2024 CMOM Corrective Action Plan

Lowell Regional Wastewater Utility

NPDES Permit Number: MA0100633

Report Date: December 19, 2024

CAPACITY, MANAGEMENT, OPERATIONS, & MAINTENANCE (CMOM) CORRECTIVE ACTION PLAN

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

12/19/2024
Date

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1. Introduction

Lowell Regional Wastewater Utility (Utility) is a public utility located in the City of Lowell, Massachusetts (the City) that owns, maintains and operates an extensive stormwater drainage system; a flood protection system; and a wastewater utility comprised of a large combined sewer system dating back to the 1800s, newer separated conveyance systems, and the Duck Island Wastewater Facility (Duck Island), a multi-modal wastewater treatment works 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 purpose of the Utility's collection system is to protect public health and the environment by conveying sewage to Duck Island for treatment. The primary objective of the Capacity, Management, Operation and Maintenance (CMOM) program is to ensure that all work necessary to provide maximum conveyance of wastewater to the treatment plant is performed in a timely manner and to industry standards, and to minimize CSO and SSO discharges.

2. Report Requirements

The Utility completed a CMOM Program Self-Assessment (PSA), on December 31, 2022, as part of its National Pollutant Discharge Elimination System (NPDES) requirement to properly operate and maintain its sewer system. Following the submittal and review of the CMOM PSA, a corresponding CMOM Corrective Action Plan (CAP), identifying short and long-term actions to address the deficiencies identified in the PSA, is to be completed, submitted to the agencies for review and approval, and immediately and continuously implemented by the Utility per Paragraph 15 of the Consent Decree (CD).

The CMOM CAP is to include, at a minimum, the following:

a) A list of any action items identified by the CMOM PSA;
b) A plan for any measures needed to reduce the risk of surcharge/overflow events and resultant public health risks at/near areas with historical capacity-related sewer overflow events, including at a minimum, the following areas: Raven/River Road, Eagle Court (the Lowell Boys and Girls Club), Windward Road, Marginal Street, Bishop Street, an assessment of the Chelmsford Pump Station, Merrimack Street, and Bishop Street;
c) A list of causes and contributing factors leading to unauthorized discharges;
d) A description of the specific short and long-term actions that the Utility is taking, or plans to take, to address any of the deficiencies identified during the completion of the CMOM PSA; and
e) A schedule for implementation of the CMOM CAP (the "CMOM CAP Implementation Schedule").

3. CMOM Program Self-Assessment Action Items

The Utility identified sixteen (16) assessment items across four (4) CMOM PSA categories and nine (9) sub-categories as being deficient and in need of requiring future action in the CMOM PSA. The Utility received comments from the agencies on the CMOM PSA on August 21, 2024. Responses to these comments are included in the CMOM CAP as Appendix C. These comments also resulted in two (2) additional deficiencies beyond the 16 identified from the CMOM PSA, one of which was in a new self-assessment sub-category.

Table 1 below provides a summary of the action items identified by the CMOM PSA and the agency comments.

Further discussion of the corrective actions that the Utility is taking, or plans to take, to address these deficiencies is provided in Section 6 of this CMOM CAP.

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

Table 1. CMOM Program Self-Assessment Action Items Overview

4. Surcharge/Overflow Reduction Plan

In addition to addressing deficiencies identified as part of the CMOM PSA, the CMOM CAP provides a list of causes and contributing factors that lead to unauthorized discharges in the Utility's collection system, and a plan to reduce the risk of surcharge/overflow events at locations with a known history of surcharges/overflows. A detailed summary of the Utility's Sewer Surcharge Notification Program, templates for all reporting forms, and a yearly summary of surcharges/overflows can be found in Lowell's Annual NPDES Wastewater Report (see Appendix A).

4.1 Causes and Contributing Factors for Unauthorized Discharges

The Utility reported 88 sanitary sewer overflows between January 2019 and December 2024 as shown in Table 2. The causes and contributing factors that led to these overflows are largely maintenance related, resulting from system blockages (i.e., general sewer debris, roots, and grease). At select locations that experienced repeated surcharge occurrences, rain events have been preliminarily identified as the underlying cause. It is less common for overflows to be the result of pipe collapse or pump station failure in the City.

Surcharges/overflows stemming from issues along private sewer services occur on occasion; Utility personnel will respond to these private surcharges, assess the cause, and evaluate the Utility's responsibilities.

Cause of Surcharge/Overflow	Number of SSOs
Rain Event	68
Pump Station Failure	1
General Sewer System Blockage	4
Pipe Collapse	0
Root Intrusion	8
Grease Blockage	5
Private Service	2
Total	88

Table 2. Causes and Contributing Factors for Unauthorized Discharges

4.2 Surcharge/Overflow Reduction Plan: Remedial Protocol

The Utility has a remedial protocol that it follows to mitigate reoccurring overflows in the collection system. Upon arriving at the scene of an overflow, the Collection System Supervisor (or an appointed representative) evaluates the situation to determine if the cause of the overflow is related to the municipal collection system or to a private sewer service. If the overflow is potentially caused by surcharge within the collection system, the Collection System Supervisor will resolve the immediate issue. Additional personnel, including contracted services, may be called in when necessary; this usually entails removing a blockage and cleaning/disinfecting the site.

Shortly after the immediate overflow has been resolved, the downstream sewer main is video inspected to assess the condition of the line and determine if the overflow was caused by a structural deficiency or

conveyance issue. If a conveyance issue is found (e.g. root intrusion, grease blockage, etc.), a work order is placed to reestablish proper conveyance through the line. Related follow-up can consist of cleaning the line, cutting roots, or Cured-In-Place-Pipe (CIPP) lining the affected downstream main.

Once this initial follow-up has been completed, engineering staff will perform further assessment of the nature of the overflow event, as well as review past collection system records for the affected area, to determine if and where level sensor meters might be deployed to monitor for signs of potential future overflows.

The Utility may maintain these sensors or relocate them to other points along the sewer pipe to fully assess evidence of surcharge. These sensors are typically deployed at, or just downstream of, a manhole experiencing repeated surcharge overflows. Sensors are continuously deployed and inspected both before and after heavy rain events. The data collected by these sensors provides a better understanding of the duration and intensity of any captured surcharge and enables for a quicker real-time response from The Utility to investigate, remediate and resolve surcharging issues as they happen. Furthermore, this data is also helpful to determine what further planned action may be needed to mitigate surcharges or overflows at a specific location.

4.3 Surcharge/Overflow Reduction Plan: Past and Planned Corrective Actions

Table 3 below provides an overview of specified areas identified in the CD with historical capacity-related sewer overflow events, including a brief surcharge/overflow history, identified causes and contributing factors for each overflow, past corrective actions taken towards resolving the underlying causes of these issues, planned short term and long term corrective actions to be taken by the Utility to resolve the underlying causes of these issues, and expected deliverable dates for these future corrective actions.

Areas that were specified by the CD as having historical capacity-related sewer overflow events include the following: Raven/River Road, Eagle Court/Payne Street/Pevey Street (the Lowell Boys and Girls Club), Windward Road, Marginal Street, Bishop Street, the Chelmsford Pump Station, Merrimack Street, and Bishop Street.

Surcharging events reported at Eagle Court and the Lowell Boys and Girls Club (LBGC) occurred at the same manhole but have been reported with different names. As such, surcharges occurring at Eagle Court and the LBGC are summarized in a shared row in Table 3.

Area of Concern	Surcharge/Overflow History	Contributing Factors	Past/Planned Corrective Actions	Long-Term Deliverable Date
River/Raven Road	**First Recorded Surcharge:** September 10, 2020 **Last Recorded Surcharge:** July 21, 2023 **Total Recorded Surcharges:** 8	• Maintenance issue: roots • Tributary combined sewer catchments • Rain events	**Short Term:** In August 2021, the Utility deployed a level sensor at the manhole of concern (sMH-13353) after repeated surcharges were observed over the preceding year. Assessment and inspection of the area sewerage led to the discovery of large root growths and intrusions in a pipe segment downstream of the manhole. These roots caused a hydraulic restriction within the system. Root cutting was performed in December 2021, followed by CIPP lining of the affected pipe segment in February 2022. **Long Term:** After these Corrective Actions were performed, no further surcharges/overflows occurred at River/Raven Road until July 2023. The overflow event in July 2023 was attributed to significantly large rainfall event (greater than the 5-year average return interval storm event) in a short duration. The level sensor has been removed from this area and the issue is considered resolved. The Utility's sewer model of this area does not predict sanitary sewer overflow during a 5-year synthetic storm event. **Deliverable:** Issue resolved.	Issue Resolved
Eagle Court, Pevey Street, Payne Street, & Lowell Boys and Girls Club	**First Recorded Surcharge:** July 18, 2017 **Last Recorded Surcharge:** August 19, 2024 **Total Recorded Surcharges:** 29	• Steep pipe-grade • Tributary combined sewer catchments • Rain events	**Short Term:** In September 2020, The Utility deployed a level sensor at the manhole of concern (sMH-13326) to continually monitor the affected area and provide quick remedial response if a surcharge/overflow to occur. **Long Term:** The Utility will be submitting a Phase 3 Candidate Area Sewer Separation Preliminary Design Report (PDR) on December 31, 2024. A recommended plan will be included in this report to mitigate the risk of surcharge/overflows in this area. **Deliverable:** Implement proposed sewer improvements.	December 31, 2032

Area of Concern	Surcharge/Overflow History	Contributing Factors	Past/Planned Corrective Actions	Long-Term Deliverable Date
Windward Road	**First Recorded Surcharge:** July 18, 2017 **Last Recorded Surcharge:** August 19, 2024 **Total Recorded Surcharges:** 18	• Tributary to a combined sewer catchment • Rain events	**Short Term:** In August 2020, the Utility deployed a level sensor at the manhole of concern (sMH-13356) to continually monitor the affected area, and provide quick remedial response were a surcharge/overflow to occur. **Long Term:** The Utility will be starting construction of a project to install a wet-weather flow storage facility (sized for the 25-year design storm) that will address sewer surcharging and SSOs as part of the Douglas Road/Wentworth Avenue area, which is included as part of the Phase 3 Candidate Area Sewer Separation PDR work. The sewer along Windward Road is tributary to this area and will benefit from this storage facility. The proposed storage facility will be sized to manage wet-weather flows, significantly reducing sewer surcharging and SSOs along Douglas Road and Windward Road. **Deliverable:** Implement proposed sewer improvements.	December 31, 2026
Marginal Street	**First Recorded Surcharge:** June 6, 2016 **Last Recorded Surcharge:** July 18, 2017 **Total Recorded Surcharges:** 5	• Tributary combined sewer catchments • Rain events	**Short Term:** In 2016, the Utility installed the Marginal Sewer Relief Pipe. This 24-inch RCP was installed downstream of the surcharging manhole (sMH-12621) and connected the nearby 48-inch Walker Interceptor upstream of the Walker CSO Station. This relief pipe allows for wet weather flow to be diverted directly to the Walker Interceptor, reducing hydraulic restrictions in the Marginal Interceptor, which eliminated the SSOs occurring at this location. From August 2020 to October 2021, the Utility had a level sensor deployed at the manhole of concern to assess surcharge during rain events. Data collected over this timeframe indicated that the issues attributable to the surcharge were corrected. **Long Term:** Issue resolved. **Deliverable:** Issue resolved.	Issue Resolved

Area of Concern	Surcharge/Overflow History	Contributing Factors	Past/Planned Corrective Actions	Long-Term Deliverable Date
Bishop Street	**First Recorded Surcharge:** September 10, 2020 **Last Recorded Surcharge:** September 10, 2020 **Total Recorded Surcharges:** 1	• Private sewer service backup • Rain event	**Short Term:** Responding personnel determined that the underlying cause of the surcharge/overflow stemmed from the private sewer service, not the municipal collection system. As such, the Utility views this issue as being resolved. **Long Term:** Issue Resolved	Issue Resolved
Chelmsford Pump Station	**First Recorded Surcharge:** July 18, 2017 **Last Recorded Surcharge:** July 18, 2017 **Total Recorded Surcharges:** 1	• Equipment failure • Rain event	**Short Term:** This singular overflow event was not caused by a sizing issue with the Chelmsford Street Pump Station, as was reported; instead, reassessment of the situation led to the determination that this surcharge was caused by mechanical pumping equipment failure. In 2017, the Utility's Remote Station Upgrade project saw the installation of new pumps at the Chelmsford Pump Station. Since then, no subsequent surcharge/overflows have occurred at the Chelmsford Pump Station. The Utility views this issue as having been resolved. **Long Term:** Issue resolved. **Deliverable:** Issue resolved.	Issue Resolved
Merrimack Street	**First Recorded Surcharge:** September 10, 2020 **Last Recorded Surcharge:** September 10, 2020 **Total Recorded Surcharges:** 1	• Private sewer service backup • Rain event	**Short Term:** Responding personnel determined that the underlying cause of the surcharge/overflow stemmed from the private sewer service, not the municipal collection system. Additionally, a recommendation was made to the property owner to install a check-valve on their private sewer to prevent any further backup-related issues. As such, the Utility views this issue as being resolved. **Long Term:** Issue Resolved	Issue Resolved

Table 3. Historical Capacity-related Sewer Overflow Events: Past and Planned Corrective Actions

5. Corrective Action Plan and Implementation Schedule

Sixteen (16) assessment items across four (4) CMOM PSA categories and nine (9) sub-categories were identified by the Utility in the PSA as being deficient and in need of future action. Two (2) additional deficiencies were identified based on the comments provided by the agencies on August 21, 2024. The following section summarizes the corrective action measures the Utility is committing to towards addressing and resolving these deficiencies. Each corrective action includes a description of the existing identified deficiency, the Utility's proposed corrective action, and a deliverable date for the implementation of these corrective actions.

III.A. Collection System Management Organizational Structure

Checklist Reference	Question	Checklist Response	Corrective Action/Deliverable	Deliverable Date
III.A.4 (Corrective Action 1)	*Are there any collection system maintenance position vacancies? How long has the position(s) been vacant?*	One Mechanic I position is vacant. This position has been vacant since March 2022.	A new organizational chart has been developed by LRWWU. There are currently no vacant collection system positions. See attached Organizational Chart in Appendix D. **Deliverable:** Complete.	Complete

III.C. Collection System Management: Communication and Customer Service

Checklist Reference	Question	Checklist Response	Corrective Action/Deliverable	Deliverable Date
III.C.1 (Corrective Action 2)	*Describe your public education/outreach programs (e.g., for user rates, FOG, extraneous flow, SSOs etc.)?*	Lowell Wastewater's public education/outreach programs are largely spearheaded by MS4 requirements, and therefor focus more on stormwater messaging than on CMOM messaging. Template fliers are available to the public upon request. Additionally, collection system personnel have been labeling catch basins in an effort to promote a better understanding of the purpose that this infrastructure has in facilitating flow, and remediating street flooding.	The Utility has enlisted contracted professional engineering services to evaluate its existing public education/outreach program, identify deficiencies, and develop new educational materials and programs pertaining to collection systems operations. All public education materials will be made publicly available at Duck Island and will be posted on the City's website. The Utility will increase public outreach, including tabling at relevant City-run public events, distribute public educational flyers, and updating the Utility's website. **Deliverable:** Create public education material and distribute via the channels above. Public education material that will be available includes materials on FOG, SSO public notification plan, user rates, flushables, and private I/I.	October 31, 2026

III.F. Collection System Management: Legal Authority

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
III.F.1 (Corrective Action 3)	*Are discharges to the sewer regulated by a sewer use ordinance (SUO)? Does the SUO contain procedures for controlling and enforcing the following: □ FOG; □ Infiltration/ Inflow (I/I); □ building structures over the sewer lines; □ storm water connections to sanitary lines; □ defects in service laterals located on private property; □ sump pumps?*	Yes, certain discharges to the sewer system are regulated by Lowell's City Ordinance. The Ordinance can be found in Appendix E. The following sections of the ordinance outline regulations prohibiting or regulating discharges to the collection system: • § 272-38. Surface runoff and groundwater • § 272-42. Uncontaminated waters excluded from sanitary sewer • § 272-43. Discharge of surface drainage and industrial cooling water. • § 272-44. Prohibited discharges • § 272-45. Discharges which cause pass-through or interference • § 272-47. Grease, oil and sand interceptors. • § 272-53. Industrial discharge permit. • § 272-73. Compliance with pretreatment standards.	While a sewer use ordinance is in place and serves to enforce the protection of the collection system, the majority of the SUO sections have not been updated since the 1990s. The Utility will conduct a review of the City's current SUO to identify deficiencies within the ordinances that require improvements, revisions, and/or additional content. The City recently updated the stormwater ordinances (see Corrective Action 5). **Deliverable:** A summary detailing the findings obtained from reviewing the City's current SUO.	April 30, 2026

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
III.F.4 (Corrective Action 4)	*Do you have a program to control FOG entering the collection system? If so, which of the following does it include: □ permits, □ inspection □ enforcement? Are commercial grease traps inspected regularly and who is responsible for conducting inspections?*	The Sewer Use Ordinance identifies/quantifies what FOG is in § 272-45.B.(1). Grease traps are inspected on a corrective action basis by the Pretreatment Coordinator and the Sanitary Code Enforcement Inspector and follow up to the onsite inspection is done by the Executive Director or his/her designee.	§ 272-45.B.(1) will be updated to address any identified issues uncovered as part of the SUO review to be completed in response to Corrective Action 3. Updates to City ordinances are subject to review by the City's Law Department before coming to a City Council vote. The Utility expects this process to be completed by April 2027. **Deliverable:** Update the subparagraph within the City's sewer use ordinance for management of fats, oils, and grease.	April 30, 2027
III.F.5 (Corrective Action 5)	*Is there an ordinance dealing with storm water connections or requirements to remove storm water connections?*	Below is the current language in the SUO ordinance dealing with storm water connections: § 272-42. Uncontaminated waters excluded from sanitary sewer. [Amended 12-13-1988] No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, roof runoff, and uncontaminated cooling water to any sanitary sewer without expressed permission by the Executive Director of the Lowell Regional Wastewater Utility.	The City has fully adopted new stormwater ordinances as of January 2, 2024. See Appendix E for the City's newly adopted stormwater ordinances. **Deliverable:** Complete.	Complete

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
III.F.6 (Corrective Action 6)	*Does the collection system receive flow from satellite communities? Which communities? How are flows from these satellite communities regulated? Are satellite flow capacity issues periodically reviewed?*	The plant receives flow from four towns – Chelmsford, Dracut, Tewksbury and Tyngsboro. Each community has an allotment of flow and regulations are identified in their Inter-municipal Agreement with Lowell. • Chelmsford 3.01 MGD • Dracut 3.60 MGD • Lowell 21.06 MGD • Tewksbury 4.25 MGD • Tyngsborough 0.08 MGD All communities are continuously metered at major entry points to Lowell. Lowell maintains the flow meters for all flow Tewksbury, Dracut, and Tyngsborough entering Lowell. Chelmsford manages their own flow meters and Lowell participates in the yearly calibration of all their meters. Flow that enters the system from unmetered lines are identified and billed based on water usage as tracked by respective water billing departments. No communities have exceeded their flow allotment, as determined by yearly billing.	The Utility has provided in this CMOM CAP the existing Intermunicipal Agreements (IMAs, located in Appendix F) and will comment on their exceedances in flow during each April Semi-Annual Consent Decree Compliance Report. The Utility has reviewed flow and I/I data from the City and its satellite communities in detail since the 2022 Annual NPDES Compliance Report. **Deliverable:** Complete.	Complete

IV.B. Collection System Operation: Hydrogen Sulfide Monitoring and Control

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
IV.B.3 (Corrective Action 7)	*Does your system contain air relief valves at the high points of the force main system? How often are they inspected? How often are they exercised?*	There are no known air relief valves on city owned force mains.	The Utility will review available force main record plans to determine if there are any existing air relief valves and assess the need for any additional air relief valves. **Deliverable:** Review force main record plans to determine the need for any additional air relief valves at intermediate high points and examine the need for maintenance of these air relief valves.	April 30, 2026

IV.D. Collection System Operation: Emergency Preparedness and Response

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
IV.D.1 (Corrective Action 8)	*Do you have a written collection system emergency response plan? When was the plan last updated? What departments are included in your emergency planning?*	Lowell Wastewater does not have a formalized collection system emergency response plan. All personnel are trained in spill response procedures as part of the mandatory safety training program that employees are required to participate in. Additionally, the Utility maintains a flood response plan for the Centralville Flood Damage Reduction (FDR) System and the West Street Flood Pump Station.	The Emergency Response Plan will set forth procedures for responding to SSOs to minimize the environmental impact and potential human health risk. **Deliverable:** Develop a written SSO Emergency Response Plan.	October 31, 2025

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
IV.D.2 (Corrective Action 9)	*Which of the following issues are considered: □ vulnerable points in the system, □ severe natural events, □ failure of critical system components, □ vandalism or other third party events (specify), □ other types of incidents (specify)?*	As previously mentioned in Question IV.D.1, Lowell Wastewater does not have a formalized collection system emergency response plan.	The City is a designated Municipal Vulnerability Preparedness (MVP) community and completed a Hazard Mitigation Plan (HMP) in June 2020, which was approved by the Federal Emergency Management Agency (FEMA) and is effective June 21, 2021, to June 20, 2026. The DPW Commissioner and Wastewater Director were included in the Hazard Mitigation Advisory Group. The HMP discusses the vulnerable points in the collection system and severe natural events. **Deliverable:** An SSO Emergency Response Plan will be developed as part of Corrective Action 8 and will serve as a complementary document to the City's HMP.	October 31, 2025
IV.D.3 (Corrective Action 10)	*How do you train staff to respond to emergency situations? Where are responsibilities detailed for personnel who respond to emergencies?*	As previously mentioned in Section III.B, The Utility provides mandatory safety training to all employees on an annual basis. One major component of this training is spill response. This training program consists of a classroom setting review of the response procedures, followed by a simulated example allowing for the demonstration and application of the procedures in a safe, but representative, setting. Detailed responsibilities for personnel who respond to emergencies are included in employee job descriptions, which are stored on the Utility's shared drive. Additionally, safety training sessions are recorded and posted to a Utility YouTube account.	The Utility will train Wastewater staff and detail staff responsibilities on the SSO emergency response plan listed in Corrective Action IV.D.1 once these plans are completed. The Utility will incorporate a formal SSO response training for all Wastewater staff into the existing safety training regimen. **Deliverable:** SSO training documentation, including sign-in sheets, agenda, and pertinent presentation materials will be submitted.	April 30, 2026

IV.F. Collection System Operation: Pump Stations - Inspection

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
IV.F.5 (Corrective Action 11)	*How many pump stations are equipped with backup power sources? How many require portable generators? How many portable generators does your system own? Explain how the portable generators will be deployed during a system-wide electrical outage.*	Twelve of the fourteen pump stations have backup power. The Utility has two portable generators; when necessary, on-call electricians are able to deploy these generators.	Two pump stations were identified as having no portable generator connection/hook-up: Appleton Mills and Hamilton Canal District. Appleton Mills and Hamilton Canal District have since been retrofitted with portable generator connections/hook-ups. **Deliverable:** Complete.	Complete

V.B. Equipment and Collection System Maintenance: Maintenance Right-of-Way

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
V.B.1 (Corrective Action 12)	*Is scheduled maintenance performed on Rights-of-Way and Easements? At what frequency? How many manholes in easement areas can not be located?*	Lowell Wastewater does not perform scheduled maintenance on Rights-of-Way and Easements. Maintenance work in these areas are performed on an as-needed basis. Lowell Wastewater does not have an accurate easements layer present in its GIS system, making it difficult to quantify the number of manholes that are located in easement areas. Collection system infrastructure that falls within the extents of a Right-of-Way, easement, or municipally owned parcel are referred to as "cross-country" by Utility personnel and are recorded as such in GIS.	A recent effort has been made by the Utility towards collecting easement records hosted through the Northern Middlesex Registry of Deeds website. The extents of these easements have been recorded in the Utility's GIS database. The Utility also received a wastewater utility Asset Management Plan (AMP) grant with the MassDEP Clean Water State Revolving Fund (CWSRF) as part of the Calendar Year (CY) 2024 cycle. The Utility will inventory the portions of the collection system that are within rights-of-way and easements (i.e. sewer assets located off-road). A prioritized maintenance plan will be developed. Sewers that are located off road, that have a history of sanitary sewer overflow will be prioritized for maintenance. The number of manholes in easements that cannot be located will be identified. **Deliverable:** A desktop analysis will be performed to identify collection system assets that are located outside of public rights-of-way (off-road assets). A prioritized maintenance plan will be developed to perform maintenance on off-road assets/easements that pose a higher risk of sanitary sewer overflow.	October 31, 2028

V.C. Equipment and Collection System Maintenance: Parts Inventory

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
V.C.3 (Corrective Action 13)	*How to you determine if adequate supplies on hand? Has an inventory tracking system been implemented?*	An adequate supply of a particular spare part is determined by past experience and needs. Inventory is replaced as supplies are used, on an as needed basis. There is no established inventory tracking system currently in place.	The Utility has contracted services to maintain and manage the Utility's consumable stock room. **Deliverable:** Completed.	Complete

VI A. SSES: System Assessment

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
VI.A.2 (Corrective Action 14)	*If problems are related to I/I, has a Sewer System Evaluation Survey (SSES) been conducted? When? What is the status of the recommendations?*	Due to formatting constraints, the reader is referred to the CMOM Program Self-Assessment Checklist for the Utility's response to Question VI.A.2.	An I/I Analysis Report was delivered to the agencies on January 31, 2024 for review and approval. The Utility will implement the approved SSES program. Each year by April 30 in the Consent Decree Compliance Report, the Utility will provide flow data and analysis of flows at the LRWWU Treatment Facility and flows received from Tewksbury, Tyngsborough, Chelmsford, and Dracut. Updates to SSES actions undertaken and expected future activities will be summarized in the CD Semi-Annual Compliance Reports. **Deliverable:** Completed.	Complete

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
VI.A.3 (Corrective Action 15)	*Do you have a program to identify and eliminate sources of I/I into the system including private service laterals and illegal connections? If so, describe.*	Due to formatting constraints, the reader is referred to the CMOM Program Self-Assessment Checklist for the Utility's response to Question VI.A.3.	The 2024 I/I Analysis Report documents the Utility's program to identify and eliminate sources of I/I into the system from private service laterals and illegal connections. The I/I Analysis Report was delivered to the agencies on January 31, 2024 for review and approval. The Utility will implement the approved SSES program. Updates to SSES actions undertaken and expected future activities will be summarized in the CD Semi-Annual Compliance Reports. The Utility will continue to assess its I/I reduction program with respect to extraneous flow from private laterals and illegal connections. The Utility will continue to complete SSES work to reduce I/I in areas that are not part of the future sewer separation program. During the separation program, the Utility has currently adopted a program to line or replace most existing sewer pipe due to age. This program currently includes an approach to inspect sewer laterals and on a case-by-case basis improve laterals up to the property line to avoid any future excavations for repairs within the street rights-of-way. Additionally, the City is considering a program to extend lateral lining to each building on a case-by-case basis to affect extraneous flow control. **Deliverable:** Completed.	Complete
VI.A.4 (Corrective Action 16)	*Have private residences been inspected for sump pumps and roof leader connections?*	Private residences and businesses that fell within the extents of Phase I LTCP sewer separation areas were inspected for sump pumps and roof leader connections. These inspections took place from 2006 to 2010.	In accordance with the Utility's sewer I/I Plan and sewer separation work, the Utility will evaluate continuing the implementation of a private sump pump and roof leader inspection program targeting residential and commercial properties as part of planned sewer separation projects. This program will first be implemented as a part of the Centralville Sewer Separation project. **Deliverable:** Results from Phase 1 Centralville Sewer Separation Project will be submitted.	April 30, 2028

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
VI.A.5 (Corrective Action 17)	*Are inspections to identify illicit connections conducted during the property transfer process?*	Inspections to specifically identify illicit connections are not conducted during the property transfer process. Inspections of existing sewer laterals are required during property redevelopment projects.	The Utility has coordinated with City Engineering and determined that inspections to identify illicit connections conducted during the property transfer process is not feasible. However, the Utility does utilize CCTV inspections to identify clear flow from laterals connected to the sewer main as a method of identifying potential illicit connections. **Deliverable:** Completed	Complete

VI.B. SSES: Manhole Inspection

Checklist Reference	Question	Response	Corrective Action/Deliverable	Deliverable Date
VI.B.2 (Corrective Action 18)	*Has a formal manhole inspection checklist been developed?*	A formal manhole inspection checklist is not used. Designated GIS users are able to directly access and edit a manhole's attribute information in the field via ArcGIS Collector. Survey123 forms containing space to provide relevant information related to a mapped manhole, as well as a space to record comments observed during an inspection are available also available for field staff.	A manhole inspection checklist has been developed. A table displaying fields and values utilized in the checklist is attached to this report as Appendix B. **Deliverable:** Completed.	Complete

Appendix A: Lowell Wastewater 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.

Appendix B: Formal Manhole Inspection Checklist Fields and Values

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Appendix B - Formal Manhole Inspection Checklist Fields and Values

Field #	Requirement Level	Lowell Required	Field	Type	Units	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8	Value 9	Value 10	Value 11	Value 12	Value 13	Value 14	Value 15	Value 16	Value 17	Value 18	Value 19	Value 20	Value 21	Value 22	Value 23	Value 24	Value 25	Value 26	Value 27
1	1,2	Y	Surveyed By	Alphanumeric	NA	Inspector Name																										
2	1,2	N	Certificate Number	Alphanumeric	NA	Certificate Number																										
3	Optional	N	Reviewed By	Alphanumeric	NA	Reviewer Name																										
4	Optional	N	Reviewer Cetificate Number	Alphanumeric	NA	Reviewer Certificate Number																										
5	Optional	N	Owner	Alphanumeric	NA	Owner Name																										
6	Optional	N	Customer	Alphanumeric	NA	Customer Name																										
7	Optional	N	P/O Number	Alphanumeric	NA	Purchase Order Number or Contract																										
8	Optional	N	Work Order	Alphanumeric	NA	Work Order Number																										
9	Optional	N	Media Label	Alphanumeric	NA	Media Number																										
10	Optional	Y	Project	Alphanumeric	NA	Project Name																										
11	1,2	Y	Date	Numeric (8 characters)	NA	YYYYMMDD																										
12	Optional	Y	Time	Alphanumeric (2 characters:2 characters)	NA	HH:MM																										
13	1,2	N	Sheet Number	Numeric	NA	Page Number																										
14	Optional	Y	Weather	Alphabetic	NA	Dry - No Precipitation During Survey	Heavy Rain	Light Rain	Snow	Dry Weather/Wet Ground																						
15	2	N	Pre-Cleaning	Alphabetic	NA	Heavy Cleaning	Light Cleaning	No Pre-Cleaning	Not Known	Other																						
16	Optional	N	Date Cleaned	Numeric (8 characters)	NA	YYYYMMDD																										
17	1,2	Y	Purpose of Survey	Alphabetic	NA	Maintenance Related	Infiltration and Inflow Investigation	Post-Rehabilition Survey	Pre-Rehabilitation Survey	Pre-Acceptance	Routine Assessment	Capital Improvement Program Assessment	Resurvey	Sewer System Evaluation Survey	Pre-Existing Video or Photographs	Not Known																
18	1,2	Y	Inspection Level	Alphanumeric	NA	Level 1	Level 2																									
19	1,2	Y	Inspection Status	Alphanumeric	NA	Descent Inspection	Surface Inspection	Remote Inspection																								
20	Optional	N	Consequence of Failure	Numeric (1 character)	NA	1	2	3	4	5	6																					
21	Optional	N	Drainage Area	Alphanumeric	NA	Name of Drainage Area																										
22	1,2	Y	Manhole/Access Point Number	Alphanumeric	NA	Reference Number																										
23	1,2	Y	Street	Alphanumeric	NA	Name and Number																										
24	1,2	Y	City	Alphanumeric	NA	City Name																										
25	2	Y	Location Code	Alphanumeric	NA	Primary Major Arterial Roads	Secondary Roads	Local Rural Streets	Easement/Right of Way	Woods	Sidewalk	Parking Lot	Alley	Ditch	Building	Creek	Railway	Airport	Levee/Floodwall	Dam	Levee Pump Station	Yard	Other									
26	2	Y	Surface Type	Alphabetic	NA	Asphalt	Concrete/Pavement	Concrete Collar	Grass/Dirt	Gravel	Other																					
27	Optional	Y	Inflow Potential from Runoff	Alphanumeric	NA	None	Sheeting	Ponding	Inundated																							
28	Optional	N	Location Details	Alphanumeric	NA	Additional Location Details																										
29	2	Y	Manhole Use	Alphabetic	NA	Combined	Dam	Force Main	Levee Gravity	Levee	Processes	Sanitary	Stormwater	Not Known	Other																	
30	1,2	Y	Access Type	Alphabetic	NA	Catch Basin	Cleanout House	Cleanout Mainline	Cleanout Property	Junction Box	Meter	Manhole	Other Special Structure	Wastewater Access	Wet Well																	
31	Optional	N	Year Constructed	Numeric (4 characters)	NA	YYYY																										
32	Optional	N	Year Renewed	Numeric (4 characters)	NA	YYYY																										
33	2	Y	Evidence of Surcharge	Alphabetic	NA	Yes	No																									
34	2	Y	Rim to Invert	Numeric	Feet	Distance Between Rim Level and Outgoing Pipe Invert Level																										
35	2	N	Rim to Grade	Numeric	Feet	Distance Between Rim Level and Grade Level																										

Appendix B - Formal Manhole Inspection Checklist Fields and Values

Field #	Requirement Level	Lowell Required	Field	Type	Units	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8	Value 9	Value 10	Value 11	Value 12	Value 13	Value 14	Value 15	Value 16	Value 17	Value 18	Value 19	Value 20	Value 21	Value 22	Value 23	Value 24	Value 25	Value 26	Value 27
36	2	N	Grade to Invert	Numeric	Feet	Distance Between Grade Level and Outgoing Pipe Invert Level																										
37	Optional	N	Rim to Grade Exposed	Numeric	Feet	Distance Between Rim Level and Lowest Exposed Point of Manhole Exterior																										
38	Optional	N	Northing	Alphanumeric	NA	Y Coordinate																										
39	Optional	N	Easting	Alphanumeric	NA	X Coordinate																										
40	Optional	N	Elevation	Alphanumeric	NA	Z Coordinate																										
41	Optional	N	Coordinate System	Alphanumeric	NA	Reference System Used for GPS Coordinates																										
42	Optional	N	Vertical Datum	Alphanumeric	NA	Specific Geodetic System used Z Coordinate																										
43	Optional	N	GPS Accuracy	Alphabetic	NA	Survey Level	Sub-Meter	Nearest Meter																								
44	Optional	N	Additional Information	Alphanumeric (up to 255 characters)	NA	Description of Any Special Details																										
45	2	Y	Cover Type	Alphabetic	NA	Bolted	Gasketed	Solid	Inner Cover	Locking	Single Hatch	Double Hatch	Lamphole	Removable Center Cover	Vented																	
46	2	Y	Cover Shape	Alphabetic	NA	Circular	Elliptical	Rectangular	Square	Triangular	Other																				
47	2	Y	Cover Size	Numeric	Inches	Diameter	Longest Side																								
48	Optional	N	Center Cover Size	Numeric	Inches	Inner Diameter																										
49	2	N	Cover Size Width	Numeric	Inches	Shorter Side																										
50	2	N	Cover Material	Alphabetic	NA	Aluminum	Cast Iron	Concrete (cast in place)	Concrete (precast)	Ductile Iron	Fiberglass Reinforced	Polyethylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Not Known	Other														
51	2	Y	Vent Hole Diameter	Alphabetic	NA	Less than or equal to 1/2" (10 mm)	Greater than 1/2" (10 mm) but less than or equal to 1" (25 mm)	Greater than 1" (25 mm) but less than or equal to 1 1/2" (38 mm)	Greater than 1 1/2" (38 mm) but less than or equal to 2" (50 mm)	Greater than 2" (50 mm) or grated/slotted																					
52	2	Y	Hole Number	Numeric	NA	Number of Vent Holes																										
53	2	N	Cover Bearing Surface Diamter	Numeric	Inches	Length of Longer Dimension of Cover over the Frame																										
54	2	N	Cover Bearing Surface Width	Numeric	Inches	Length of Smaller Dimension of Cover over the Frame																										
55	2	Y	Cover/Fram Fit	Alphabetic	NA	Good	Oversized	Rocks/Wobbles	Undersized																						
56	1,2	Y	Cover Condition	Alphabetic	NA	Bolts Missing	Broken	Corroded (pitted)	Cracked	Missing	Restraint Missing	Restraint Defective	Sound																			
57	2	Y	Insert Type	Alphabetic	NA	Metal	None	Plastic	Other																						
58	2	Y	Cover Insert Condition	Alphabetic	NA	Sound	Corroded	Cracked	Insert Fell	Leaking	Poor Fitting																				
59	1,2	N	Adjustment Ring Type	Alphabetic	NA	Adjustable	None	Solid																							
60	2	N	Adjustment Ring Material	Alphabetic	NA	Cast Iron	Concrete (cast in place)	Concrete (precast)	Ductile Iron	Fiberglass Reinforced	Polyethylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Not Known	Other															
61	1,2	N	Ring Condition	Alphanumeric	NA	Sound (No significant defects)	Broken	Corroded	Cracked	Leaking	Poor Installation																				
62	Optional	N	Adjustment Ring Height	Numeric	Inches	Distance from the Top of Rim to Bottom of the Adjustment Ring																										
63	2	N	Frame Material	Alphabetic	NA	Cast Iron	Concrete (cast in place)	Concrete (precast)	Ductile Iron	Fiberglass Reinforced	Polyethylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Not Known	Other															
64	2	N	Frame Bearing Surface Width	Numeric	Inches	Distance of the Bearing Surface on Which the Cover Sits																										

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65	2	N	Frame Bearing Surface Depth	Numeric	Inches	Distance from the Top of Frame Rim to Top of Frame Bearing Surface																										
66	2	Y	Frame Clear Opening Diameter	Numeric	Inches	Length of Longer Inner Measurment of the Frame Bearing Surface																										
67	2	N	Frame Clear Opening Width	Numeric	Inches	Length of Smaller Inner Measurment of the Frame Bearing Surface																										
68	1,2	Y	Frame Condition	Alphabetic	NA	Broken	Coated	Corroded	Cracked	Missing	Sound																				
69	2	N	Seal Condition	Alphabetic	NA	Cracked	Loose	Missing	Offset	Sound																					
70	2	N	Frame Offset Distance	Numeric	Inches	Offset Distance From Manhole Frame to Chimney Top																									
71	2	Y	Frame Seal Inflow	Alphabetic	NA	None	Stains	Weeper	Dripper	Runner	Gusher																				
72	Optional	N	Frame Depth	Numeric	Inches	Distance from the Top of Frame Rim to Bottom of Frame																									
73	2	Y	Chimney Present	Alphabetic	NA	Yes	No																								
74	2	Y	Chimney First Material	Alphabetic	NA	Asbestos Cement	Brick	Corrugated Metal	Concrete (cast in place)	Concrete (precast)	Clay Tile	Fiberglass Reinforced	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Rubber	Steel	Vitrified Clay	Not Known	Other										
75	Optional	N	Chimney Second Material	Alphabetic	NA	Asbestos Cement	Brick	Corrugated Metal	Concrete (cast in place)	Concrete (precast)	Clay Tile	Fiberglass Reinforced	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Rubber	Steel	Vitrified Clay	Not Known	Other										
76	Optional	Y	Chimney I/I	Alphabetic	NA	None	Stains	Weeper	Dripper	Runner	Gusher																				
77	Optional	N	Chimney Clear Opening	Numeric	Inches	Diameter of the Minimum Chimney Clear Opening																									
78	2	N	Chimney Depth	Numeric	Feet	Distance from the Top of Frame to Bottom of Chimney																									
79	Optional	N	Chimney Lining Interior	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-Place	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other															
80	Optional	N	Chimney Lining Exterior	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-Place	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other															
81	1	Y	Chimney Condition	Alphabetic	NA	Defective	Sound	Not Known																							
82	2	Y	Cone Type	Alphabetic	NA	Conical Centered	Conical Off Centered	Flat Top	Not Present	Other																					
83	2	Y	Cone Material	Alphabetic	NA	Asbestos Cement	Brick	Corrugated Metal	Concrete (cast in place)	Concrete (precast)	Clay Tile	Fiberglass Reinforced	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Vitrified Clay	Not Known	Other											
84	2	N	Cone Depth	Numeric	Feet	Distances from the Top of Frame Rim to Bottom of the Cone																									
85	Optional	N	Cone Lining Interior	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-Place	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other															
86	Optional	N	Cone Lining Exterior	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-Place	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other															
87	1	Y	Cone Condition	Alphabetic	NA	Defective	Sound	Not Known																							
88	Optional	N	Wall Diameter	Numeric	Inches	Longer Dimension of the Manhole Wall																									
89	Optional	N	Wall by Size	Numeric	Inches	Smaller Dimension of the Manhole Wall																									
90	2	Y	Wall Material	Alphabetic	NA	Asbestos Cement	Brick	Corrugated Metal	Concrete (cast in place)	Concrete (precast)	Clay Tile	Fiberglass Reinforced	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Vitrified Clay	Not Known	Other											

Appendix B - Formal Manhole Inspection Checklist Fields and Values

Field #	Requirement Level	Lowell Required	Field	Type	Units	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8	Value 9	Value 10	Value 11	Value 12	Value 13	Value 14	Value 15	Value 16	Value 17	Value 18	Value 19	Value 20	Value 21	Value 22	Value 23	Value 24	Value 25	Value 26	Value 27
91	2	N	Wall Depth	Numeric	Feet	Distance from the Frame Rim to Wall Bottom																										
92	Optional	N	Wall Lining Interior	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-Place	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other																
93	Optional	N	Wall Lining Exterior	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-Place	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other																
94	1	Y	Wall	Alphabetic	NA	Defective	Sound	Not Known																								
95	2	Y	Bench Present	Alphabetic	NA	None	Partial	Yes																								
96	2	Y	Bench Material	Alphabetic	NA	Asbestos Cement	Aluminum	Brick	Corrugated Metal	Concrete (cast in place)	Concrete (precast)	Clay Tile	Fiberglass Reinforced	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Vitrified Clay	Not Known	Other										
97	Optional	N	Bench Lining	Alphabetic	NA	Bitumastic	Cementitious	Cured-in-	Epoxy	Fiberglass	None	Polymer	Plastic	Rubber	Not Known	Other																
98	1	Y	Bench Condition	Alphabetic	NA	Defective	Sound	Not Known																								
99	2	Y	Channel Installed	Alphabetic	NA	Yes	No																									
100	2	Y	Channel Material	Alphabetic	NA	Asbestos Cement	Brick	Corrugated Metal	Concrete (cast in place)	Concrete (precast)	Clay Tile	Fiberglass Reinforced	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Steel	Vitrified Clay	Not Known	Other											
101	2	N	Channel Type	Alphabetic	NA	Formed	Insert	None	Pipe	Precast	Other																					
102	2	N	Channel Exposure	Alphabetic	NA	Closed	Fully Open	Partially Open																								
103	1	Y	Channel Condition	Alphabetic	NA	Defective	Sound	Not Known																								
104	2	N	Step Number	Numeric	Whole Number	Quantity of Steps																										
105	2	N	Step Material	Alphabetic	NA	Brick	Metal	Plastic	Other																							
106	Optional	N	Additional Component Information	Alphanumeric	NA	I/I Location Description	Defective Component Details																									
107	2	Y	Connection Pipe Number	Numeric	NA	Sequentially Number Connection Pipes Starting at the Outgoing Pipe at 6 o'clock, Counting Clockwise																										
108	2	Y	Connection Pipe Clock Position	Numeric	NA	Clock Position of Each Pipe Connection																										
109	2	Y	Rim to Connection Pipe Invert	Numeric	NA	Distance from the Rim to the Bottom of the Connection Pipe																										
110	2	Y	Connection Pipe Direction	Alphabetic	NA	In	Out																									
111	2	Y	Connection Pipe Material	Alphabetic	NA	Acrylonitrile Butadiene Styrene	Asbestos Cement	Brick	Cast Iron	Clay-Lined Concrete Pipe	Corrugated Metal Pipe	Concrete Pipe (non-reinforced)	Concrete Segments (bolted)	Concrete Segments (unbolted)	Clay Tile (not vitrified clay)	Ductile Iron Pipe	Fiberglass Reinforced Pipe	Pitch Fiber	Pre-Stressed Concrete Cylinder Pipe	Polymer Concrete Pipe	Polyethylene	Polypropylene	Plastic/Steel Composite	Polyvinyl Chloride	Reinforced Concrete Pipe	Reinforced Plastic Pipe	Steel Pipe	Segmented Brick	Vitrified Clay Pipe	Wood	Not Known	Other
112	2	Y	Connection Pipe Shape	Alphabetic	NA	Arched	Barrel	Circular	Egg Shaped	Horseshoe	Oval	Rectangular	Square	Trapezoidal	U-Shaped with Flat Top	Other															
113	2	Y	Connection Pipe Height	Numeric	Inches	Longer Dimension Inside of Pipe																										
114	2	Y	Connection Pipe Width	Numeric	Inches	Shorter Dimension Inside of Pipe																										
115	2	Y	Connection Pipe	Alphabetic	NA	Sound	Defective																									
116	2	Y	Connection Pipe Seal Condition	Alphabetic	NA	Sound	Defective																									
117	2	Y	Connection Pipe Type	Alphabetic	NA	Force Main	Gravity Connection	Inside Drop Lower	Inside Drop Upper	Lateral to Building	Outside Drop Lower	Outside Drop Upper	Not Known	Other																		
118	Optional	N	Connection Pipe Structure ID	Alphanumeric	NA	Structure ID																										
119	Optional	N	Connection Pipe Comments	Alphanumeric	NA	Any Additional Information																										
120	Optional	Y	Overall Condition Score	Numeric	NA	1	2	3	4	5																						
121	Optional	Y	Estimated Infiltration	Numeric	Gallons Per Day	Estimated Infiltration Rate																										
122	Optional	Y	Immediate Action Required	Alphabetic	NA	Yes	No																									
123	Optional	Y	Roots Present	Alphabetic	NA	Yes	No																									

Appendix B - Formal Manhole Inspection Checklist Fields and Values

Field #	Requirement Level	Lowell Required	Field	Type	Units	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8	Value 9	Value 10	Value 11	Value 12	Value 13	Value 14	Value 15	Value 16	Value 17	Value 18	Value 19	Value 20	Value 21	Value 22	Value 23	Value 24	Value 25	Value 26	Value 27
124	Optional	Y	Currently Surcharged	Alphabetic	NA	Yes	No																									
125	Optional	Y	Photo of Cover/Frame	Image	NA																											
126	Optional	Y	Photo of Internal with Downstream Pipe at 6 o'clock	Image	NA																											

Appendix C: CMOM Self-Assessment Agency Comment Responses

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Appendix C - CMOM Self-Assessment Agency Comment Responses

Lowell Regional Wastewater Utility

NPDES Permit Number: MA0100633

Introduction

The City of Lowell (the City) submitted a Capacity, Management, Operation and Maintenance (CMOM) Program Self-Assessment (PSA), on December 31, 2022, as part of its National Pollutant Discharge Elimination System (NPDES) requirement to properly operate and maintain its sewer system. Lowell Wastewater (the Utility) received comments from the EPA and MassDEP on August 21, 2024. The comments from the Agencies have been included below in **bold**. The Utility's responses to the comments have been included below in *italics*.

Sewer Surcharging/SSO Risk

The information in the Assessment focused primarily on actions related to the combined sewer overflows, for which there is a separate regulatory framework from that for discharges from sanitary sewer systems. EPA's CMOM guidance and associated checklist for evaluating collection systems puts more focus on collection system operation and maintenance, and risk of sanitary sewer overflows (SSOs). Based on a review of the City's SSO records, we are aware that the City has a number of areas that have had recurring SSO events, which should be a focus of further CMOM efforts, including the Raven/River Road, Eagle Court, Winward Road, Pevey Street, and Wentworth/Douglas areas. The City should provide additional information on the SSO risks at these sites, and any system management actions or engineering evaluations of options to mitigate the SSO risk.

Information on the SSO risk, system management actions, and engineering evaluations of options to mitigate SSO risk at each of the sites outlined in the comment above and identified in the Consent Decree (i.e. River/Raven Road, Eagle Court, Windward Road, Marginal Street, Bishop Street, the Chelmsford Pump Station, and Merrimack Street) is included in the CMOM CAP under Section 4.3, "Surcharge/Overflow Reduction Plan: Past and Planned Correction Actions".

System Inspections

The Assessment notes that the City has its own CCTV equipment, and also conducts other investigations to identify elements of the system that may need rehabilitation, repair, or replacement. However, it is not clear in all cases how large the scope of this work is or how this work is prioritized. The CAP should expand this assessment to address the following:

1. **A description of the City's program of manhole inspections, indicating, over the past five years, how many manholes have been determined to be in a condition of "imminent failure" and repaired by the City's on-call services.**

   A description of the City's program of manhole inspections was included in the I/I Analysis Report submitted to the Agencies on January 31, 2024. A map showing the sewer manholes that were inspected over the past five years is provided with these responses in Attachment 1-1. Over the past five years there are 60 sewer manholes that were determined to be in a condition of "imminent failure" and repaired by the City's on-call services and are shown in the Sewer Work map also provided with these responses in Attachment 1-3.

2. **A summary of the linear feet of sewer/drain the City CCTV'd each year, with a map, if available, showing the location of the lines with "conveyance issues."**

   A map showing sewer main that was CCTV inspected over the past five years and lines with known conveyance issues is provided with these responses in Attachment 1-2. A summary of the linear feet of sewer main CCTV'd each year has also been provided in Table 1-1 in Attachment 1.

3. **The City notes that it deploys Echo sensor devices in the system. Provide a description of how many such devices the City owns/leases, and how their deployment is managed.**

   The Utility owns eight (8) ADS Echo sensor devices that it currently has deployed at the following locations: Tyler Park, Saint James Street, French Street, Payne Street, Eagle Court, the intersection of Gorham and Moore Street, the intersection of Lakeview Avenue and Ennell Street, and Windward Road. The Utility also previously had Echo sensors installed at Raven Road and Coburn Road which have since been removed. The Echo sensor devices and their deployment is managed internally by the Utility. Data collection and alarming for the Echo sensor devices is managed through the ADS' web-based Prism software.

4. **The City should provide a map showing the City's force mains, and note their length, materials, and any incidence of failure. A review of the need for any air relief valves should also be included in the CAP.**

   A map showing the City's pump stations and force mains is provided with these responses in Attachment 2. The length and material of the City's force mains is also provided with these responses in Table 2-1 in Attachment 2. A corrective action has been added to the CAP (Corrective Action 7) to review the City's record information on their force mains to determine the need for any air relief valves at intermediate high points.

5. **The City indicates there is no CIP funding allotment for prioritized work on the sewer system, but that annual budgeting is typically about $1.25 million. The City should provide information on how and where that work has been done over the last five-year period.**

   The City has utilized the on-call contracted services outlined in Table 3-1 in Attachment 3 to perform sewer work over the last five years. A map showing the sewer manholes and gravity mains where sewer work has been completed over the last five years has been provided with these responses in Attachment 1-3.

The CAP should include short and long-term goals for assessing the needs of the full collection system, which considers the age of the system, materials, design parameters, and history of any failures. System investigation work done under other programs (sewer separation, I/I work, etc.) should also be considered in developing the approach for this work.

The short and long-term plan for assessing sewer collection needs is included in the I/I Analysis Report, dated January 31, 2024. Sewer assessment information from Sewer Separation, CMOM, and I/I related work is organized by LRWWU into various databases including their CCTV management program GraniteNET, and their Enterprise ESRI software. This information is reviewed by LRWWU engineers and their consultants on a rolling basis to prioritize assessment and repair on a short and long-term basis.

Collection System Staffing/Resources

EPA's CMOM Guidance recommends 27 sewer collection system staff for systems serving >l00,000 people. The staffing chart included in the Assessment is well short of this goal. The CAP should indicate if current operations reflect "full" staffing, or if the lack of full staffing is offset by contract services. Any current or future needs should be identified and appropriately budgeted.

The Utility's staffing is supported by contract services. A list of contracted services and their contracts has been provided with these responses as Attachment 3.

Public Education/Outreach Programs

Lowell Wastewater's public education/outreach programs are largely spearheaded by MS4 requirements, and therefore focus more on stormwater messaging than on CMOM messaging.

MassDEP and EPA acknowledge the importance of this effort, however, outreach efforts should also include sewer-related issues such as proper management of fats, oil, and grease (FOG) and baby wipes, which have emerged as significant collection system problems for many sewer authorities.

Outreach efforts regarding sewer-related issues are included in the CAP under Corrective Action 2 and will include the creation and distribution of public education material related to FOG, sewer user rates, flushables, and private I/I.

SSO Notification Program

The SSO Notification Form is to be submitted within 5 days of the initial notice. The City should also confirm that timely notice is provided to downstream public drinking water suppliers and shellfish authorities for all SSO discharges which flow to downstream resources, even if such events are not subject to notification under 314 CMR 16.00.

Acknowledged and confirmed.

The City's Assessment also noted that, while staff is provided with training, there is currently no Collection System Emergency Response Plan. The CAP should include a task to develop and maintain an up-to-date Emergency Response Plan.

A task to develop and maintain an up-to-date SSO Emergency Response Plan has been included in the CAP under Corrective Action 8.

It does not appear the City has a 4:1 I/I mitigation requirement in place as required under 314 CMR 12.04(2). The CAP should also include a summary of the intermunicipal agreements with the customer communities and note where any of the connected communities have exceeded the pollutant load or flow limits their IMA allotments. MassDEP notes that the City's full I/I Abatement Plan is under separate review, and comments will follow on that program.

A task to provide a summary of the City's intermunicipal agreements with customer communities has been included in the CAP under Corrective Action 6. The City will implement the 4:1 I/I mitigation requirement per 314 CMR 12.04(2).

Right-of-Way/Easements

Lowell Wastewater does not have an accurate easements layer present in its GIS system, making it difficult to quantify the number of manholes that are located in easement areas. Collection system infrastructure that falls within the extents of a Right-of-Way, easement, or municipally owned parcel are referred to as "cross-country" by utility personnel and are recorded as such in GIS. The matter of access has arisen as an issue for some sewer authorities, i.e., not being able to adequately access critical collection system infrastructure on a timely basis. The City's CAP should include further actions to identify these areas, and any access constraints.

A task to perform a desktop analysis to identify collection system assets that are located outside of public rights-of-way (off-road assets) and to develop a prioritized maintenance plan for off-road assets/easements that pose a higher risk of sanitary sewer overflow has been included in the CAP under Corrective Action 12. LRWWU has obtained a MassDEP Asset Management Grant to perform this work.

Attachment 1: Manhole Inspections, CCTV, and Sewer Work Maps (2020-2024)

Year	Linear Feet of Sewer Main Inspected (LF)
2020	51,567
2021	85,520
2022	71,376
2023	81,471
2024	139,322
Total	429,255

Table 1-1. Linear Feet of Sewer Main Inspected by Year, 2020 - 2024

Attachment 1-1
Manhole Inspections (2020-2024)

City of Lowell, MA

N

Legend

- Lowell Municipal Boundaries
- Sewer Manholes
- Manhole Inspections (2020 - 2024)

Gravity Sewer Main

- Gravity Sewer Main

0 600 1,200 2,400 Feet

Woodard & Curran

Map Created: December 2024

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:**

Maxar

Figure Exported: 12/18/2024 By: cgriffith Using: \\woodardcurran.net\shared\Projects\02350894.01 Lowell MA CMOM and MS4\wip\GIS\Projects\Lowell MA CMOM and MS4 appx Layout: Attachment 1-1 Manhole Inspections

Attachment 1-2
CCTV Inspections

City of Lowell, MA

N

Legend

Lowell Municipal Boundaries

Gravity Sewer Main

Gravity Sewer Main

CCTV Inspections

Inspection Year

- 2020
- 2021
- 2022
- 2023
- 2024

0 600 1,200 2,400 Feet

Woodard & Curran

Map Created: December 2024

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:**

Maxar

Figure Exported: 12/19/2024 By: cgriffith Using: \\woodardcurran.net\shared\Projects\02350\84.01 Lowell MA CMOM and MS4\wip\GIS\Projects\Lowell MA CMOM and MS4 appx Layout: Attachment 1-2 CCTV Inspections

Attachment 1-3
Sewer Work
(2020-2024)

City of Lowell, MA

N

Legend

- Lowell Municipal Boundaries
- Sewer Manhole
- Gravity Sewer Main
- Sewer Work Locations (2020-2024)
- Rehabilitated Sewer Manholes (2020-2024)

0 600 1,200 2,400 Feet

Woodard & Curran

Map Created: December 2024

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:**

Maxar

Figure Exported: 12/18/2024 By: cgriffith Using: \\woodardcurran.net\shared\Projects\023508.01 Lowell MA CMOM and MS4\win\GIS\Projects\Lowell MA CMOM and MS4.aprx Layout: Attachment 1-3 Sewer Work

Attachment 2: Force Mains Information

Force Main			
Total Length (LF)	10,036		
Composition	Material	Length (LF)	Percentage
	HDPE	622	6%
	Cast Iron	1,790	18%
	Ductile Iron	1,724	17%
	PVC	3,369	34%
	Unknown	2,532	25%
Size	Diameter (in)	Length (LF)	Percentage
	Unknown	460	5%
	1.25	503	5%
	2	853	8%
	3	979	10%
	4	475	5%
	6	2,171	22%
	8	1,035	10%
	10	3,561	35%

Table 2-1. Force Main Material and Diameter Summary

Attachment 2 - Force Mains

City of Lowell, MA

N

sPS-48
sPS-47
sPS-46
sPS-45
sPS-44
sPS-43
sPS-59
sPS-55
sPS-60
sPS-70
sPS-74
sPS-49
sPS-61
sPS-58

Legend

- Lowell Municipal Boundaries
- Pump Stations
- Gravity Sewer Main

Sewer Force Mains

Diameter (in)

- Unknown
- 1.25
- 2
- 3
- 4
- 6
- 8
- 10

0 600 1,200 2,400 Feet

Woodard & Curran

Map Created: November 2024

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:**

Maxar

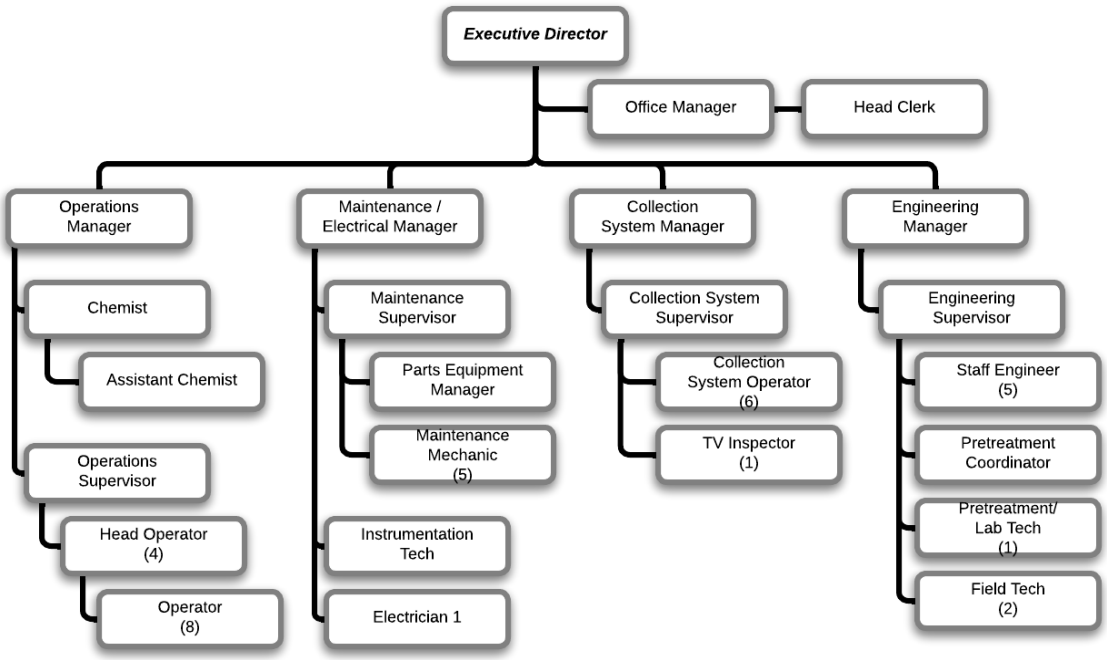
Figure Exported: 12/19/2024 By: cgriffith Using: \\woodardcurran.net\shared\Projects\023\5084.01 Lowell MA CMOM and MS4\wip\GIS\Projects\Lowell MA CMOM and MS4.aprx Layout: Attachment 2 - Force Mains

Attachment 3: List of Contracted Services

Service	Contractor
CCTV and Cleaning	Rapid Flow
Pipe Excavation, Pipe Rehabilitation and Manhole Rehabilitation	Meninno Construction
Sewer Main and Lateral CIPP Lining	National Water Main
Pump Station Maintenance and Repair	In-house Maintenance Mechanics and Collection System Operators
Engineering	Woodard & Curran, CDM Smith, Tighe & Bond, Wright-Pierce

Table 3-1. List of Contracted Services

Appendix D: Lowell Wastewater Organizational Chart



Appendix E: Stormwater Ordinances

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Chapter 272. Water and Sewers

Part 6. Management of Stormwater

[Added 7-24-2018; amended 1-2-2024]

Article X. Stormwater Management

§ 272-109. Definitions.

As used in this article, the following terms shall have the meanings indicated:

APPLICANT
Any person, individual, partnership, association, firm, company, corporation, trust, authority, agency, department, or political subdivision of the commonwealth or the federal government, to the extent permitted by law, requesting a stormwater management permit or approval from the enforcement authority.

AS-BUILT PLANS
Drawings that completely record and document aspects and features of a project site post development. As-built drawings must be stamped by a professional engineer.

BEST MANAGEMENT PRACTICE or BMP
Structural, nonstructural, and managerial techniques that are recognized to be an effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection of the environment. Structural BMPs are stationary and permanent BMPs that are designed, constructed, and operated solutions to prevent or reduce the discharge of pollutants in stormwater. Nonstructural BMPs are nonengineered, nonconstructed solutions to prevent or reduce the discharge of pollutants in stormwater such as LID site maintenance, education, natural measures, site planning, and pollutant prevention.

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL or CPESC
A specialist in soil erosion and sediment control certified by EnviroCert, which is a certification program sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy.

CLEAN WATER ACT
The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

COMMON PLAN OF DEVELOPMENT
A common plan of development goes across boundary lines affecting adjacent lots with disturbance equal to or greater than one acre within five years of initial permitting of the first lot.

DISCHARGE OF POLLUTANTS
The addition of any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States.

DRAINAGE STRUCTURE

A structure designed to convey, capture, retain, or discharge stormwater such as drain manholes, catch basins, or outfalls.

ENFORCEMENT AUTHORITY

The Executive Director of Lowell Regional Wastewater Utility, or his or her duly authorized representative agents, assistants, or designees, or other authorized City entities such as plumbing inspectors or the City Engineer.

EROSION

The wearing away of the land surface by natural or artificial forces such as wind, water, ice, gravity, or vehicle traffic and the subsequent detachment and transportation of soil particles.

EROSION AND SEDIMENTATION CONTROL PLAN or ESCP

A document containing narrative, drawings and details developed by a qualified professional engineer (PE) or a certified professional in erosion and sedimentation control (CPESC), which includes best management practices, or equivalent measures designed to control surface runoff, erosion and sedimentation during preconstruction- and construction-related activities.

GROUNDWATER

Water beneath the surface of the ground, residing within the cracks, crevices and spaces in soil, sand, and rock.

HAZARDOUS MATERIAL

Any material which, because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances constitutes a present or potential threat to human health, safety, welfare, or to the environment (subject to state and federal regulations).

ILLICIT CONNECTION

A surface or subsurface drain or conveyance which allows an illicit discharge into the municipal storm drain system. Any unauthorized active or inactive connection is considered an illicit connection.

ILLICIT DISCHARGE

Any direct or indirect nonstormwater discharge to the municipal storm drain system except as exempted in § **272-110E(2)** of this article.

IMPERVIOUS SURFACE

Any surface that prevents or impedes the infiltration of water into the underlying soil. This can include, but is not limited to, paved areas and other areas created using nonporous material, buildings, rooftops, structures, artificial turf and compacted gravel or soil.

INFILTRATION

The process of percolating stormwater into the subsoil.

LAND-DISTURBING ACTIVITY

Any activity that changes the volume or peak flow discharge rate of rainfall runoff from the land source; causes a change in the position or location of soil, sand, rock, gravel, or similar earth material; results in an increased amount of runoff or pollutants; results in measurable changes to the ability of a ground surface to infiltrate waters; involves clearing, grading, or excavating, including grubbing; or results in an alteration of drainage characteristics.

LOW-IMPACT DEVELOPMENT or LID

Systems and practices to minimize runoff and pollutant loading by managing runoff as close to its source(s) as possible. LID use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat. LID employs principles such as preserving and recreating natural landscape features and

minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. Examples of LID practices include but are not limited to bioretention facilities, rain gardens, vegetated rooftops, rain barrels and permeable pavements.

MUNICIPAL SEPARATE STORMWATER SYSTEM or MS4

The system of conveyances designed or used for collecting or conveying stormwater, including inlets, piped storm drains, pumping facilities, retention or detention basins, treatment structures, natural or man-made or altered drainage channels, reservoirs, and other drainage structures, that together comprise the storm drainage system owned or operated by the City of Lowell.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT

A permit issued under the authority of the Clean Water Act[1] by the United States Environmental Protection Agency that authorizes the discharge of pollutants to waters of the United States.

NEW DEVELOPMENT

Any construction activity or land alteration on an area that has not previously been developed to include impervious cover.

NONPOINT SOURCE POLLUTION

Pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal, and urban runoff sources.

OPERATION AND MAINTENANCE PLAN

A plan setting up the functional, financial, and organizational mechanisms for the ongoing operation and maintenance of a stormwater management system to ensure that it continues to function as designed.

OWNER

A person with a legal or equitable interest in property.

POINT SOURCE

Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container, from which pollutants are or may be discharged.

POLLUTANT

Substances that are chemical, physical, or biological materials that contaminate the environment and cause pollution. These include, but are not limited to, dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, construction wastes and residues including discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes and industrial, municipal and agricultural waste discharged into water.

POST-DEVELOPMENT

Conditions after the culmination of a new development or redevelopment project, and does not depict conditions during the construction phases of a project.

PREDEVELOPMENT

The conditions that exist at the time when plans for the land development of a tract are submitted to the enforcement authority. Where phased development or phased plan approval occurs (preliminary grading, roads, utilities, etc.), the existing conditions at the time prior to the first plan submission shall establish predevelopment conditions.

PRIVATE STORMWATER SYSTEM

The system of conveyances designed or used for collecting or conveying stormwater, including inlets, piped storm drains, pumping facilities, retention or detention basins, treatment structures, natural or man-made or altered drainage channels, reservoirs, and other drainage structures, that together comprise a storm drainage system that is privately owned and operated.

REDEVELOPMENT

Development, rehabilitation, expansion, demolition, construction, land alteration, or phased projects that disturb the ground surface, including impervious surfaces, on previously developed sites.

RUNOFF

Rainfall, snowmelt, or irrigation water flowing over the ground or impervious surfaces.

SEDIMENT

Mineral or organic soil material that is transported by wind or water from its origin to another location; the product of erosion processes.

SEDIMENTATION

The process or act of deposition of sediment.

SITE

The areal extent of property on which construction activities occur, as defined by the site boundary and/or the stormwater management plan.

SOIL

Any earth, sand, rock, gravel, or similar material.

STORMWATER

Any flow occurring during, following, or resulting from any form of natural precipitation, including snowmelt. This flow shall not include any industrial or domestic wastewater.

STORMWATER MANAGEMENT PERMIT

Permit issued by the enforcement authority pursuant to relevant federal and state laws for connections to the municipal separate stormwater system, and applicable land-disturbing activity and/or development that changes drainage characteristics of a site per § **272-110A(1)** and D(1).

STORMWATER MANAGEMENT PLAN or SWMP

A document containing narrative, drawings, details and reporting requirements developed by a qualified professional engineer (PE), which describes structural and nonstructural best management practices designed to control the discharge of pollutants from impervious surfaces and on-site activities as well as the volume and peak rate of surface runoff from a site on an ongoing basis after construction has been completed.

WATERCOURSE

A natural or man-made channel through which water flows. A stream of water, including a canal, river, brook, or underground stream.

WATERS OF THE COMMONWEALTH

All waters within the jurisdiction of the commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, groundwater, and waters of the United States as defined under the Federal Clean Water Act[2] as hereafter amended.

[1] *Editor's Note: See 33 U.S.C. § 1251 et seq.*

[2] *Editor's Note: See 33 U.S.C. § 1251 et seq.*

§ 272-110. General regulations.

A. No person shall perform any applicable land-disturbing activity, as defined in § **272-110A(1)**, within the corporate limits of the City without having provided for adequate stormwater management measures that control erosion and sedimentation and that control other wastes associated with land-disturbing activities, namely construction debris, litter, and sanitary wastes, to prevent the off-site transport of sediment via stormwater, and that prevent the discharge of pollutants to watercourses or waters of the commonwealth. Persons performing new development or redevelopment projects shall ensure that post-development runoff and quantity does not adversely impact adjacent lots, watercourses, or waters of the commonwealth. A stormwater management permit must be obtained from the enforcement authority before construction, or any sort of applicable land-disturbing activity, commences. All applicable activity shall remain in compliance with this article and any other applicable local, state, or federal laws, rules, and regulations. The enforcement authority shall take any and all enforcement action deemed necessary to prohibit or remedy any such unpermitted activity, in accordance with this section and any other applicable local, state, or federal laws, rules, and regulations.

(1) Applicability. The provisions of § **272-110A** shall apply to all construction activities or land disturbances that individually, or as part of a common plan of development, result in any disturbance of land in excess of or equal to one acre.

(2) Exemptions. The following activities are exempt from the provisions of § **272-110A**:

(a) Construction projects that have a waiver from EPA, per 40 CFR 122.26(b)(15)(i);

(b) Construction of fencing that will not substantially alter existing terrain or drainage patterns;

(c) Construction of utilities, other than drainage, that will not substantially alter terrain or drainage patterns, or result in the discharge of sediment or pollutants to the municipal separate stormwater system, or into a watercourse or waters of the commonwealth;

(d) Maintenance of existing landscaping, gardens or lawn areas of residential dwellings conducted in such a way as not to cause a nuisance;

(e) Emergency work necessary to protect life, limb, or property.

B. The enforcement authority shall have the authority to manage, operate, maintain, and regulate the municipal separate stormwater system.

C. In furtherance of his or her authority under this article, the enforcement authority shall promulgate the provisions in this article and other regulations or guidance documents governing all activities related to the excavation, alteration, disturbance, uncovering, connection, or other direct or indirect use of the municipal separate stormwater system.

D. No unauthorized person shall excavate, alter, disturb, uncover, restrict or impede access, obstruct or interfere with flow, make any connection with or opening into, or in any way directly or indirectly use the municipal separate stormwater system without first obtaining a written stormwater management permit from the enforcement authority. The enforcement authority shall establish stormwater management permit requirements for all such activities and take any and all necessary enforcement action deemed necessary by the enforcement authority to prohibit or remedy any such unpermitted activity, in accordance with § **272-110E** and any other applicable local, state, and federal laws, regulations, and rules.

E. No person shall commence, allow, conduct or continue any illicit discharge to the municipal separate stormwater system, nor shall any person construct, use, allow, maintain or continue any illicit connections to the municipal separate stormwater system, regardless of whether it was permissible under an applicable law, regulation or custom at the time of connection.

(1) Applicability. The provisions of § **272-110E** shall apply to all direct or indirect discharges to the municipal separate stormwater system and to any activities that may obstruct a municipal storm drain that discharge into areas subject to jurisdiction under MGL c. 131, § 40, and 310 CMR 10.02(1) of the Wetlands Protection Act and their associated buffers zones.

(2) Exemptions.

(a) The following nonstormwater flows, discharged without causing a nuisance or causing damage to municipal assets, are permitted to be discharged into the municipal separate stormwater system:

[1] Waterline flushing;

[2] Landscape irrigation;

[3] Diverted stream flow;

[4] Pumped or infiltrated uncontaminated groundwater [as defined in 40 CFR 35.2005(20)];

[5] Discharge from potable water sources;

[6] Foundation drains, footing drains, air conditioning condensation, water from crawl space pumps;

[7] Spring irrigation water;

[8] Lawn watering;

[9] Individual resident car washing;

[10] Natural flows from riparian habitats and wetlands;

[11] Dechlorinated swimming pool discharges (less than one ppm chlorine);

[12] Street wash waters;

[13] Residential wash waters without detergents; and

[14] Nonstormwater discharge permitted under a NPDES permit, waiver, or waste discharge order administered under the authority of the United States, Environmental Protection Agency, provided that the discharge is in full compliance with the requirements of the approved NPDES permit, waiver or order.

(b) Discharges or flows from firefighting activities are allowed under this article unless they are identified as significant sources of pollutants to watercourses or waters of the commonwealth. Discharges associated with dye testing are allowed under this article; however this activity requires notification to the enforcement authority prior to the time of the test.

(3) Emergency suspension of municipal separate stormwater system access. The enforcement authority may suspend municipal separate stormwater system access to any person or property without prior written notice if such a suspension would abate or reduce an illicit discharge. In the event any person fails to comply with an emergency suspension order, the enforcement authority may take all reasonable steps to prevent or minimize harm to the public health, public property, safety, welfare, or the environment.

(4) Notification of spills. Notwithstanding other requirements of local, state or federal law, as soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the municipal drainage system, the person shall take all necessary steps to ensure containment and remediation of the release. In the event of a release of oil, hazardous materials or nonhazardous materials, the person shall immediately notify the City Fire and Police Departments and MassDEP within 24 hours. The reporting person shall provide to the enforcement authority written confirmation of all telephone, facsimile or in-person notifications within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on site a written record of the discharge and the actions

taken to address it and prevent its recurrence. Such records shall be retained for at least three years.

F. In the event a person willfully, maliciously, or negligently breaks, damages, destroys, uncovers, defaces, tampers, or otherwise interferes with any structure, appurtenance, or equipment which is part of the municipal separate stormwater system and contrary to all applicable local, state, and federal laws, regulations and rules, the enforcement authority or any other enforcement or regulatory entity in the City shall be authorized to take any enforcement action, remedy, or response so provided under this article, and all applicable local, state, and federal laws, regulations and rules.

G. Applicants shall indemnify the City from any loss or damage that may directly or indirectly be occasioned by the installation, connection, or alteration to the City's stormwater system.

H. The enforcement authority shall adopt and amend regulations, rules and/or written guidelines relating to the terms, conditions, definitions, enforcement, fees, procedures and administration of this Management of Stormwater Part **6**. Management of stormwater regulations, rules or guidance shall identify requirements for the stormwater management permit required by this article and consistent with, or more stringent than, the relevant requirements of the most recent NPDES stormwater discharge permit for the City.

§ 272-111. Stormwater management permit requirements.

A. To obtain a stormwater management permit, applicants must show that site design, construction site stormwater runoff control, and post-development stormwater management will meet the standards set by the enforcement authority in regulations, rules and guidance, which shall be at least as stringent as the relevant requirements of the City's NPDES stormwater discharge permit and may also address relevant environmental considerations, including (without limitation) aquifer and wetland protections, climate resiliency, combined sewer overflow mitigation, and flood prevention. Applicants seeking a stormwater management permit, at their own expense, shall make and file accurately the documents listed in § **272-111A(1)** with the enforcement authority.

(1) Required submittals.

(a) Erosion and sedimentation control plan (ESCP).

[1] Narratives and construction plan shall describe the actions to minimize disturbed areas; protection of natural resources; stabilization of soils across the sites during temporary cessation or completion; protection of slopes on site; usage of perimeter controls; ESC inspections; evaluation of measures to minimize erosion and sedimentation and topsoil compaction during construction; and controls of demolition debris, litter, and sanitary wastes.

[2] Site plans depicting flows and planned BMPs for ESC in accordance with Massachusetts Department of Environmental Protection Stormwater Standards.

(b) Stormwater management plan (SWMP).

[1] Narrative explaining existing and proposed site conditions, measures to mitigate stormwater impacts, LID used, planned post-construction BMPs.

[2] Site plans showing existing flow, site features, and stormwater management, proposed stormwater management systems, new flow regime, and limits of disturbances.

[3] Considerations for potential water quality impacts.

(c) Operation and maintenance plan.

[1] Funding structure for future operation and maintenance.

[2] Inspection and maintenance schedule.

[3] Owner of the system and responsible parties for maintenance.

[4] SOPs of structural and nonstructural BMPs.

[5] Annual self-certification of operation and maintenance activities.

(2) Post-development design standards.

(a) Projects shall be designed to collect, treat, and convey stormwater runoff from the project site in accordance with Massachusetts Department of Environmental Protection Stormwater Management Standards.

(b) Projects are encouraged to use LID techniques within stormwater management design to the maximum extent practicable to manage stormwater.

(c) Stormwater management systems for new development or redevelopment sites shall be designed to meet an average annual pollutant removal in accordance with Massachusetts Department of Environmental Protection Stormwater Management Standards. Average annual pollutant removal requirements shall be achieved through a combination of the following methods:

[1] Installing stormwater BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tools provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or state-approved BMP design guidance or performance standards (e.g., state stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or

[2] Retaining the volume of runoff equivalent to, or greater than, one inch multiplied by the total post-construction impervious surface area on the new development site or retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-development impervious surface area on the redeveloped site.

B. The enforcement authority may require from the applicant a surety or cash bond, or other means of security acceptable to the City, prior to the issuance of any stormwater management permit for land-disturbing activity. The amount of the security shall not be less than the total estimated construction cost of the stormwater management system, if one is being built, and shall be in an amount deemed sufficient by the enforcement authority to ensure accordance with the stormwater management permit. The bond so required in this section shall include provisions relative to forfeiture to the City for failure to complete work specified in the approved stormwater management plan, compliance with all provisions of this article, obligations imposed by the stormwater management permit, and other applicable laws and regulations, and any time limitations. The bond shall not be fully released without a final inspection of the completed work by the enforcement authority, submission of as-built plans, and certification that the complete work is in compliance with the approved plan and the provisions of this article by the enforcement authority.

(1) If the project is phased, the enforcement authority may release part of the surety or cash bond, or other means of security acceptable to the City Treasurer, as each phase is completed in compliance with the permit.

(2) Upon completion of work and no later than six months after completion of construction, the holder of a stormwater management permit shall submit a report and certified as-built construction plans from a professional engineer, surveyor or CPESC certifying that the project has been completed in accordance with the conditions of the stormwater management permit. As-builts must depict all on-site controls, both structural and nonstructural, that manage the post-development stormwater. All discrepancies with the approved permit plan shall be noted in the report and as-built plans.

(3) The enforcement authority shall issue a letter certifying project and permit completion upon receipt and approval of the final report and as-builts or confirmation that all work has been done in accordance with this article and stormwater management permit conditions.

§ 272-112. Interference and obstruction during construction.

A. All construction work involving the installation of structures or pipes for the purpose of providing water, gas, drain, or other underground utilities shall not interfere with or obstruct, in any way, the course, capacity or integrity of any part of the municipal separate stormwater system.

B. Whenever pipes for any purpose, or any work of construction, are found to exist at such a depth or in such location as to interfere with any existing part of the municipal separate stormwater system, the person maintaining the same shall, upon notice thereof, at once remove, change, or alter such pipes or other works in such a manner as the enforcement authority may direct. If such person neglects to comply in a reasonable time, at the discretion of the enforcement authority, with the terms of such notification, the City may make such removal, change, or alteration, and the cost thereof shall be paid by such person; provided that, whenever any drain is to be constructed, or any water pipe to be laid, in any street or way, enforcement authorities shall consult each other in regard to the location of any existing pipes.

§ 272-113. Inspectors; powers and authority.

A. The enforcement authority, bearing proper credentials and identification, shall be allowed to enter the premises of any property in the City for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance, and testing of municipal and/or private stormwater systems and stormwater runoff. All entry and subsequent work shall be done in accordance with the provisions of this article and any other applicable local, state, and federal laws.

B. The enforcement authority bearing proper credentials and identification shall be permitted to enter all private properties through which the City holds a duly negotiated easement for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance of any portion of the stormwater works lying within such easement. All entry and subsequent work, if any, on such easement, shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved and the provisions of this article, and any other applicable local, state, and federal laws.

C. By submitting the stormwater management permit application, an applicant consents to the entry of the enforcement authority bearing proper credentials and identification in or on the site while the application is under review to verify the information in the application, and at any time after a review or permit is issued to inspect for compliance with review or permit conditions.

D. By signing the stormwater management permit application, an applicant consents to allow the enforcement authority bearing proper credentials and identification to verify and document compliance with the stormwater management permit.

§ 272-114. Violations and penalties.

A. The enforcement authority may issue a written order to enforce provisions of § **272-110** to any persons found to be violating any provisions of this article or any other regulations or rules promulgated by the enforcement authority pursuant to the authority granted by this article. Written orders may include:

(1) Elimination of illicit connections or direct or indirect discharges to the municipal separate stormwater system, watercourses, or waters of the commonwealth;

(2) Performance monitoring, analyses and reporting;

(3) Cessation of unlawful discharges, practices, or operations;

(4) Implementation of measures to minimize the discharge of pollutants until such time as the illicit connection or discharge shall be eliminated;

(5) Remediation of any adverse impacts of an illicit discharge or connection;

(6) Cease and desist from land-disturbing activities until compliance is met;

(7) Maintenance, installation of additional ESC;

(8) Remediation of erosion and sedimentation resulting directly or indirectly from land-disturbing activities;

(9) Construction, reconstruction, repair or maintenance of stormwater BMPs or any other aspect of the post-construction stormwater management system; or

(10) Remediation of adverse impacts resulting from improper construction or operation.

B. Any person found to be violating any of the provisions of this article, written orders, or any other regulations or rules promulgated by the enforcement authority pursuant to the authority granted by this article, and by any and all applicable federal, state or local laws, regulations, or rules, may be subject to a civil penalty and, if found liable for the violation, shall be subject to a civil penalty and, upon conviction, shall be fined up to $5,000 a day for each violation back to the first day of the violation in accordance with MGL c. 83, § 10, as amended by Chapter 174, Section 7, of the Acts of 1987.

C. Any person found to be violating any of the provisions of this article, written order, or any other regulations or rules promulgated by the enforcement authority pursuant to the authority granted by this article and by any and all applicable federal, state or local laws, regulations, or rules shall be liable for the maximum penalty provided under the Massachusetts General Laws for each violation back to the first day of said violation.

D. Any person violating any of the provisions of this article, written orders, or any other regulations or rules promulgated by the enforcement authority pursuant to the authority granted by this article and by any and all applicable federal, state or local laws, regulations, or rules shall become liable for any expense, loss or damage incurred by the City by reason of such violation.

E. A penalty provided for under this section may be imposed in conjunction with any other charges or penalties that can be imposed for violation of any other local, state, or federal criminal or civil offenses committed.

§ 272-115. Severability.

If any section, subsection, sentence, clause, or other provision of this article is, for any reason, held to be unconstitutional or invalid, in whole, or in part, by any court of competent jurisdiction, such provision shall be deemed severable, and such unconstitutionality or invalidity shall not affect the validity or application of the remaining provisions of this article.

Appendix F: Intermunicipal Agreements

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AMENDED AND RESTATED INTERMUNICIPAL AGREEMENT

THIS AMENDED AND RESTATED INTERMUNICIPAL AGREEMENT (this "Agreement") is made and entered into this 1st day of July, 2012 (the "Effective Date") by and between the CITY OF LOWELL, a municipal corporation within the County of Middlesex and the Commonwealth of Massachusetts ("Lowell"), the TOWN OF CHELMSFORD, an incorporated township within the County of Middlesex and the Commonwealth of Massachusetts ("Chelmsford"), the TOWN OF DRACUT, an incorporated township within the County of Middlesex and the Commonwealth of Massachusetts ("Dracut"), the TOWN OF TEWKSBURY, an incorporated township within the County of Middlesex and the Commonwealth of Massachusetts ("Tewksbury") and the TOWN OF TYNGSBOROUGH, an incorporated township within the County of Middlesex and the Commonwealth of Massachusetts ("Tyngsborough," and together with Chelmsford, Dracut and Tewksbury, the "Towns"). Lowell and the Towns are referred to herein as the "Parties" or "Party," as dictated by the context

WITNESSETH:

WHEREAS, Lowell and Chelmsford entered into that certain Agreement, dated June 26, 1985, as amended by (i) that certain Addendum and Settlement Agreement, dated April 1, 1995, (ii) that certain Industrial Sewer Use Addendum, (iii) that certain East Chelmsford Sewer Connection Agreement, dated April 15, 2003, and (iv) that certain Stedman Street Sewer Connection Agreement, dated June 29, 2005 (as so amended, the "Prior Chelmsford Agreement");

WHEREAS, Lowell and Dracut entered into that certain Agreement, dated May 25, 1977, as amended by (i) that certain Addendum between the Parties, dated October 18, 1995, and (ii) that certain Addendum dated October 1, 2007 for the treatment and disposal of Dracut's wastewater (as so amended, the "Prior Dracut Agreement");

WHEREAS, Lowell and Tewksbury entered into that certain Agreement, dated July 23, 1975, as amended by (i) that certain Industrial Sewer Use Addendum, dated May 27, 1994, and (ii) that certain Addendum dated May 27, 1994 (as so amended, the "Prior Tewksbury Agreement");

WHEREAS, Lowell and Tyngsborough entered into that certain Agreement, dated November 13, 1995, as amended by (i) that certain Industrial Sewer Use Addendum, dated October 11, 1995, and (ii) that certain Amendment to the Agreement, dated May 11, 2000 (as so amended, the "Prior Tyngsborough Agreement," and together with the Prior Chelmsford Agreement, the Prior Dracut Agreement and the Prior Tewksbury Agreement, the "Prior Agreements");

WHEREAS, subsequent to the execution of the Prior Chelmsford Agreement, Chelmsford and Tyngsborough entered into an Agreement granting Tyngsborough the use of a

portion of Chelmsford's Allocated Daily Flow (as hereinafter defined), which is attached hereto for informational purposes only as Exhibit A;

WHEREAS, subsequent to the execution of the Prior Dracut Agreement, Dracut and Tyngsborough entered into an Agreement granting Tyngsborough the use of a portion of Dracut's Allocated Daily Flow (as hereinafter defined), which is attached hereto for informational purposes only as Exhibit B;

WHEREAS, Tewksbury and the Town of Andover entered into an Agreement granting Andover the use of a portion of Tewksbury's Allocated Daily Flow (as hereinafter defined), a copy of which is attached for informational purposes only as Exhibit C, and which was consented to by Lowell pursuant to an Agreement a copy of which is attached for informational purposes only as Exhibit D;

WHEREAS, pursuant to the Prior Agreements, the Wastewater Treatment Facility (as hereinafter defined) was constructed in the City of Lowell to treat and dispose of wastewater from Lowell and the Towns; and

WHEREAS, the Parties wish to amend, restate and consolidate the Prior Agreements in its entirety to reflect the changed circumstances since the execution of the Prior Agreements and to modify such provisions of the Prior Agreements as more particularly set forth herein;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree to amend and restate the Prior Agreements in its entirety as follows:

ARTICLE I. DEFINITIONS

1.1 For the purposes of this Agreement, the following terms are defined:

1.1.1 "Allocated Daily Flow" shall mean each party's allocation of the Design Flow of the Wastewater Treatment Facility. The Parties acknowledge and agree that the current Allocated Daily Flow of each municipality that discharges to the Wastewater Treatment Facility is as set forth in Table 1 below:

Table 1: Allocated Daily Flow

Municipality	Allocated Daily Flow	Percentage of Design Flow
Chelmsford	3.01 mgd	9.406%
Dracut	3.60 mgd	11.250%
Lowell	21.06 mgd	65.813%

Tewksbury	4.25 mgd	13.281%
Tyngsborough	0.08 mgd	0.250%
Total for Lowell and Towns	**32.00 mgd**	**100%**

In the event the Design Flow of the Wastewater Treatment Facility is increased as a result of a rerating of the Wastewater Treatment Facility (an "Engineering Rerating"), each of the Towns' Allocated Daily Flow set forth in Table 1 shall be increased by an amount equal to the increase in the Design Flow approved during the Engineering Rerating multiplied by that Town's percentage of the Allocated Daily Flow set forth in Table 1 herein.

1.1.2 "Average Daily Flow" shall mean (a) for the Towns, the total annual flow to the LRWWU Sewerage System as measured at Metering Stations together with the flow from Unmetered Properties within each Town, divided by the number of days in the year, and (b) for Lowell, the total annual flow discharged from the Wastewater Treatment Facility plus the total annual flow discharged directly from the LRWWU Sewerage System into local waterways as Combined Sewer Overflows (CSOs) during certain wet weather events through the diversion structures identified in Exhibit E attached hereto, which list is incorporated fully herein, less the total annual flow to the LRWWU Sewerage System from the Towns measured in Section 1.1.2(a) above, divided by the number of days in the year.

1.1.3 "Capital Costs" shall mean repairs, replacements, upgrades, additions or modifications to the buildings, fixtures, machinery, equipment, accessories, appurtenances of the POTW, or such other changes to the POTW which are intended to substantially replace or expand the capacity of the POTW, including, without limitation, the costs necessary to construct a centralized treatment and/or storage facility within Lowell to treat Wastewater and Combined Sewer flow. Capital Costs shall include any and all interest and fees incurred on money borrowed to pay for such Capital Costs. Capital Costs do not include routine maintenance, which is part of Operating Costs. In addition, Capital Costs do not include capital costs for any facilities which solely convey, treat or dispose of stormwater and do not convey, treat or dispose of any Wastewater. For sewer separation projects, Capital Costs do not include costs associated with excavation, street opening and closing, soil disposal and paving. Notwithstanding anything to the contrary in this Agreement, Capital Costs shall include (a) one hundred percent (100%) of the Capital Costs for the Wastewater Treatment Facility, (b) one hundred percent (100%) of the Capital Costs for the Town Metering Stations, and (c) ninety percent (90%) of the Capital Costs for all other portions of the POTW.

1.1.4 "Capital Reserve Account" shall mean a reserve account, together with all interest earned thereon, used and maintained by LRWWU to pay certain Capital Costs. The Capital Reserve Account will be established by LRWWU as a subaccount of the LRWWU enterprise fund. Prior to the start of each fiscal year, LRWWU will notify the Towns of the current balance of the Capital Reserve Account and the amount of funds required to be paid by the Towns. Such amount shall be included within the quarterly bills issued by LRWWU, discussed in more detail in Article VII below.

1.1.5 "Carbonaceous Biochemical Oxygen Demand" or "CBOD" shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter (carbonaceous demand) and the oxygen used to oxidize inorganic material such as sulfides and ferrous iron. The test measures the molecular oxygen utilized during a specified incubation period for the biochemical degradation of organic material, under standard laboratory conditions five (5) days at twenty degrees (20°) Centigrade (68° Fahrenheit) expressed in milligrams per liter (mg/L) by weight.

1.1.6 "Chelmsford Sewerage System" shall mean all facilities for collecting, conveying, pumping, treating and disposing of Sanitary Sewage and/or Industrial Sewage located within the confines of Chelmsford.

1.1.7 "Combined Sewer" shall mean a sewer system or a segment thereof conveying both stormwater and Sanitary Sewage and/or Industrial Sewage.

1.1.8 "Combined Sewer Overflow" or "CSO" shall mean any combined sewage and stormwater that is discharged to a local waterway through the LRWWU Sewerage System during wet weather.

1.1.9 "Design Flow" shall mean the design flow of the Wastewater Treatment Facility, which is currently set at 32 mgd of Average Daily Flow, plus any future facilities that treat and discharge Wastewater into a local waterway.

1.1.10 "Domestic Source" shall mean any residence, building, structure, facility or installation from which Sanitary Sewage is or may be discharged.

1.1.11 "Dracut Sewerage System" shall mean all facilities for collecting, conveying, pumping, treating and disposing of Sanitary Sewage and/or Industrial Sewage located within the confines of Dracut.

1.1.12 "Effective Date" shall mean July 1, 2012.

1.1.13 "EPA" shall mean the United States Environmental Protection Agency.

1.1.14 "Industrial User" shall mean any user of the POTW that discharges Wastewater containing Industrial Sewage.

1.1.15 "Industrial Sewage" shall mean liquid, gaseous or solid waste substances, or a combination thereof, other than Sanitary Sewage, from industrial manufacturing, processing, trade, or any other source that is not a Domestic Source.

1.1.16 "Interference" shall mean a discharge of Wastewater which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the Wastewater Treatment Facility, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the Wastewater Treatment Facility's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder or any more stringent state or local regulations: Section 405 of the Clean Water Act, the Solid Waste Disposal Act ("SWDA") (including Title II, more commonly referred to as the Resource Conservation and Recovery Act, and any State regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, the Marine Protection, Research, and Sanctuaries Act and any other law subsequently enacted or imposed.

1.1.17 "Lowell Regional Wastewater Utility" or "LRWWU" shall mean the organization that operates and maintains the POTW.

1.1.18 "Lowell Sewer Use Ordinance" shall mean the applicable provisions of the City of Lowell Code of Ordinances pertaining to the LRWWU Sewerage System, the Wastewater Treatment Facility and any industrial pretreatment program.

1.1.19 "LRWWU Sewerage System" shall mean all facilities for collecting, conveying, pumping, treating and disposing of Sanitary Sewage and/or Industrial Sewage located within the confines of Lowell, including, without limitation, Combined Sewers.

1.1.20 "MassDEP" shall mean the Massachusetts Department of Environmental Protection.

1.1.21 "Metering Stations" shall mean the stations containing meters that measure flow from the Towns to the POTW. The parties agree that the Metering Stations set forth in Exhibit F attached hereto currently measure flow from the Towns.

1.1.22 "NPDES" shall mean the National Pollutant Discharge Elimination System.

1.1.23 "Operating Costs" shall mean the costs, direct and indirect, incurred by LRWWU for the proper and efficient operation and maintenance of the POTW. Operating Costs shall include the costs of biannual street sweeping in Lowell. Operating costs shall not include operating costs associated with any facilities which solely

convey, treat or dispose of stormwater and do not convey, treat or dispose of any Wastewater.

1.1.24 "Pass Through" shall mean a discharge of Wastewater which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of the Wastewater Treatment Facility's NPDES permit (including an increase in the magnitude or duration of a violation).

1.1.25 "pH" shall mean the negative logarithm, to the base of 10, of the weight of hydrogen ions in grams per liter of solution.

1.1.26 "Publicly Owned Treatment Works" or "POTW" shall mean the Wastewater conveyance, treatment, storage and disposal facilities owned or operated by the Lowell Regional Wastewater Utility, including, without limitation, the Wastewater Treatment Facility, the LRWWU Sewerage System and any additional facilities that are constructed by or on behalf of LRWWU to convey, treat, store or dispose of Wastewater from Lowell and the Towns.

1.1.27 "Sanitary Sewage" shall mean liquid and water-carried human and domestic wastes from residences, commercial buildings, industrial plants and institutions, exclusive of storm and surface water and exclusive of Industrial Sewage.

1.1.28 "Sewer Use Regulations of the Towns" shall mean the Sewer Use Regulations enacted by each of the Towns, as the same may be amended from time to time, including, without limitation, any industrial pretreatment program.

1.1.29 "Tewksbury Sewerage System" shall mean all facilities for collecting, conveying, pumping, treating and disposing of Sanitary Sewage and/or Industrial Sewage located within the confines of Tewksbury.

1.1.30 "Total Average Daily Flow" shall mean the sum of the Average Daily Flow of the Towns and Lowell.

1.1.31 "Towns' Sewerage System" shall mean the Chelmsford Sewerage System, the Dracut Sewerage System, the Tewksbury Sewerage System and the Tyngsborough Sewerage System.

1.1.32 "Tyngsborough Sewerage System" shall mean all facilities for collecting, conveying, pumping, treating and disposing of Sanitary Sewage and/or Industrial Sewage located within the confines of Tyngsborough.

1.1.33 "Unmetered Properties" shall mean those properties which discharge directly to the LRWWU Sewerage System without sewer metering. The Unmetered Properties in each of the Towns include, but are not limited to, the properties listed in Exhibit G attached hereto, which list is incorporated fully herein. Additional Unmetered Properties, when identified by both LRWWU and each of the Towns, will be added to Exhibit G.

1.1.34 "Wastewater" shall mean all discharges into the POTW, including Sanitary Sewage and Industrial Sewage.

1.1.35 "Wastewater Treatment Facility" shall mean the Duck Island Wastewater Treatment Facility, an ISO 1401 approved facility, designed to treat the combined wastewater from Lowell and the Towns.

ARTICLE II. OBLIGATIONS AND RESPONSIBILITIES

2.1 LRWWU shall receive, treat and dispose of Wastewater from the Towns, and the Towns shall collect, convey and discharge said Wastewater into the LRWWU Sewerage System and Wastewater Treatment Facility, in compliance with and pursuant to the Lowell Sewer Use Ordinance, including the discharge prohibitions, limitations and requirements set forth therein, and applicable federal and state requirements, including 40 CFR Parts 400-499. LRWWU shall operate and maintain the POTW in accordance with standard industry practice. In addition, it is the objective of LRWWU to operate and maintain the POTW in accordance with the requirements of all federal and state statutes, regulations and permits. For purposes of this Agreement, (i) Wastewater from Chelmsford shall include Wastewater received by Chelmsford pursuant to the Agreement attached hereto as Exhibit A; provided, however, that Chelmsford shall be required to notify LRWWU on an annual basis of the amount of Wastewater received by Chelmsford from Tyngsborough in the prior year, (ii) Wastewater from Dracut shall include Wastewater received by Dracut from Tyngsborough pursuant to the Agreement attached hereto as Exhibit B; provided, however, that Dracut shall be required to notify LRWWU on an annual basis of the amount of Wastewater received by Dracut from Tyngsborough in the prior year, and (iii) Wastewater from Tewksbury shall include Wastewater received by Tewksbury from Andover pursuant to the Agreement attached hereto as Exhibit D. With the exception of Wastewater from Tyngsborough to Chelmsford and Dracut and Wastewater from Andover to Tewksbury, all as discussed above, each Town shall not be permitted to collect, convey and discharge Wastewater into the LRWWU Sewerage System and Wastewater Treatment Facility which is not generated within the boundaries of that Town, without the consent of Lowell

2.2 Prior to amending the Lowell Sewer Use Ordinance, Lowell shall provide the proposed amendments to the Towns for the Towns' review and comment. The Towns shall have thirty (30) days to provide any comments to Lowell. Lowell will endeavor to incorporate any reasonable comments received from the Towns.

2.3 Within ninety (90) days of receipt of notice that Lowell has amended the Lowell Sewer Use Ordinance, each Town shall amend its Sewer Use Regulations as necessary to be and remain at least as stringent as the Lowell Sewer Use Ordinance. Notwithstanding the foregoing, in the event such amendment requires approval at Town Meeting, the Town shall place approval of such amendments on the warrant for the next occurring Annual or Special Town Meeting in the Town.

2.4 The Towns will not directly or indirectly connect or allow the connection of any Combined Sewer or separate drains into the LRWWU Sewerage System. Each of the

Towns shall use best efforts, in compliance with all applicable laws, to remove and/or disconnect any illegal connections to that Town's Sewerage System and to remove and/or eliminate inflow and infiltration into that Town's Sewerage System.

2.5 Each of the Towns will not discharge or cause to be discharged into the LRWWU Sewerage System or the Wastewater Treatment Facility any of the following described waters or wastes, whether or not they are subject to categorical standards or any other Federal, State or local pretreatment standards or requirements:

2.5.1 Any gasoline, benzene, naptha, lube oil, fuel oil, or other flammable, or explosive liquid, solid or gas.

2.5.2 Any Wastewater containing toxic or poisonous solids, liquids or gases in sufficient quantity, either singly or by interaction with any sewage treatment process, which constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the Wastewater Treatment Facility.

2.5.3 Any Wastewater having a pH lower than or higher than the limits set forth in the Lowell Sewer Use Ordinance, or having any other corrosive property capable of causing damage or hazard to structures, equipment and personnel of the LRWWU Sewerage System and/or its Wastewater Treatment Facility.

2.5.4 Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the LRWWU Sewerage System and/or Wastewater Treatment Facility such as, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders.

2.5.5 Heat from a liquid or vapor having the ability to inhibit biological activity at the Wastewater Treatment Facility. In no case shall discharges containing heat cause the water temperature at the Wastewater Treatment Facility to exceed the limits set forth in the Lowell Sewer Use Ordinance.

2.5.6 Any Wastewater containing fat, wax, grease or oils, whether emulsified or not, in excess of the limits set forth in the Lowell Sewer Use Ordinance or containing substances which may solidify or become viscous at temperatures between the temperatures set forth in the Lowell Sewer Use Ordinance

2.5.7 Any radioactive waste or isotopes of such half-life or concentration as may exceed limits established by applicable state or federal regulations.

2.5.8 Materials which exert or cause:

(a) Extraordinary concentrations of inert suspended solids (such as, but not limited to, Fullers Earth, lime slurries and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate).

(b) Excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions).

(c) Unusual CBOD, chemical oxygen demand, or chlorine requirements in such quantities as to constitute a significant load on the Wastewater Treatment Facility.

(d) Unusual volume or flow or concentration of Wastewater constituting "slugs" as defined herein. A Slug is any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge, which has a reasonable potential to cause Interference or Pass Through, or in any other way violates the Wastewater Treatment Facility's regulations, the Lowell Sewer Use Ordinance, the Sewer Use Regulations of the Towns or any applicable federal or state permits and approvals, including, without limitation, the Wastewater Treatment Facility's NPDES permit.

2.5.9 Any substance containing residues, sludges, scums, garbage or metallic wastes that exceed limits set forth in the Lowell Sewer Use Ordinance, or toxic vapors or gases.

2.5.10 Wastewater containing pollutants in excess of local industrial pretreatment limits, adopted by Lowell and the Towns pursuant to Article II of this Agreement, and designed to protect the POTW from Pass Through or Interference, protect receiving water quality and sludge quality, protect against treatment inhibition and to protect worker health and safety as required and approved by EPA and MassDEP.

2.5.11 Wastewater containing substances which are not amenable to treatment or reduction by the Wastewater Treatment Facility process employed, or are amenable to treatment only to such degree that the Wastewater Treatment Facility effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters, including, without limitation, EPA.

ARTICLE III. AGREEMENT TERM

3.1 The provisions of this Agreement shall run for twenty-five (25) years from the Effective Date of this Agreement.

ARTICLE IV. IMPLEMENTATION

4.1 LRWWU agrees to provide each of the Towns and Lowell with capacity in the LRWWU Sewerage System and the Wastewater Treatment Facility up to the Town's Allocated Daily Flow set forth in Table 1 above.

4.2 In the event Lowell or any of the Towns wishes to increase its Allocated Daily Flow limitation, Lowell or any of the Towns may purchase such additional flow from any Party with excess capacity that discharges to the POTW; provided, however, that such purchase

of additional flow by any of the Towns shall be subject to the consent of Lowell, whose consent shall not be unreasonably withheld, conditioned or delayed.

4.3 In the event that any of the Towns wish to sell or otherwise transfer a portion of its Allocated Daily Flow to a municipality that is not a party to this Agreement, such Town shall obtain the consent of LRWWU to the transfer, whose consent shall not be unreasonably withheld, conditioned or delayed. Notwithstanding the foregoing, Lowell shall not be required to consent to a conveyance or transfer unless and until the third party purchaser or transferee of Allocated Daily Flow from one of the Towns signs an agreement in writing that binds such third party to the terms, conditions and obligations imposed on the Parties by the terms of this Agreement. The Towns shall not sell or otherwise transfer any of its Allocated Daily Flow to a non-municipal entity located outside of the boundaries of the Towns, nor shall a Town permit the connection of any facility in the Town to the Town's Sewerage System which collects and discharges wastewater originating outside of that Town.

4.4 Most measurements of volume and characteristics of Wastewater from the Towns shall be made at Metering Stations. LRWWU shall be responsible for the construction, operation and maintenance of all Metering Stations identified in Exhibit F that are located within the boundaries of Lowell. The Towns shall be responsible for the construction, operation and maintenance of all Metering Stations located within the boundaries of each Town, as identified in Exhibit F; provided, however, that the Towns shall not construct any new Metering Stations nor alter, modify or relocate any of the existing Metering Stations identified in Exhibit F, without the approval of plans and specifications by the LRWWU, which approval shall not be unreasonably withheld. Each of the Towns shall have access to the Metering Stations for that Town and the Wastewater measurements obtained by LRWWU during normal business hours. In the event the metering equipment is temporarily out of order or service for any reason, that Town's estimated flow will be based on the Average Daily Flows of the previous twelve months. Regardless of where a Metering Station is located and who is responsible for the construction, operation and maintenance of that Metering Station, LRWWU shall have the right to access any and all Metering Stations for the purposes of verifying, testing and calibrating the equipment. At the request of any Town, LRWWU will provide that Town with copies of any calibration reports prepared by or on behalf of LRWWU for the Metering Stations and any other relevant meters within the POTW.

The flow measurements for Unmetered Properties shall be calculated as set forth in Article VIII.

4.5 If a Town's Average Daily Flow exceeds the Allocated Daily Flow set forth in Table 1, such Town shall be liable for any and all damages, penalties and fines incurred by Lowell and/or LRWWU or claims brought against Lowell and/or LRWWU as a result of that Town's exceedance of the limitation set forth in Table 1.

4.6 The Towns hereby designate LRWWU as the agent of the Towns for the purpose of implementation and enforcement of the Sewer Use Regulations of the Towns against any discharger located in one or more of the Towns. LRWWU may take any action under the

Sewer Use Regulations of the Towns which could have been taken by the Towns, including the enforcement of the Sewer Use Regulations of the Towns in courts of law.

4.7 LRWWU, on behalf of and as agent for the Towns, will perform technical and administrative duties necessary to implement and enforce the Sewer Use Regulations of the Towns. LRWWU will:

(a) create and update a comprehensive list of all Industrial Users within each of the Towns;

(b) issue permits to all Industrial Users required to obtain a permit;

(c) conduct inspections, sampling and analysis;

(d) take all appropriate enforcement actions as outlined in the Sewer Use Regulations of the Towns; and

(e) perform any other technical or administrative duties the Parties deem appropriate.

In addition, LRWWU may, as agent of the Towns, take emergency actions to stop or prevent any discharge which presents or may present imminent danger to the health and welfare of humans, which reasonably appears to threaten the environment, or which threatens to cause Interference or Pass Through.

4.8 No new or existing Industrial User located in Andover shall discharge into the Tewksbury Sewerage System or Lowell Sewerage System until such Industrial User has consented to the jurisdiction of LRWWU to enforce the terms of the Lowell Sewer Use Ordinance and Tewksbury Sewer Use Regulations upon such Industrial User, and such Industrial User has obtained a permit, if necessary.

4.9 LRWWU retains the right to bill Industrial Users in the Towns directly for sampling and related costs in accordance with the Lowell Sewer Use Ordinance and the Sewer Use Regulations of the Towns. In the event Industrial Users within the Towns fail to pay such sampling or related costs, the applicable Town agrees to place liens on property owned by such Industrial Users. Any costs or fees received by LRWWU pursuant to this subsection shall be placed in an enterprise fund to be used to offset future Capital Costs and Operating Costs of the POTW.

4.10 If the authority of LRWWU to act as agent for any of the Towns is challenged by an Industrial User in a court of law, or otherwise, the applicable Town, upon the request of LRWWU, will take whatever action is necessary to ensure the implementation and enforcement of that Town's Sewer Use Regulations against its Industrial Users, including, but not limited to, implementing and enforcing that Town's Sewer Use Regulations on its own behalf and/or amending this Agreement to clarify LRWWU's authority.

ARTICLE V. INDEMNIFICATION

5.1 Each of the Towns hereby agrees to reimburse, indemnify and hold harmless Lowell and LRWWU from any and all costs incurred by Lowell and LRWWU due to (a) a breach of the terms of this Agreement by that Town, including, without limitation, the failure of the Town to amend its Sewer Use Regulations and the failure of the Town to enforce its Sewer Use Regulations, and/or (b) the acts or omissions of any third party purchaser of the Town's excess capacity under Article IV of this Agreement.

5.2 Such reimbursement pursuant to this Article shall be due and payable by the Town within forty-five (45) days of receipt of an invoice from Lowell or LRWWU.

ARTICLE VI. APPORTIONMENT OF CAPITAL COSTS AND OPERATING COSTS

6.1 The Towns shall pay Capital Costs and Operating Costs based on its Allocable Share. "Allocable Share," as used in this Agreement, shall mean the Town's Average Daily Flow from the prior fiscal year divided by the Total Average Daily Flow from the prior fiscal year. Notwithstanding the foregoing, in no event shall the Average Daily Flow for each of the Towns used in the calculation of its Allocable Share be less than the following:

Table 2: Minimum Average Daily Flows

Chelmsford	1.250 mgd
Dracut	1.500 mgd
Tewksbury	1.770 mgd
Tyngsborough	0.005 mgd

6.2 For the purpose of this Agreement, Operating Costs shall include:

6.2.1 Salaries of all employees of the Wastewater Treatment Facility, including the benefits of all such employees;

6.2.2 Overall administrative expenses of the Wastewater Treatment Facility, including office supplies, postage, computer expenses, insurance, consultant expenses, including legal and engineering expenses.

6.2.3 Wastewater Treatment Facility expenses including telephone, building heat and water, laboratory supplies, uniforms, equipment maintenance, gas and oil (for vehicles), electricity and chemicals, the costs of sampling and analyzing Wastewater and the cost accounting related to the distribution and invoicing of Operating Costs and Capital Costs;

6.2.4 Costs to comply with any orders, judgments, decrees, settlements, notices, permits or approvals (including any applicable fines and/or penalties) from applicable federal or state agencies with jurisdiction over the LRWWU Sewerage System and Wastewater Treatment Facility.[1]

6.2.5 One percent (1%) of the total salaries and administrative expenses of the City of Lowell, excluding the salaries and administrative expenses of the school department, school health and library department.

6.3 Notwithstanding the foregoing, one hundred percent (100%) of the Capital Costs related to the Town Metering Stations shall be borne entirely by the Town served by that Metering Station.

6.4 If LRWWU decides to outsource any services related to the construction and operations of the POTW, such outsourced services shall be competitively bid where permitted.

ARTICLE VII. BILLING

7.1 LRWWU will bill the Towns on a quarterly basis. LRWWU will endeavor to send out all such bills within sixty (60) days of the end of the quarter. Bills shall be paid within sixty (60) days of receipt by the Towns, after which time interest shall accrue at the rate of 14% per annum.

7.2 Within each quarterly invoice, LRWWU will bill the Towns as follows:

The Town's Allocable Share (as set forth in Article VI above) multiplied by the sum of the following:

(a) ¼ of the Operating Costs from the prior fiscal year,

plus

(b) ¼ of the Capital Costs from the prior fiscal year,

plus

(c) ¼ of the funds to be contributed to the Capital Reserve Account,

less

(d) ¼ of the fees received from Industrial Users pursuant to Section 4.9 of this Agreement during the prior fiscal year,

[1] Notwithstanding anything to the contrary in this Agreement, each of the Towns shall not be responsible for costs to comply with any orders, judgments, decrees, settlements, notices, permits or approvals that arise due to the intentional misconduct of Lowell. In the event that any costs of compliance arise due to the negligence, misconduct, errors or omissions of a third party (e.g. contractor, supplier), Lowell agrees to use reasonable efforts to pursue such third party for costs, expenses and damages.

less

(e) ¼ of the fees collected by LRWWU and placed in the enterprise fund from the POTW's receipt of third party hauled waste during the prior fiscal year.

ARTICLE VIII. CALCULATION OF AVERAGE DAILY FLOWS

8.1 Average Daily Flows for each of the Towns and the LRWWU shall be determined from records at the Metering Stations, the Wastewater Treatment Facility or at any other POTW facility, including the CSO diversion structures listed in Exhibit E.

8.2 Whenever possible, the estimated flow for the Unmetered Properties will be based on water consumption data obtained from the water suppliers to the Unmetered Properties. Water consumption volumes will be calculated at least twice per year. In the case of Unmetered Properties for which LRWWU does not receive water consumption data, such volumes for Unmetered Properties will be estimated by LRWWU at three hundred (300) gallons per household per day.

ARTICLE IX. COST ACCOUNTING

9.1 LRWWU shall maintain an adequate cost accounting system which shall be the basis for the determination and allocation of Capital Costs and Operating Costs. This accounting system shall be available for review by the Towns. LRWWU shall provide the Towns with an annual statement of account after the close of each fiscal year. Representatives from LRWWU and the Towns shall meet annually in the Fall of each year to discuss the annual statement of account and upcoming capital and operating improvements at the POTW. After this meeting, in the event that three or more of the Towns wish to initiate an independent review of the annual statement of account, such Towns shall provide notice to Lowell and the other Towns of their intent to initiate an independent audit of the statement of account. The parties shall reconvene to select a mutually-agreeable engineering firm to perform such audit. The costs of such an independent audit shall be an Operating Cost.

ARTICLE X. DISPUTE RESOLUTION

10.1 Any claims or disputes arising under the terms and provisions of this Agreement, or any claims or disputes which representatives of Lowell and the Towns are unable to resolve, shall be submitted to non-binding mediation. The parties to the mediation shall split the costs of the mediator.

10.2 If a dispute cannot be resolved pursuant to Section 10.1, any party may bring an action to resolve the matter in the Superior Court for Middlesex County in Lowell, Massachusetts. All parties agree to waive a jury trial.

10.3 The Towns shall continue to make all payments pursuant to this Agreement during any settlement, mediation or litigation proceedings.

ARTICLE XI. MISCELLANEOUS PROVISIONS

11.1 Governing Law. The Parties agree that the laws of the Commonwealth of Massachusetts shall govern this Agreement.

11.2 Assignment. Except for transfers of flow, which are governed by the provisions of Article IV of this Agreement, the benefits and obligations under this Agreement shall not be transferred or assigned by any Party without the prior written consent of the other Parties.

11.3 Non-Waiver. No waiver of any breach of this Agreement shall be held to be a waiver of any subsequent breach. Any remedy provided in the Agreement shall be taken and construed as cumulative, that is, in addition to each and every other remedy herein provided.

11.4 Authority. Each Party hereby represents and warrants that it has full power to execute, deliver and carry out the terms and provisions of this Agreement and has taken all necessary action to authorize the execution, delivery and performance of this Agreement, and that this Agreement constitutes the legal, valid and binding obligation of each Party in accordance with its terms.

11.5 Entire Agreement. Except as otherwise provided herein, this Agreement embodies and constitutes the entire understanding between the Parties with respect to the transaction contemplated herein, and all prior agreements, including the Prior Agreement, decisions, judgments, term sheets, understandings, representations and statements, oral or written, are merged into this Agreement. Neither the Agreement nor any provisions hereof may be waived, modified, amended, discharged or terminated except by an instrument signed by both Parties.

11.6 Binding Effect. This Agreement shall be binding upon and shall inure to the benefit of the Parties hereto and their respective successors and assigns.

11.7 Headings. The captions in this Agreement are inserted for convenience of reference only and in no way define, describe or limit the scope or intent of this Agreement or any of the provisions hereof.

11.8 Severability. If any clause or provision of this Agreement is or should ever be held to be illegal, invalid or unenforceable under any present or future law applicable to the terms hereof, then and in that event, it is the intention of the Parties hereto that the remainder of this Agreement shall not be affected thereby, and that in lieu of each such clause or provision of this Agreement that is illegal, invalid or unenforceable, such clause or provision shall be judicially construed and interpreted to be as similar in substance and content to such illegal, invalid or unenforceable clause or provision, as the context thereof would reasonably suggest, so as to thereafter be legal, valid and enforceable.

11.9 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one in the same instrument.

IN WITNESS WHEREOF, each of the Parties have caused their proper representatives to execute this Agreement to be effective as of the Effective Date first above written.

CITY OF LOWELL, MASSACHUSETTS

By:_____
Bernard F. Lynch, City Manager,
duly authorized by the City Council

By:_____
Mark A. Young, Executive Director,
Lowell Regional Wastewater Utility

Approved as to form:

By:_____
Christine O'Connor, City Solicitor

TOWN OF CHELMSFORD, MASSACHUSETTS

By Its Board of Selectmen

_____
Jon Kurland, Chairman

_____
Matt Hanson, Vice Chairman

_____
Pat Wojtas, Clerk

_____
James M. Lane, Jr.

_____
George R. Dixon, Jr.

Approved as to form:

By:_____
Town Counsel

Paul E. Cohen

PAUL E. COHEN
TOWN MANAGER
Duly Authorized

TOWN OF DRACUT, MASSACHUSETTS

By:_____
Dennis E. Piendak, Town Manager, duly
authorized by the Board of Selectmen

Approved as to form:

By:_____
Town Counsel

TOWN OF TEWKSBURY, MASSACHUSETTS

By Its Board of Selectmen

_____

David H. Gay, Chairman

_____

Douglas W. Sears, Esq., Vice-Chairman

_____

Scott Wilson, Clerk

_____

Anne Marie Stronach

_____

Todd R. Johnson

Approved as to form:

By:_____
Town Counsel

Richard A. Montuori
Town Manager
Duly Authorized

TOWN OF TYNGSBOROUGH, MASSACHUSETTS

By Its Board of Selectmen

_____
Robert Jackson, Chairman

_____
Karyn Puleo, Vice-Chairman

_____
Rick Reault, Clerk

_____
Corliss Lambert

_____
Allen Curseaden

By Its Sewer Commissioners

_____
Jeffrey Hannaford, Chairman

_____
Gerald P. Foley

_____
Fred Perrault

Approved as to form:

By:_____
Town Counsel