

# Consent Decree Compliance Report #3

(Civil Action No. 1:24-cv-10290)

April 2025

(October 2024 to March 2025)

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## *Lowell Regional Wastewater Utility*



*NPDES Permit Number: MA0100633*

*Report Due Date: April 30, 2025*

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## CONCENT DECREE COMPLIANCE REPORT #3

### CERTIFICATION STATEMENT

I certify under penalty of perjury that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

\_\_\_\_\_  
Aaron Fox  
Executive Director  
Lowell Regional Wastewater Utility

\_\_\_\_\_  
4/30/2025

Date

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## 1. Introduction

### 1.1 Overview

The Lowell Regional Wastewater Utility (The Utility) is a public utility located in Lowell, Massachusetts that owns, operates, and maintains a wastewater collection system comprised of a combined sewer system dating to the 1800s, newer separated sewer conveyance systems, an extensive stormwater drainage system, and a flood protection system. Wastewater flow is conveyed to the Duck Island Wastewater Treatment Facility (Duck Island) that delivers efficient secondary-level treatment of dry-weather sewage flows as well as wet-weather flows up to 112 million gallons per day (MGD).

The Utility's mission is to effectively manage wastewater and stormwater transport and treatment systems in a professional manner and strives to provide reliable, cost-effective, high-quality services that protect public health, promote environmental stewardship, and deliver outstanding service to our customers.

### 1.2 Utility Operations

The Utility's sewer system consists of approximately 226 miles of gravity sewers with 14 sewage pumping stations. Nine miles of large-diameter (36-inch to 120-inch) interceptors are located along the banks of the Merrimack and Concord Rivers and collect wastewater from the sewer system and convey it to Duck Island. Duck Island was designed to provide biological (activated sludge) treatment for an average dry-weather design flow of 32 million gallons per day (MGD). A map of the interceptor system is provided in [Figure 1-1](#).

During wet-weather conditions, a maximum flow of approximately 112 MGD is processed at Duck Island. Flow exceeding the capacity of the biological and secondary clarifier systems (secondary treatment systems) results in activation of the High-Flow Treatment mode (as discussed in the Utility's High Flow Management Plan, [Appendix A](#)). Under the High-Flow Treatment mode, wet weather flow that exceeds secondary treatment capacity receives screening and primary clarification and then the flow is bypassed around the secondary treatment systems and is pre-chlorinated before being mixed with secondary treatment effluent. This mixture is then disinfected and discharged into the Merrimack River in compliance with the Utility's National Pollutant Discharge Elimination System (NPDES) effluent permit (MA0100633) requirements.

Flow that exceeds the Duck Island High-Flow Treatment capacity is stored in the interceptor system through an automated network of gates controlled by computational algorithms designed for this purpose and implemented in a Supervisory Control and Data Acquisition (SCADA) system. Flows to the collection system that exceed this interceptor storage capacity are diverted as combined sewer overflows (CSOs) to the Merrimack River, the Concord River and Beaver Brook, as necessary to prevent sewer system surcharges that may cause sewage back-ups into homes and streets.

## Lowell Wastewater Collection and Treatment Systems Overview

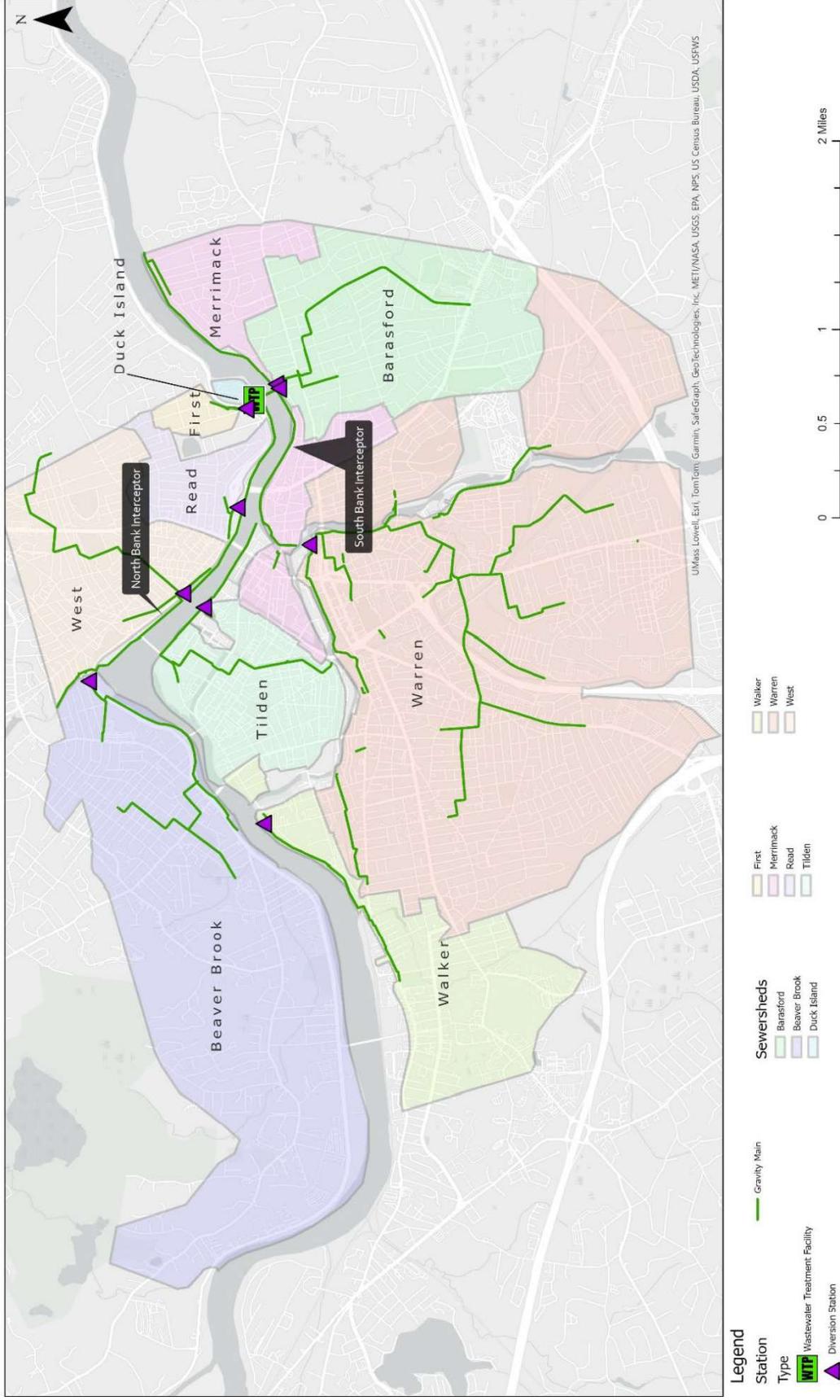


Figure 1-1. Lowell Wastewater Collection and Treatment Systems Overview

### 1.3 Consent Decree

In 2023, the regulatory agencies, along with the U.S. Department of Justice and the Commonwealth of Massachusetts Department of Justice, and the City and the Utility completed negotiations to develop a new Consent Decree (CD) with remedial measures to address violation findings (NPDES permit, Section 301(a) of the Clean Water Act and provisions of the 2003 Small MS4 General Permit). The CD was fully executed and filed with the US District Court on May 17, 2024 (Case: 1:24-cv-1290-DJC, Document 13).

As part of the CD, the City is required to submit a Compliance Report to the state and federal agencies for the previous six-month period, referred to as the Reporting Period (CD Paragraph 40). The bi-annual Reporting Periods run from October 1<sup>st</sup> thru March 31<sup>st</sup> and from April 1<sup>st</sup> thru September 30<sup>th</sup>, with the Compliance Reports due on April 30<sup>th</sup> and October 31<sup>st</sup> for the previous period.

The Compliance Report shall include:

- a) A description of the activities undertaken during the Reporting Period directed at achieving compliance with the Consent Decree,
- b) Identification of all plans, reports, and other deliverables required the Consent Decree that have been completed and submitted during the Reporting Period, and
- c) A description of the expected activities to be taken during the next Reporting Period in order to achieve compliance with the Consent Decree.

This April 2025 Six-Month Compliance Report (Compliance Report #3) summarizes the Utility's compliance with the CD. [Appendix A](#) provides links to the NPDES and CD compliance reports that are submitted to the regulator agencies.

### 1.4 Unanticipated Compliance Challenges

No unanticipated compliance challenges occurred in the last six months. However, the implementation schedule for the Centralville Sewer Separation Program Phase 1 – Mainline Conduit project may be impacted by the challenges of land acquisition required for the separation outfalls working through the state's Article 97 conversion process, which requires extensive discussions with state agencies and an approval vote by the state legislature.

## 2. Overview of the Compliance Activities

*Table 1* provides a summary of the CD Deliverables (with associated Paragraph), and a summary of activities performed by the Utility for the last six months of the reporting period and the next six months of the reporting period. In some cases, the Utility will provide additional information on the current status of each of these activities in the following sections of this report. Additional information can be found in the following sections:

- [Section 3 - Centralville \(Humphrey's Brook\) Drain Area Sewer Separation Program](#)
- [Section 4 - Phase 3 Sewer Separation Program](#)
- [Section 5 - Infiltration/Inflow Reduction Program](#)
- [Section 6 - Capacity, Management, Operation, & Maintenance \(CMOM\) Program](#)
- [Section 7 - Stormwater \(MS4\) Compliance Program](#)
- [Section 8 - Geographical Information System \(GIS\)](#)
- [Appendix A - NPDES and CD compliance reports.](#)

Table 1 Summary of Consent Decree Activities

| Document Deliverable  | CD Paragraph | Deadline          | Compliance Progress in the Respective Period  |  |
|---|--------------|-------------------|---|--|
|   |              |                   | Last Six Months<br>(October 1, 2024, to March 31, 2025)   | Next Six Months<br>(April 1, 2025, to September 30, 2025)  |
| Centralville Area Sewer Separation Preliminary Design Report (PDR) (Humphrey's Brook)             | 10           | Dec. 31, 2023     | The revised Centralville PDR was submitted on July 31 <sup>st</sup> , 2024 to address comments from MassDEP and USEPA provided in a letter dated March 5, 2024 (on the original PDR submitted on December 31, 2023). The Revised PDR was approved by MassDEP and USEPA on November 6 <sup>th</sup> , 2024.  |  |
| Centralville Area Sewer Separation Removal of Humphrey's Brook and Dracut Surface Flows (Phase 1) | 10.b.i       | Dec. 31, 2027     | The Final Design Project Bid Documents (Plans and Specifications) were submitted to the MassDEP on January 24, 2025 for the 2024 SRF Loan Application approval. The project was publicly advertised for bidding on March 19, 2025. The Utility attended a November 4, 2024 Centralville Neighborhood Association meeting to continue discussions on the project and construction impacts. | Public bidding will close on April 24 <sup>th</sup> , 2025 with a contracted awarded by June 30, 2025. Construction activities are anticipated to commence in the summer of 2025.<br>Attend a meeting with the Centralville Neighborhood Association on April 7, 2024. Additionally, secure services with a Public Relation firm to help support communication throughout the community during construction. |
| Centralville Area Sewer Separation (Phase 2)  | 10.b.ii      | December 31, 2031 | Field services including a topographic and utility survey, sewer mainline and manhole inspection, and a geotechnical boring program was initiated.  | All field services related to Phase 2A and Phase 2B are anticipated to be completed by July 2025. A design kick-off meeting with CDM Smith focused on Phase 2A.  |
| Phase 3 Areas Sewer Separation Report   | 11           | Dec. 31, 2024     | The Phase 3 Sewer Separation PDR was submitted on December 20, 2024. MassDEP and USEPA provided comments in a letter dated February 27, 2025, which the Utility responded to on March 28, 2025.   | A revised Phase 3PDR is anticipated to be submitted upon approval of the Utility's March 28, 2025 response to their comments.<br>Field services including a topographic and utility survey, sewer mainline and manhole inspection, and a geotechnical boring program will be initiated for Phase 3A and 3B.  |
| LTCP Scope of Work  | 12           | Sept. 1, 2032     | No work occurred.   | No planned work will occur.  |
| LTCP Delivery   | 13           | Sept. 1, 2034     | No work occurred.   | No planned work will occur.  |
| CMOM Program Self-Assessment  | 14           | Dec. 30, 2022     | The CMOM Program Self-Assessment was submitted on December 30, 2022 ( <i>Appendix A</i> ).  |  |
| CMOM Corrective Action Plan   | 15/16        | Dec. 19, 2024     | The CMOM CAP was submitted on December 19 <sup>th</sup> , 2024.   | . The next deliverable outlined in the CAP is a written SSO Emergency Response Plan in response to CMOM Checklist items IV.D.1 and IV.D.2. The SSO Emergency Response Plan is scheduled to be delivered to the agencies on October 31, 2025.   |

Consent Decree Compliance Report #3

| Document Deliverable                      | CD Paragraph          | Deadline  | Compliance Progress in the Respective Period   |   |
|---|-----------------------|---|--|---|
|   |                       |   | Last Six Months<br>(October 1, 2024, to March 31, 2025)  | Next Six Months<br>(April 1, 2025, to September 30, 2025)   |
| CMOM Program Implementation Annual Report | 17                    | April 30th yearly                                     | The 2024 NPDES Permit Annual Report ( <i>Appendix A</i> ) was submitted on March 20 <sup>th</sup> , 2025. The CMOM Program Implementation Annual Report, required by the CD, will continue to be submitted as part of the NPDES Annual Report. | No planned work will occur.   |
| I/I Analysis Report                       | 18                    | Jan. 31, 2024   | Submitted a supplemental memorandum to the previously submitted I/I Analysis Report on March 20 <sup>th</sup> , 2025.  | Develop and submit to the Utility the SSES Phase 1 Report, summarizing the 2024 field program and providing I/I reduction recommendations in the collection system. |
| Co-Permittee I/I Analysis Annual Report   | 19                    | April 30 <sup>th</sup> yearly                         | The 2024 NPDES Permit Annual Report ( <i>Appendix A</i> ) was submitted on March 20 <sup>th</sup> , 2025. The Co-Permittee I/I Analysis Annual Report will continue to be submitted as part of the NPDES Annual Report.                        | No planned work will occur.   |
| High Flow Management Plan                 | 20                    | April 30, 2023  | The updated HFMP was submitted on April 30, 2023 and is linked in <i>Appendix A</i> . The Utility continues to implement and assess the performance of the High Flow Management Plan to minimize CSO discharges.                               |   |
| Municipal Separate Stormwater Ordinances  | 21, 22, 23            | March 31, 2024  | Ordinances were voted on by City Council and became effective on January 2, 2024. The ordinances were submitted to the agencies on March 19, 2024.   |   |
| Implement Updated IDDE                    | 24, 25, 26, 27 and 30 | Dec. 31, 2023   | The City continues to implement the draft IDDE program based on the December 31, 2023 submittal.   |   |
| Wet Weather Sampling Program              | 28                    | June 15, 2031   | Wet-weather outfall inspections resulted in the collection of three (3) samples. Results are included in <i>Table 5</i> .  | Continue monitoring and sampling drainage outfalls for wet-weather flow.  |
| Illicit Discharge Removal/Abatement       | 29                    |   | The City continued enforcement of its IDDE ordinance. One (1) illicit discharges were identified from Lowell's MS4. GI/LID was not viable for removal.   | The City will continue proper enforcement of its IDDE ordinance and to implement and enforce corrective measures to resolve known illicit discharges.               |
| Semi-Annual IDDE Report                   | 31                    | April 30 <sup>th</sup> & Oct. 31 <sup>st</sup> yearly | Work was performed to prepare the Semi-Annual Compliance Report for April 30, 2025.  | Work will be performed to prepare the Semi-Annual Compliance Report for October 31, 2025.   |
| Best Management Practices                 | 32                    |   | GI/LID was not viable for the removal of illicit discharges found during this reporting period.  | To be considered in the IDDE Program Implementation as illicit discharges are discovered.   |
| Updated SWMP                              | 33.a                  | Dec. 31, 2023   | The Stormwater Management Plan was submitted on December 31, 2023 ( <i>Appendix A</i> ). The City will report on its progress on the SWMP in the annual MS4 Compliance Report.   |   |

Consent Decree Compliance Report #3

| Document Deliverable                    | CD Paragraph | Deadline  | Compliance Progress in the Respective Period   |  |
|---|--------------|---|--|--|
|   |              |   | Last Six Months<br>(October 1, 2024, to March 31, 2025)  | Next Six Months<br>(April 1, 2025, to September 30, 2025)  |
| Phosphorus Source Identification Report | 33.c (ii)    | January 31, 2026                                      | City continues to work on identifying sub-catchments to each drainage pipe/subsystem.  | City will continue to work on identification of sub-catchments to each drainage pipe/subsystem. City will begin preliminary work in establishing PSIR. |
| Phosphorus BMP Demonstration Plan       | 33.d         | January 31, 2027                                      | No work occurred.  | No planned work will occur.  |
| Existing Stormwater GIS                 | 34           | August 31, 2022                                       | On August 31, 2022, the City submitted to EPA and MassDEP in electronic format the current version of the City's stormwater collection system and wastewater collection system geographic information system (GIS) map.  |  |
| Updated Stormwater GIS                  | 35           | Sept. 30, 2024  | The updated Stormwater Collection System GIS Map was submitted on September 30, 2024 to MassDEP and EPA.   |  |
| Annual GIS Update                       | 36           | April 30th yearly                                     | An updated link to the Updated GIS Map was submitted on April 30, 2025   | The Utility will continue to update the GIS Maps as new information is identified.   |
| SSO and CSO Reporting Requirements      | 37, 38, & 39 | Ongoing   | The City is in compliance with State Regulations 314 CMR 12.03(8) and 314 CMR 16, and USEPA Regulations 40 CFR 122.63(f) for reporting and notification rules for SSO and CSO discharges. A summary of the annual SSO/CSO discharges for the City were provided in NPDES Permit Annual Report submitted on March 31, 2024. |  |
| CD Semi-Annual Compliance Reports       | 40           | April 30 <sup>th</sup> & Oct. 31 <sup>st</sup> yearly | Work was performed to prepare the Semi-Annual Compliance Report for April 30, 2025.  | Work will be performed to prepare the Semi-Annual Compliance Report for October 31, 2025.  |
| Maintenance of Website                  | 41           | Ongoing   | The City of Lowell's Website was updated and will continue to be updated for deliverables submitted to the agencies or prepared for public comment.  |  |

### 3. Centralville (Humphrey's Brook) Drain Area Sewer Separation Program

The Consent Decree (CD) requires the Utility to develop a program to separate the combined sewer system in the Humphrey's Brook Drainage Basin in several phases. This includes the preparation and submittal of a Preliminary Design Report (PDR) (Paragraph 10) and the completion of two phases of final design and construction of the Separation Program (Paragraphs 10.b.i and 10.b.ii). The intent of the sewer separation program is to reduce CSO discharges. Additionally, the projects will remove three surface water inflow sources from Dracut that will also reduce the base sewer flow treated at Duck Island shown in [Figure 3-1](#).

During the development of the PDR, the Utility renamed the project to Centralville to reflect the nomenclature the Lowell citizens utilize and the inclusion of additional combined sewer area within Centralville neighborhood that may also be considered for sewer separation to reduce CSO discharges.

#### 3.1 PDR

The Utility contracted with CDM Smith Inc. (CDM) to assist in the planning, development, and execution of this program. In December 2023, the Utility submitted the Centralville Sewer Separation PDR, summarizing an approach to separate the combined sewer system in this neighborhood. The report includes assessment based on field investigation, extensive modeling to determine pipe conveyance, and 30% design drawings of the proposed separation plan.

MassDEP and USEPA completed a review of the PDR, submitted on December 31, 2023, and provided comments in a letter dated March 5, 2024. The comments focused on request for additional input on the use of green infrastructure strategies in the program, the Utility's proposal not to separate small portions of the combined sewer system because of hydraulic/river flood challenges, and the need to provide estimates of annual CSO discharge reduction and other benefits achieved by the separation program. The Utility and CDM Smith met with the agencies on May 10, 2024 to fully discuss the comments and provide further Utility input.

CDM Smith submitted the Centralville Revised PDR on July 31, 2024, based on the May 10, 2024 meeting, and established a recommended implementation plan for new drains to complete the sewer separation of the Centralville area, as shown in [Figure 3-1](#). The implementation plan includes three phases of construction work that will meet the CD objectives and deadlines. The revised PDR was approved by the MassDEP and USEPA on November 6, 2025.

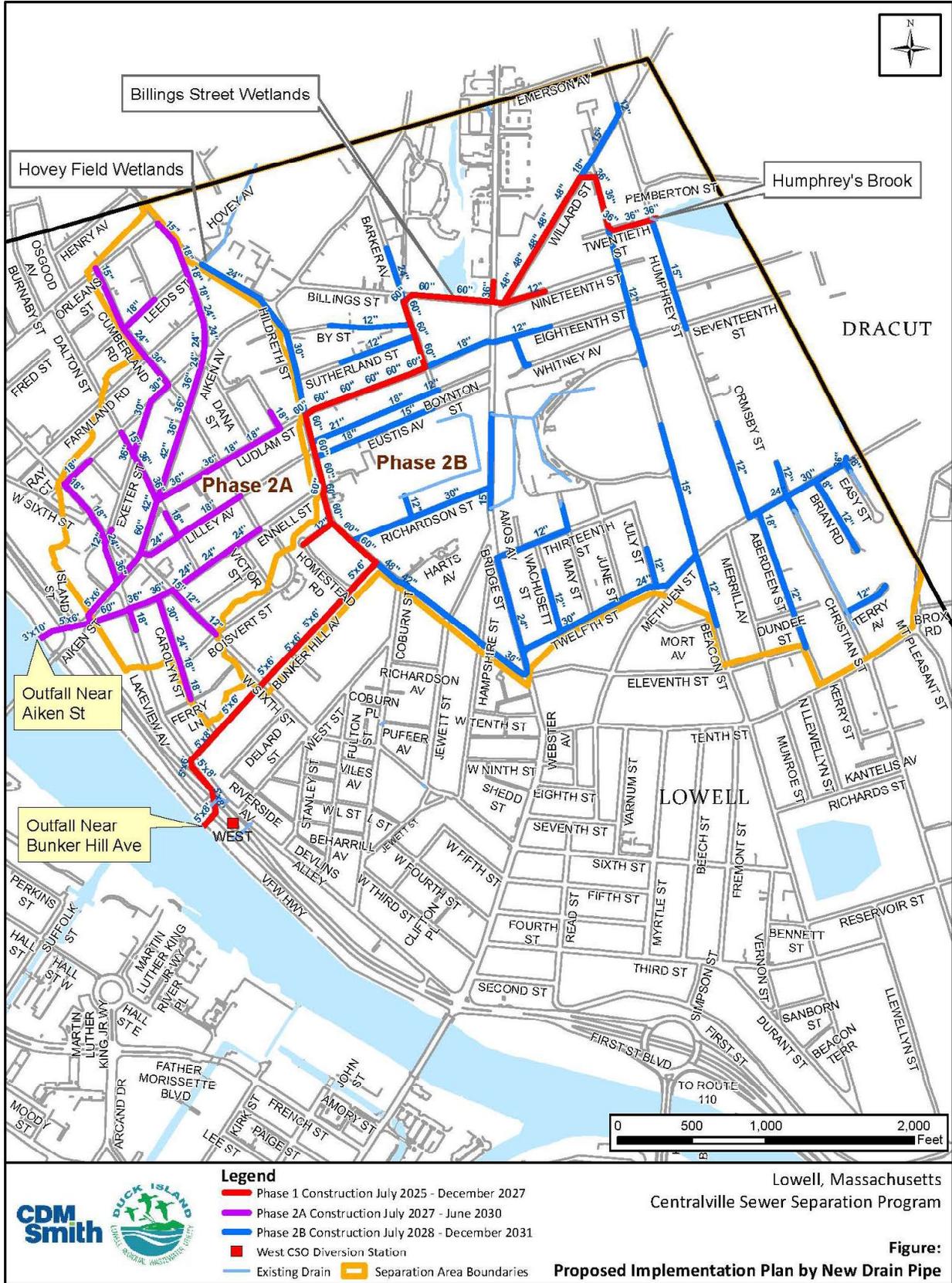


Figure 3-1 Centralville Sewer Separation

### 3.2 Phase 1 Design

The Phase 1 Final Design (Paragraph 10.b.i) requires the construction of the mainline drain conduit to remove the Humphrey's Brook and Billings Street Wetlands from the sewer system and this will entail the installation of a large diameter conveyance system ranging from 36 inches in diameter to a 5-foot by 8-foot box culvert and a new outfall (Bunker Hill) to the Merrimack River near the West CSO Station. The Phase 1 work is depicted in red on [Figure 3-1](#).

The design work involves extensive underground utility conflict resolutions, permitting and interagency integration, and public outreach. For this project, the Utility is coordinating with:

- All City Departments
- Executive Office of Energy and Environmental Affairs (EEA):
  - Environmental Justice (EJ) Community Notifications and coordination,
  - Massachusetts Environmental Protection Act (MEPA) compliance for submittal of an Environmental Notification Form (ENF)/Environmental Impact Report (EIR),
  - Department of Conservation and Recreation (DCR) for Article 97 property conversions along the riverbanks for the drain outfalls,
- US Army Corps of Engineers (USACE) for coordination of the construction through the earthen levee along the Lakeview portion of Lowell Flood Damage Reduction System and for the permitting of the outfalls along the river bank,
- Federal Emergency Management Act (FEMA) coordination with the work through the Flood Damage Reduction System,
- Massachusetts Department of Transportation (MassDOT) for access under VFW Highway for construction of the drain outfalls along with coordination with an ongoing MassDOT VFW paving and drain improvement project,
- Lowell Conservation Commission for Notice of Intent (NOI) for wetland disturbances,
- Massachusetts State Revolving Fund Program (SRF) for funding,
- USEPA for general CD compliance and approval of the planning documents, and
- MassDEP for general project coordination and approval of the planning and design documents

#### 3.2.1 Last Six Months of the Reporting Period

In the last six months, the Final Design work included the following:

- Meetings with internal City departments (DPD, DPW, and Water) and MassDOT to coordinate the design work and future construction impact mitigation program.
- Coordination with National Grid for required gas relocation and their betterment plans.
- Continued the design and layout of the Bunker Hill Outfall to be coordinated with DCR Article 97 conversions and some private property acquisition requirements.
- Finalized plans and profiles including resolution of utility conflicts identified in the topographic survey and further optimization of drain pipe sizing and routing.
- Finalized design specifications and bid documentation.
- Submitted all permit applications for the project.

### 3.2.2 Next Six Months of the Reporting Period

In the next six months, the Final Design work will include:

- Continue integration with USACE, EEA (MEPA, EJ, and DCR), MassDOT, MassDEP/USEPA, and FEMA for all potential permitting documents include the USACE Section 408 Application, USACE 404 Permit, ENF/EIR, Massachusetts Historical Commission notification, MassDOT coordination and access permits as required, and NOI.
- Continued land acquisition for project, Article 97 and local easements.
- Complete SRF Loan application.
- Establish a construction communication team.
- Attend neighborhood meeting(s) to continue outreach to residents.
- Receive construction bids, award a contract to a construction contractor, and begin construction.

### 3.3 Phase 2 Design

Work on the Phase 2 Design (Paragraph 10.b.ii) has been integrated with the Phase 1 Design (as it relates to the connection drains that convey flow to the Phase 1 mainline drain conduit and the relationship between connecting pipe inverts) in the Centralville Revised PDR (July 2024).

#### 3.3.1 Last Six Months of the Reporting Period

On behalf of The Utility, CDM Smith commenced field services related to the Phase 2A and Phase 2B projects, including development of topographic and utility survey, inspection of sewer mainline (15,100 LF) and manholes (130), and commencement of a geotechnical boring program (21 completed). The completed borings are depicted on *Figure 3-2*.

#### 3.3.2 Next Six Months of the Reporting Period

All field services (topographic and utility survey, sewer mainline and manhole inspections, and the geotechnical program for Phase 2A and Phase 2B) will be completed. Work will also commence on the development of 30% design drawings and specifications for Phase 2A and Phase 2B. Permitting activities related to the Aiken Street Outfall will also commence.

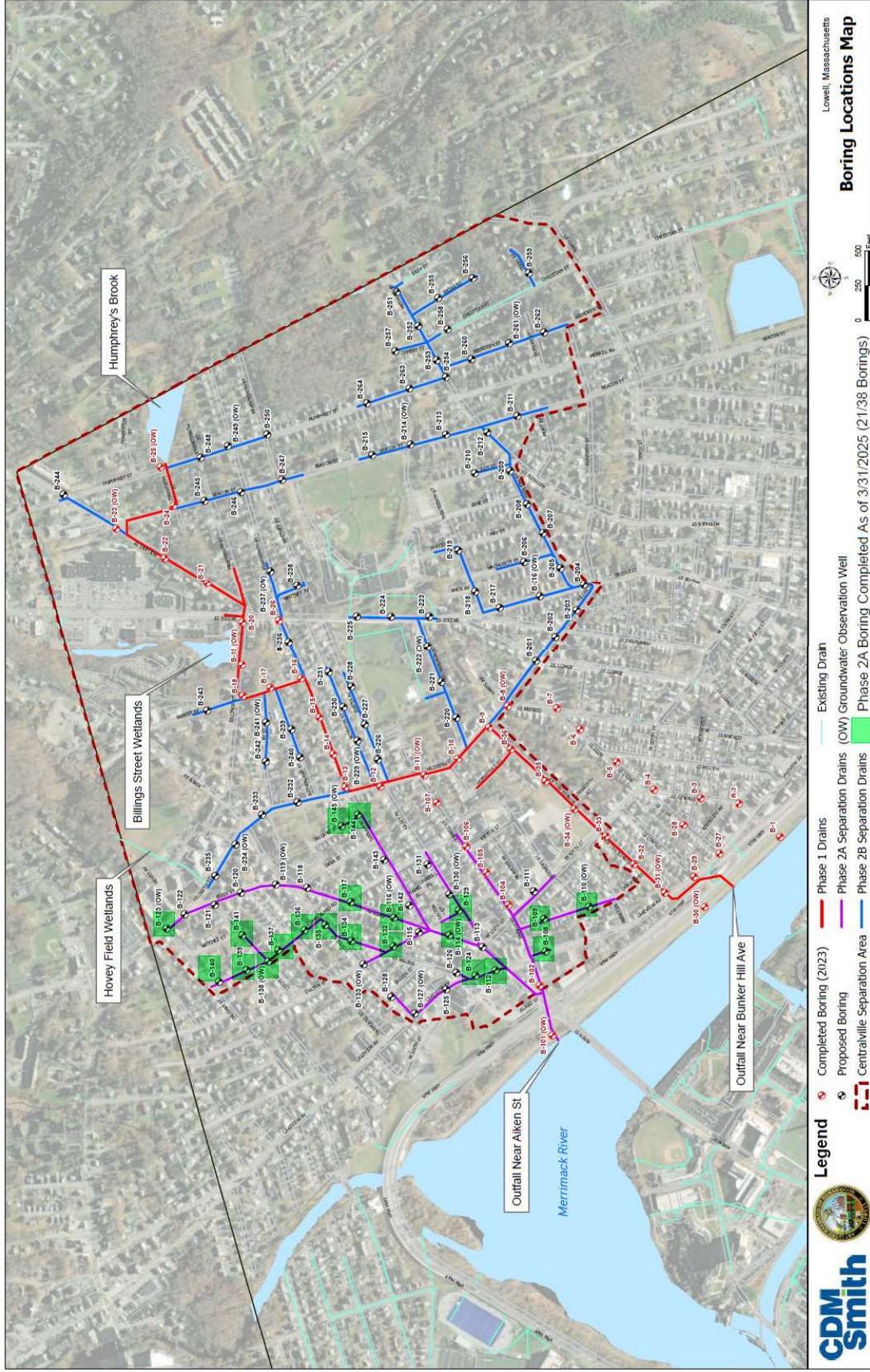


Figure 3-2: Phase 2A Completed Borings

## 4. Phase 3 Sewer Separation Program

The Phase 3 Candidate Area Sewer Separation Program (Paragraph 11) involves the preliminary design for potential sewer separation for 19 candidate combined sewer system subbasins in the Tilden, Warren, Barasford, West, and Merrimack CSO Basin shown in [Figure 4-1](#). [The West/Jewett/Coburn combined sewer area near the West CSO Station was removed from the Centralville PDR and MassDEP requested that the City consider the relative benefits and priority for separation of this area in the Phase 3 Sewer Separation Program.]

The intent of this program is to help to further reduce CSO discharges and to assess potential solutions using sewer separation to mitigate chronic sanitary sewer overflows (SSOs), or to consider other extraneous flow reduction approaches. The CD focuses on two chronic SSO locations – Douglas Road in the Barasford CSO Basin and the Pevey/Boys and Girls Club in the Warren CSO Basin. The Utility contracted with CDM Smith to assist in the planning, development, and execution of this Phase 3 Sewer Separation Program. Based on the system-wide implementation challenges, the Utility elected to proceed with the Grand, Lower Saunders, and Pevey Phase 3 Candidate Area Separation Project, shown in [Figure 4-2](#).

### 4.1 Last Six Months in the Reporting Period

CDM Smith completed calibration of the SWMM model for the entire combined sewer interceptor system using data from the City's Spring 2023 flow metering program. SWMM is being used for extensive analysis of the SSO locations, including the Wentworth Avenue/Douglas Road and Boys and Girls Club SSOs for potential solutions. The effort included analysis of potential sizing for a Wet Weather Storage Tank along Douglas Road (under design by Tighe and Bond) and other CSO/SSO reduction strategies.

On December 20, 2024 CDM Smith submitted the Phase 3 Sewer Separation PDR to MassDEP and USEPA. The PDR included SWMM simulations of the combined sewer areas in the Tilden, Warren, Barasford, West, and Merrimack CSO Basins to evaluate the proposed sewer separation projects and their CSO Reduction and SSO Mitigation Benefits; updated project drawings and cost estimates; evaluation of the constructability of the projects and the outfalls; and analysis of the Pevey/Boys and Girls Club SSO mitigation options including sewer separation and wet weather flow storage. Based on the system-wide implementation challenges, the Utility elected to proceed with the Grand, Lower Saunders, and Pevey Phase 3 Candidate Area Separation Project, shown in [Figure 4-2](#). MassDEP and USEPA provided comments in a letter dated February 27, 2025, which the Utility responded to on March 28, 2025.

### 4.2 Next Six Months in the Reporting Period

A revised Phase 3 PDR is anticipated to be submitted upon approval of the Utility's March 28, 2025 response to their comments.

The Utility is anticipated to award a design contract for the design of Phase 3A/3B Sewer Separation Project. Preliminary design work will consist of topographic and utility survey work, geotechnical investigation work, and development of design drawings and specifications.

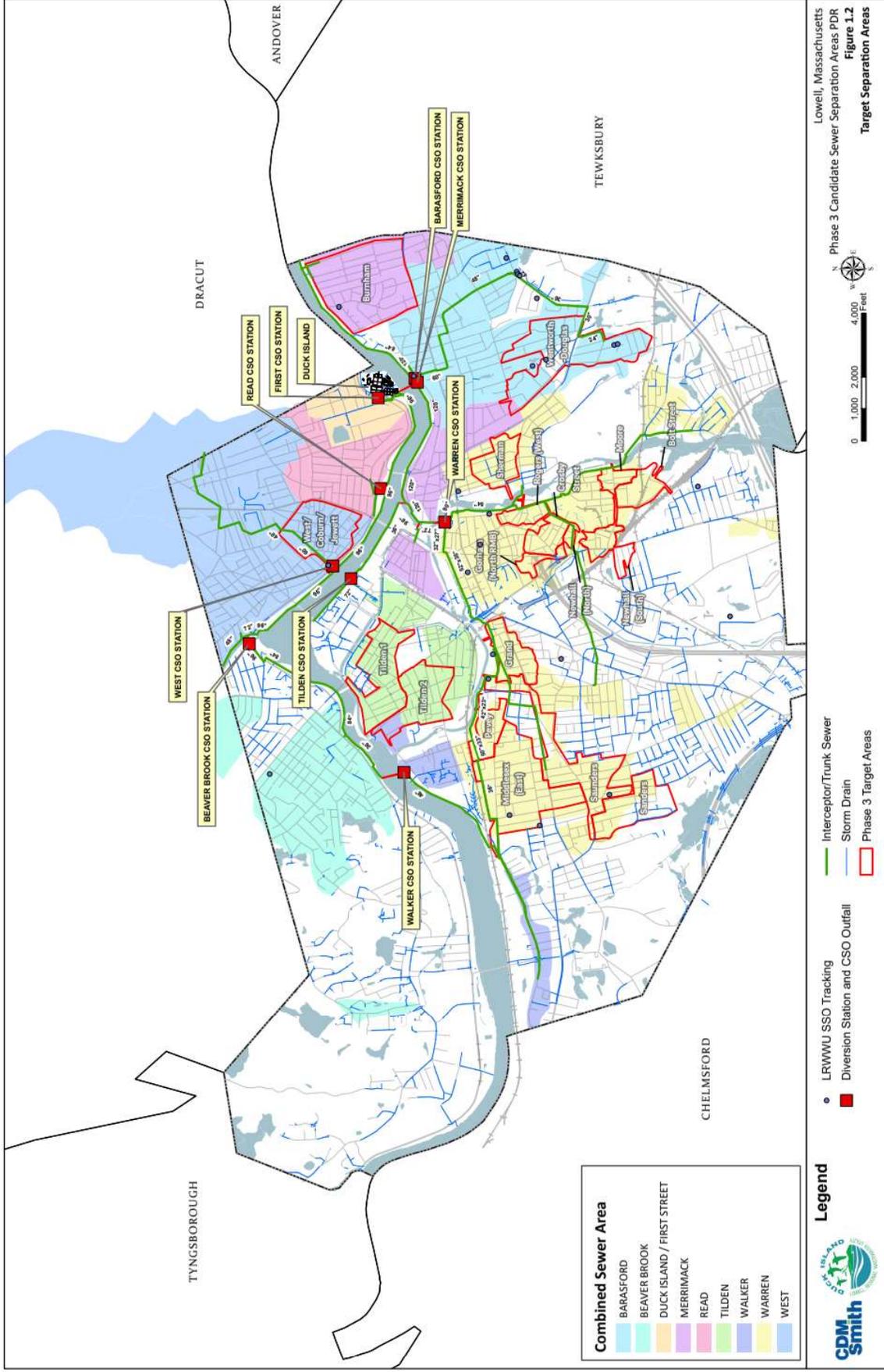


Figure 4-1 Phase 3 Sewer Separation Target Areas

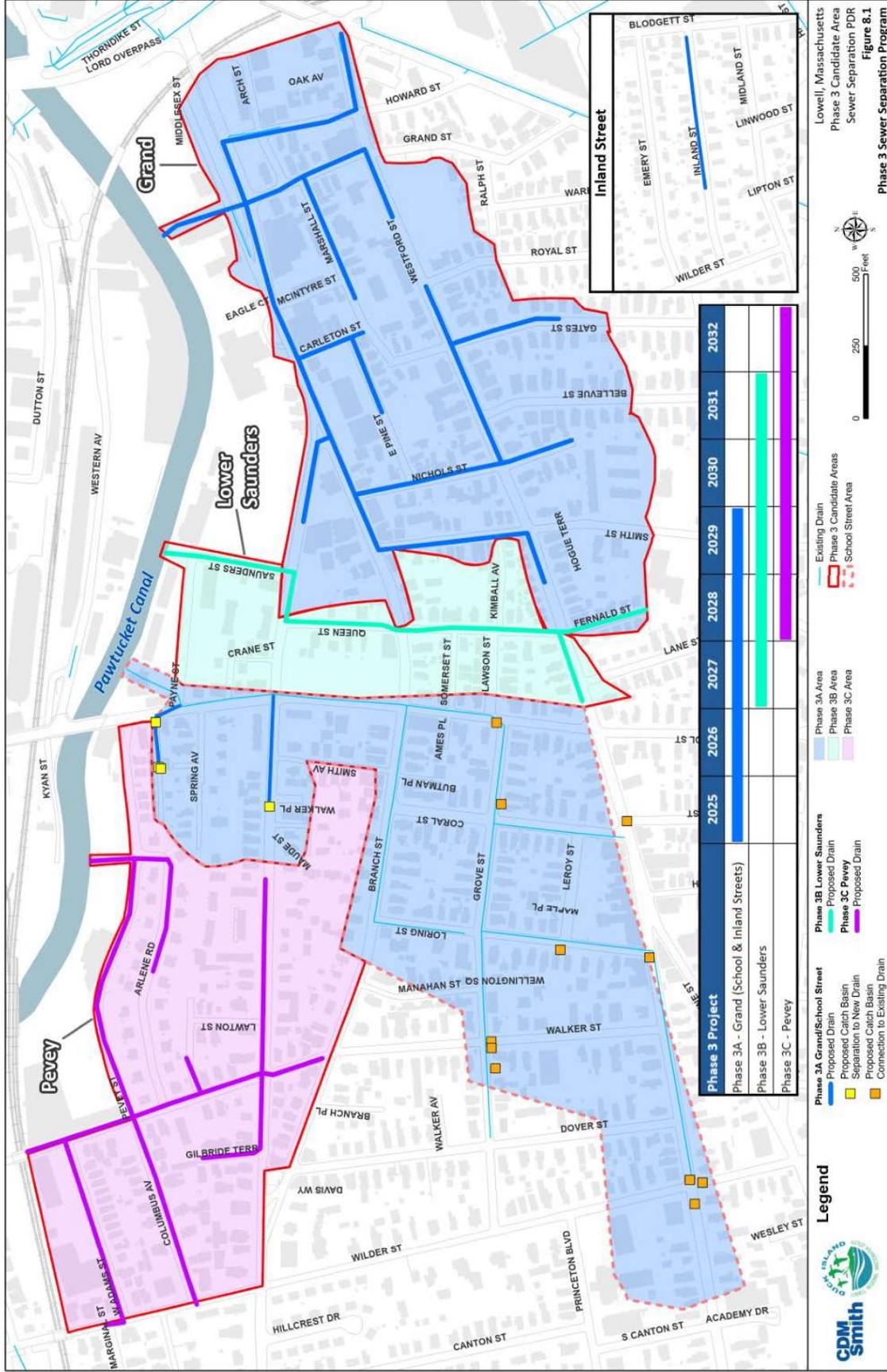


Figure 4-2: Phase 3 Candidate Area Separation Projects

## 5. Infiltration/Inflow Reduction Program

The Utility's Infiltration and Inflow (I/I) Reduction Program (Paragraph 18) was developed, in coordination with Kleinfelder, to identify and remove infiltration and inflow from the sewer system in accordance with 314 C.M.R. §12.04(2). The program is based on the I/I Analysis Report, submitted on January 31, 2024 ([Appendix A](#)), and was subsequently updated through the I/I Analysis Supplemental Report, submitted on March 28, 2025 ([Appendix A](#)). The I/I Analysis Supplemental Report provides revised recommendations, schedule, and projected costs for subsequent phases of Sewer System Evaluation Surveys (SSES). These recommendations serve as a road map for the Utility to implement an ongoing plan to execute I/I investigations and reduction efforts. The revised SSES phases are shown in [Figure 5-1](#).

### 5.1 Last Six Months in the Reporting Period

The 2024 supplemental metering program was performed to address data quality issues identified in the I/I Analysis Report ([Appendix A](#)). [Figure 5-2](#) provides an overview of the 10-meter areas that were re-metered in this effort. The I/I Analysis Supplemental Report was submitted on March 28, 2025 and provides updated recommendations, schedule, and costs based on the integration of the data from the re-metered areas which shifted the prioritization of the SSES Implementation Plan accordingly.

Kleinfelder continued their evaluation of the results of the Phase 1 SSES field inspections (NWMCC pipe inspections, RedZone pipe and manhole inspections, and EST manhole inspections as noted in [Figure 5-3](#)). Kleinfelder also began development of the Phase 1 SSES Report which will summarize the results of the field inspections and provide I/I reduction recommendations in the collection system.

### 5.2 Next Six Months in the Reporting Period

The Phase 1 SSES Report will be submitted in April 2025. The Downtown Area Sewer Improvements Project was listed on MassDEP's 2025 draft Intended Use Plan, with an anticipated \$6 million of construction funding. The Utility intends to begin design of the Downtown Area Sewer Improvements in 2025 with an anticipated construction start by June 2026 in accordance with the 2025 CWSRF requirements. The SSES Phase 1 Report will summarize the field investigations completed and provide recommendations for sewer system rehabilitation and repair, including estimated design and construction costs and anticipated schedules.

In August 2024, the Utility collaborated with Hull Street Energy to discover the Kearney Square inflow source was due to a failed hatch that cross-connects the Canal to the sewer. Hull Street Energy made a temporary repair to limit the inflow and is working through installing a permanent solution in 2025.

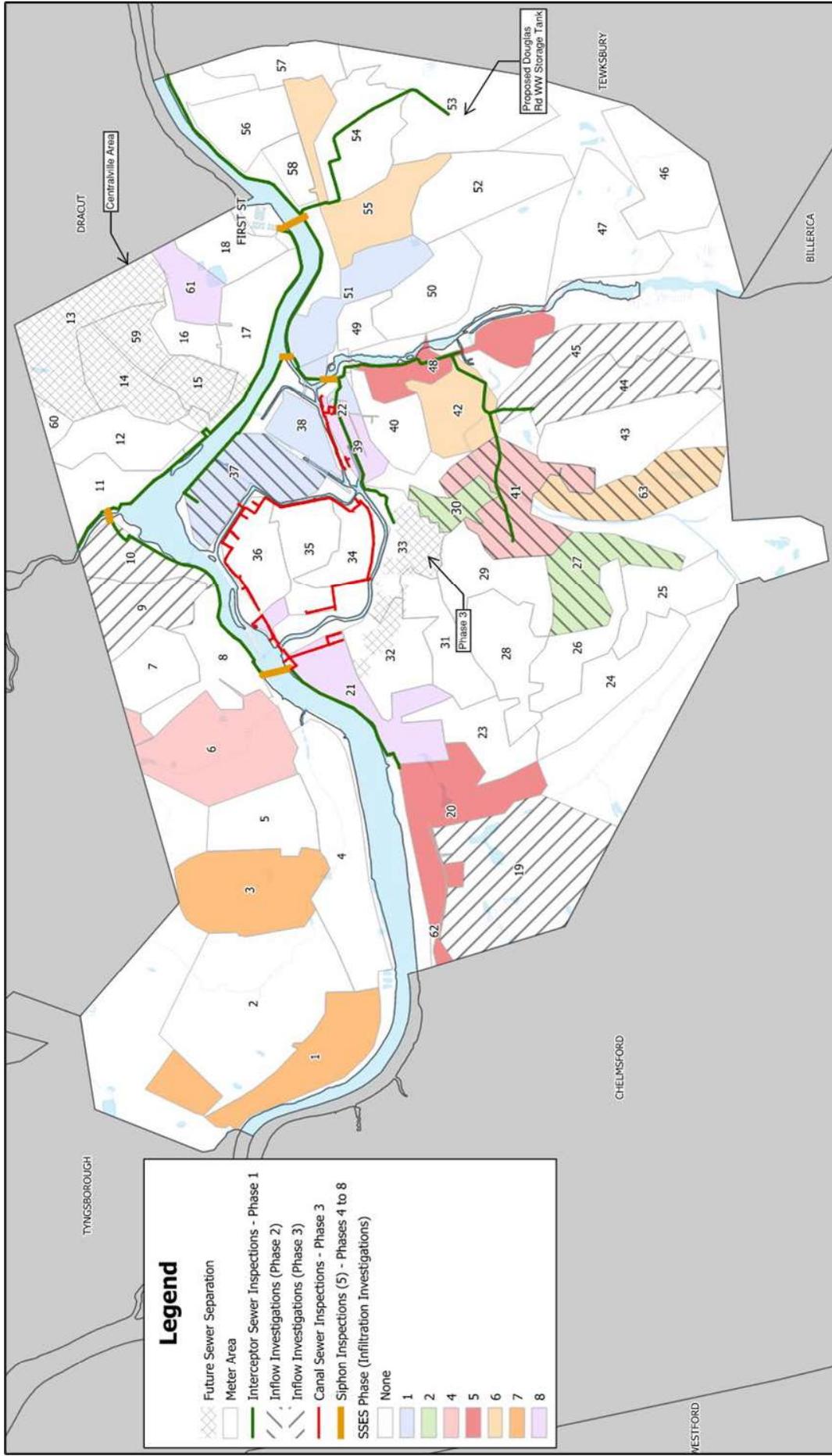


Figure 5-1 SSES Program Phases

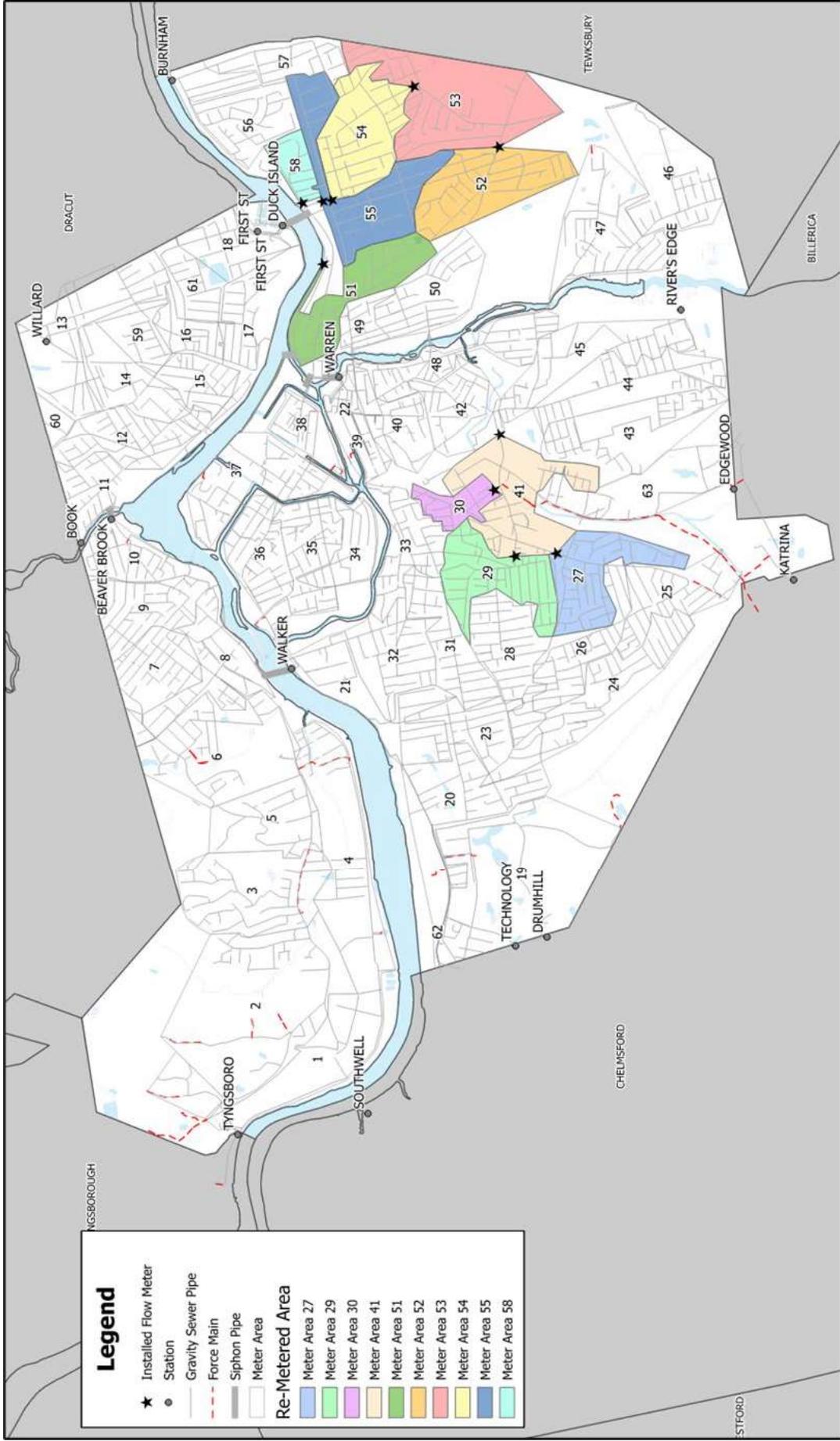


Figure 5-2 2024 Re-Metered Areas

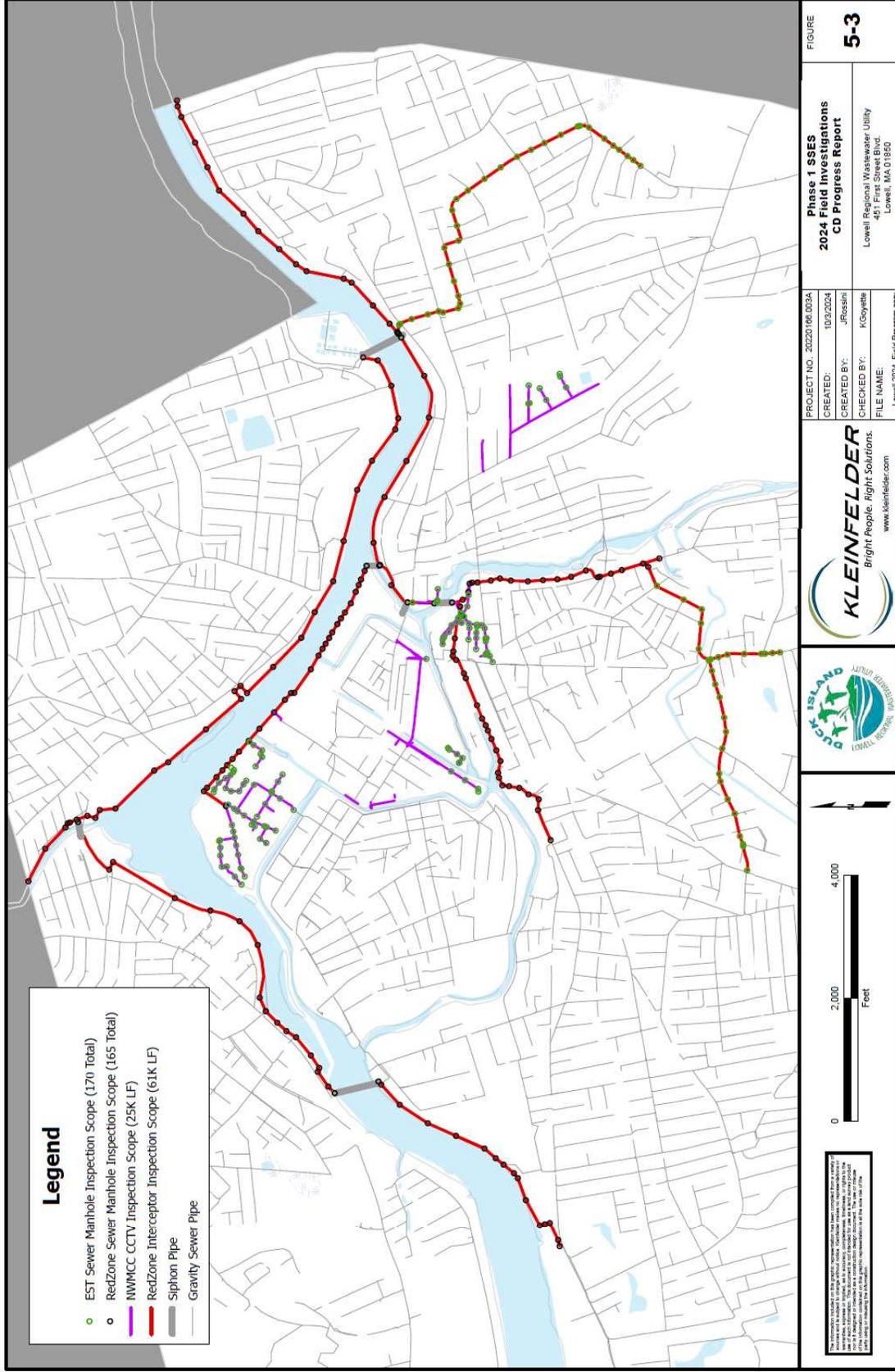


Figure 5-3 2024 Field Investigations

## 6. CMOM Program

The Utility's Capacity, Management, Operation, and Maintenance (CMOM) Program Self-Assessment (PSA) (CD Paragraph 14), developed in 2022 (*Appendix A*), was designed to evaluate the CMOM programs and identify areas needing improvement. Upon completing the assessment, it was found that Lowell's CMOM program is strong but could be enhanced in certain areas. The EPA and MassDEP provided comments on the CMOM PSA on August 21, 2024. Per Consent Decree Paragraph 15, a CMOM Corrective Action Plan (CAP) (CD Paragraph 16) was submitted on December 19, 2024. This plan will address the identified areas for improvement and incorporate feedback from the agency's review of the PSA. The CAP will serve as a roadmap for the Utility to implement ongoing improvements in its collection system.

### 6.1 Last Six Months in the Reporting Period

The Utility developed the CAP and submitted it to the EPA and MassDEP on December 19, 2024, in compliance with the requirements outlined in the CD (*Appendix A*). The Utility identified sixteen (18) assessment items across four (4) CMOM PSA categories and ten (10) subcategories as being deficient and in need of requiring future action in the CMOM PSA (*Table 2*). The Utility has already addressed nine (9) of the identified deficiencies.

### 6.2 Next Six Months in the Reporting Period

The Utility, in conjunction with Woodard & Curran, is working to address the action items identified in the finalized CMOM CAP, adhering to the timelines establish in the CAP to ensure compliance and operational improvements within the collection system. The next deliverable outlined in the CAP is a written SSO Emergency Response Plan in response to CMOM Checklist items IV.D.1 and IV.D.2. The SSO Emergency Response Plan is scheduled to be delivered to the agencies on October 31, 2025.

Table 2: CMOM CAP Deficiencies and Status

| Deficiency | Self-Assessment Category                    | Self-Assessment Sub-Category            | Checklist Reference | Source          | Deliverable Date / Status |
|------------|---|---|---------------------|-----------------|---------------------------|
| 1          | Collection System Management                | Organizational Structure                | III.A.4             | PSA             | Complete                  |
| 2          |   | Communication and Customer Service      | III.C.1             | PSA             | 10/31/2026                |
| 3          |   | Legal Authority                         | III.F.1             | PSA             | 4/30/2026                 |
| 4          |   |   | III.F.4             | PSA             | 4/30/2027                 |
| 5          |   |   | III.F.5             | PSA             | Complete                  |
| 6          |   |   | III.F.6             | Agency Comments | Complete                  |
| 7          | Collection System Operation                 | Hydrogen Sulfide Monitoring and Control | IV.B.3              | Agency Comments | 4/30/2026                 |
| 8          |   | Emergency Preparedness and Response     | IV.D.1              | PSA             | 10/31/2025                |
| 9          |   |   | IV.D.2              | PSA             | 10/31/2025                |
| 10         |   |   | IV.D.3              | PSA             | 4/30/2026                 |
| 11         |   | Pump Stations - Inspection              | IV.F.5              | PSA             | Complete                  |
| 12         | Equipment and Collection System Maintenance | Maintenance Right-of-Way                | V.B.1               | PSA             | 10/31/2028                |
| 13         |   | Parts Inventory                         | V.C.3               | PSA             | Complete                  |
| 14         | SSES  | System Assessment                       | VI.A.2              | PSA             | Complete                  |
| 15         |   |   | VI.A.3              | PSA             | Complete                  |
| 16         |   |   | VI.A.4              | PSA             | 4/30/2028                 |
| 17         |   |   | VI.A.5              | PSA             | Complete                  |
| 18         |   | Manhole Inspection                      | VI.B.2              | PSA             | Complete                  |

## 7. Stormwater (MS4) Compliance Program

For Federal and State stormwater regulations, the City is operating under the 2003 Massachusetts Small Municipal Separate Storm Sewer Systems (MS4) General Permit. An Annual Report on the City's compliance with the 2003 MS4 Program will be submitted on April 30, 2024 ([Appendix A](#)).

In accordance with the CD, the City shall remain under the 2003 MS4 permit with additional requirements stipulated per the CD. These requirements include:

- The development and implementation of an updated Illicit Discharge Detection Elimination (IDDE) program (Paragraphs 24, 25, 26, 27, 28, 29, and 30),
- Additional stormwater mapping requirements (Paragraph 36),
- Utilization of Best Management Practices in stormwater management design (Paragraph 32),
- Updates to ordinances to address pre- and post-construction stormwater controls (Paragraphs 21, 22, 23), and
- Updates to the Stormwater Management Program (initially issued in 2003) (Paragraph 33.a) to update the Minimum Control Measures (MCM) and Best Management Practices (BMPs) to minimize the impact of phosphorus, including a Phosphorus Source Identification Report (Paragraph 33.c) and development of an BMP demonstration project for phosphorus control on a municipal property. (Paragraph 33.d)

The Utility updated and submitted a Stormwater Management Plan (SWMP) and Illicit Discharge Detection Elimination (IDDE) Program to MassDEP and USEPA on December 31<sup>st</sup>, 2023 ([Appendix A](#)).

### 7.1 Last Six Months in the Reporting Period

In the last six months work included:

- The Utility increased staffing. Two (2) Field Technician positions and one (1) Pretreatment/Lab Technician position were created, posted, and staffed in late December 2024. The primary role of the Field Technician position is to assist in the successful implantation of the Utility's Stormwater Management Plan and IDDE Program. A supplemental role of the Pretreatment/Lab Technician position is to assist in processing dry- and wet-weather samples collected as part of the IDDE Program.
- Fall messaging was distributed at appropriate municipal facilities.
- Two hundred eighty-one (281) assets, across twenty (20) drainage catchments were mapped. No new drainage SCMs/BMPs were identified and recorded as part of this process.
- Three (3) municipal employees completed Stormwater Permit Inspector training certification offered by the National Stormwater Center on February 20 and February 21, 2025.
- Two (2) municipal employees completed Stormwater Permit Inspector training recertification offered by the National Stormwater Center on December 19, 2024.
- Trainings related to proper sampling methodologies and catchment mapping procedures, and good housekeeping practices were held on January 31 and March 17, 2025. Three (3) municipal employees participated in the January and March trainings.

- One (1) Illicit Connection was discovered during the reporting period. The Illicit Connection was identified during CCTV inspection of a municipal drainage system; signs of sewage were found downstream of a lateral connection, which was confirmed via dye testing to be a residential sewer service. Further summary of corrective actions taken are presented in [Table 3](#).
- SSO discovery and actions taken are presented in [Table 4](#).
- Three (3) outfalls were inspected during wet-weather; wet-weather flows were present in all inspected outfalls. Samples were collected and analyzed from these outfalls. Sampling results can be found in [Table 5](#).

## 7.2 Next Six Months in the Reporting Period

In the next six months, planned work includes:

- An additional training related to proper sampling methodologies and sampling criteria is scheduled for April 8<sup>th</sup>. Five (5) municipal employees are slated to attend the April 8<sup>th</sup> meeting.
- Conduct dry weather outfall screening and sampling.
- Update catchment priority ranking presented in the previous CD Semi Annual Submittal, [Table 5](#), with up-dated outfall screening and sampling results.
- Continue catchment investigations.
- Refine MS4 mapping based on field conditions observed during outfall screenings and catchment investigations.
- Conduct IDDE investigations into priority catchments.
- Begin Phosphorus Source Identification Report per CD Paragraph 33.c.
- Perform continued stormwater quality-related public education and outreach.

Table 3 Illicit Discharge Summary

| Outfall Location |            | Illicit Discharge/Connection Verified |                    |                                |                                    | Illicit Discharge Removal Activities   |  |                             | Assessment: Is the City in compliance with schedule? |
|------------------|------------|---------------------------------------|--------------------|--------------------------------|------------------------------------|--|--|-----------------------------|--|
| Basin ID         | Outfall ID | Date Verified                         | Address Location   | Type of Discharge <sup>1</sup> | Estimated Flow                     | Schedule for Removal   | Actions Taken  | Date Eliminated             |  |
| Private service  | dDP-1260   | 3/4/2025                              | 22 Florence Avenue | Residential                    | ~100 gallons; total volume unknown | <ul style="list-style-type: none"> <li>Week of 1/27 – CCTV inspection uncovered signs of sewage downstream of a lateral connection within a municipal drain line.</li> <li>3/4 – Dye testing of private residence confirmed that the lateral connection was the residential sewer service for 22 Florence Avenue.</li> <li>3/12 – The property owner was notified that they had thirty (30) days to remove the illicit connection or else the Utility would coordinate its removal.</li> </ul> | <p>CCTV inspection of a municipal drain line uncovered signs of sewage downstream of a lateral connection, that was later confirmed via dye testing to be a residential sewer service. Records investigation revealed that both the area sewer and drain were installed in 1907. Shortly after confirmation, the property owner was notified that they had thirty (30) days to remove the illicit connection, or else the Utility would coordinate its removal to ensure that the illicit connection would be removed within the sixty (60) day compliance window. While the illicit connection was discovered during this reporting period, its removal will be completed during the next compliance report. Further details of this resolution will be provided as part of the next compliance report. GI/LID features are not being considered or implemented as a potential solution, given the nature of the source of the illicit.</p> | To be completed by 5/3/2025 | Yes  |

<sup>1</sup>Type of Discharge single-family residential, multifamily residential, commercial, industrial, exfiltration from a sanitary sewer

Table 4 SSO Summary (Last 6 Months)

| Surcharge Type               | Date & Time Overflow Started/Discovered | Date & Time Overflow Stopped | Location                         | Source of Notification to Lowell | Cause           | Estimated Volume (Gal) | Catch Basin or Surface Waterbody Reached and Estimated Volume | Corrective Actions Taken  | Date Reported to EPA and MassDEP | Date of the Last Event that Occurred at Same Location |
|------------------------------|---|------------------------------|----------------------------------|----------------------------------|-----------------|------------------------|---|---|----------------------------------|---|
| Backup into Property         | 10/20/2024<br>12:02 PM                  | 10/20/2024<br>12:53 PM       | 1 Franklin Court South           | CivicPlus Request                | Grease Blockage | Unknown                | No release to surface water                                   | A grease blockage caused a 12-inch sewer line resulting in a backup into a property basement at 1 Franklin Court South. The grease blockage has been cleared and the affected line has since been jetted.   | 10/21/2024                       | No previous SSOs have occurred at this location.      |
| Backup into Property         | 11/8/2024<br>7:48 PM                    | 11/8/2024<br>11:08 PM        | 161 Mt Pleasant Street           | CivicPlus Request                | Debris Blockage | Unknown                | No release to surface water                                   | In-house CCTV investigation confirmed that a debris buildup was restricting an 8-inch dead-end sewer main, causing the property backup. The debris was removed via hydro-jetting, and the line was then flushed to confirm proper function.   | 11/9/2024                        | No previous SSOs have occurred at this location.      |
| SSO (Sanitary Sewer Manhole) | 3/27/2025<br>1:12 PM                    | 3/27/2025<br>2:00 PM         | 145 Boylston Street (Shedd Park) | LRWWU Staff                      | Root intrusion  | Unknown                | No release to surface water                                   | A root intrusion caused an 8-inch sewer line to surcharge at 145 Boylston Street (Shedd Park). The roots were removed, and the line was meticulously cleaned to restore proper flow. A comprehensive inspection of the affected section was performed to confirm the absence of further damage. | 3/28/2025                        | No previous SSOs have occurred at this location.      |

Table 5 Outfall Priority Matrix

| Outfall ID           | Field Conditions   | Active Flow                   | Odor                  | Surfactants (mg/L) | Ammonia (mg/L) | Chlorine (mg/L) | E. coli (cfu/100 ml) | Ranking <sup>1,2,3,4,5</sup> |
|----------------------|--------------------|-------------------------------|-----------------------|--------------------|----------------|-----------------|----------------------|------------------------------|
| OUTGPS-000026        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000298        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000330        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000278        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000047        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000146        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000028        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000108        |                    |                               |                       |                    |                |                 |                      | Potential Illicit(A)         |
| OUTGPS-000352        | Dry Weather        | Yes - Dry Weather Flow        | Yes                   | 0.36               | 0              | 0.09            | 121                  | Potential Illicit(B)         |
| OUTGPS-000096        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.26               | 0.5            | 0.9             | 2420                 | Potential Illicit(C)         |
| OUTGPS-000097        | Wet Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.27               | 0.5            | 0.89            | 1986                 | Potential Illicit(C)         |
| OUTGPS-000184        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.29               | 6              | 0.3             | 1553                 | Potential Illicit(C)         |
| <b>OUTGPS-000112</b> | <b>Wet Weather</b> | <b>Yes - Wet Weather Flow</b> | <b>No - Scentless</b> | <b>0.27</b>        | <b>0.5</b>     | <b>0.54</b>     | <b>73.7</b>          | <b>Potential Illicit (D)</b> |
| OUTGPS-000268        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.35               | 0.5            | 0.24            | 5                    | Potential Illicit(D)         |
| OUTGPS-000310        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.4                | 0.5            | 0.12            | 0                    | Potential Illicit(D)         |
| <b>OUTGPS-000445</b> | <b>Wet Weather</b> | <b>Yes - Wet Weather Flow</b> | <b>No - Scentless</b> | <b>0.12</b>        | <b>0.25</b>    | <b>0.32</b>     | <b>1046.2</b>        | <b>Potential Illicit (E)</b> |
| OUTGPS-000194        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.39               | 0.25           | 1.31            | 2420                 | Potential Illicit(E)         |
| OUTGPS-000382        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.25               | 0.25           | 0.14            | 2420                 | Potential Illicit(E)         |
| OUTGPS-000184        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.24               | 0.25           | 0.71            | 2420                 | Potential Illicit(E)         |
| OUTGPS-000145        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.22               | 0.25           | 0.13            | 1414                 | Potential Illicit(E)         |
| OUTGPS-000388        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.07               | 0.25           | 0.17            | 961                  | Potential Illicit(E)         |
| OUTGPS-000360        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.2                | 0.25           | 0.04            | 649                  | Potential Illicit(E)         |
| OUTGPS-000195        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.06               | 0.5            | 0.1             | 548                  | Potential Illicit(E)         |
| OUTGPS-000250        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.29               | 0              | 0.45            | 2,420                | High Bacteria                |
| OUTGPS-000248        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.22               | 0              | 0.2             | 1,300                | High Bacteria                |
| OUTGPS-000143        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.19               | 0              | 0.24            | 2,420                | High Bacteria                |
| OUTGPS-000249        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.16               | 0              | 0.15            | 816                  | High Bacteria                |
| OUTGPS-000326        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.27               | 0              | 0.13            | 2420                 | High Bacteria                |
| OUTGPS-000031        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.25               | 0              | 0.13            | 2420                 | High Bacteria                |
| OUTGPS-000236        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.23               | 0              | 0.15            | 2420                 | High Bacteria                |
| OUTGPS-000275        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.22               | 0              | 0.17            | 2420                 | High Bacteria                |
| OUTGPS-000436        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.2                | 0              | 0.2             | 2420                 | High Bacteria                |

| Outfall ID           | Field Conditions   | Active Flow                   | Odor                  | Surfactants (mg/L) | Ammonia (mg/L) | Chlorine (mg/L) | E. coli (cfu/100 mL) | Ranking <sup>2,3,4,5</sup>   |
|----------------------|--------------------|-------------------------------|-----------------------|--------------------|----------------|-----------------|----------------------|------------------------------|
| OUTGPS-000195        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.19               | 0              | 0.15            | 2420                 | High Bacteria                |
| OUTGPS-000370        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.22               | 0              | 0.3             | 1553                 | High Bacteria                |
| OUTGPS-000228        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.06               | 0              | 0.11            | 2420                 | High Bacteria                |
| OUTGPS-000399        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.14               | 0              | 0.02            | 2420                 | High Bacteria                |
| OUTGPS-000253        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.25               | 0              | 0               | 770                  | High Bacteria                |
| OUTGPS-000252        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.24               | 0              | 0               | 2420                 | High Bacteria                |
| OUTGPS-000398        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.41               | 0              | 0               | 2420                 | High Bacteria                |
| OUTGPS-000396        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 2.18               | 0              | 0.33            | 2,420                | High Bacteria                |
| OUTGPS-000237        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.37               | 0              | 0.19            | 649                  | High Bacteria                |
| OUTGPS-000134        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.21               | 0              | 0               | 2,420                | High Bacteria                |
| OUTGPS-000135        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.42               | 0              | 0.1             | 688                  | High Bacteria                |
| OUTGPS-000093        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.1                | 0              | 0.2             | 1414                 | High Bacteria                |
| OUTGPS-000195        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0                  | 0              | 0.22            | 649                  | High Bacteria                |
| OUTGPS-000194        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.38               | 0              | 0.3             | 1733                 | High Bacteria                |
| <b>OUTGPS-000283</b> | <b>Wet Weather</b> | <b>Yes - Wet Weather Flow</b> | <b>No - Scentless</b> | <b>0.21</b>        | <b>0.5</b>     | <b>0.22</b>     | <b>287.8</b>         | <b>Low Potential Illicit</b> |
| OUTGPS-000134        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.17               | 0              | 0.03            | 313                  | Low Potential Illicit        |
| OUTGPS-000093        | Wet Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.31               | 0              | 0.16            | 308                  | Low Potential Illicit        |
| OUTGPS-000331        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.17               | 0              | 0.03            | 272                  | Low Potential Illicit        |
| OUTGPS-000145        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.14               | 0              | 0.01            | 172                  | Low Potential Illicit        |
| OUTGPS-000314        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.14               | 0              | 0.02            | 125                  | Low Potential Illicit        |
| OUTGPS-000382        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.02               | 0.25           | 0.19            | 111                  | Low Potential Illicit        |
| OUTGPS-000145        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.1                | 0              | 0.35            | 107                  | Low Potential Illicit        |
| OUTGPS-000354        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.1                | 0              | 0.06            | 102                  | Low Potential Illicit        |
| OUTGPS-000383        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.24               | 0.25           | 0.09            | 81                   | Low Potential Illicit        |
| OUTGPS-000283        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0                  | 0              | 0.04            | 74                   | Low Potential Illicit        |
| OUTGPS-000310        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.46               | 0              | 0.24            | 16                   | Low Potential Illicit        |
| OUTGPS-000193        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.14               | 2.5            | 0.05            | 7.2                  | Low Potential Illicit        |
| OUTGPS-000093        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.06               | 0              | 0               | 6.1                  | Low Potential Illicit        |
| OUTGPS-000382        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.07               | 0.25           | 0.09            | 3                    | Low Potential Illicit        |
| OUTGPS-000275        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.07               | 0              | 0.16            | 3                    | Low Potential Illicit        |
| OUTGPS-000331        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.23               | 0              | 0               | 2                    | Low Potential Illicit        |
| OUTGPS-000043        | Dry Weather        | Yes - Dry Weather Flow        | No - Scentless        | 0.1                | 0              | 0.08            | 0                    | Low Potential Illicit        |
| OUTGPS-000400        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.22               | 0              | 0.02            | 236                  | Low Potential Illicit        |
| OUTGPS-000342        | Wet Weather        | Yes - Wet Weather Flow        | No - Scentless        | 0.12               | 0              | 0.09            | 187                  | Low Potential Illicit        |

| Outfall ID    | Field Conditions | Active Flow            | Odor           | Surfactants (mg/L) | Ammonia (mg/L) | Chlorine (mg/L) | E. coli (cfu/100 mL) | Ranking <sup>2,3,4,5</sup> |
|---------------|------------------|------------------------|----------------|--------------------|----------------|-----------------|----------------------|----------------------------|
| OUTGPS-000096 | Dry Weather      | Yes - Dry Weather Flow | No - Scentless | 0.12               | 0              | 0.13            |                      | Low Potential Illicit      |
| OUTGPS-000329 | Dry Weather      | Yes - Dry Weather Flow | No - Scentless | 0.12               | 0              | 0.06            | 1                    | Low Potential Illicit      |
| OUTGPS-000400 | Dry Weather      | Yes - Dry Weather Flow | No - Scentless | 0.12               | 0              | 0.07            |                      | Low Potential Illicit      |
| OUTGPS-000360 | Wet Weather      | Yes - Wet Weather Flow |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000097 | Dry Weather      | Yes - Dry Weather Flow |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000394 | Wet Weather      | Yes - Wet Weather Flow | No - Scentless | 0.16               | 0              | 0               | 0                    | Low Potential Illicit      |
| OUTGPS-000136 | Wet Weather      | Yes - Wet Weather Flow | No - Scentless | 0.34               | 0              | 0.25            |                      | Low Potential Illicit      |
| OUTGPS-000395 | Wet Weather      | Yes - Wet Weather Flow | No - Scentless | 0.24               | 0              | 0               |                      | Low Potential Illicit      |
| OUTGPS-000007 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000031 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000031 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000043 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000087 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000088 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000088 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000089 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000091 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000093 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000094 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000094 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000095 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000095 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000111 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000184 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000192 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000192 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000193 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000193 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000194 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000194 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000195 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000229 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000230 | Wet Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000231 | Dry Weather      | No Flow                |                |                    |                |                 |                      | Low Potential Illicit      |

| Outfall ID                 | Field Conditions | Active Flow | Odor | Surfactants (mg/L) | Ammonia (mg/L) | Chlorine (mg/L) | E. coli (cfu/100 mL) | Ranking <sup>2,3,4,5</sup> |
|----------------------------|------------------|-------------|------|--------------------|----------------|-----------------|----------------------|----------------------------|
| OUTGPS-000232              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000234              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000236              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000236              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000239              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| <sup>p</sup> OUTGPS-000239 | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000240              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000251              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000252              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000253              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000254              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000273              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000274              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000327              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000330              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000359              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000367              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000369              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000370              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000386              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000387              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000387              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000400              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000401              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000401              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000401              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000412              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000413              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000414              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000427              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000427              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000432              | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |
| OUTGPS-000432              | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit      |

| Outfall ID    | Field Conditions | Active Flow | Odor | Surfactants (mg/L) | Ammonia (mg/L) | Chlorine (mg/L) | E. coli (cfu/100 mL) | Ranking <sup>1,2,3,4,5</sup> |
|---------------|------------------|-------------|------|--------------------|----------------|-----------------|----------------------|------------------------------|
| OUTGPS-000436 | Wet Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000235 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000650 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000347 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000651 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000652 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000653 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000341 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000396 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000397 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000390 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000141 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000142 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000221 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000222 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000253 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000252 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |
| OUTGPS-000420 | Dry Weather      | No Flow     |      |                    |                |                 |                      | Low Potential Illicit        |

<sup>1</sup>Outfalls are ranked into the following categories: "Potential Illicit", "High Bacteria", and "Low Potential Illicit".

<sup>2</sup>Outfalls categorized as "Potential Illicit" are further ranked based on five criteria (A) through (E): (A) identified through EPA screening/sampling; (B) olfactory or visual evidence of sewage; (C) >410 cfu/100 mL E. coli and/or > 130 cfu/100 mL Enterococcus AND >0.25 mg/L surfactants AND >0.5 mg/L ammonia; (D) >0.25 mg/L surfactants AND >0.5 mg/L ammonia AND detectable chlorine; (E) = > 410 cfu/mL E. coli and/or > 130 cfu/mL Enterococcus AND detectable ammonia.

<sup>3</sup>Outfalls are categorized as "High Bacteria" when results show >410 cfu/mL E. coli and/or > 130 cfu/mL Enterococcus.

<sup>4</sup>Outfalls are categorized as "Low Potential Illicit" when sampling and screening results do not meet any of the aforementioned criteria.

<sup>5</sup>Results depicted in **bold** and *italics* were collected during the subject reporting period.

## 8. Geographical Information System (GIS)

The Utility engaged CDM Smith in 2007 to develop a GIS database of the wastewater collection system based on historic paper records that were digitized to include the information in electronic database. In 2017, additional requirements for improved data-management were identified in conversations with ESRI water-sector representatives, wherein it was made clear that the common ArcMap platform would be supplanted by ArcGIS Pro and the related Utility Network data schema. Lowell's GIS & Data Management team determined that it was in the Utility's best interest upgrade to ESRI's ArcGIS Enterprise. In Spring 2024 the Utility completed its upgrade to the ArcGIS Enterprise platform, improving field data collection capabilities and providing a more robust data structure. The Utility completed an initial delineation of drainage catchments throughout the City by overlaying existing mapped drainage systems with topographic data.

The annual updated GIS Map includes the best available information on the sewer and stormwater collection systems. A link to this Map (Paragraph 36a, 36b, 36c.i, & 26c.ii) was provided to the agencies in the CD Compliance Report transmittal email on April 30<sup>th</sup>, 2024. The Collection System & MS4 Mapping GIS Map includes the best available information on the sewer and stormwater collection systems. A link to this Map (Paragraph 35) was provided to the agencies in the CD Compliance Report transmittal email on September 30<sup>th</sup>, 2024. Additional information regarding the Utility's investigations, remediation, and capital projects completed for the City's MS4 and Collection System (Paragraph 36c.iii) are depicted in [Figure 3-1](#), [Figure 4-1](#), [Figure 5-1](#), [Figure 5-2](#), [Figure 5-3](#), [Figure 8-1](#), and [Figure 8-2](#).

### Infrastructure Remediation Summary

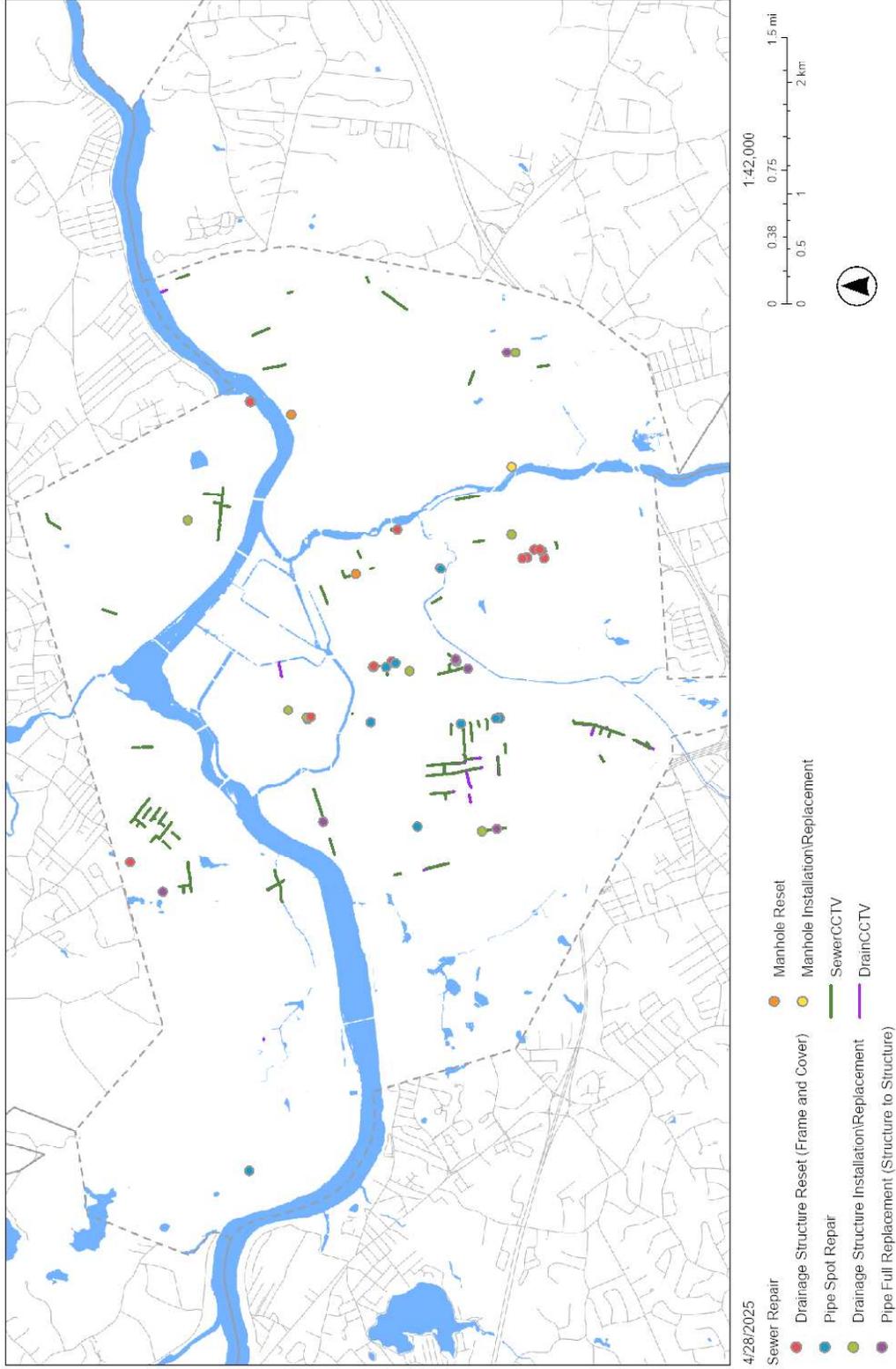


Figure 8-1 Infrastructure Remediation Summary

### MS4 Investigations & Sampling

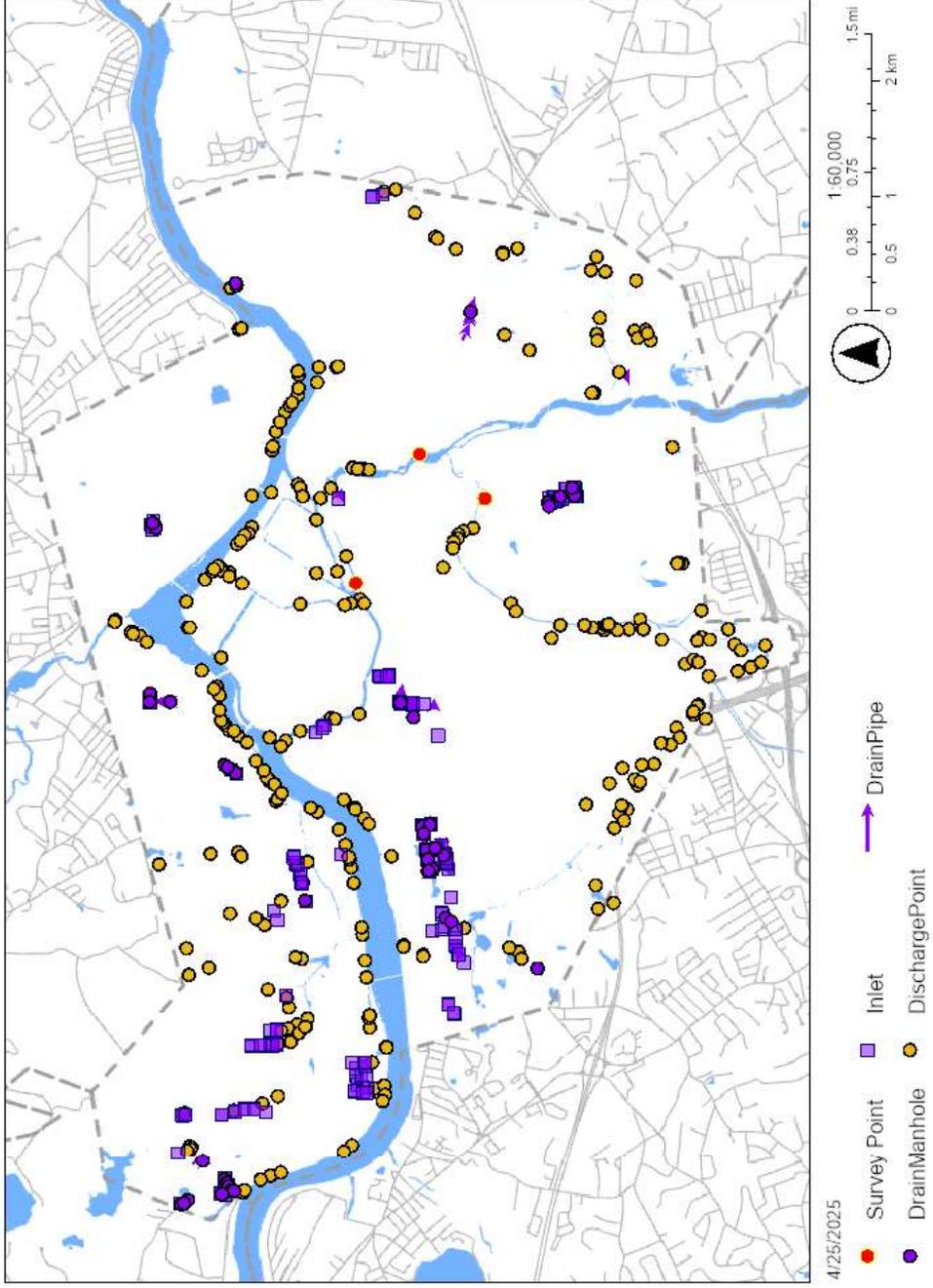


Figure 8-2 MS4 Investigations & Sampling

## Appendix A: The Utility Online Webpage

The Utility makes electronic copies of all submissions to the regulatory agencies publicly available on the City's website. This includes supporting documentation to this Annual Report. This page is accessible via the following link: <https://www.lowellma.gov/1076/>

The reader is encouraged to review the posted documentation, referenced within this report, for a more detailed overview of the Utility's core operational programs related to the operation and maintenance of its collection system.

The following are links to specific reports and submissions referenced:

**CMOM Self-Assessment:** <https://lowellma.gov/DocumentCenter/View/20980>

**CMOM Corrective Action Plan (CAP):** [www.lowellma.gov/DocumentCenter/View/29235](http://www.lowellma.gov/DocumentCenter/View/29235)

**Inflow and Infiltration Analysis Report:** <https://lowellma.gov/DocumentCenter/View/25284>

**I/I Analysis Supplemental Report:** <https://www.lowellma.gov/DocumentCenter/View/30402>

**Centralville Sewer Separation PDR:** <https://lowellma.gov/DocumentCenter/View/25108>

**Pretreatment Annual Report:** <https://lowellma.gov/DocumentCenter/View/22634>

**High Flow Management Plan:** <https://lowellma.gov/DocumentCenter/View/22823>

**Inflow and Infiltration Control Plan:** <https://lowellma.gov/DocumentCenter/View/20979>

**Stormwater Management Plan:** [www.lowellma.gov/DocumentCenter/View/21025](http://www.lowellma.gov/DocumentCenter/View/21025)

**IDDE Plan:** [www.lowellma.gov/DocumentCenter/View/21026](http://www.lowellma.gov/DocumentCenter/View/21026)

**CMOM and MS4 Annual Report:** <https://www.lowellma.gov/1702>