

Municipality/Organization: City of Lowell, Massachusetts
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NPDES PII Small MS4 General Permit ANNUAL REPORT

Part I. General Information

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Certification:

I certify under penalty of law 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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: 

Printed Name: Aaron Fox

Title: Executive Director

Date: April 30, 2024

Part II. Self-Assessment

Past Program Overview:

In 2003, the Lowell Regional Wastewater Utility (LRWWU) contracted field inspections of stormwater outfalls within the City. City maps provided initial locations for field crews to complete visual inspections of outfalls along the City's municipal waterways and wetlands. An outfall data sheet was completed for each outfall located in the field, and the location of the outfall was added to a master outfall map. If an outfall had observed dry weather flow at the time of inspection, the outfall was identified for later follow-up sampling and water quality analysis. In total 193 total outfalls were inspected, with nineteen (19) outfalls showing signs of dry weather flow, or evidence of potential illicit connections.

In 2010, the City of Lowell initiated a new drainage outfall identification project. After a decade of implementing this program, approximately 400 drainage outfalls were identified in the field, characterized in an inventory report, and captured in the City's Geographical Information System (GIS). During this time, eighty-two (82) drainage outfalls were recorded to have dry-weather flow. In 2019, these 82 outfalls were inspected and assessed; if dry-weather flow was still present, and if water levels in the receiving streams were below the invert of the outfall, a sample was collected for analysis. These samples were analyzed for pH, conductivity, dissolved oxygen, turbidity, temperature, E. coli, and fluoride; physical and olfactory conditions of the samples were also recorded. Eighteen (18) of the 82 samples resulted in E. coli levels over 235 E. coli colonies per 100 mL. In October 2021, an additional sampling effort was made to inspect these 18 outfalls where a combination of significant dry weather flow and high E.coli levels were previously observed. This led to seventeen (17) outfall inspections; samples were collected once again where dry weather flow was present. Results obtained from this round of sampling were used to prioritize future catchment mapping and tracing efforts.

In 2022, Lowell Wastewater engineering staff consolidated existing data from multiple sources, and used both desktop analysis and field verification to improve the accuracy of the existing GIS mapping data. Recorded outfalls were queried based on parcel ownership; outfalls that fell on a non-municipally owned parcel and without municipal connections were deemed private and were omitted from the total count of Lowell's municipal outfalls. Resulting from this effort, a new total count of 233 municipally owned MS4 outfalls were identified.

Permit Year Twenty-One Efforts:

Until recently, the City was operating solely under the 2003 Small MS4 General Permit. In June 2022, federal and state agencies initiated Consent Decree (CD) negotiations with the City. Throughout the process, the City negotiated with the agencies' legal and technical teams to reach an agreement in December 2023. The final CD will be submitted to Federal Court in 2024. In accordance with the CD, the City shall remain under the 2003 MS4 permit with additional requirements stipulated per the CD.

These requirements include:

- The development of an Illicit Discharge Detection Elimination (IDDE) program,
- Additional stormwater mapping requirements,
- Utilization of Best Management Practices in stormwater management design,

- Updates to ordinances to address pre- and post-construction stormwater controls, and
- Updates to this Stormwater Management Program (initially issued in 2003) to update the Minimum Control Measures (MCM) and Best Management Practices (BMPs) to minimize the impact of phosphorus, including a Phosphorus Source Identification Report and development of an BMP demonstration project on a municipal property.

In preparation for tentative re-permitting issuance by the regulatory agencies, the Utility made substantial efforts towards upgrading its stormwater program to meet the expected requirements of an individual stormwater permit. Major activities are summarized below:

- Beginning in May 2023, Lowell wastewater engineering staff started sampling municipal drainage outfalls for the updated parameters outlined in the consent decree. These parameters include ammonia, chlorine, conductivity, salinity, surfactants, temperature and turbidity. As a result of this sampling effort, 157 outfall inspections took place during Permit Year Twenty-One. Of these inspections, 69 were conducted during wet-weather conditions, and 89 were conducted during dry-weather conditions.
- In May/June 2023, Lowell staff utilized private engineering services to develop updated educational materials to promote stormwater awareness and practices to the public. This effort saw to the development of a *Stormwater Management & Green Infrastructure Information Guide*, a pair of double-sided informational roll-outs, and a Duck Island Stormwater logo with an embedded QR-code that directs to the Utility’s website. Additionally, the Utility procured Duck Island branded dog waste bag dispensers, stickers featuring the aforementioned new logo, and bubble wands to give out as educational/promotional handouts.
- In July 2023, the Utility participated in the annual Lowell Folk Festival. A pair of staff engineers worked at a promotional Lowell Wastewater booth, through which they educated the public on Lowell’s MS4 and stormwater management program.
- Between July and August 2023, members of Lowell wastewater’s engineering and maintenance department participated in three (3) stormwater education pop-up events for various Lowell summer camps. One of these events included a “touch-a-truck” component, where campers could see first-hand how municipal vehicles that are regularly used for stormwater management.
- The Utility developed and sought amendments to the City’s stormwater ordinance to create a legal mechanism that allows the City to prohibit non-stormwater discharges to Lowell’s storm drains and waterbodies, and to mitigate the impacts brought on by stormwater runoff from construction activities that result in land disturbances of greater than or equal to one acre in magnitude. These ordinance amendments were adopted by the City on January 2, 2024.
- The Utility contracted private engineering services to assist in the revision and submittal of both an Illicit Discharge Detection and Elimination (IDDE) plan and a Stormwater Management Program (SWMP) plan.
- As part of the IDDE plan development process, an assessment and ranking of Lowell’s municipally owned outfalls was performed to prioritize future investigatory activities. A detailed overview of this process can be found in the Utility’s *Illicit Discharge Detection and Elimination (IDDE) Program* overview document hosted on the City’s website. As a result of this ranking effort, seventeen (17) outfalls were classified as having a “Potential Illicit Discharge”, seven (7) outfalls were classified as having “High Bacteria Discharges”, and 246 outfalls were identified as having “Low Potential Illicit Discharges”. Additionally, the plan formalized Lowell’s catchment mapping and investigation

processes. Trainings related to proper sampling methodologies and catchment mapping procedures were held in October and December, respectively.

- As part of the SWMP plan development process, a holistic review and revision of the City's MS4 Minimum Control Measures was taken, including the identification of all City departments necessary to properly adhere to the established control measures. Through this effort, site-specific SWPPPs were developed for the City's Water Department, Department of Public Works, and Landfill. A *Good Housekeeping Manual* outlining best management practices applicable to municipal facilities and the MS4 was developed tangentially as part of this effort.

Lowell Regional Wastewater Utility (LRWWU) has formalized its approach for mapping drainage systems throughout the City of Lowell. A drainage system is first mapped in its entirety, starting at the outfall and working upstream. Mapping staff are equipped with the necessary tools, including an iPad with access to the City's GIS network through Esri's collection of field worker applications. LRWWU obtains GPS coordinates for all the catch basins, drain manholes, and outfalls using a Leica GG04+ receiver and edits/records data using ArcGIS Collector software. This allows LRWWU to obtain high-accuracy location information on each asset and will support better understanding of the dynamics of stormwater flow through the drainage system as system mapping progresses. A detailed overview of this mapping process can be found in the Utility's *Illicit Discharge Detection and Elimination (IDDE) Program* overview document hosted on the City's website.

One (1) illicit connection was discovered in March 2024 when a City building inspector witnessed a local restaurant dispose used cooking grease and oil directly into a private catch basin. Follow-up investigation revealed that this catch basin was connected to the municipal drainage system, and that this dumping had been a long-standing practice. As a result, the impacted infrastructure has been thoroughly cleaned, and the private business owner has been informed that this dumping constitutes an illicit discharge, and that further corrective actions may be necessary. Given that the cause of this illicit discharge was routed in human error, Green Infrastructure/Low Impact Development (GI/LID) features were not considered or implemented as a potential solution.

The City of Lowell approves construction plans that conform to City policies for erosion control and site stormwater management. Private property development projects are reviewed by several city departments for adherence to Massachusetts Stormwater Regulations when applicable. The stormwater management of areas outside of MS4 jurisdiction are regulated by Lowell standards and specifications that are being actively developed.

The City of Lowell has implemented long standing street sweeping and catch basin cleaning programs to reduce the migration of solids in the City's drainage system. After catch basins are cleaned, the City of Lowell labels the basins and collects vital information such as physical characteristics, GPS locations, and all elevations of these catch basins. LRWWU hires a contractor to clean drainage system catch basins and coordinates this work with the contractor using an iPad and ArcGIS Workforce software. The contractor collects a digital survey for each catch basin cleaned, measures a pre- and post-clean sump depth, records photographs of the basin after cleaning, and documents any potential illicit connections entering the catch basin. During Permit Year Twenty-One approximately 788 drainage system catch basins were cleaned by this contractor.

The City of Lowell has completed the required self-assessment and has determined that the municipality is in compliance with its MS4 permit conditions.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
1.1	Hold annual Earth Day Celebration	Neighborhood Services Department	Event Held	The City of Lowell returned to hosting its annual Earth Day Parade and Festival, following multiple years of the event being held virtually due to Covid-19 restrictions. The Lowell Regional Wastewater Utility participated in the City of Lowell’s annual Folk Festival, various educational pop-ups, and a “touch-a-truck” event.	Lowell Wastewater plans to expand this BMP to include its participation at many of the City’s other public events held throughout the year.
1.2	Develop and Distribute Stormwater Brochure	Lowell Regional Wastewater Utility	Develop stormwater brochure in Year 1 and distribute in subsequent years	Lowell Wastewater developed a new <i>Stormwater Management & Green Infrastructure Information Guide</i> which was made available to the public at municipal departments, including: City Hall; DPW; Water Plant; Wastewater Plant; City Clerk’s Office; City Hall; Public Libraries; Division of Planning & Development; and Neighborhood Services Department. The Utility made expanded efforts in Permit Year Twenty-One to distribute materials online through the City’s website and a municipal Twitter/X account.	The Utility will continue to ensure that copies of the existing Stormwater Brochure are available at the public distribution sites as needed. The Utility will expand its online presence through social media.
1.3	Enhance Awareness of Proper Pet Waste Disposal at City Parks	City Clerk, Parks Dept.	Pet Waste Brochure developed in Year 2; and distributed to all licensed dog owners in Years 3-5. Pet waste signs to be installed at City Parks in Years 2-5.	The Lowell Wastewater Utility procured and distributed Duck Island branded pet waste disposal bags to the public. Flyers discussing the Animal Control Ordinance are available at DPW and posted on signs at the City’s parks. Lowell maintains approximately 100 signs at City parks posting the Animal Control Ordinance. The City has 92 parks all of which contain at least one sign. Signs are posted wherever notable animal waste is present and all are maintained and replaced by the Parks Department.	<ul style="list-style-type: none"> • Continue to maintain supply of Stormwater Brochures. • Coordinate with City Clerk’s Office to ensure awareness of Animal Control Ordinance. • Continue to distribute Duck Island branded pet waste disposal bags at public events alongside BMP 1.1.

2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
2.1	Comply with State Public Notification Guidelines	City Clerk; other City Dept.	Comply with State public notification guidelines	City posted all applicable meetings and environmental awareness events according to state guidelines including local access TV channel.	The City continues developing website-based meeting notifications.
2.2	Hold Annual Household Hazardous Waste / Tire / Electronics Collection Days	SW&R Office, DPW	Hold hazardous waste collection day two times a year.	Household Hazardous Waste Collection Days were held on 9/30/2023 and 3/23/2024. The events were advertised in the local newspaper, on local access TV, AM Radio, Quarterly Newsletter, and on the City website . A total of 120 pre-registered residents may participate in each event. DPW retains the manifests of the household hazardous waste collected. A planned Household Hazardous Waste Collection Day was scheduled to be held on 6/3/23; however, this event was cancelled while the City and municipal departments were still recovering from a major cyber-security incident.	At the time of this report, one Permit Year Twenty-Two Hazardous Waste Collection Day is scheduled for August 31 st . Residents are able to register for this event online.
2.3	Install Catch Basin Plaques	Lowell Regional Wastewater Utility	50 catch basin plaques installed each year.	Lowell Wastewater personnel paused their catch basin labeling program during Permit Year Twenty-One. During this time, alternative strategies and methodologies for catch basin labeling were assessed.	Lowell Wastewater will proceed to label catch basins, as needed.

3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
3.1	Map Drain Outfalls and Receiving waters	Lowell Regional Wastewater Utility	Complete map of outfalls and map of drainage system	Lowell Wastewater engineering staff continued system-characterization and mapping program in 2023, utilizing one full-time engineer equipped with high-accuracy GNSS receiver and Esri's Field Worker Application package for iOS. Additional support is provided to this engineer, as needed.	Lowell Wastewater will continue to map and investigate the City's MS4 following the process outlined in Lowell's IDDE Plan. Collected data will be managed in Lowell's drainage system geodatabase. Lowell Wastewater is in the process of improving its stormwater data model following Esri best practices, and is in the process of upgrading to an Enterprise network. The new data model will support live data editing, and automated catchment delineation once individual catchments are fully confirmed in the new geodatabase. Adoption of the Enterprise network is tentatively scheduled for late Spring/early Summer 2024.
3.2	Continue Inspections of New Sanitary Sewer Connections	City Engineering	Continue existing program	The City inspected ninety (90) new/updated sewer services. During April 2022-March 2023, the City of Lowell repaired thirty-five (35) sewer services, and installed fifteen (15) new sewer services.	Lowell Wastewater will continue with inspections of new sewer connections.
3.3	Continue enforcement of illicit connection/illegal dumping bylaws	City Engineering & Lowell Regional Wastewater Utility	Continue existing program	The City's Stormwater Ordinance was amended to include an IDDE ordinance to effectively prohibit non-stormwater discharges to Lowell's MS4 and implement appropriate enforcement procedures and actions. One (1) illicit connection was discovered and eliminated in Permit Year Twenty-One.	The City will continue proper enforcement of its IDDE ordinance. Lowell Wastewater will continue to implement and enforce corrective measures to fully resolve any known illicit discharges impacting the City's MS4.
3.4	Dry weather screening of drain outfalls	Lowell Regional Wastewater Utility	All outfalls screened once during permit period	157 outfall inspections took place during Permit Year Twenty-One; 88 of which were conducted during dry-weather conditions.	Lowell Wastewater will continue to screen and analyze dry weather discharge as part of its dry weather tracing program.
3.5	Develop and Implement System for Elimination of Illicit Discharges	Lowell Regional Wastewater Utility	Based on prioritized results in BMP No.3.4, determine procedures to identify and remove illicit connections to drain; maintain records	The City's Stormwater Ordinance was amended to include an IDDE ordinance to effectively prohibit non-stormwater discharges to Lowell's MS4 and implement appropriate enforcement procedures and actions. Procedures for identifying and eliminating illicit discharges were developed and formalized in the <i>Utility's Illicit Discharge Detection and Elimination (IDDE) Program</i> overview document.	Lowell Wastewater will continue to implement the IDDE program as described in the <i>Utility's Illicit Discharge Detection and Elimination (IDDE) Program</i> overview document, and will remove illicit discharges and connections from the MS4 as they are uncovered.

4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
4.1	Continue to Apply Standard 8 of MA Stormwater Policy	Conservation Commission	Standard 8 of MSP applied	The City of Lowell’s Conservation Commission requires proper stabilization of all sites during construction including, but not limited to, the installation of erosion control measures.	Continue enforcement of Standard 8 for proposed development projects in the City.
4.2	Continue to Inspect/Maintain Control Measures at Construction Sites	City Engineer	Continue Existing Program	City Engineer’s Office inspects all sites while construction activity is underway. Any activities that need to be addressed are brought to the attention of the site developer immediately, corrective action is taken and the site is re-inspected. No violations were reported during Permit Year Twenty-One.	Continue City’s Site Inspection Policies.
4.3	Continue to Enforce procedures for collection/filing of public comments	All Departments	Continue Existing Program	All departments keep their own public comments on file. When the public places a complaint through the Civic Plus software, the complaint is automatically sent to the specified department. All departments make effort to respond to comment in a timely manner and keep the public updated throughout every step of completing the task.	The City will continue to implement and maintain the Civic Plus software and track public complaints.
4.4	Develop and present an Ordinance for Erosion Control Measures and Construction Material Management for Construction Sites more than 1-acre.	City Engineer	Draft Ordinance language and present to City Council for approval	The City’s Stormwater Ordinance was amended to include an Erosion and Sedimentation Control ordinance to require sediment and erosion control for construction activities or land disturbances that individually, or as part of a Common Plan of Development, result in any disturbances of land in excess or equal to one acre.	The City will continue proper enforcement of its Erosion and Sedimentation Control ordinance.

5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
5.1	Continue application of Planning Board Rules and Regulations for Subdivisions	Planning Board	Continue enforcement of existing regulations	The City has applied Rules and Regulations to all projects that come under its review. Seventy-nine (98) projects were reviewed during Permit Year Twenty-One.	Continue application of existing Rules and Regulations. New site-stormwater management review procedures have been established. Standards and specifications are in development to improve the rate of ‘incremental improvement’ required as properties are developed.
5.2	Apply Standards 2, 3, 4, 7 and 9 of MA Stormwater Policy	Planning Board, Conservation Commission, & Lowell Regional Wastewater Utility	Develop/ Incorporate modifications to existing regulations as needed	MA Stormwater standards applied to subject development projects, where applicable.	MA stormwater standards are applied to all projects within the WPA jurisdictional area and for construction activities or land disturbances that individually, or as part of a Common Plan of Development, result in any disturbances of land in excess or equal to one acre.
5.3	Develop/Implement Ordinance/Regulation to ensure long-term maintenance of private structural BMPs.	Planning Board & Lowell Regional Wastewater Utility	Draft and adopt stormwater ordinance	The City’s Stormwater Ordinance was amended to include a Post-Construction Runoff from New/Redevelopment Control ordinance to ensure long-term maintenance of private structural BMPs. Projects undergoing substantial (re)development that have newly proposed or previously existing private drainage systems, including structural BMPs, are required to submit and adhere to an Operations and Management Plan specific to the individual system.	The City will continue proper enforcement of its Post-Construction Runoff from New/Redevelopment Control ordinance.

6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
6.1	Continue Street Sweeping Program	DPW & Lowell Regional Wastewater Utility	Percentage of streets swept annually with emphasis on sensitive receptors	The City of Lowell currently performs all street sweeping operations in-house in order to ensure the effectiveness of this preventative maintenance program. The City maintained its current street sweeping and residuals disposal program to reduce the migration of solids in the city’s drainage system. All City streets were swept twice in 2023, with some streets having been swept more often, as needed. Active street sweeping yielded 1,052 tons of sediment and debris in 2023.	The City of Lowell will continue existing program.
6.2	Continue Catch Basin Cleaning Program	Lowell Regional Wastewater Utility	Percentage of catch basins cleaned annual; with emphasis on sensitive receptors	The Utility maintained its current catch basin cleaning and residuals disposal program to reduce the migration of solids into the City’s drainage systems. An ArcGIS Online Workforce project was created to better manage catch basin cleaning. In 2023, 788 drainage catch basins were cleaned by Lowell Wastewater staff and hired contractors. This accounts for approximately 38% of all drainage catch basins.	Lowell Wastewater will continue implementing existing program.
6.3	Continue Salting and Snow Removal Practices	DPW	Continue existing programs for salt storage/use and management, especially in sensitive areas	The City continued its existing salt storage/snow removal practices. Records of salt use are kept by DPW. Lowell has stopped spreading sand on the roads and now uses salt. This has decreased the amount of sediment getting into the sewage and drainage systems and water resources. DPW uses the Cirrus salt-tracking system to ensure that the salt has been evenly distributed with the newest and most effective techniques, while tracking and calibrating the dispensing technique based on weather conditions.	The City of Lowell will continue existing program. Options are being considered to reduce salt usage in the future.
6.4	Continue Vehicle Washing Practices	DPW	Continue existing program in DPW yard	City vehicles were washed in approved areas.	Continue existing program. Modify practices as necessary to minimize stormwater impacts.

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities –
6.5	Continue Vehicle Maintenance	DPW	Continue existing program in DPW garage	City vehicle maintenance is performed in approved designated areas. Byproduct vehicle waste oil was either used to heat the DPW's maintenance garage using two new clean burn, oil fired heating systems or disposed of off-site by approved waste handlers.	Continue existing program. Modify practices as necessary to minimize stormwater impacts.
6.6	Park and Landscape Maintenance	Parks Department	Minimize herbicides, pesticides, fertilizers in sensitive areas; maintain records	The City utilizes reduced-phosphorus fertilizers and has reduced its use thereof, improving stormwater quality in the process. Records of fertilizer/herbicide/pesticide use are maintained by the Parks Department.	Continue existing program. The City will continue to examine existing fertilizer practices and make revisions as necessary to minimize impact to stormwater runoff and receiving streams.
6.7	Employee Education Program	Lowell Regional Wastewater Utility	Awareness training on stormwater topics	Lowell Wastewater staff attended various stormwater webinars and reviewed potential training materials. Training sessions were held in October and December, detailing sampling practices and drainage system mapping procedures, respectively.	Appropriate staff personnel will continue to attend relevant training events pertaining to stormwater management and practices.

7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA)

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year Twenty-One (2023) (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year
Not Applicable					
Revised					

7a. Additions

7b. WLA Assessment

Part IV. Summary of Information Collected and Analyzed
N/A