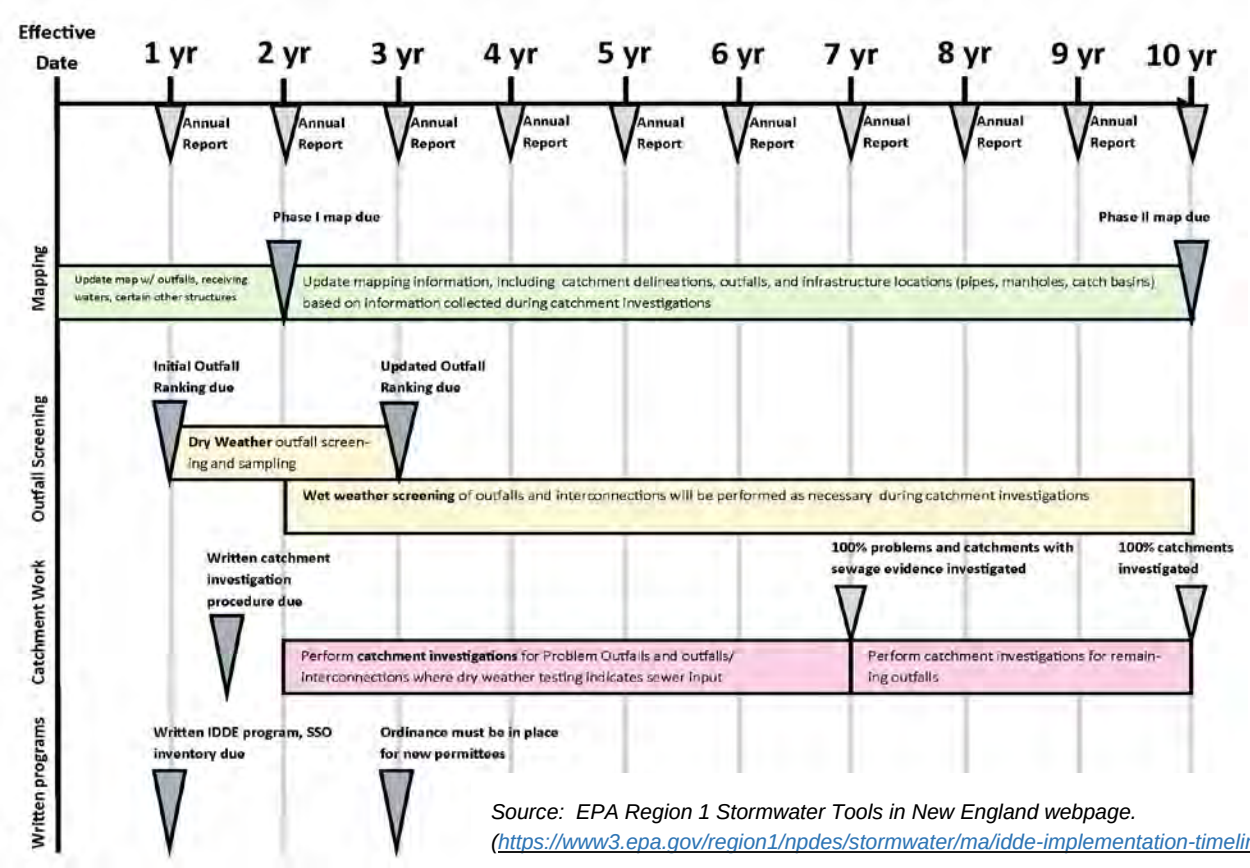
The IDDE investigation procedure framework shown in **Figure 1**, from the Central Massachusetts Regional Stormwater Coalition (CMRSWC), will generally be used to guide IDDE investigations work in the City throughout the permit term.



Source: Central Massachusetts Regional Stormwater Coalition IDDE Plan Template, Figure 1-1.

Figure 1. IDDE Investigation Procedure Framework

It is the City's intent to adhere to the IDDE timeline requirements of the MS4 permit as graphically shown in **Figure 2**, as provided by the EPA. **Table 1** presents a summary of the IDDE program requirement deadlines for the current permit term.



Source: EPA Region 1 Stormwater Tools in New England webpage. (https://www3.epa.gov/region1/npdes/stormwater/ma/idde-implementation-timeline.pdf)

Figure 2. IDDE Program Implementation Timeline

Table 1. Summary of IDDE Program Details

IDDE Permit Requirement	Deadline (Permit Year End Date)
Phase I Map	June 30, 2020 (Year 2)
Phase II Map	June 30, 2028 (Year 10)
Dry Weather Outfall Screening	June 30, 2021 (Year 3)
Initial Outfall Ranking	June 30, 2019 (Year 1) – included in this IDDE Plan
Updated Outfall Ranking	June 30, 2021 (Year 3)
Wet Weather Screening	June 30, 2028 (Year 10)
Written Catchment Investigation Procedures	December 30, 2019 (between Years 1 & 2)
100% Problem Catchments and outfalls where dry weather testing indicates sewer input	June 30, 2025 (Year 7)
Catchment investigations for remaining outfalls	June 30, 2028 (Year 10)
Written IDDE program, SSO Inventory	June 30, 2019 (Year 1)

1.2 Illicit Discharges

An illicit discharge is defined as any non-stormwater discharge to the drainage system, with the exception of discharges pursuant to a private NPDES permit (not to include the NPDES permit for discharges from the MS4) or those considered allowable non-stormwater discharges, such as discharges resulting from fire-fighting activities. A list of allowable non-stormwater discharges is presented in **Section 1.3** of this plan.

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 sanitary 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 washwater or old household products, in many cases due to a lack of understanding on the part of the homeowner.

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 following categories of non-storm water discharges are allowed under the MS4 Permit and under the City's Stormwater Management Ordinance, unless the City, EPA or DEP identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation or lawn watering
- Diverted stream flows
- Rising groundwater
- Uncontaminated groundwater infiltration (40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains and Footing drains
- Air conditioning condensation
- Irrigation water, springs

- Water from crawl space pumps
- Individual residential car washing
- De-chlorinated swimming pool discharges (untouched for no less than 1 week and containing less than 1 ppm of chlorine)
- Street wash waters; and
- Residential building wash waters absent of detergents

Additionally, discharges resulting from fire-fighting activities are exempt from being considered illicit discharges and shall be considered allowable discharges to the MS4.

1.4 Surface Waters within the City

Surface waters within the City are part of the Nashua River basin. All surface waters identified within the City are classified as either Class A or Class B waters by the DEP. There are currently 15 surface waters that have been classified under the Massachusetts Surface Water Quality Standards (WQS), 314 CMR 4.00, by the DEP which assigns all inland, coastal, and marine surface waters a class in accordance with the intended beneficial uses of each surface water and any associated wetlands. Under the WQS all other inland waterbodies within the City fall under Class B waters until otherwise defined. The location of surface waters identified within the City are show in **Figure 3** along with those designated a usage classification by DEP.

The surface water designation descriptions for classes within the City include:

- Class A – Waters designated for public water supply sources, fish and wildlife resource areas, primary and secondary recreation, and are protected as Outstanding Resource Waters; or
- Class B – Waters designated as fish and wildlife resource areas, as well as primary and secondary recreation areas.

Additionally, the Massachusetts Year 2016 Integrated List of Waters prepared by the DEP's Division of Watershed Management has categorized 15 surface waters within the City. The document provides assessments on the quality of Massachusetts surface waters pursuant to Sections 303(d) and 305(b) of the EPA's Clean Water Act (CWA). Section 305(b) of the CWA outlines the process by which surface waters are to be evaluated or classified with respect to their uses and Section 303(d) of the CWA requires the categorization of surface waters. The process of assessing surface waters under Section 305(b) and listing impairments under Section 303(d) of the Clean Water Act is inextricably linked to the Massachusetts Surface WQS, as the standards define the uses that are to be evaluated for any given water body.

The State's surface waters are separated into the following categories:

- Category 1 – Waters attaining all designated uses
- Category 2 – Waters attaining some uses; other uses not assessed
- Category 3 – No uses assessed
- Category 4a – TMDL completed

- Category 4b – Impairment controlled by alternative pollution control requirements
- Category 4c – Impairment not caused by a pollutant – TMDL not required,
- Category 5 – Waters requiring a TMDL

These categories determine which waters require an allowable total maximum daily load (TMDL) for a given pollutant or impairment. The Integrated List of Waters is developed every two years and contains a growing list of impairments, many of whose primary sources are stormwater runoff. There are currently no Category 1, Category 4a, or Category 4b waters within the City of Fitchburg. Waterbodies that have not been designated a Category automatically fall under Category 3 waters until otherwise defined.

1.4.1 TMDL Development

Currently, a Phosphorus TMDL has been drafted for the Nashua River watershed. This TMDL was developed to address nutrient-related impairments in the Nashua River. Several segments in the Nashua are on the MassDEP Category 5 list of impaired waters for nutrient enrichment, organic enrichment, and low dissolved oxygen. Eutrophic conditions have been observed inducing the formation of excessive algal mats and macrophytic plant growth in Pepperell Pond Impoundment, with supersaturated dissolved oxygen conditions. This Total Maximum Daily Load (TMDL) focuses on the nutrient phosphorus to address organic enrichment/dissolved oxygen, and noxious aquatic plants in the river system.

Figure 3 shows the location and class of surface waters within the City, and **Table 2** provides a summary of surface water classifications and impairment categories.

1.5 Work Completed to Date

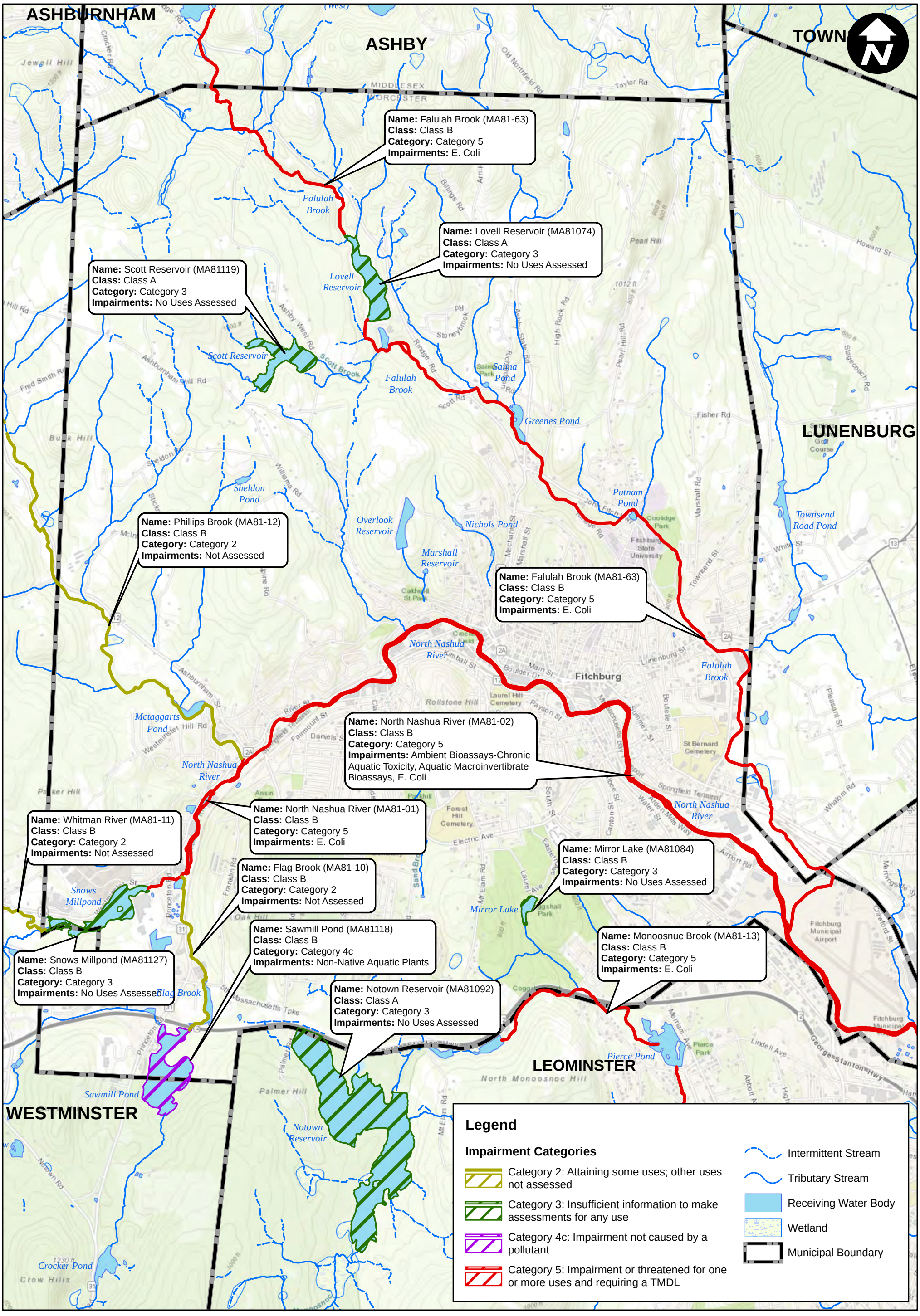
The 2003 MS4 Permit required each MS4 community to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each MS4 community was also required to define how confirmed discharges would be eliminated and how the removal would be documented.

The City of Fitchburg has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters
- Adopted a Stormwater Management Ordinance (including IDDE) and drafted corresponding rules and regulations
- Conducted comprehensive outfall screening for compliance with the 2003 MS4 Permit. During this program, a total of 40 outfalls were screened. If dry-weather flow was present, samples were collected and analyzed for E-Coli, MBAS, and Nitrogen. All outfalls were also sampled during a wet-weather event and samples were analyzed for Total coliform, E-Coli, MBAS, and Nitrogen. Sample results from five out of forty outfalls. Through testing and investigation, 23 illicit connections to the stormwater system were detected. 18 known illicit connections have been removed during the permit term, one illicit connection has a planned removal for this year, and four known connections have yet to be corrected.

The City has also completed additional related work, including:

- Additional storm system mapping, including the locations of catch basins, manholes and pipe connectivity
- Sanitary Sewer Overflow documentation and inventory



CITY OF FITCHBURG, MASSACHUSETTS

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Surface Water Classifications and Impairment Categories

Miles
0 0.2 0.4 0.6 0.8 1

FIGURE 3

Table 2. Fitchburg Surface Water Classifications and Impairment Categories

Receiving Waterbody and Segment ID	Surface Water Class	TMDL Category	Impairment
Baker Brook (MA81-62)	Class B	Category 5	E. Coli
Baker Pond	Class B	Category 3	Insufficient Information
Falulah Brook (MA81-63)	Class B	Category 5	E. Coli
Flag Brook (MA81-10)	Class B	Category 2	Not Assessed
Goodfellow Pond	Class A	Category 3	Insufficient Information
Greenes Pond	Class B	Category 3	Insufficient Information
Lowell Reservoir (MA81074)	Class A	Category 3	Insufficient Information
McTaggarts Pond	Class B	Category 3	Insufficient Information
Mirror Lake (MA81084)	Class B	Category 3	Insufficient Information
Monoosnuc Brook (MA91-13)	Class B	Category 5	E. Coli
North Nashua River (MA81-01)	Class B	Category 5	E. Coli
North Nashua River (MA81-02)	Class B	Category 5	Ambient Bioassays -- Chronic Aquatic Toxicity, Aquatic Macroinvertebrate Bioassessments, E. Coli
Notown Reservoir (MA81092)	Class A	Category 3	Insufficient Information
Overlook Reservoir	Class A	Category 3	Insufficient Information
Pearl Hill Brook (MA81-80)	Class B	Category 5	Enterococcus
Phillips Brook (MA81-12)	Class B	Category 2	Not Assessed
Sand Brook	Class B	Category 3	Insufficient Information
Sawmill Pond (MA81118)	Class B	Category 4c	Non-Native Aquatic Plants
Scott Reservoir (MA81119)	Class A	Category 3	Insufficient Information
Shea Brook	Class B	Category 3	Insufficient Information
Sheldon Brook	Class B	Category 3	Insufficient Information
Snows Millpond (MA81127)	Class B	Category 3	Insufficient Information
Summond Pond	Class B	Category 3	Insufficient Information
Whitman River (MA81-11)	Class B	Category 2	Not Assessed
Wymans Brook	Class B	Category 3	Insufficient Information

2 AUTHORITY AND STATEMENT OF IDDE RESPONSIBILITIES

2.1 Legal Authority

The City has adopted an updated Stormwater Management Ordinance (2019) and drafted Stormwater Management Rules and Regulations. These regulatory documents provide the City 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.
- Promulgate and modify regulations.

The Stormwater Ordinance can be found as Chapter 154 in the City Code. The most recent Code of the City of Fitchburg may be viewed at the City Clerk's office or found on the City's website at:
link below:

http://www.ci.fitchburg.ma.us/154/City-Clerk (Click on ***Code of City of Fitchburg***)

The Stormwater Management Rules and Regulations may be found on file at the Department of Public Works (DPW).

2.2 Statement of Responsibilities

The DPW is the lead municipal agency or department responsible for implementing the IDDE program pursuant to the provisions of the Stormwater Ordinance and the MS4 Permit. Other agencies or departments with responsibility for aspects of the program include:

- **Wastewater Division** – Support for investigations and removal of illicit connections/discharges.
- **Building and Zoning Department** – Ensure illicit connections are not made during renovations or new construction.
- **Health Department** – Ensure illicit discharges from food establishments and other facilities are not going to the MS4.
- **Conservation Commission and Planning (Community Development)** – Ensure stormwater requirements are being met during review/inspection of new development and redevelopment.
- **Mayor and City Solicitor** – Support for enforcement or legal actions.

All City departments are responsible for following-up with the DPW on any reports of suspected illicit connections or discharges to the MS4.

3 MUNICIPAL STORM DRAINAGE SYSTEM

3.1 Mapping and GIS Database Management

The City of Fitchburg originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. The 2016 MS4 Permit requires a more detailed storm system map than was required by the 2003 MS4 Permit. The revised mapping is intended to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The City fulfilled the 2003 MS4 permit requirements for mapping and conducted additional mapping efforts to produce a stormwater drainage system map that includes catch basins, manholes, pipe connectivity on top of the outfalls and receiving waters which were already mapped. The mapping exists in a Geographic Information System (GIS) database and is updated as projects occur. A map of the Fitchburg Municipal Storm Drainage System is included as **Figure 4**.

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The DPW is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. The City will report on the progress towards completion of the storm system map in each annual report.

The City plans to continually update their stormwater mapping during field investigations and maintenance of their storm drainage system to comply with the requirements of the 2016 Massachusetts Small MS4 general permit.

3.1.1 Phase 1 Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures (Bioswales, BMPS, etc.)
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

The City will update its stormwater mapping by July 1, 2020 to include the remaining Phase I information.

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Municipal Stormwater System and Receiving Waters

FIGURE 4

3.1.2 Phase 2 Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the following information:

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

The City will update its stormwater mapping by July 1, 2028 to include the remaining Phase II information.

Although not a requirement of the 2016 MS4 Permit, the City has included the following recommended elements in its storm system mapping:

- Storm sewer material, size (pipe diameter), year built;
- Sanitary sewer system material, size (pipe diameter), year built.

4 SANITARY SEWER OVERFLOWS (SSOs)

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

The City keeps information on SSOs and has compiled an inventory of SSOs that have occurred within the five (5) years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs. A record of each SSO event includes the location of each event, the date and time of each event, an estimated discharge volume, the known or suspect source and cause of the overflow, and mitigation measures. The current inventory of known SSOs in the City is included in **Appendix A**.

Upon detection of an SSO, the City will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, the City will provide oral notice to EPA within 24 hours and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence.

The inventory in **Appendix A** will be updated by the DPW at least annually. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

5 IDDE PROTOCOL AND PROCEDURES

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall[1] or interconnection.[2] The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available. Initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

5.2 Outfalls and Interconnections

5.2.1 Initial Outfall / Interconnection Ranking

The DPW will complete an initial outfall[1] and interconnection[2] inventory and priority ranking to assess illicit discharge potential within one (1) year from the effective date of the permit (by June 30, 2019). All known outfalls and interconnections will be ranked into four classifications, as described on the following page, prior to the implementation of outfall screening. The initial ranking of outfalls will use information from previous screenings, catchment investigations, reports to the City, the Massachusetts Integrated List of Waters, and proximity to areas where public health, or environmental impact may be a concern.

An updated inventory and ranking will be provided in each annual report after the initial ranking. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other IDDE program activities.

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[1] **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. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that 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.

[2] **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:

- **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 and interconnections that have not been classified as Problem Outfalls and that discharge to surface waters in an area of concern to public health, categorized as having or needing a TMDL, in a catchment area where exists aging sewer or storm structures, SSO's, or septic systems, or where flows are received from a network of previously combined sewer-storm system.
- **Low Priority Outfalls:** Outfalls and interconnections determined to have low likelihood for an illicit discharge by the City and are not considered for any of the criteria indicating the outfall or interconnection as a High Priority Outfall.
- **Excluded Outfalls:** Outfalls and interconnections with no potential for illicit discharges based on the tributary stormwater features being a significant distance from any sanitary sewers or septic systems, where non-stormwater flows are determined as absent from the area and only road and surface stormwater runoff may enter the system. This category is limited to 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.

Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls or Excluded Outfalls. Problem Outfalls will be directly investigated following the procedures for catchment investigations as detailed in **Section 7**. Outfalls/interconnections classified as High Priority Outfalls and Low Priority Outfalls will be screened for indicators of illicit discharges.

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. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan.

- **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.

An outfall inventory and priority ranking matrix table is included in **Appendix B.**

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 DPW 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.

6.1 Outfall Screening Weather Conditions Criteria

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and when no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from an approved local weather station within or nearby the investigation area. If the approved weather stations is not available or not reporting current weather data, then the use of local weather forecasting data from sources like the United States Geological Survey (USGS), and the National Oceanic Atmospheric Administration (NOAA) may serve as a back-up.

6.2 Dry Weather Outfall Screening/Sampling Procedure

6.2.1 General Procedure

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 **Section 6.1** for weather criteria):
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (using paper or digital forms)
    c. 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.
4. If flow is observed, sample and test the flow following the procedures described in the following sections.
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, sandbagging, and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. Include all screening data in the annual report.

Table 3. Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and dry weather sampling should be available with extras
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labelling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
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	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labelling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria require sterile containers).
Pry Bar, Pick or Manhole Puller	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Sledge Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
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

Previous outfall screening/sampling conducted under the 2003 MS4 Permit may be used to satisfy the dry weather outfall/screening requirements of the 2016 MS4 Permit only if the previous screening and sampling was substantially equivalent to that required by the 2016 MS4 Permit, including the list of analytes outlined in Section 2.3.4.7.b.iii.4 of the 2016 permit.

The following information is generally recorded during dry weather investigations:

- Field personnel, inspection date and time, weather and temperature
- Time (in hours) since last precipitation event and amount (in inches of precipitation).
- Photos (One general area photo, one closeup of outfall structure)
- Outfall/Structure ID
- Receiving Waterbody
- Outfall type (pipe, box culvert, arch, horizontal elliptical, vertical elliptical)
- Outfall material (reinforced concrete, corrugated metal, PVC, HDPE, stone, brick, earthen, other)
- Opening Size Diameter if round or Width and Height if not round (inches)
- Condition (corrosion, cracks/breaks, spalling, pipe collapsed, pipe crushed, pipe submerged)
- Dry weather flow (indication of flow and flow depth in inches)
- Color, clarity, and odor of flow
- Presence of floatables (trash, oil, suds, scum, leaves) and deposits/stains (oil, rust, sediments)
- Vegetation growth (algae, iron floc)
- Test kit sampling results (if sample is taken)
- Whether or not an Illicit discharge is suspected

A sample of an outfall inspection form is included as **Appendix C.**

6.2.2 Evidence of Illicit Flows

In the event an outfall is inspected, and no flows are observed, indicators of illicit flow evidence may be used in the determination of likely illicit discharges. Some observable evidence of an illicit discharge includes the presence of toilet paper and other sanitary items, staining, grease deposits, or excessive vegetation or bacterial growth. Examples of illicit flow evidence in non-flowing outfalls are shown in **Figure 5**. These examples are excerpts from the Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments by the Center for Watershed Protection and Robert Pitt, 2004.

Toilet paper or other sanitary items directly around the storm drain outlet are indicators of an upstream illicit connection.

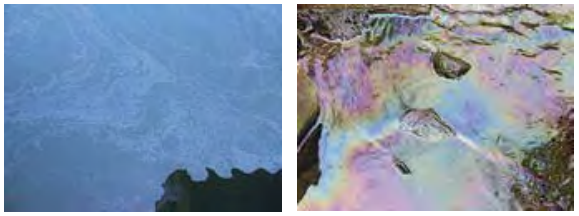
Suds present at an outfall may indicate and illicit connection and likely when accompanied by the presence of a fragrant detergent odor.

Bacterial growth at an outfall indicates nutrient enrichment likely from sanitary connections / defects.

Excessive vegetation and algae growth may indicate enriched flows associated with sewage or fertilizers from lawn care

Water color indicators may identify the presence of an illicit connection or illegal dumping and may require additional investigation.

Note: water color may also be a result of minerals and algae growth



Oily Sheen or Film may indicate the presence of an illicit connection or illegal dumping of pollutants.

Note: some oils are organic and should be differentiated from Synthetic oils before using as an indicator

Source: Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments by the Center for Watershed Protection and Robert Pitt, 2004.

Figure 5. Evidence of Illicit Flow

6.2.3 General Outfall Sampling Procedure

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[3] listed in **Table 4**. The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles 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 and then in water to be sampled (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 an EPA approved laboratory
9. Dispose of used test strips and test kit ampules properly
10. Decontaminate all testing personnel and equipment

In the event that an 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 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 4** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern.

If flow is observed at an outfall or interconnection during dry weather conditions, a grab sample will be taken and analyzed for the minimum parameters of E. coli or Enterococcus (dependent on the impairment and class of the receiving water), ammonia, surfactants, and total chlorine. When flow is observed, the inspectors will also conduct a visual windshield survey of the surrounding areas. Windshield surveys will entail driving through the area serviced by the drainage system of concern seeking to identify or isolate the source of an illicit or approved non-stormwater discharge. Potential illicit sources might include significant commercial, industrial or construction activity, un-swept streets, poorly maintained catch basins, broken pipes, etc. Potential approved non-stormwater discharge sources might include normal seasonal stream flow, lawn irrigation, non-commercial car washing, hydrant flushing, etc. All pertinent observations will be recorded and compiled along with other field collected screening data.

[3] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Outfalls that are flowing will be sampled as described in the general procedure for outfall sampling. If an outfall is observed with no flow, but evidence of an illicit discharge is observed, the outfall will be rescreened within one week, if possible, under dry weather conditions.

Table 4. Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136.[4] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. **Table 5** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

Suspect dry weather flows without obvious evidence of contamination (olfactory, excrement, toilet paper, etc.) will be sampled and analyzed for the minimum parameters of E. coli or enterococcus (as appropriate), ammonia, surfactants, chlorine, temperature, specific conductance, and salinity. In the presence of dry weather flow, samples will be gathered prior to the performance of any inspections which could cause flow disturbance. Temperature and pH of the dry weather flow will be determined after samples are secured.

[4] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Table 5. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520		28 days	Cool ≤6°C
Indicator Bacteria: *E.coli* Enterococcus	*E.coli* **EPA**: 1603 **SM**: 9221B, 9221F , 9223 B **Other**: Colilert®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E.coli* **EPA**: 1 cfu/100mL **SM**: 2 MPN/100mL **Other**: 1 MPN/100mL *Enterococcus* **EPA**: 1 cfu/100mL **SM**: 1 MPN/100mL **Other**: 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM** : 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

Notes:

SM = Standard Methods

1. Total Nitrogen is not a required parameter for the outfalls found in the City of Fitchburg, at this time.
2. No outfalls discharge directly to a waterbody with a final approved TMDL or impairment for Phosphorus. Total Phosphorus is not a required parameter for the outfalls found in the City of Fitchburg at this time.

6.3 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

6.3.1 Follow on Priority Ranking of Outfalls / Interconnections

The City 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 (July 1, 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 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. All other outfalls will be ranked accordingly based on the levels found for the indicators shown in **Table 6**.

Table 6. Water Quality Sampling Criteria

Indicator	EPA Water Quality Standard	Benchmark: Illicit Discharge Likely	Benchmark: Illicit Discharge Unlikely	Instrumentation
E. coli (Class B waters)	235 cfu/100 ml The geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml	≥ 1000 colonies/100 ml	< 1000 colonies/100 ml	Samples are taken in the field and analyzed at a local laboratory
Enterococci (Class SB waters)	104 cfu/100 ml The geometric mean of the five most recent samples taken during the same bathing season shall not exceed 35 colonies per 100 ml and no single sample taken during the bathing season shall exceed 104 colonies per 100 ml	≥ 1000 colonies/100 ml	< 1000 colonies/100 ml	
Surfactants (as MBAS)	>0.25 mg/l (field kits) 0.1 mg/l (lab)	≥ 0.25 mg/l	< 0.25 mg/l	MBAS Test Kit (e.g. CHEMetrics K-9400)
Ammonia (NH_3)	> 0.5 mg/l	≥ 1.0 mg/l	< 1.0 mg/l	NH_3 Test Kit (e.g. CHEMetrics K-1510)
Total Residual Chlorine	>0.02 mg/l (detectable levels per the 2016 MS4 Permit)	See note below.	See note below.	Total Chlorine Test Kit (e.g. CHEMetrics K-2504)
Temperature	-	> Air Temperature and < 54°	≤ Air Temperature and ≥ 54°	Thermometer
pH	-	≥ 9.0 or ≤ 6.3	< 9.0 or > 6.3	pH Meter

Note: Detectable total residual chlorine will require additional investigation of the outfall and catchment area to determine the likelihood of an illicit discharge. The presence of Chlorine can affect other outfall screening parameters and result in a loss of data accuracy. Additionally, the presence of chlorine may indicate and upstream watermain break, pool discharge, firefighting activity, hydrant flushing, etc. and should be investigated by means of a windshield survey.

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. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

The DPW 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
- Plans related to the construction of the sewer drainage network
- Prior work on storm drains or sewer lines
- Board of Health or other municipal data on septic systems
- Complaint records related to SSOs
- Septic system breakouts.

Based on the review of this information, the presence of any of the following **System Vulnerability Factors (SVFs)** will be identified for each catchment:

- History of SSO's
- Common or Twin Invert manholes
- Common trench constructions
- Storm / Sewer crossings, where Sewer pipe is above Storm pipe
- Sanitary lines with underdrains
- Surcharging sewers or backups
- Areas formerly served by a combined system
- Sanitary infrastructure defects
- Dated Sewer / Storm infrastructure (>40 years)
- Septic with poor soils or water table separation
- History of Board of Health actions addressing septic failure.

An SVF inventory will be documented for each catchment and, retained in **Appendix D** as part of this IDDE Plan, and included in the annual report.

7.2 Dry Weather Manhole Inspections

The City 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 or SSOs.

The DPW 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. 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.

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 C.**

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. Sampling and analysis will be in accordance with procedures outlined in **Section 6**. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).

3. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, 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 or SSOs 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.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) SVF is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. Wet weather investigations will occur concurrently with catchment area investigations, and as such must be completed by the end of the 10-year IDDE timeframe set by the EPA (refer to **Figure 2**). The DPW 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. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. 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. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. 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 7.4**.

4. 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.

7.4 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.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the DPW will notify property owners in the affected area. Smoke testing notification will include door hanger/residential flyer notifications for single family homes, businesses and building lobbies for multi-family dwellings.

7.4.1 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.

7.4.2 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 placed 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.

7.4.3 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.

7.4.4 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.

7.4.5 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.

7.4.6 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.

7.5 Illicit Discharge Removal

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

7.5.1 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.

7.6 Ongoing Outfall Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6.2** of this plan. 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 7.3**. All sampling results will be reported in the annual report.

8 TRAINING

Annual IDDE training will be made available to all 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 E**. 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
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- 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

Sanitary Sewer Overflow (SSO) Inventory

City of Fitchburg, Massachusetts
Illicit Discharge Detection and Elimination Program
Appendix A - Sanitary Sewer Overflow Inventory

Year	Location	Location of Discharge	Did SSO Enter Surface Water or MS4	Date Discovered	Date Discovered	Date Stopped	Date Stopped	Estimated Volume (gal)	Description of event with known or suspected causes	Mitigation and Corrective measures
2018	192 Marshall Road	Ground surface	No release to surface water	12/3/2018	10:00 AM	12/3/2018	10:15 AM	40	Sewer system blockage caused by bricks dropped into sewer by contractor who had recently paved road.	Jetted line and pulled out two bricks.
	101 Fitchburg Road, Westminister	Ground surface	No release to surface water	9/19/2018	6:30 PM	9/19/2018	7:30 PM	3,000	Pipe collapse; MassDOT put guardrail through PVC force main during road reconstruction a few years prior.	Shut off pumps at pump station, fixed pipe.
	569 Main Street	Backup into property basement		6/20/2018	4:00 PM	6/18/2018	8:00 PM	1,500	Rain event, insufficient capacity in system	Checked manholes and main lines for debris, all clear.
	212 Marshall Street	Backup into property basement		6/20/2018	4:00 PM	6/18/2018	8:00 PM	800	Rain event, insufficient capacity in system	Checked manholes and main lines for debris, all clear.
2017	33 Shelly Avenue	Backup into property basement		10/30/2017	7:30 AM	10/30/2017	7:30 AM	10	Rain event, insufficient capacity in system. Homeowners use of flapper valve lead to water in basement.	Back-flow preventer was installed and working properly.
	1 Oak Hill Road	Backup into property basement		10/30/2017	8:00 AM	10/30/2017	8:00 AM	2,000	Rain event, insufficient capacity in system	Mainline flow was good. Additional combined sewer seperation upstream may help alleviate surcharging.
	8 Crescent Heights	Backup into property basement		10/3/2017	12:00 PM	10/3/2017	12:00 PM	15	Sewer system blockage	Excavation was conducted, line was cleaned, jetted, inspected, and reparied.
	10 Jerry Street	Ground surface	No release to surface water	4/20/2017	2:30 PM	4/20/2017	3:30 PM	500	Sewer system blockage	Bloackge was freed after debris removal, puddling sewerage was sucked up with vactor truck.
	22 Prospect Street	Catch basin (MS4) to receiving water	North Nashua River	4/12/2017	5:00 PM	4/13/2017	8:00 AM	5,000	Pipe collapse	Bypass setup morning after SSO was discovered, collapsed pipe was repaired.
	22 Davis Street	Ground surface	No release to surface water	4/11/2017	3:30 PM	4/12/2017	8:00 AM	2,000	Root Intrusion	Jetting of line was unsuccesful. Line was cleared the following morning after roots were cut free.
	396 Fifth Mass Turnpike	Ground surface; Direct to reciveing water	Flagg Brook	2/28/2017	11:00 AM	2/28/2017	2:30 PM	21,000	Pipe collapse	Bypass was setup and stayed in place until following morning when the repair was made to the cast iron siphon.
	59 Upham Street	Ground surface	No release to surface water	1/26/2017	10:00 AM	1/26/2017	10:30 AM	200	Sewer system blockage due to rocks, asphalt, and other debris	Line was jetted and debris was cleared and disposed of; line was completely cleared to main trunk sewer.
	72 Jackson Avenue	Ground surface	No release to surface water	1/8/2017	2:30 AM	1/8/2017	3:30 AM	300	Sewer system blockage due to rocks, asphalt, and other debris	Line was jetted and debris was vaccumed up and disposed of properly.
	11 Hardy Passway	Ground surface	No release to surface water	1/7/2017	11:30 AM	1/7/2017	1:30 PM	500	Sewer system blockage due to rocks, asphalt, and other debris	Line was jetted and debris was vaccumed up and disposed of properly. Line added to priority cleaning list.

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2016	1153 John Fitch Highway	Catch basin (MS4) to receiving water	Falulah Brook	12/25/2016	10:30 PM	12/26/2016	9:00 AM	4,000	Sewer system blockage	Downstream manhole was jetted and blockage was relived. Roots were cut from main line.
	31 Olin Drive	Backup into property basement		12/16/2016	3:00 PM	12/16/2016	3:30 PM	30	Sewer system blockage caused by a root ball downstream of the home at a defective wye service connection.	Blockage was relived via water jetting. Roots could not be cut out due to deflected clay pipe joints. Manhole installed Spring 2017 at lateral connection at the summit of the line.
	545 Westiminster Street	Direct to receiving water	North Nashua River	11/14/2016	1:00 PM	11/14/2016	2:00 PM	5,400,000	Initially notified of algae growth on 10/26/2016. After multiple investigations a sewer sytem blockage was found at the intersection of Route 2A and Route 31.	Rag ball blockage was relived via jetting, restoring normal operations. Pipe repaired in following weeks.
	153 Fairmount	Backup into property basement		11/4/2016	1:00 PM	10/21/2016	8:00 PM	300	Rain event	Surcharging subsided with rain event.
	14 Wallace Avenue	Backup into property basement		11/2/2016	3:30 PM	10/21/2016	8:00 PM	1,870	Rain event, insufficient capacity in system	Surcharging subsided with rain event.
	400 Summer Street	Backup into property basement		10/27/2016	1:30 PM	10/21/2016	8:00 PM	3,800	Rain event, insufficient capacity in system	Surcharging subsided with rain event. City will install backflow preventer in owner's service lateral.
	187 Fairmount Street	Backup into property basement		10/26/2016	2:00 PM	10/21/2016	8:00 PM	N/A	Rain event, sewer system blockage	Surcharging subsided with rain event. City will install backflow preventer in owner's service lateral at owner's requests.
	40 Ray Avenue	Backup into property basement		10/24/2016	4:30 PM			300	Rain event, insufficient capacity in system	Unmaintained backflow preventer didn't work properly causing water to backup into basement.
	70 Benson Street	Catch basin (MS4) to receving water	Unnamed intermittent stream	10/24/2016	10:45 AM	10/24/2016	12:50 PM	162,000	Rain event, sewer sy.stem blocakge of bricks and debris wedged into pipe caused water to come out of manhole cover. Manhole had been overflowing since 10/22/16 at 7 AM. Majority of sewage was released into a very large flat rip-rapped area and infiltrated into ground.	Blockage was cleared by water jetting.
	33 Shelly Avenue	Backup into property basement		10/24/2016	9:30 AM	10/21/2016	7:00 PM	3,000	Rain event, insufficient capacity in system	City installed backflow preventer in this location sometime in following weeks to prevent future SSO's.
	29 Goodwin Street	Ground surface	No release to surface water	9/29/2016	11:00 AM	9/29/2016	1:00 PM	20	Sewer system blockage due to size transition in pipe (10 inch diameter to 6 inch). Sewage ran down street 10 feet and infiltrated into grass.	Bloackage was cleared with jetter, debris was removed, and roots were cut out of pipe.
	132 Green Street	Backup into property basement		9/27/2016	5:00 PM	9/27/2016	5:30 PM	10	Sewer sysyem blockage, root intrusion. Resident claims lateral was clear but sewage was still entering basement. Sewer collections team jetted mainline and pulled back debris. Baby wipe build up appears to havecause bloackage.	Blocakge was cleared with jetter. Considerations for putting extra manhole to provide acess to both ends of main line were made.
	Water Street at Walnut (CSO-039)	Direct to receiving water	North Nashua River	6/21/2016	1:00 PM	6/21/2016	2:00 PM	577,000	After a rain event the SSO was discovered during routine checks and was caused by sand/grit and rags blocking the base flow outlet pipe of the CSO regulator.	The blockage was cleared and the structure was cleaned with a jetter/vacuum truck. All catch basin sumps upstream were cleaned.
	1 Delisle Street (Park Hill Park)	Ground surface	No release to surface water	3/1/2016	2:00 PM	3/1/2016	3:00 PM	150	Sewer system blockage; 6 to 12 inch sized rip-rap stones were found in sewer manhole causing blockage. Sewage from SSO percolated into ground around surcharged manhole.	The rip-rap was removed via a catch basin clamshell cleaner truck, vactor truck, and manual labor. Sewer main up and downstream of the block was cleaned and inspected with camera. City will install a locking frame on manhole to prevent unauthorized access and debris.
	10 Jerry Street	Ground surface	No release to surface water	2/11/2016	10:00 AM	2/11/2016	11:00 AM	1,000	Sewer system blockage due to bricks, rocks, and a tire-chock block.	Blockage relieved by jetting main line and cleaining out SMH. Crew vactored up sewage that had pooled on road, remaining sewage percolated into ground.
	65 Fredette Street	Ground surface; Backup into basement	No release to surface water	2/10/2016	10:30 PM	2/10/2016	11:30 PM	2,000	Sewer system blockage due to bricks. Homeowner pumped sewage into backyard where it percolated into ground.	Main line was jetted. 25 bricks were removed from sewer. Repairs were made to failing manhole where the bricks originated.
2015	444 Franklin Street	Backup into property basement		11/10/2015	6:45 AM				Sewer system blockage in main line due to protruding tap.	Line was jetted and blockage was cleared.
	130 South Street									
	300' West of 50 Stoneybrook Road	Catch basin (MS4) to receving water	Unnamed brook	10/14/2015	10:00	10/15/2015	2:00 PM	2,000	Leaking steel sewer force main. The line was jetted which led to short relief period. Leak continued so the pump station was shut down.	Replaced 8 feet of sewer force main. Condition assesment was conducted on the sewer force main to determine if any other repairs or replacments needed to be made.
	149 High Street	Backup into property basement		10/5/2015					Sewer system blockage and pipe collapse.	Rooter team snaked line but only up to 80 ft where they could not go any further. Suspected pipe had been crushed or broken. Excavation of area and repair of pipe was done.
	40 Ray Avenue	Backup into property basement		9/30/2015					Rain event caused sewer surcharging.	Surcharging subsided with rain event.
	35 Proctor Avenue	Backup into property basement		9/30/2015	10:45 AM	9/30/2015	11:45 AM	16,000	Rain event; Heavy inflow to sewer system due to torrential rains surcharged sewer in street. Blockage caused by debris in sewer main that originated from newly installed sewer.	Surcharging subsided with rain event. Investigation of storm drains to see if a blockage was the reason for transfer from storm sewer to sanitary sewer.
	667 Westminster Street	CB and 1000' of pipe (MS4) to receving water	North Nashua River	6/20/2015	9:00 AM	6/24/2015	9:00 AM	205,000	Multiple sewer system collapses in same area over 4 day period. 8-inch VC pipe constructed on ledge was shaken apart by vibratory compactor during paving project 2 weeks prior. Sewage was released onto ground surface and into catch basin.	Located collapse with camera truck and called in on-call services contractor. Multiple collapses in area over 4 day period required multiple temporary fixes leading to permanent fix.
	54 Fredette Street	Backup into property basement		2/10/2015	10:00 AM	2/10/2015	3:00 PM	200	Sewer system blockage of 8 inch VC pipe.	Vac truck cleared blockage, pipe was cleaned. Attempt to CCTV was made however protruding lateral in way. Plans for lateral to be cut out after weather improved were made.
	55 Fredette Street	Backup into property basement		2/10/2015	10:00 AM	2/10/2015	3:00 PM	50	Sewer system blockage of 8 inch VC pipe.	Vac truck cleared blockage, pipe was cleaned. Attempt to CCTV was made however protruding lateral in way. Plans for lateral to be cut out after weather improved were made.

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2014	John Fitch Highway at Woodbury Ave	Ground; Catch basin (MS4) to detention basin		11/19/2014	10:15 PM	11/19/2014	10:40 PM	2,000	Caused by a failed bypass pumping system. The bypass system was being transferred from pump 1 to pump 2 and with the valve not being closed properly and the pump being brought online not primed properly the SSO occurred.	An employee of the company that had installed the pump figured out the problem and closed the valve. The site of the SSO was cleaned.
	285 Main Street	Backup into property basement		7/27/2014				2,000	Sewer system blockage. Contractor didn't get proper information from engineering firm during project leading to blockage in sewer lateral.	City assisted the contractor in cleearing the blockage. Rooterman vacuumed the SSO into their vactor truck and decanted into a sewer manhole on Day St.
	95 Goodrich Street	Backup into basement; Ground surface	No release to surface water	7/7/2014	5:00 PM			200	Rain event, insufficient capacity. 1.1 inches of rain in 20 minutes too much capacity for system under construction. Homeowner bailed the sewage onto the back lawn where it infiltrated the ground.	Contractor made temporary modifications to system to utilize more capacity in storm drain.
	96 St Bernard St	Backup into basement; Ground surface	No release to surface water	7/7/2014	5:00 PM			1,000	Rain event, insufficient capacity. 1.1 inches of rain in 20 minutes too much capacity for system under construction. Homeowner bailed the sewage onto the back lawn where it infiltrated the ground.	Contractor made temporary modifications to system to utilize more capacity in storm drain.
	254/256 Boutelle Street	Backup into basement; Ground surface	No release to surface water	7/7/2014	5:00 PM			400	Rain event, insufficient capacity. 1.1 inches of rain in 20 minutes too much capacity for system under construction. Homeowner bailed the sewage onto the back lawn where it infiltrated the ground.	Contractor made temporary modifications to system to utilize more capacity in storm drain.
	264 Boutelle Street	Backup into basement; Ground surface	No release to surface water	7/7/2014	5:00 PM			200	Rain event, insufficient capacity. 1.1 inches of rain in 20 minutes too much capacity for system under construction. Homeowner bailed the sewage onto the back lawn where it infiltrated the ground.	Contractor made temporary modifications to system to utilize more capacity in storm drain.
	276 Boutelle Street	Backup into basement; Ground surface	No release to surface water	7/7/2014	5:00 PM			500	Rain event, insufficient capacity. 1.1 inches of rain in 20 minutes too much capacity for system under construction. Homeowner bailed the sewage onto the back lawn where it infiltrated the ground.	Contractor made temporary modifications to system to utilize more capacity in storm drain.
	300 Boutelle Street	Backup into basement; Ground surface	No release to surface water	7/7/2014	5:00 PM			200	Rain event, insufficient capacity. 1.1 inches of rain in 20 minutes too much capacity for system under construction. Homeowner bailed the sewage onto the back lawn where it infiltrated the ground.	Contractor made temporary modifications to system to utilize more capacity in storm drain.
	4 Maverick Street	Backup into property first floor and basment		6/26/2014	3:00 AM			200	Rain event, insufficient capacity, sewer system blockage. Temporary connection due to construction was insufficient for combined sewer. Sewage emptied into first floor and drained into basement.	Contractor made a permanent connection to existing combined sewer.
	Boutelle Street at St Bernard Street	Ground surface	No release to surface water	5/17/2014	5:45 AM			1,000,000	Rain event. Revoli Construction installed a temporary connection that was undersized and restricted flow cuasing SSO to exit manhole and run down the street before infiltrating the ground. Sewage also entered a few basements of surrounding properties.	Surcharging subsided with rain event. City met to discuss measures to be taken. Includeded better plans for temporary connections to be provided by Revoli Construction.
	65 Fredette Street	Ground; CB and 5,230' (MS4) to reciving water	Nashua River	2/12/2014	5:00 PM			5,000	Sewer system blockage of 8 inch VC pipe in street lead to backup in property basement which was pumped into driveawy and eventually entered a catch basin which brought it to the Oak Hill Road bridge outfall.	Vac truck cleared blockage. Collections crew cleaned pipe and checked it the following day.
	75 Walnut Street	Direct to receiving water	North Nashua River	1/11/2014		1/29/2014		1,800	Sewer system collapse; Large block of ice knocked manhole off its base in river. Private lateral assumed to come loose concurrently.	Blue Diamond Construction hired to fix manhole. Lateral reconnected on 1/29/2014
2013	66 Thorndike Street	Backup into basement; Ground surface		12/16/2013	10:30 AM			500	Sewer system blockage in street due to 8 inch VC pipe collapse. Plumber bailed 500 gallons into backyard where it percolated into ground underneath snow.	Vac truck cleared blockage. Excavation planned to repair pipe in following days.
	Regulator 036 at 98 Laurel Street	CB and 1000' of pipe (MS4) to receving water	Nashua River	9/22/2013	5:15 AM			50,000	Rain event; insufficient capacity. During combined sewer seperation regulator was closed too soon; not enough capacity in downstream pipe. Sewer manhole cover popped off, crew arrived after event was over.	Short term fix included openeing regulator and installing meter. Long term fix included more catch basin seperation.
	905 Merriam Ave, Pizzaria Uno, Twin City Plaza	Ground surface; wetland area		6/11/2013	7:45 AM	6/11/2013	11:30 AM	81,000	Sewer sysytem blockage of 12 inch dishcharge pipe due to rocks, grease, and rags.	Two 3 inch trash pumps setup to stop SSO. 6 inch pump installed to bypass problem manhole. Surcharging in system relieved. Problem manhole is isolated and blockage is cleared.
	58 St Andrew Street	Backup into property basement		5/22/2013	7:00 AM			200	Rain event; Sewer system blockage due to grease and a root intrusion.	Blocakge cleared with jetter and roots were cut out. Line CCTV'd following incident.
	Pole 55, Oak Hill Road	Ground surface	No release to surface water	4/29/2013	9:15 AM			125	Sewer system blockage due to grease from Oak Hill Country Club. SSO flowed for 75 ft along side of road eventually percolatinginto ground at low point.	Blockage was cleared. City scheduled to visit pipe to clean, jet and CCTV in the following months. Notified OHCC to be diligent about semi-annual pump outs.

APPENDIX B

Outfall Inventory and Ranking

City of Fitchburg, Massachusetts
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Appendix B - Outfall Inventory and Prioritization Matrix

ID Number	Origin ID	Type	Diameter	Material	Section	Picture	Location	Drains To	Notes
C357		Drop Inlet			C3	357	Across from 520 Fairmount St	North Nashua River MA81-01	
C393		Inlet	18"	RCP	C3	421,422	South End of North Detention Pond at intersection of Victoria Lane and Ropers Rd	BMP/Sawmill Pond	
C414		Inlet	12"	PVC	C4	146	Detention pond behind 349 Lunenburg St South side	Falulah Brook	Outfall / inlet / culvert ? overgrown
C226		Inlet	24"	RCP	C2	85, 86	Between 983(Competitive Edge Hocky store) and 1001-1039 (Maplecrest Manor) John Fitch Highway	Falulah Brook MA81-63	Inlet, covered by a cage which was covered in debris, no flow
C488		Inlet	8"	RCP	C4	233	Behind Parkinglot of North Street on FSU Campus, Across from Weston Auditorium	Falulah Brook MA81-63	
C207		Inlet	24"	HDPE	C2	41	Charter School Parking lot, brook at south side of field, near Rindge x Ashbystate Rotary	Falulah Brook MA81-63	
C221		Inlet	24"	CI	C2	71,72	Behind 628 Rindge Rd	Greene's Pond/Falulah Brook MA81-63	Very Overgrown
C604		Inlet	12"	RCP	C6	561	Next to 30 Glen Ave	Monoosnoc Brook	
C489		Inlet	2' x 3'	Stone	C4	234	Behind 134 Mechanic St at end of Brook	Nicholas Brook	
C382		Inlet	2'x3'	Stone	C3	401,402	Across from 1 Overland	North Nashua River	Inlet to culvert with drainage sewer tie ins
C339		Inlet	12"	HDPE	C3	297	Across from 91 Wallace Rd South of Detention Pond	North Nashua River MA81-02	
		Inlet	3' x 2'	Stone	C3	295	Behind 125 Wallace Rd	North Nashua River MA81-02	
		Inlet			C3	344	Behind 601 River St	North Nashua River MA81-02	
N/A		Inlet		Stone	C2	95-101	Under Inteserction of Elm St and High St	North Nashua River MA81-02	Underground tunnel with several VC pipes
C398		Inlet			C3	429,430	Behind 41 Arlington St	North Nashua River MA81-02	Buried in Swamp
C3100		Inlet		Stone	C3	432	Behind 18 Chesnut St	North Nashua River MA81-02	
C3107		Inlet	30"	RCP	C3	442	Between 330 and 372 Franklin Rd	North Nashua River MA81-02	
C3130		Inlet		RC	C3	476	Next to 72 Beech St	North Nashua River MA81-02	Concrete Drop Inlet
C3131		Inlet		RC	C3	477	Across from 91 Beech St	North Nashua River MA81-02	Concrete Drop Inlet
C3133		Inlet	8"	PVC	C3	479	In yard of 132 Beech St	North Nashua River MA81-02	
N/A		Inlet	18"	CMP	C6	577	In woods next to 750 Crawford St	North Nashua River MA81-02	
C3108		Inlet	36"	CMP	C3	443	Behind 516 Electric Avenue	Sand Brook	
C3110		Inlet	36"	RCP	C3	448	Intersection of Rollstone Rd and Electirc Aveneue	Sand Brook	
C3117		Inlet	48"	RCP	C3	458	Near Tennis Courts Within Park Hill Park	Sand Brook	
N/A		Inlet			C3	462	North Side of Parkhill Park	Sand Brook	BURIED DISCONNECTED, BLOCKED BY ROCKS
C3121		Inlet	12"	HDPE	C3	465	Around the End of Amoit St	Sand Brook	
C3123		Inlet	12"	HDPE	C3	467	Behind the Shed of 73 Amoit St	Sand Brook	
C3124		Inlet	30"	HDPE	C3	468	South End of Quarry Lane Detion Pond 1 (Closest to Street)	Sand Brook	
C3125		Inlet	24"	HDPE	C3	469,470	North End of Quarry Lane Detion Pond 1 (Closest to Street)	Sand Brook	
C3126		Inlet	24"	HDPE	C3	471,472	North End of Quarry Lane Detion Pond 1 (Closest to Street)	Sand Brook	
C504		Inlet	18"	PVC	C5	491, 492	Bray Ave South Deteniton Pond	Sawmill Pond	
C509		Inlet	12"	HDPE	C5	488, 489	Bray Ave North Detention Pond	Sawmill Pond	
C529		Inlet	18"	RCP	C5	528, 529	Detention pond East end of Sarah Lane (Next to 69 Sarah Lane)	Shea Brook	
C523		Inlet	12"	RCP	C5	523	Swale Parellel to South Protion of Shea St	Shea Brook	
C524		Inlet	12"	RCP	C5	524	Swale Parellel to South Protion of Shea St	Shea Brook	
N/A		Inlet	12"	RCP	C3	408,409	Intersection of Westminister St and Industrial Rd (Under Westminister)	Snows Millpond	
		Inlet						Unnamed Pond off Townsend St	
C215		Inlet	12"	RCP	C2	53	Behind 205 and 221 Will Thompson Way	Unnamed Trib to Falulah Brook MA81-63	Inlet, partially buried, no flow
C542		Inlet	18"	HDPE	C5	551	Detention Pond Behind 32 Goodfellow Dr	Unnamed Trib to Monoosnoc Brook	
C605		Inlet		Stone	C6	562	Next to 399 Wanoosnos Rd	Unnamed Trib to Monoosnoc Brook	
C3104		Inlet	12"	RCP	C3	439	Instersection of Depot St and Franklin Rd	Unnamed Trib to North Nashua River MA81-01	
C461		Inlet	24"	VC	C4	207	Near Intersection of Romano Ave and South St, West side in the woods	Unnamed Trib to North Nashua River MA81-02	
C463		Inlet	36"	RCP	C4	209	Near Intersection of Electric Ave and South St, NW side	Unnamed Trib to North Nashua River MA81-02	
C466		Inlet	48"	RCP	C4	211	Across from 49 Hobson St	Unnamed Trib to North Nashua River MA81-02	
C467		Inlet	8"	VC	C4	212	End of Capone St	Unnamed Trib to North Nashua River MA81-02	
C437		Inlet	36"	RCP	C4	171	Near Intersection of Water St and Bemis Rd, SE side	Unnamed Trib to North Nashua River MA81-02	
C307		Inlet	12"	PVC	C3	250,251	West Side of Detention Pond at end of Valley View Court	Unnamed Trib to North Nashua River MA81-02	
C308		Inlet	12"	PVC	C3	250,251	West Side of Detention Pond at end of Valley View Court	Unnamed Trib to North Nashua River MA81-02	Directly Below C307
C397		Inlet		Stone	C3	426	Near Intersection of Caldwell and Arlington St	Unnamed Trib to North Nashua River MA81-02	Hole in the ground (possibly collapsed stone culvert inlet?)
C609		Inlet	3'x3'	Stone	C6	571	Behind 129 Rodiman Ave	Unnamed Trib to North Nashua River MA81-02	
C611		Inlet	3'x3'	Stone	C6	573	Dam of Patton St Pond	Unnamed Trib to North Nashua River MA81-02	
C366		Inlet	36"	RCP	C3	371, 374	Next to 568 Ashburnham St.	Unnamed Trib to Phillips Brook	
C238		Inlet	12"	RCP	C2	122,123	In Detention Pond Behind 12 Macintosh Lane East Side	Unnamed Trib to Townsend Road Pond	
C242		Inlet	12"	RCP	C2	125	In Detention Pond Behind 122 Macintosh Lane North End	Unnamed Trib to Townsend Road Pond	
C521		Inlet	36"	RCP	C5	521	In woods at the end of Authority Dr	Wymans Brook	
C429	4408	Outfall	12"	RCP	C4	P4	In brook benind Jonh Fitch Highway Across from St Bernand Athletic Fields	Baker Brook	
C428	4409	Outfall	12"	RCP	C4	P3	In brook benind Jonh Fitch Highway Across from St Bernand Athletic Fields	Baker Brook	
	4410	Outfall			C4		Supposidly behind 264 John Fitch Highway (Fitchburg Car Wash)	Baker Brook	Not Found, likley doesn't exist, possible buried or overgrown
C427	4411	Outfall	30"	RCP	C4	159,159_B	In brook behind 314 John Fitch Highway (Chevy Dealership)	Baker Brook	
C424	4412	Outfall	8"	VC	C4	P1	In brook behind 334 John Fitch Highway (McDonalds)	Baker Brook	
C423	4413	Outfall	18"	CMP	C4	P2	In brook behind 334 John Fitch Highway (McDonalds)	Baker Brook	
C421	4415	Outfall	18"	RCP	C4	154	In brook behind 406 John Fitch Highway (Aarons)□	Baker Brook	
C422	4416	Outfall	12"	RCP	C4	156	In brook behind 380 John Fitch Highway (Urgent Care)	Baker Brook	
C425		Outfall	18"	RCP	C4	157	In brook behind 334 John Fitch Highway (McDonalds)	Baker Brook	
C426		Outfall	6"	VC	C4	158,158_B	In brook behind 334 John Fitch Highway (McDonalds)	Baker Brook	
C420		Outfall	18"	RCP	C4	155	In brook behind 420 John Fitch Highway (Enterprise Bank)	Baker Brook	
C431		Outfall			C4		In swale near the end of Ray Ave	Baker Brook	Completetly submerged
C430		Outfall	12"	RCP	C4	162	In brook next to 130 John Fitch Highway (Carstar)	Baker Brook	
C391		Outfall	18"	RCP	C3	419	NE Corner of SW detention Pond at intersection of Victoria Lane and Ropers Rd	BMP/Sawmill Pond	
C392		Outfall	6"	PVC	C3	420	At the end of Swail SW of the SW detention Pond	BMP/Sawmill Pond	For drainage of Detenion Pond
C394		Outfall	6"	PVC	C3	423	East side of North Detenion Pond at intersection of Victoria Lane and Ropers Rd	BMP/Sawmill Pond	
C395		Outfall	12"	?	C3	424	North Side of North Deteniton Pond at intersection of Victoria Lane and Ropers Rd	BMP/Sawmill Pond	Submerged
C396		Outfall	12'	RCP	C3	425	North Side of Detetion Pond at interstion of Victoria lane and Game on way	BMP/Sawmill Pond	Half Buried

C208	3303	Outfall	12"	RCP	C2	42	Greens Pond Bridge, Ashbystate Rd, NW side □	Falulah Brook MA81-63	Outflow, Clear, flow□
C209	3304	Outfall	12"	CMP	C2	43	Greens Pond Bridge, Ashbystate Rd, NE side □	Falulah Brook MA81-63	Outflow, Clear, Hidden from view by vegataion□
C210	3305	Outfall	12"	PVC	C2	44	Fisher Rd Bridge SW side, easily visable□	Falulah Brook MA81-63	Outflow, Clear, flow
	3307	Outfall	18"	CMP	C2		Lower Rindge Rd	Falulah Brook MA81-63	On Plans, Not found in field
C218	3403	Outfall	12"	RCP	C2	61, 62	John Fitch Highway NE side of bridge between Will Thompson way and Pearl Hill Rd□	Falulah Brook MA81-63	Outflow, Clear, flow
C219	3404	Outfall	24"	VC	C2	59	North side underneath Pearl Hill Rd Bridge□	Falulah Brook MA81-63	Outflow, Clear, flow
C220	3405	Outfall	24"	RCP	C2	60	South side underneath Pearl Hill Rd Bridge	Falulah Brook MA81-63	Outflow, Clear, flow
C416	4205	Outfall	18"	RCP	C4	149	In brook on North Side of Parkinglot at John Fitch Plaza	Falulah Brook MA81-63	
C418	4206	Outfall	4"	PVC	C4	152	In brook behind 528 John Fitch Highway (Peerless Liquors)	Falulah Brook MA81-63	Buried but not blocked
C419	4207	Outfall	10"	PVC	C4	153	In brook behind 560 John Fitch Highway (Mad Vapes/Fitchburg Tatoo)	Falulah Brook MA81-63	
C412	4208	Outfall	12"	RCP	C4	145	Downstream of Lunenburg St Bridge East Side	Falulah Brook MA81-63	
C411	4209	Outfall	30"	RCP	C4	144	Downstream of Lunenburg St Bridge West Side	Falulah Brook MA81-63	
C406	4213	Outfall	30"	RCP	C4	139	Downstream of Coolidge Park Bridge (East Bank) behind 146 Buttrick Ave	Falulah Brook MA81-63	Hidden by vegitation
C404	4214	Outfall	36"	RCP	C4	136	Downstream of Coolidge Park Bridge (West Bank)	Falulah Brook MA81-63	
C405	4215	Outfall	36"	RCP	C4	138	Downstream of Coolidge Park Bridge (West Bank) behind 197 Townsend St	Falulah Brook MA81-63	
C401	4216	Outfall	30"	RCP	C4	134	Upstream of coolodge park Bridge (West Bank)	Falulah Brook MA81-63	
C403	4217	Outfall	18"	RCP	C4	137	Upstream of coolodge park Bridge (East Bank)	Falulah Brook MA81-63	Almost completely buried, hidden by vegitation
C228	4222	Outfall	12"	VC	C2	91	East side of river, off of trail in Coolidge Park (North of new dog park) in line with interesction of Oakwood Ave and East Prospect St.	Falulah Brook MA81-63	Outflow, partially buried, no flow
C227	4223	Outfall	12"	HDPE	C2	90	West side of river, off of trail in Coolidge Park (North of new dog park) in line with interesction of Oakwood Ave and East Prospect St.	Falulah Brook MA81-63	Outflow, Clear, no flow
C402		Outfall	12"	HDPE	C4	135	Upstream of coolodge park Bridge (West Bank)	Falulah Brook MA81-63	
C417		Outfall	12"	RCP	C4	151	In brook on North Side of Parkinglot at John Fitch Plaza	Falulah Brook MA81-63	Completely buried
C101		Outfall	12"	RCP	C1	9,10	Under bridge just North of Intersection of Scott and Ridge Rd, NE side visable from top	Falulah Brook MA81-63	
C102		Outfall	24"	RCP	C1	13,14	In the woods behind 839 and 930 ridge Rd, west side of road	Falulah Brook MA81-63	
C103		Outfall	6"		C1	12	In woods directly behind pump building on ridge Rd Upstream of C102	Falulah Brook MA81-63	
C104		Outfall	6"	CI	C1	11	40 Feet Upstream of C103	Falulah Brook MA81-63	
C105		Outfall	6"		C1	15	90 Feet Upstream of C103	Falulah Brook MA81-63	
C106		Outfall	12"	CI	C1	16,17	200 Feet Upstream of C103	Falulah Brook MA81-63	Capped, No Discharg
C205		Outfall	24"	RCP	C2	37	In woods behind 709 and 697 Ridnge Rd	Falulah Brook MA81-63	
C233		Outfall	12"	HDPE	C2	129	Lower Rindge Rd (South End Near Mckay School)	Falulah Brook MA81-63	Inside Large Tuneel/Culvert
C232		Outfall	6"	CMP	C2	130	Lower Rindge Rd	Falulah Brook MA81-63	
C231		Outfall	6"	CMP	C2	131	Lower Rindge Rd	Falulah Brook MA81-63	
C230		Outfall	12"	RCP	C2	107	Lower Rindge Rd	Falulah Brook MA81-63	Buried
		Outfall						Falulah Brook MA81-63	
C211	3308	Outfall	12"	VC	C2	45	Inside culvert near intersection of Richardson Rd and Richardson Dr, inside Manhole□	Falulah Brook MA81-63	Outflow, Clear, flow□
C212	3309	Outfall	12"	VC	C2		Inside culvert near intersection of Richardson Rd and Richardson Dr, upstream of Manhole□	Falulah Brook MA81-63	Outflow, Clear, flowOutflow, Clear, flow□
C407	4210	Outfall	30"	RCP	C4	140	Detention Pond at Aimee's Way NE Corner	Falulah Brook MA81-63	
C408	4211	Outfall	30"	RCP	C4	142	Detention Pond at Aimee's Way SE Corner	Falulah Brook MA81-63	
C409	4212	Outfall	12"	PVC	C4	141	Detention Pond at Aimee's Way SW Corner	Falulah Brook MA81-63	
C223		Outfall	48"	RCP	C2	76	John Fitch Highway SE of La Bella Pizza on SE corner of Bridge	Falulah Brook MA81-63	Not indicated on plans. Outflow, Clear, flow, Not visible from road, Angled down from road into river
C225		Outfall	18"	PVC	C2	84	Between 983(Competitive Edge Hocky store) and 1001-1039 (Maplecrest Manor) John Fitch Highway	Falulah Brook MA81-63	Outlfow, half submerged, flow
C224		Outfall	6"	PVC	C2	83	Between 983(Competitive Edge Hocky store) and 1001-1039 (Maplecrest Manor) John Fitch Highway	Falulah Brook MA81-63	Outflow, clear, no flow
C229		Outfall	12"	HDPE	C2	102	Intersection of Blossom St. and Mt.Vernon St.	Falulah Brook MA81-63	Clearly visible
C222		Outfall	24"	RCP	C2	73	On hillside in fron of Burbank Hospital, near top of hill	Falulah Brook MA81-63	
C234		Outfall	12"	VC	C2	115	Marden St, near intersection with Townsend St (Near Eastwood Club)	Falulah Brook MA81-63	Inside Culvert
C235		Outfall	12"	VC	C2	112	Marden St, near intersection with Townsend St (Near Eastwood Club)	Falulah Brook MA81-63	Inside Culvert
C236		Outfall	12"	RCP	C2	108	Marden St, near intersection with Townsend St (Near Eastwood Club)	Falulah Brook MA81-63	Inside Culvert
C515	2306	Outfall	12"	RCP	C5	511	SW side of Old Turpike Rd Bridge (Buried under Thorn Bush)	Flag Brook	
C512	2307	Outfall	36"	RCP	C5	505	Across from 375 Princton Rd	Flag Brook	
C511	2312	Outfall	15"	VC	C5	504	Across from 375 Princton Rd	Flag Brook	
C513	2313	Outfall	36"	CMP	C5	506	Across from 407 Princeton Rd	Flag Brook	
C514	2314	Outfall	12"	RCP	C5	508	Across from 407 Princeton Rd	Flag Brook	
C206		Outfall	24"	RCP	C2	70	Aproximatly 50 yards west of Greens Pond Damn	Greene's Pond/Falulah Brook MA81-63	Overgrown, not seen from road
C603		Outfall	12"	RCP	C6	588	Next to 30 Glen Ave	Monoosnoc Brook	
C375	1404	Outfall	18"	VC	C3	389-391	Behind 179 Westminister St	North Nashua River MA81-01	Concealed by debris but not blocked
C356	1405	Outfall	12'	RCP	C3	352	Intersection of Fairmount St and Liberty Cir (North)	North Nashua River MA81-01	
C355	1406	Outfall	12"	RCP	C3	354	Intersection of Fairmount St and Liberty Cir (North)	North Nashua River MA81-01	
C354		Outfall	48"	RCP	C3	349, 350	Across from 753 River St	North Nashua River MA81-01	Starts as 4' x 4' culvert outflows as 48" RCP
C353		Outfall	12"	DI	C3	348	Across from 753 River St	North Nashua River MA81-01	
C358		Outfall	3' x 3'	Stone	C3	364	Below SW corner of Munksjo building in wall next to river	North Nashua River MA81-01	
C359		Outfall	12"	DI	C3	358	Depot St Bridge South Side	North Nashua River MA81-01	
C360		Outfall	8"	DI	C3	361	Depot St Bridge North Side	North Nashua River MA81-01	
C375		Outfall	18"	VC	C3	389,390	Behind 179 Westminister St	North Nashua River MA81-01	Covered in debris. but not blocked
C376		Outfall	12"	HDPE	C3	392	In the wood between 46 and 45 Hartland Ave (past the end of the street)	North Nashua River MA81-01	
C377		Outfall	12"	HDPE	C3	393	In the wood between 46 and 45 Hartland Ave (past the end of the street)	North Nashua River MA81-01	
C379		Outfall	8"	CI	C3	396	Across from 490 Westminister St	North Nashua River MA81-01	
C381		Outfall	2'x3'	Stone	C3	398	Across from 490 Westminister St	North Nashua River MA81-01	Culvert + Outfall
C380		Outfall	30"	RCP	C3	399,400	Across from 490 Westminister St	North Nashua River MA81-01	
C3101		Outfall			C3	N/A	Across from 520 Fairmount St (Assumed)	North Nashua River MA81-01	Not found either tied into C357 or submerged in Detion Pond

C3102		Outfall	18"	HDPE	C3	433	Behind 68 Bilotta Way in North Detention Pond	North Nashua River MA81-01	
C3103		Outfall	18"	HDPE	C3	438	Behind 76 Bilotta Way in South Detention Pond	North Nashua River MA81-01	
C3105		Outfall	18"	HDPE	C3	440	In the wood west of Appleton Circle on hillside	North Nashua River MA81-01	Half Buried
C319	1201	Outfall	8"	VC	C3	269	River St Bridge @ Wallace Rd, East Side Downstream	North Nashua River MA81-02	
C320	1201	Outfall	12"	VC	C3	270	River St Bridge @ Wallace Rd, East Side Downstream	North Nashua River MA81-02	
C351	1207	Outfall	18"	HDPE	C3	336	Detion Pond in center of Bishop Rd	North Nashua River MA81-02	
C352	1208	Outfall	18"	HDPE	C3	337	Detion Pond in center of Bishop Rd	North Nashua River MA81-02	Half buried
C321	1210	Outfall	12"	VC	C3	271	River St Bridge @ Wallace Rd, West Side Downstream	North Nashua River MA81-02	
C322	1211	Outfall	12"	VC	C3	272	River St Bridge @ Wallace Rd, West Side Downstream	North Nashua River MA81-02	
C343	1406	Outfall	3' x 3'	Stone	C3	302	Across from 601 River St North bank of Nashua River	North Nashua River MA81-02	
C347	1407	Outfall	18"	HDPE	C3	321	Detention Pond Next to 26 Castle Rd	North Nashua River MA81-02	
C348	1408	Outfall	18"	HDPE	C3	322	Detention Pond Next to 26 Castle Rd	North Nashua River MA81-02	
C349	1409	Outfall	4"	PVC	C3		Detention Pond Behind 208 Bishop Rd	North Nashua River MA81-02	NOT FOUND, Possibly overgrown or buried
C350	1410	Outfall	18"	HDPE	C3	332	Detention Pond Behind 208 Bishop Rd	North Nashua River MA81-02	
C329	1411	Outfall	12"	DI	C3	283	Underneath Daniels St Bridge	North Nashua River MA81-02	
C481	4106	Outfall	36"	HDPE	C4	225	Underneath Old Rollstone Street Bridge South Side	North Nashua River MA81-02	
C480	4107	Outfall	12"	VC	C4	227	Underneath Old Rollstone Street Bridge North Side	North Nashua River MA81-02	
C479	4108	Outfall	24"	VC	C4	226	Underneath Old Rollstone Street Bridge South Side	North Nashua River MA81-02	
C476	4109	Outfall	12"	PVC	C4	218	Across river from DPW Parkinglot (End of Broad St)	North Nashua River MA81-02	
C477	4110	Outfall	72"	RCP	C4	219	Across river from DPW Parkinglot (End of Broad St) Just Downstream of C476	North Nashua River MA81-02	
C478	4111	Outfall	12"	RCP	C4	220	Along river at DPW Parkinglot (End of Broad Street) Across and downstream from C477 (Covered in Bamboo)	North Nashua River MA81-02	
C457	4311	Outfall	18"	HDPE	C4	202	Riverfront Park off Boulder Dr, Downstream of Bridge East Bank Hidden by Bamboo	North Nashua River MA81-02	
C456	4312	Outfall	18"	DI	C4	201	Riverfront Park off Boulder Dr, Downstream of Bridge West Bank	North Nashua River MA81-02	Overflow pipe for CSO 007
C459	4313	Outfall	6"	VC	C4	204	Riverfront Park off Boulder Dr, within bridge abutment on upstream West side	North Nashua River MA81-02	SEALED SHUT BY CEMENT / GROUT
C453	4403	Outfall	6"	RCP	C4	197,198	NW side of Water Street Bridge Behind tall grass	North Nashua River MA81-02	
C432	5201	Outfall	48"	RCP	C4	163	Behind 68 Airport Rd, in swail hidden by dense Bamboo	North Nashua River MA81-02	
C434	5202	Outfall	48"	RCP	C4	170	On Nasua River bank behind 135 Intervale Rd	North Nashua River MA81-02	Dense bamboo
C454		Outfall	8"	DI	C4	196	Underneath Fifth St Bridge, hidden by bamboo	North Nashua River MA81-02	
C455		Outfall	66"	RCP	C4	200	Just Downstream of Laurel St Bridge, West Bank	North Nashua River MA81-02	
C458		Outfall	18"	HDPE	C4	203	Riverfront Park off Boulder Dr, Downstream of Bridge Adjacent to C457	North Nashua River MA81-02	
C460		Outfall	48"	RCP	C4	206	Riverfront Park off Boulder Dr. Couple hundred ft East of steel / wood bridge	North Nashua River MA81-02	
C482		Outfall	12"	DI	C4	228	Underneath New Rollstone Street Bridge South Side	North Nashua River MA81-02	
C487		Outfall	12"	HDPE	C4	232	Underneath Circle St Bridge North Side	North Nashua River MA81-02	
C486		Outfall	18"	HDPE	C4	231	Underneath Circle St Bridge North Side	North Nashua River MA81-02	
C485		Outfall	4"	VC	C4	230	Underneath Circle St Bridge North Side	North Nashua River MA81-02	
C484		Outfall	12'	VC	C4	229	Underneath Circle St Bridge North Side	North Nashua River MA81-02	
C475		Outfall	12'	CMP	C4	236	At the end of Kimball St Sewer Easememnt (Bewteen Intersections with Putnam and Franklin)	North Nashua River MA81-02	
C323		Outfall	12"	CMP	C3	273	River St Bridge @ Wallace Rd, West Side Underneath	North Nashua River MA81-02	
C325		Outfall	24"	RCP	C3	277	Kimball St Bridge (between rotary and Cleghorn St) East Side Upstream	North Nashua River MA81-02	
C324		Outfall	12"	DI	C3	275	Kimball St Bridge (between rotary and Cleghorn St) East Side Underneath	North Nashua River MA81-02	
C326		Outfall	12"	HDPE	C3	278, 280	Off the West Side of Cleghorn street Between Kimball and Federal Street	North Nashua River MA81-02	
C327		Outfall	18"	CMP	C3	279, 280	Off the West Side of Cleghorn street Between Kimball and Federal Street Right Below C326	North Nashua River MA81-02	
C328		Outfall	18"	CMP	C3	281, 282	Intersection of Cleghorn St and Federal St	North Nashua River MA81-02	
C330		Outfall	3' x 3'	Stone	C3	284. 285	Underneath Daniels St Bridge	North Nashua River MA81-02	
C333		Outfall	48"	RCP	C3	288	Underneath Oak Hill Rd Bridge South Side	North Nashua River MA81-02	
C334		Outfall	48"	RCP	C3	289	Underneath Oak Hill Rd Bridge South Side	North Nashua River MA81-02	Disconnected, old CSO overflow
C332		Outfall	8"	VC	C3	289	Underneath Oak Hill Rd Bridge North Side	North Nashua River MA81-02	
C331		Outfall	1' x 2'	Stone	C3	290	Behind East side of 408 River St	North Nashua River MA81-02	
C338		Outfall	12"	CMP	C3	296	Across from 91 Wallace Rd North West of Detention Pond	North Nashua River MA81-02	
C336		Outfall	12"	VC	C3	292	Between 25 and 41 Almount St	North Nashua River MA81-02	
C342		Outfall	12"	RCP	C3	301	Upstream of brook that enters Nashua next to Railroad bridge at Southern intersection of Wallace and River	North Nashua River MA81-02	
C345		Outfall	12"	RCP	C3	304	South bank of Nashua River across from East side of 644 River St (Far behind 389 Fairmount St)	North Nashua River MA81-02	
C341		Outfall	2' x 2'	Stone	C3	318,19,20	Straight down towards river from hole in the wall	North Nashua River MA81-02	
C433		Outfall	12"	HDPE	C4	164	Behind 68 Airport Rd, in swail hidden by dense Bamboo	North Nashua River MA81-02	
C440		Outfall	3'x3'	RCP	C4	175,176	Downstream of C438, on downstream face of Damn	North Nashua River MA81-02	On face of Damn, Obscured by waterfall
C439		Outfall	60"	RCP	C4	173,174	Behind 480 Water St, downstream of railroad bridge	North Nashua River MA81-02	
C441		Outfall	8"	RCP	C4	178	In woods SE of Intersection of Water St and John T Centrino Memorial Dr	North Nashua River MA81-02	Downstream C442
C442		Outfall	3'x3'	RCP	C4	179	In woods SE of Intersection of Water St and John T Centrino Memorial Dr	North Nashua River MA81-02	
C443		Outfall	8"	RCP	C4	182	End of Sawyer Passway at NE side of bridge Abutment	North Nashua River MA81-02	Possibly Private
C444		Outfall	72"	RCP	C4	183	In Nashua River Upstream of C444, Downstream of Rail Road Bridge	North Nashua River MA81-02	Upstream of C443
C445		Outfall	12"	CI	C4	180,181	In Nashua River near corner of First St and Railroad St	North Nashua River MA81-02	
C447		Outfall	24"	VC	C4	190	Under Water St Bridge at Central Plaza North Side	North Nashua River MA81-02	
C446		Outfall	24"	VC	C4	184	Under Water St Bridge at Central Plaza South Side	North Nashua River MA81-02	
C448		Outfall	12"	RCP	C4	185	North Side of Walnut St	North Nashua River MA81-02	SW Side of Bridge
C449		Outfall	12"	VC	C4	186	North Side of Walnut St	North Nashua River MA81-02	
C450		Outfall	12"	VC	C4	187	North Side of Walnut St	North Nashua River MA81-02	
C451		Outfall	12"	VC	C4	188	North Side of Walnut St	North Nashua River MA81-02	
C452		Outfall	12"	RCP	C4	189	North Side of Walnut St	North Nashua River MA81-02	Farthest From Bridge
C301		Outfall	2'x3'	Stone	C3	237	Under River st Bridge at Intersection with Main St (by KC's Pub) North Side	North Nashua River MA81-02	
C303		Outfall	18"	DI	C3	239	Under River st Bridge at Intersection with Main St (by KC's Pub) South Side	North Nashua River MA81-02	
C302		Outfall	18"	DI	C3	238	Under River st Bridge at Intersection with Main St (by KC's Pub) North Side	North Nashua River MA81-02	
C304		Outfall	12"	VC	C3	242,243	Upstream of C303 North Side of River	North Nashua River MA81-02	Completely Burried and Overgrown
C309		Outfall	12"	VC	C3	254	Instersection of West St and Sheldon St Downstream	North Nashua River MA81-02	
C310		Outfall	12"	VC	C3	255	Instersection of West St and Sheldon St Downstream	North Nashua River MA81-02	
C311		Outfall	8"	RCP	C3	260	Underneath Sheldon St Bridge	North Nashua River MA81-02	

C312		Outfall	18"	VC	C3	261	Underneath Sheldon St Bridge	North Nashua River MA81-02	
C313		Outfall	12"	RCP	C3	262	Underneath Sheldon St Bridge	North Nashua River MA81-02	
C314		Outfall	12"	VC	C3	263	In Nashua River near abandoned Pedestrian bridge behind 1428 Main St	North Nashua River MA81-02	
C315		Outfall	12"	DI	C3	264	In Nashua River near abandoned Pedestrian bridge behind 1428 Main St	North Nashua River MA81-02	Possible Outfall, Facing Upstream
C316		Outfall	12"	DI	C3	265	In Nashua River near abandoned Pedestrian bridge behind 1428 Main St	North Nashua River MA81-02	
C317		Outfall	18"	HDPE	C3	266	Parking Lot of 1428 Main St	North Nashua River MA81-02	
C318		Outfall	18"	HDPE	C3	267	Parking Lot of 1428 Main St	North Nashua River MA81-02	Empties Into Catch Basin
C399		Outfall		Stone	C3	431	Behind 18 Chesnut St	North Nashua River MA81-02	
C3129		Outfall	15"	VC	C3	475	Behind 249 Kimball St (covered in Dense Bamboo)	North Nashua River MA81-02	NEARLY BURIED
C3132		Outfall	8"	CPP	C3	478	In yard of 132 Beech St	North Nashua River MA81-02	
C613		Outfall			C6	575	Intersection of Crawford St and Airport Blvd	North Nashua River MA81-02	Could Not Access due to fence
		Outfall						North Nashua River MA81-02	
C369	1303	Outfall	18"	RCP	C3	381	Underneath Mctaggards Damn Bridge on Sanborn St	Phillips Brook	
C371	1304	Outfall	8"	VC	C3	P7	Along Westminister Hill Rd between Sanborn St and Baltic Lane (Best observed from Canyon)	Phillips Brook	
C372	1305	Outfall	12"	CMP	C3		Along Westminister Hill Rd between Sanborn St and Baltic Lane (Best observed from Canyon)	Phillips Brook	
C361		Outfall	12"	RCP	C3	368, 369	Westminster St Bridge over Phillips Brook	Phillips Brook	Water goes into big box contraption water outflows from hole in wall into river
C362		Outfall	24"	RCP	C3	367	Westminster St Bridge over Phillips Brook	Phillips Brook	Potential disconnected CSO Overflow
C363		Outfall	12'	RCP	C3	366	Westminster St Bridge over Phillips Brook	Phillips Brook	
C374		Outfall	12"	VC	C3	388□	In the woods near 153 Sanborn St (Upstream from house)	Phillips Brook	Half buried
C529		Outfall	12"	PVC	C5	532	Next to 62 Anita Dr	Sand Brook	
C530		Outfall	12"	PVC	C5	533	Next to 62 Anita Dr	Sand Brook	
C535		Outfall	12"	PVC	C5	539	Off Watt's Way @ Eleanor St In Detention Pond	Sand Brook	
C534		Outfall	20"	PVC	C5	537	Off Watt's Way @ Eleanor St In Detention Pond	Sand Brook	
C536		Outfall	10"	PVC	C5	541	Off Watt's Way @ Eleanor St In Detention Pond	Sand Brook	
C537		Outfall	18"	RCP	C5	542	Detention Pond Across from 15 Carrie Ann Lane	Sand Brook	
C538		Outfall	18"	RCP	C5	544	Detention Pond Across from 15 Carrie Ann Lane	Sand Brook	
C3109		Outfall	36"	RCP	C3	445	Next to 242 Rollstone Rd	Sand Brook	
C3111		Outfall	8"	RCP	C3	449	Intersection of Rollstone Rd and Electirc Aveneue	Sand Brook	
C3112		Outfall	15"	VC	C3	450	Intersection of Rollstone Rd and Electirc Aveneue	Sand Brook	
C3113		Outfall	24"	RCP	C3	451	Across from 100 Franklin St (next to utility corridor)	Sand Brook	
C3115		Outfall	12"	RCP	C3	453	South End in of Parkhill Park, within stone Channel	Sand Brook	
C3116		Outfall	2'x4'	Stone	C3	454	South End in of Parkhill Park, at the upstream end of stone channel	Sand Brook	Stone Culvert Outfall
C3118		Outfall	18"	PVC	C3	459	In the woods behind 55 Causeway St	Sand Brook	
N/A		Outfall	12"	HDPE	C3	461	In Parkhill Park near Skate Park	Sand Brook	BURIED DISCONNECTED, BLOCKED BY ROCKS
C3120		Outfall	12"	CMP	C3	464	North Side of Parkhill Park (Downstream of C3119)	Sand Brook	
C3122		Outfall	12"	HDPE	C3	466	Behind the Shed of 73 Amoit St	Sand Brook	
C3127		Outfall	24"	HDPE	C3	473	Quarry Lane Detion Pond 2 (Farthest from the Street)	Sand Brook	
C3128		Outfall	12"	CMP	C3	474	In the yard of 96 Wall St	Sand Brook	NO LONGER IN USE
C3114		Outfall	24"	RCP	C3	452	Across from 100 Franklin St (next to utility corridor)	Sand Brook	
C503	2308	Outfall	18"	PVC	C5	P10	Bray Ave South Deteniton Pond	Sawmill Pond	
C508	2309	Outfall	24"	HDPE	C5	487	Bray Ave North Detention Pond	Sawmill Pond	
C505		Outfall	18"	PVC	C5	490	Just Outside Bray Ave South Deteniton Pond (Outfall for C504 Inlet)	Sawmill Pond	
C510		Outfall	12"	HDPE	C5	P9	Just Outsdide Bray Ave North Detention Pond (Oufall to C509 Inlet)	Sawmill Pond	
C528	2401	Outfall	18"	RCP	C5	527	Detention pond East end of Sarah Lane (Next to 69 Sarah Lane)	Shea Brook	
C525	2403	Outfall	24"	RCP	C5	525	East End of Pepper St	Shea Brook	
C526		Outfall	42"	HDPE	C5	526	Behind 160 Pepper Rd (Upstream of C525)	Shea Brook	
C527		Outfall	42"	HDPE	C5	526	Behind 160 Pepper Rd (Upstream of C525)	Shea Brook	
C385		Outfall	12"	DI	C3	407	Intersection of Westminister St and Industrial Rd	Snows Millpond	
C386		Outfall	12"	DI	C3	407	Intersection of Westminister St and Industrial Rd	Snows Millpond	
C387		Outfall	12"	DI	C3	407	Intersection of Westminister St and Industrial Rd	Snows Millpond	
C469		Outfall	12"	PVC	C4	214	Around 252 Mt Elam Rd, at beginning of treach running along Laurel Ave	Unnamed Pond off Laurel Ave.	
C204		Outfall	12"	RCP	C2	36	Near North-East side of Saima Park bridge next to 41 Scott Rd	Unnamed Trib to Falulah Brook MA81-63	Possible Culvert
C216	3401	Outfall	6"	PVC	C2	55, 56	Corner of John Fitch and Will Thompson Way	Unnamed Trib to Falulah Brook MA81-63	Outflow, Clear, flow
C217	3402	Outfall	12"	RCP	C2	57	John Fitch Highway, 100ft East of intersection with Will Thompson Way□ John Fitch Highway, 100ft east of intersection with Will Thompson Way□	Unnamed Trib to Falulah Brook MA81-63	Outflow, Clear, no flow
C213		Outfall	12"	VC	C2	48	Fisher Rd, SW of intersection with Pearl Hill Rd. (Into Brook behind house at intersection of Pearl Hill Rd and Fisher Rd upstream of Culvert) □	Unnamed Trib to Falulah Brook MA81-63	Not indicated on plans
C214		Outfall	24"	RCP	C2	52	Behind 205 and 221 Will Thompson Way□	Unnamed Trib to Falulah Brook MA81-63	Outflow, Partially Buried, No Flow□
C107		Outfall	24"	RCP	C1	18,19	15 feet from catchbasin on east side of Rindge Rd, between 1107 amd 1163 Rindge Rd	Unnamed Trib to Falulah Brook MA81-63	
C111		Outfall	24"	HDPE	C1	29	Intersection of Nijal Court and Rindge Rd, SE Corner, in the side of slope	Unnamed Trib to Falulah Brook MA81-63	
C112		Outfall	6"	HDPE	C1	28	North side of detetnion pond off Nijal Court	Unnamed Trib to Falulah Brook MA81-63	
C113		Outfall	12"	HDPE	C1	27	South side of detention pond off Nijal Court	Unnamed Trib to Falulah Brook MA81-63	
C108		Outfall	6"	RCP	C1	23	S side of Stoneybrook Rd. next to (3) 36" R.C. culverts□ . next to (3) 36" R.C. culverts	Unnamed Trib to Falulah Brook MA81-63	
C109		Outfall	24"	RCP	C1	24	Behind pump station between 101 and 103 Stoneybrook Rd	Unnamed Trib to Falulah Brook MA81-63	
C201		Outfall	24"	HDPE	C2	30	NW Corner of detention pond behind 513 Richardson Rd	Unnamed Trib to Greene's Pond	
C202		Outfall	24"	HDPE	C2	32.35	NE Corner of detention pond behind 513 Richardson Rd	Unnamed Trib to Greene's Pond	Possible Culvert
C203		Outfall	24"	HDPE	C2	33	Up Stream of brook that enters detention pond behind 513 Richardson Rd in SW cormer	Unnamed Trib to Greene's Pond	
N/A		Outfall	6"	HDPE	C2		Intersection of Kyle Rd and Ashby State Rd	Unnamed Trib to Greene's Pond	
C539		Outfall	15"	HDPE	C5	545	Detention pond behind 112 Goodfellow Dr	Unnamed Trib to Monoosnoc Brook	
C540		Outfall	18"	HDPE	C5	546	Detention pond behind 112 Goodfellow Dr	Unnamed Trib to Monoosnoc Brook	
		Outfall	18"	HDPE	C5		Just outside detention pond behind 112 Goodfellow Dr	Unnamed Trib to Monoosnoc Brook	

C541		Outfall	24"	HDPE	C5	549	Detention Pond Behind 32 Goodfellow Dr	Unnamed Trib to Monoosnoc Brook	
C543		Outfall	18"	HDPE	C5	552	Just Outside Detention Pond Behind 32 Goodfellow Dr	Unnamed Trib to Monoosnoc Brook	
C531		Outfall	15"	PVC	C5	535	Between 105 and 121 Tibbett Circle	Unnamed Trib to Monoosnoc Brook	
C533		Outfall	15"	HDPE	C5	536	Detention pond behind 257 Tibbett Circle	Unnamed Trib to Monoosnoc Brook	
C532		Outfall	8"	PVC	C5	534	Between 105 and 121 Tibbett Circle	Unnamed Trib to Monoosnoc Brook	Outfall for detention pond
N/A		Outfall	36"	RCP	C6	563,564	Next to 60 Nester Ave	Unnamed Trib to Monoosnoc Brook	
C606		Outfall	15"	VC	C6	565	Next to 18 Olin Ave	Unnamed Trib to Monoosnoc Brook	
C607		Outfall			C6	566	Next to 18 Olin Ave	Unnamed Trib to Monoosnoc Brook	COMPLETELY SUBMERGED
		Outfall						Unnamed Trib to Monoosnoc Brook	
		Outfall						Unnamed Trib to Monoosnoc Brook	
C383		Outfall	4"	VC	C3	403	Across from 1 Overland	Unnamed Trib to North Nashua River MA81-01	
C384		Outfall	12"	HDPE	C3	404	Behind 114 Cascade St	Unnamed Trib to North Nashua River MA81-01	
C388		Outfall	48"	CMP	C3	411	In the woods behind Arbor Way	Unnamed Trib to North Nashua River MA81-01	
C389		Outfall	12"	RCP	C3	414	End of Stevens Rd	Unnamed Trib to North Nashua River MA81-01	
C390		Outfall	12"	CMP	C3	413	End of Stevens Rd	Unnamed Trib to North Nashua River MA81-01	
C3106		Outfall	30"	RCP	C3	441	Behind 109 Depot St	Unnamed Trib to North Nashua River MA81-01	
C471	4305	Outfall	12"	VC	C4	P5	Across from 455 Milk St	Unnamed Trib to North Nashua River MA81-02	
C472	4306	Outfall	24"	CMP	C4	P5	Across from 455 Milk St	Unnamed Trib to North Nashua River MA81-02	
C473	4307	Outfall	36"	RCP	C4	P5	Across from 455 Milk St	Unnamed Trib to North Nashua River MA81-02	
C435	5204	Outfall	48"	CMP	C4	167	Behind 88 Benson St	Unnamed Trib to North Nashua River MA81-02	
C462		Outfall	30"	RCP	C4	208	Near Intersection of Romano Ave and South St, Across the Street from C461	Unnamed Trib to North Nashua River MA81-02	
C464		Outfall	36"	RCP	C4	210	Near Intersection of Electric Ave and South St, NE Side	Unnamed Trib to North Nashua River MA81-02	
C465		Outfall	4"	VC	C4	210	Near Intersection of Electric Ave and South St, NE Side	Unnamed Trib to North Nashua River MA81-02	
C468		Outfall	8"	VC	C4	213	Between 106 and 132 Canton St	Unnamed Trib to North Nashua River MA81-02	
C474		Outfall	12"	DI	C4	217	In the woods behind Kingsburry and Colburn St	Unnamed Trib to North Nashua River MA81-02	
C470		Outfall	36"	RCP	C4	216	Across from 455 Milk St (Likley originatates from manhole @ intersection of Hutchinson and Seneca)	Unnamed Trib to North Nashua River MA81-02	3/4 Buried and fully Submerged (Picture P6 before submergence(2002))
C436		Outfall	12"	HDPE	C4	168	Behind 88 Benson St	Unnamed Trib to North Nashua River MA81-02	
C438		Outfall	2'x3'	RCP	C4	172	In woods across from Canton St, South Side of 44 Wanoosnoc Rd	Unnamed Trib to North Nashua River MA81-02	Upstream of C437
C305		Outfall	12"	PVC	C3	247	East Side of Detention Pond at end of Valley View Court	Unnamed Trib to North Nashua River MA81-02	
C306		Outfall	30"	RCP	C3	248	East Side of Detention Pond at end of Valley View Court (Next to C305)	Unnamed Trib to North Nashua River MA81-02	Right Next to C305
C601		Outfall	8"	PVC	C6	556	Next to 234 Wanoosnoc Rd	Unnamed Trib to North Nashua River MA81-02	
C602		Outfall	15"	VC	C6	557	Next to 234 Wanoosnoc Rd	Unnamed Trib to North Nashua River MA81-02	
C610		Outfall	36"	RCP	C6	572	Intersection of Carriageway Dr and Chalmers St	Unnamed Trib to North Nashua River MA81-02	
C612		Outfall	3'x3'	Stone	C6	574	Behind 1426 Water St	Unnamed Trib to North Nashua River MA81-02	
C365		Outfall	12"	DI	C3	370	Next to 62 Stickney Rd	Unnamed Trib to Phillips Brook	
C367		Outfall	36'	RCP	C3	375	Next to 535 Ashburnham St.	Unnamed Trib to Phillips Brook	
C368		Outfall	24"	RCP	C3	378	Behind 365 Ashburham St. (in back yard)	Unnamed Trib to Phillips Brook	Half Buried
C373		Outfall	8"	RCP	C3	385	Near Culvert next to 224 Ashburham St	Unnamed Trib to Phillips Brook	Empties from Catch basin into brook
C378		Outfall	24"	HDPE	C3	394	Detention Pond at the east end of Kaysha Dr	Unnamed Trib to Phillips Brook	
C110		Outfall	36"	RCP	C1	25	In woods between 171 and 183 Stoneybrook Rd	Unnamed Trib to Saima Pond	
C244		Outfall	12"	HDPE	C2	579,580	Underneath Ann Howe Farm Rd Bridge	Unnamed Trib to Saima Pond	
C237		Outfall	6"	RCP	C2	121	In Detention Pond Behind 12 Macintosh Lane North End	Unnamed Trib to Townsend Road Pond	
C239		Outfall	6"	RCP	C2	124	In Detention Pond Behind 12 Macintosh Lane South End	Unnamed Trib to Townsend Road Pond	
C240		Outfall	6"	HDPE	C2	120	Behind 3 Macintosh Lane	Unnamed Trib to Townsend Road Pond	Possible Outfall
C241		Outfall	6"	RCP	C2	126	In Detention Pond Behind 122 Macintosh Lane South End	Unnamed Trib to Townsend Road Pond	
C243		Outfall	16"	RCP	C2	127	Under Driveway of 19 New West Townsend Rd	Unnamed Trib to Townsend Road Pond	
C520	2301	Outfall	15"	RCP	C5	518	In woods at the end of Authority Dr	Wymans Brook	
C519	2302	Outfall	36"	RCP	C5	517	In woods at the end of Authority Dr	Wymans Brook	
C518	2303	Outfall	30"	RCP	C5	516	Intersection of Authority Dr and Development Rd	Wymans Brook	
C517	2304	Outfall	30"	RCP	C5	512	Between 180 and 160 Authority Dr	Wymans Brook	
C516	2305	Outfall	30"	RCP	C5	513	Between 180 and 160 Authority Dr	Wymans Brook	
C522		Outfall	18"	RCP	C5	522	in woods at the end of Authority Dr	Wymans Brook	
		Outfall					Into culvert across Whittemore Street		
C413	4204	Outlet	12"	PVC	C4	47	Detention pond behind 349 Lunenburg St West side	Falulah Brook	Overgrown
N/A		Outlet		Stone	C2	132	Lower Rindge Rd	Falulah Brook	Bridge/Culvert
N/A		Outlet	12"	RCP	C2	105,106	Lower Rindge Rd	Falulah Brook	
N/A		Outlet			C2	103,104	Lower Rindge Rd (North End Near Rotary)	Falulah Brook	
		Outlet			C2	92,93,94	In line with edge of Softball field parking in Coolidge park, Manhole	Falulah Brook MA81-63	Inside Manhole which is clearly visible from trail which goes around Coolidge
		Outlet			C2	87,88,89	Go to Visitor parking on North side of Bella Vista Condominiums, Look NW up the wooded hill and there is a manhole	Falulah Brook MA81-63	Inside manhole on side of hill
N/A		Outlet	36"	RCP	C2	40	Across from 88 Whittemore St Upstream of Charter School	Falulah Brook MA81-63	Partially Buried
N/A		Outlet	6"	RCP	C2	74,75	On hillside in fron of Burbank Hospital, in swail in the middle of hillside	Falulah Brook MA81-63	Flanked by 2 6' HDPE pipes of unkown origin
N/A		Outlet	30ft	CMP	C3	412	Under Arbor way	North Nashua River	Massive CMP Half Pipe Culvert
N/A		Outlet	2'x1'	Stone	C3	416,417	Between 226 and 270 Westminister St	North Nashua River MA81-01	Culvert Dry, wate seeps out of stone wall few feet away
C346	1206	Outlet	18"	HDPE	C3	326	Between 47 and 65 Castle Rd	North Nashua River MA81-02	
C340		Outlet	2' x 2'	Stone	C3	317	Hole in retaining wall between street and train tracks Between 556 and 440 River St	North Nashua River MA81-02	Flows into catch basin
N/A		Outlet			C6	578	Underneath Airport Rd near 750 Crawford St	North Nashua River MA81-02	Could Not Access due to fence
N/A		Outlet	48"	RCP	C3	460	In Parkhill Park near Skate Park	Sand Brook	DISCONNECTED, BLOCKED BY ROCKS
C3119		Outlet	48"	RCP	C3	463	North Side of Parkhill Park	Sand Brook	
N/A		Outlet		Stone	C3	405,410	Intersection of Westminister St and Industrial Rd (Under Industrial)	Snows Millpond	Collapsed
		Outlet						Unnamed Pond off Townsend St	
N/A		Outlet	36"	RCP	C1		S side of Stoneybrook Rd.	Unnamed Trib to Falulah Brook MA81-63	
N/A		Outlet	36"	RCP	C1		S side of Stoneybrook Rd.	Unnamed Trib to Falulah Brook MA81-63	
N/A		Outlet	36"	RCP	C1		S side of Stoneybrook Rd.	Unnamed Trib to Falulah Brook MA81-63	
N/A		Outlet		RCP	C1		Intersection of Nijal Court and Rindge Rd	Unnamed Trib to Falulah Brook MA81-63	Bridge
N/A		Outlet	36"	RCP	C2		Intersection of Kyle Rd and Ashby State Rd	Unnamed Trib to Greene's Pond	

N/A		Outlet	24"	RCP	C2	581	Underneath Ashy State Rd Next to House # 328	Unnamed Trib to Greene's Pond	
N/A		Outlet	36"	RCP	C6	554,555	Next to 234 Wanoosnoc Rd	Unnamed Trib to North Nashua River MA81-02	
N/A		Outlet	12"	CMP	C6	567,568	Intersection of Harvard Ave and Peirce Ave	Unnamed Trib to North Nashua River MA81-02	
N/A		Outlet	18"	RCP	C6	569,570	Underneath Pierce Ave between Harvard Ave and Rodiman Ave	Unnamed Trib to North Nashua River MA81-02	
N/A		Outlet	36"	RCP	C3	386,387	Next to 224 Ashburham St	Unnamed Trib to Phillips Brook	

APPENDIX C

Inspection Forms

City of Fitchburg, MA Outfall Inspection Form

Outfall ID: _____ Weather: _____

Inspection By: _____ Temperature: _____

Date: _____ Photograph1: _____

Time: _____ Photograph2: _____

Location: (Street Address, Intersection, Business) _____

Watershed/Discharge Location: _____

Time (hours) since last precipitation event: _____ Last precipitation amount (inches): _____

1. Predominant Contributing Land Use

☐ Residential ☐ Commercial ☐ Industrial ☐ Open Space ☐ Other: _____

Describe any known industrial or commerical users in the drainage area:

_____

2. Outfall Type ☐ Circular/Pipe ☐ Box Culvert ☐ Open Channel ☐ Elliptical ☐ Other _____

3. Outfall Material ☐ Reinforced Conc ☐ Corr.Metal ☐ PVC ☐ HDPE ☐ Clay ☐ Brick ☐ Other _____

4. Outfall Size - Diameter (inches): _____

5. Is there visable flow from the pipe? None-Dry / None-Wet / Trickle / Running / Gushing

6. Color: ☐ Colorless ☐ Gray ☐ Red ☐ Green ☐ White ☐ Other: _____

7. Odor: ☐ None ☐ Musty ☐ Sewage ☐ Sour Milk ☐ Rotten Eggs ☐ Other _____

8. Floatables: ☐ None ☐ Oily ☐ Sewage ☐ Suds ☐ Algae ☐ Scum ☐ Garbage ☐ Other _____

9. Deposits/Stains ☐ None ☐ Oils ☐ Corrosion ☐ Sediment ☐ Rust ☐ Other: _____

10. Clarity ☐ Clear ☐ Cloudy ☐ Muddy ☐ Milky ☐ Suspended Solids ☐ Other: _____

11. Performed Windshield Survey (Y/N) Description: _____

_____

_____

_____

14. Standing Water Present: Y/N _____

15. If yes, location of standing water ☐ Inside Outfall ☐ Outside Outfall

16. Are there unusual piping or ditches that drain to the stormwater conveyance? Y/N (Description) _____

17. Is there any overland flow visible from the discharge location? Y/N (Description) _____

Sampling/Field Testing

pH: _____

Temperature: _____

Salinity: _____

Spec. Cond.: _____

Ammonia: _____

Surfactants: _____

Total Chlorine: _____

Lab Sample(Circle one):

Enterococcus (Saltwater) / E. Coli (Freshwater) / N/A

LabID: _____

Results

Illicit Discharge/Connection ☐ Ruled Out ☐ Suspected ☐ Confirmed

Follow Up Actions ☐ None Required ☐ Notified Town ☐ Illicit Removed ☐ Investigate Further

☐ Dye Test ☐ CCTV ☐ Sandbag ☐ Other: _____

New Outfall (Y/N): _____ CNF (Y/N): _____ CNI (Y/N): _____

Comments: _____

City of Fitchburg, MA Manhole Inspection Form

Manhole ID: _____ Weather: _____

Inspection By: _____ Temperature: _____

Date: _____ Photograph1: _____

Time: _____ Photograph2: _____

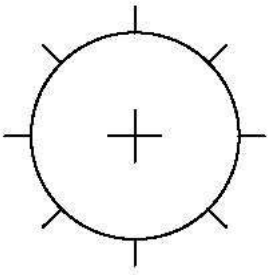
Location: (Street Address, Intersection, Business) _____

Watershed/Discharge Location: _____

Time (hours) since last precipitation event: _____ Last precipitation amount (inches): _____

1. Buried: ☐ Yes ☐ No
2. Frame Condition: ☐ Good ☐ Reset ☐ Replace
3. Frame Material: ☐ Metal ☐ Concrete ☐ Other
4. Corbel Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid ☐ Lined
5. Wall Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid ☐ Lined
6. Floor Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid ☐ Lined
7. Invert Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast COncrete ☐ Cast in Place ☐ Hybrid ☐ Lined
8. Wall Condition: ☐ Good ☐ Fair ☐ Poor
9. Structure Shape: ☐ Round ☐ Square ☐ Rectangular
10. Currently Surcharged: ☐ Yes ☐ No
11. Evidence of Surcharging: ☐ Yes ☐ No
12. Leaking: ☐ Yes ☐ No
13. Type: ☐ Sewer ☐ Drain
14. Dirt or Debris Present: ☐ Below Invert ☐ Above Invert

Comments:



15. Is there visable flow from the pipe? If yes, check all that apply, if not go to #11 _____
16. Color: ☐ Colorless ☐ Gray ☐ Red ☐ Green ☐ White ☐ Other: _____
17. Odor: ☐ None ☐ Musty ☐ Sewage ☐ Sour Milk ☐ Rotten Eggs ☐ Other _____
18. Floatables: ☐ None ☐ Oily ☐ Sewage ☐ Suds ☐ Algae ☐ Scum ☐ Garbage ☐ Other _____
19. Deposits/Stains ☐ None ☐ Oils ☐ Corrosion ☐ Sediment ☐ Rust ☐ Other: _____
20. Clarity ☐ Clear ☐ Cloudy ☐ Muddy ☐ Milky ☐ Suspended Solids ☐ Other: _____
21. Intermunicipal Connection ☐ Yes ☐ No

Sampling/Field Testing

pH: _____

Temperature: _____

Salinity: _____

Spec. Cond.: _____

Ammonia: _____

Total Chlorine: _____

Detergents: _____

Bacteria Sample:

Enterococcus (Saltwater) / E. Coli (Freshwater) / N/A

LabID: _____

Results

Illicit Discharge/Connection

☐ Ruled Out

☐ Suspected

☐ Confirmed

New Outfall (Y/N): _____

CNF (Y/N): _____

CNI (Y/N): _____

Follow Up Actions

☐ None Required

☐ Notified City

☐ Illicit Removed

☐ Investigate Further

☐ Dye Test

☐ Sandbag

☐ CCTV

☐ Other: _____

Comments: _____

City of Fitchburg, MA Catch Basin Inspection Form

Catch Basin ID: _____ Weather: _____

Inspection By: _____ Temperature: _____

Date: _____ Photograph1: _____

Time: _____ Photograph2: _____

Location: (Street Address, Intersection, Business) _____

Watershed/Discharge Location: _____

Time (hours) since last precipitation event: _____ Last precipitation amount (inches): _____

1. Grate Shape: ☐ Rounded ☐ Square ☐ Rectangular
2. Curb Inlet: ☐ Casting ☐ Stone ☐ Concrete ☐ None
3. Grate Condition: ☐ Good ☐ Cracks/Broken ☐ Replace
4. Type: ☐ Single Grate ☐ Double Grate
5. Structure Shape: ☐ Round ☐ Square ☐ Rectangular
6. Frame Condition: ☐ Good ☐ Reset ☐ Replace
7. Structure Construction: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid
8. Wall Condition: ☐ Good ☐ Fair ☐ Poor
9. Currently Surcharged: ☐ Yes ☐ No
10. Evidence of Surcharging: ☐ Yes ☐ No
11. Hood Present: ☐ Yes ☐ No
12. Type of Hood: ☐ Cast Iron with Hinge ☐ Other
13. Dirt or Debris Present: ☐ Below Invert ☐ Above Invert

Sampling/Field Testing

pH: _____

Temperature: _____

Salinity: _____

Spec. Cond.: _____

Ammonia: _____

Total Chlorine: _____

Detergents: _____

Bacteria Sample:

Enterococcus (Saltwater) / E. Coli (Freshwater) / N/A

LabID: _____

Results

Illicit Discharge/Connection

☐ Ruled Out

☐ Suspected

☐ Confirmed

New Outfall (Y/N): _____

CNF (Y/N): _____

CNI (Y/N): _____

Follow Up Actions

☐ None Required

☐ Notified City

☐ Illicit Removed

☐ Investigate Further

☐ Dye Test

☐ Sandbag

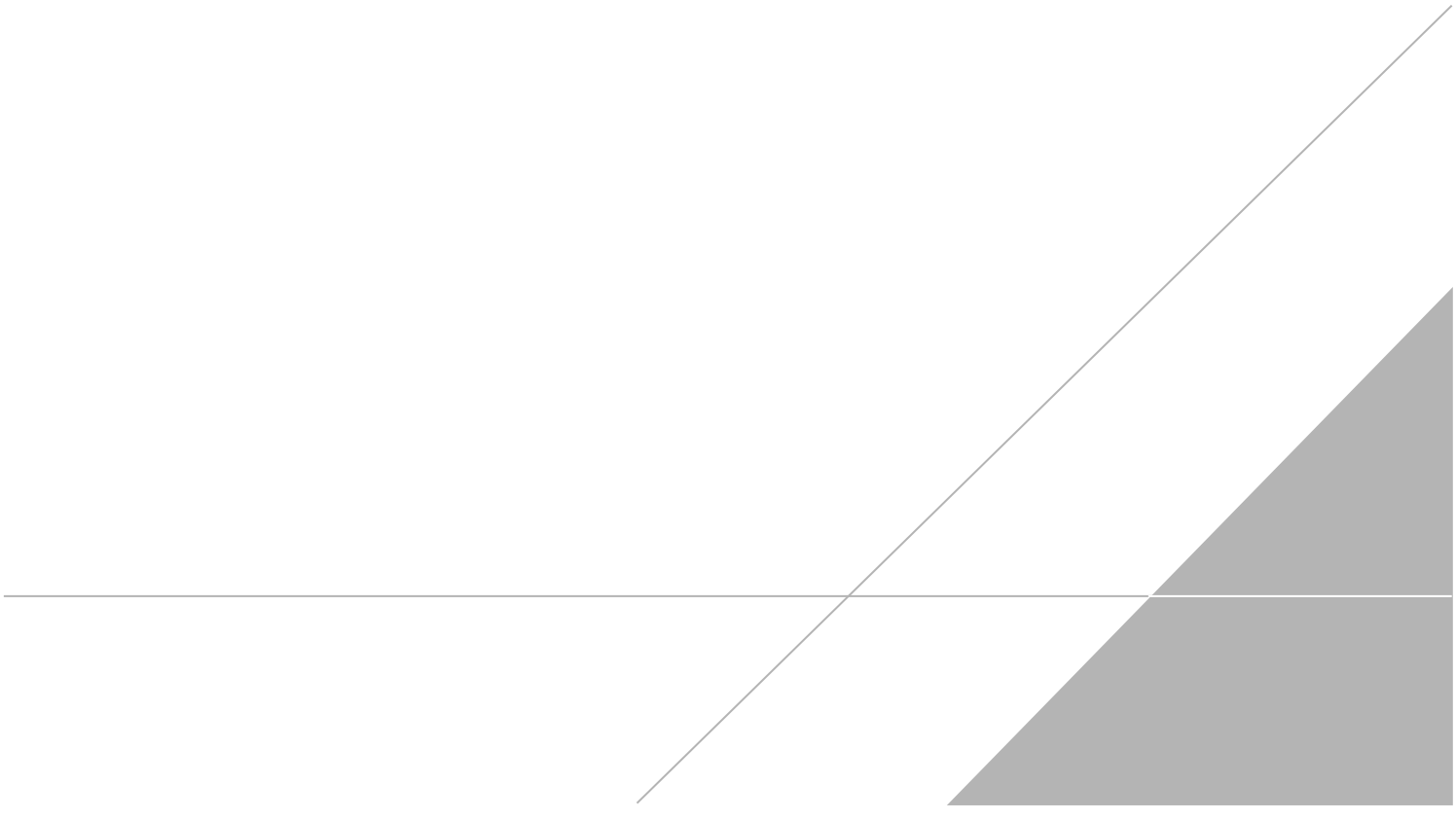
☐ CCTV

☐ Other: _____

Comments: _____

APPENDIX D

System Vulnerability Factors (SVFs)



APPENDIX E

Personnel Training Records

Arcadis U.S., Inc.

500 Edgewater Drive

Suite 511

Wakefield, Massachusetts 01880

Tel 781 213 4931

www.arcadis.com