ECA Number: 023-S701

St. Catharines

City of St. Catharines

Stormwater Management System

2024 Annual Performance Report

For submission to the Ministry of Environment, Conservation and Parks

April 2025

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*Request access to the appendices by emailing Engineering Facilities and Environmental Services at efesall@stcatharines.ca

Glossary

Term	Explanation
CLI-ECA	A framework approval that outlines pre-authorized conditions for changes to the sewage works system and ensures standardized operating and reporting conditions to safeguard accountability and oversight, with enhanced requirements for monitoring and system operation
Combined Sewers	A sewer in which all sanitary and storm flows are collected within the same sewer
CSO Regulators / Overflows	A flow regulating device / structure that directs dry weather flow to a WWTP and diverts wet weather flows in excess of the regulator's capacity to outfalls / receiving waters
Forcemains	Pipes located downstream of a pump station that convey wastewater under pressure.
Fully Separated Sewer	Sewers that allow only sanitary flows to be collected within the sewer - there are no stormwater connections. All stormwater is collected within a separate sewer
Impervious Surfaces	Hard, non-porous surfaces that prevent water from infiltrating into the ground, leading to increased stormwater runoff and potential environmental impacts
MECP Procedure F-5-5	Determination of treatment requirements for municipal and private combined and partially separated sewer systems - outlines the rules for treating the wastewater from municipal and private combined and partially separated sewage systems

Glossary

Term	Explanation
Outlets / Outfalls	The point where the system discharges into the natural environment / receiving waters
Overflow Events	Events that result in a surcharge of the sanitary sewer system or WWTP, which discharge into the natural environment / receiving waters
Partially Separated Sewer	Sewers that collect all sanitary flows and some stormwater from weeping tiles and roof leaders. Stormwater from roadways is collected in a separate sewer
Receiving Water	A natural body of water into which treated or untreated wastewater is discharged
Spill	An accidental, unplanned or unpermitted release of wastewater into the natural environment
Stormwater	Refers to rainwater runoff, snow melt and surface runoff
Wastewater Collection System	City-owned sewage works / infrastructure that collects and transmits sanitary wastewater
Wet Weather Flows	Flows resulting from the combination of sanitary sewage and extraneous flows, resulting from a weather event such as rainfall or snow melt
Wet Weather Storage Facility	A facility that provides temporary storage of excess wet weather flows that can later be treated at a WWTP

Glossary

Term	Explanation
Stormwater Management Facilities (SWF)	Components of our system that offer some treatment to stormwater before being discharged into the natural environment
Stormwater Management System	Is a system designed to collect stormwater from private and public properties across the city, consisting of storm sewers, urban ditches and swales, culverts, catch basins, outlets, and stormwater management facilities.

Acronym	Definition
City	City of St. Catharines
CLI-ECA	Consolidated Linear Infrastructure Environmental Compliance Approval
CSO	Combined Sewer Overflow
CSO Outfall	Combined Sewer Overflow Outfall
GEI	GEI Consultants Canada Ltd
MECP	Ministry of Environment, Conservation and Parks
MTO	Ministry of Transportation
Niagara Region or Region	The Regional Municipality of Niagara
OGS	Oil / Grit Separator

Glossary

Acronym	Definition
SAC	Spills Action Center
SWMS	Stormwater Management System
WWTP	Wastewater Treatment Plant

Introduction and Purpose

The City of St. Catharines (the City or St. Catharines) owns and operates the St. Catharines Stormwater Management System, which is operated under a Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA), ECA Number: 023-S701, issued by the Ministry of the Environment, Conservation, and Parks (MECP). The approval replaces the numerous pipe-by-pipe Environmental Compliance Approvals (ECAs) that were previously issued for components of the municipal system. The streamlined CLI-ECA outlines pre-authorized conditions for changes to the system and requires standardized operating and reporting conditions to safeguard accountability and oversight, with enhanced requirements for monitoring and system operation. One condition of this CLI-ECA is preparing an annual report outlining actions relating to the CLI-ECA.

This Annual Performance Report is for the Period of Jan. 1 to Dec. 31, 2024, and fulfils the reporting requirements in the CLI-ECA. It is important to note some of the CLI-ECA requirements are phased in and therefore not all of the requirements are in place. As additional requirements come into effect and additional information becomes available it will be reflected in future annual reports.

Background

Stormwater Management System

The Municipal Stormwater Management System (System or SWM System) serving the St. Catharines' drainage area, is a separate system for stormwater (i.e.designed not to convey sanitary or combined sewage) within the Lake Ontario watershed. This system consists of storm sewers, urban ditches and swales, culverts, catch basins, outlets, and Stormwater Management Facilities (SWF) including wet ponds, constructed wetlands, and dry ponds, and other components such as Oil / Grit Separators (OGS). The SWM System helps to protect water quality and lowers the riskof flooding that can damage property and impact the environment.

This CLI-ECA covers the entire Municipal Stormwater Management System owned and operated by the City of St. Catharines. It does not cover municipal or privately owned sewage works on industrial or commercial land or roadside ditches outside of the urban area.

This Municipal Stormwater Management System does not contain any third pipe systems or storage tanks.

The City's Stormwater Management System is designed to collect stormwater from private and public properties across the city. The City's stormwater system operates in conjunction with assets from both the Regional Municipality of Niagara (Niagara Region) and Province of Ontario (e.g. Provincial highways operated by the Ministry of Transportation Ontario [MTO]), such as storm sewers and ponds. The stormwater assets operated by the Niagara Region and the MTO are beyond the scope of this report.

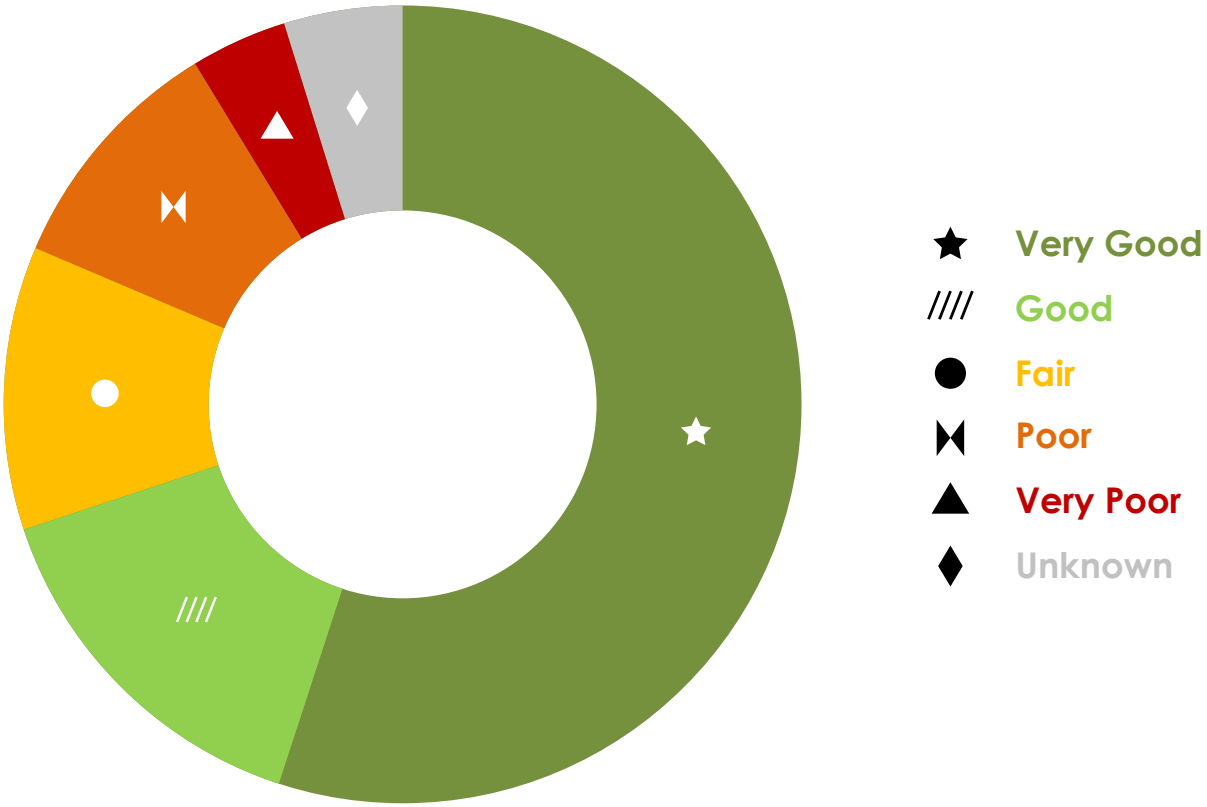
All the watersheds in St. Catharines drain into Lake Ontario. The drainage includes three major waterways (Welland Ship Canal, Twelve Mile Creek, and the former Welland Canal), and 25 urban watercourses / creeks totaling 120 kilometres in length. Notable features include three beaches (Lakeside Beach, Sunset Beach, and Jones Beach), Martindale Pond, and Provincially Significant Wetlands (e.g. Barnsdale and Briarsdale Marshes). A map depicting the locations of these local watershed features can be found in Appendix A.

Background

The City actively monitors, operates, and maintains the system to ensure regulatory compliance and system reliability. The City is also responsible for maintaining the system in a state of good repair.

As part of the City's Asset Management programs, condition assessments are undertaken. Nearly 70 per cent of the assets are in Good or Very Good Condition and 11 per cent are in Fair condition. Approximately 14 per cent have been rated in Poor or Very Poor condition.

Figure 1: Summary of Stormwater Asset Conditions



Note: The asset condition distribution is based on the asset replacement cost

Background

Types of Sewers

St. Catharines is serviced through networks of fully separated, partially separated and combined sanitary and storm sewers. These types of sewers are defined as follows:

Fully Separated

Only sanitary flows are collected within the sanitary sewer - there are no stormwater connections. All stormwater is collected within a separate storm sewer. These types of sewers are mandatory for all new developments where no new storm connections to the sanitary sewer are allowed.

Partially Separated

Stormwater from roadways is collected in a separate storm sewer. The partially separated sanitary sewer collects all sanitary flows and some stormwater from weeping tiles and downspouts.

Combined Sewers

All sanitary and storm flows are collected within the same sewer.

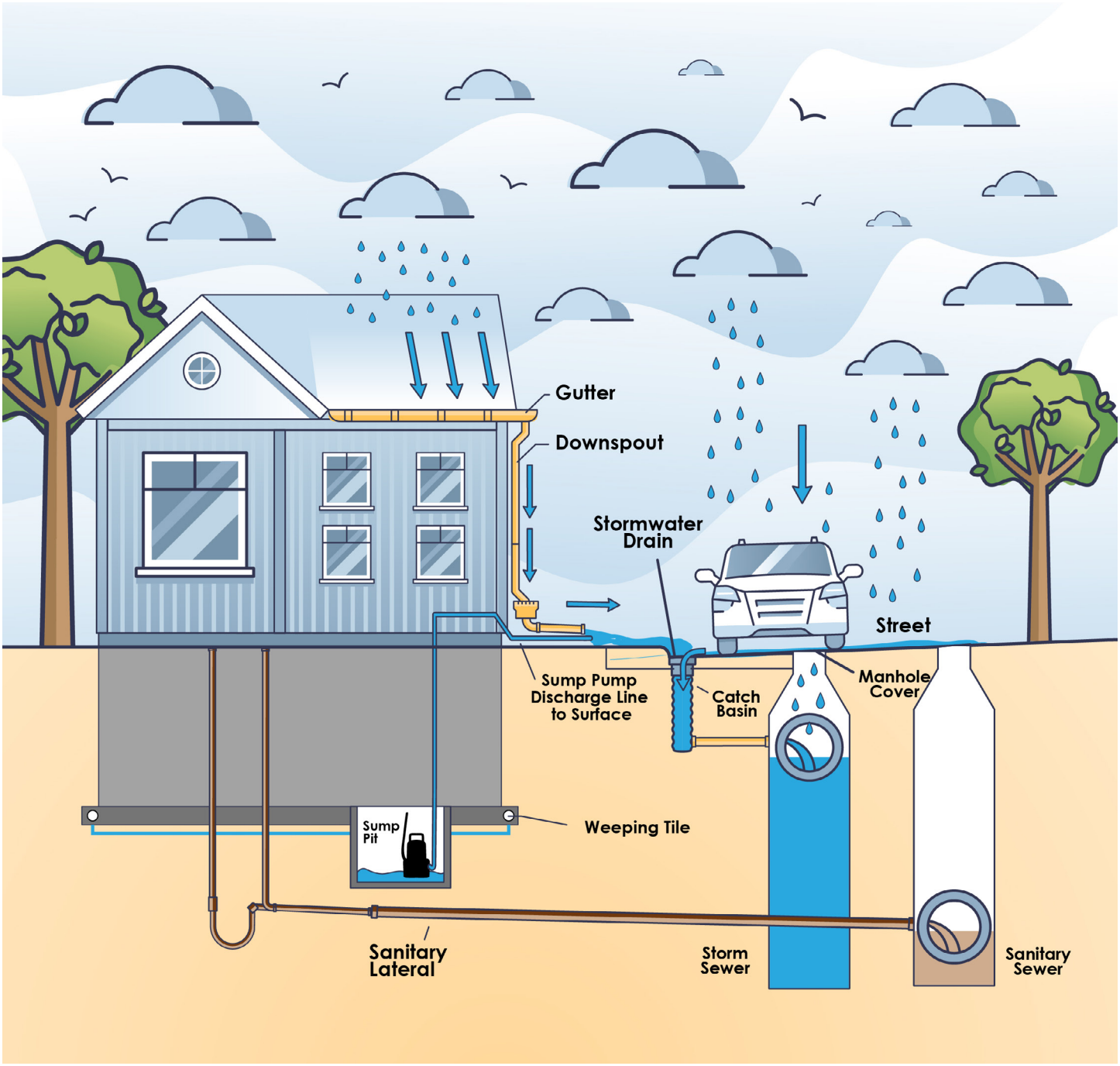
Storm Sewers

Collects and transmits stormwater resulting from precipitation and snow melt tiles and downspouts.

Note: the above sewer system type definitions are slightly different that those defined in the CLI-ECA. The City is working to better align these discrepancies, as part of the ongoing transitional efforts for improved consistency.

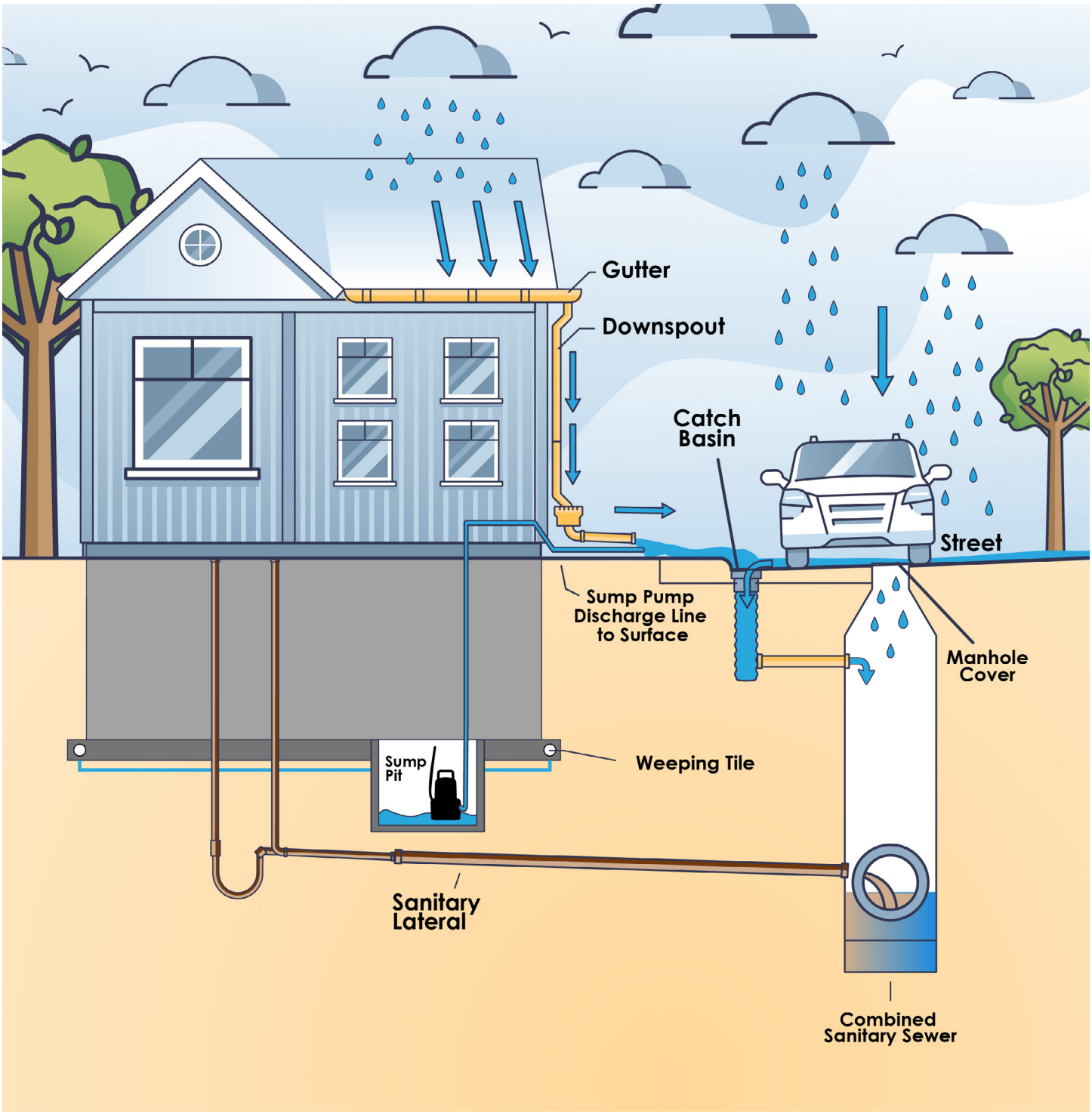
Background

Figure 2: Typical Separated Sewer System



Background

Figure 3: Typical Combined Sewer System



Background

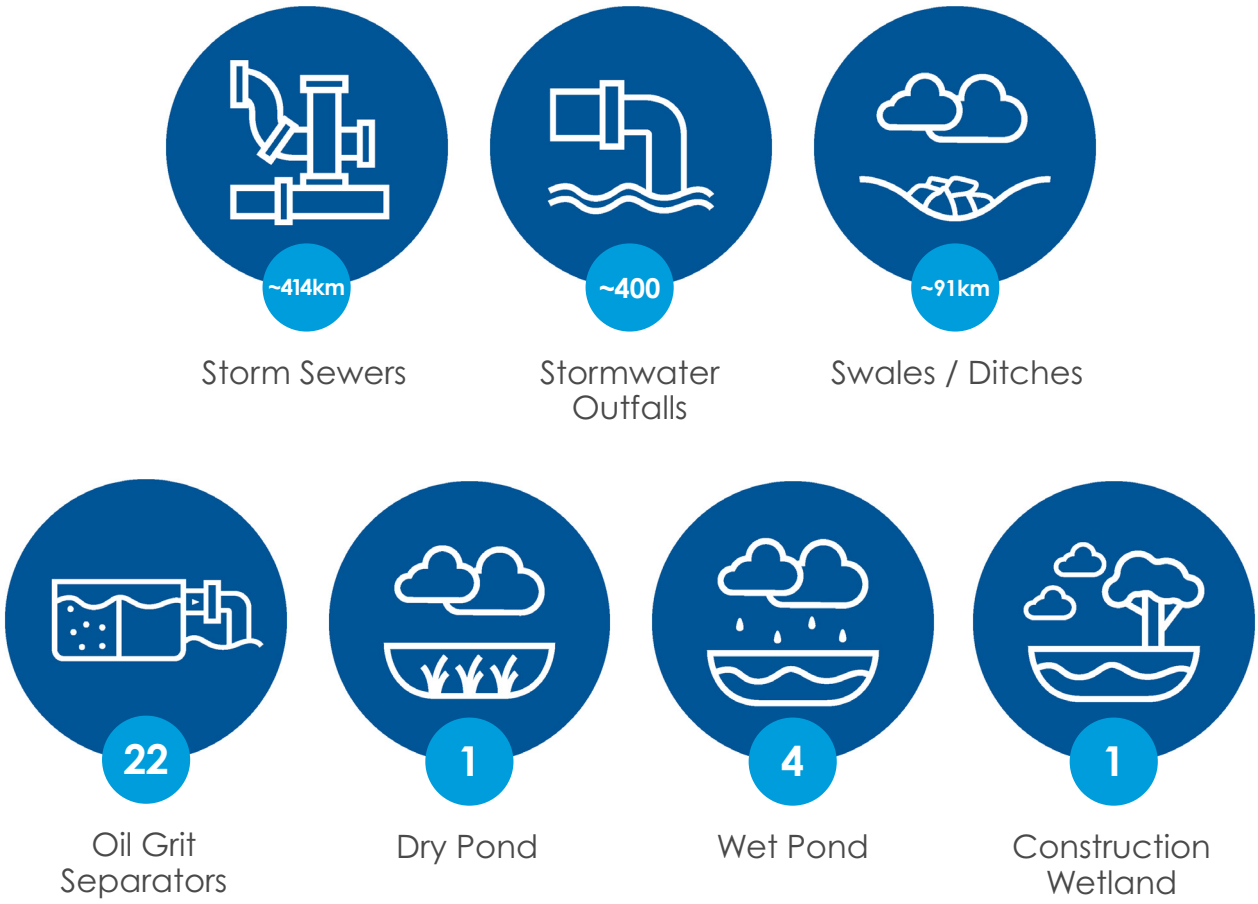
Stormwater, including rain and snow melt, enters the SWM System through downspouts, weeping tiles, and run-off from impervious surfaces such as driveways, parking lots, and roadway drainage. Stormwater captured in combined sewers is transported to a wastewater treatment plant. Conversely, stormwater captured in a storm sewer, ditches or swales enters the SWM System and is discharged directly to our local waterways, typically with minimal treatment. Impacts from the urban stormwater system is illustrated in Figure 4. A map depicting the City's storm sewers by size (diameter) and urban ditches can be found in Appendix B.

Figure 4: Urban Stormwater Flows

Components of the Stormwater Management System

In addition to storm sewers, ditches and swales, culverts, catch basins and outlets, the City's SWM System also includes other components that offer some treatment to stormwater before discharged into the natural environment. Known as Stormwater Management (SWM) Facilities, they are designed to help eliminate pollutants picked up in stormwater runoff including harmful bacteria from pet waste, fertilizers, motor oil, detergents, trash, and sediment. These SWM facilities include wet and dry stormwater ponds, a constructed wetland and OGSs. Characteristics of St. Catharines Stormwater Management System can be found below in Figure 5.

Figure 5: Stormwater Management Characteristics



Stormwater Management Facilities - Stormwater Ponds and Constructed Wetlands

St. Catharines maintains several Stormwater Management Facilities including four wet stormwater ponds, one constructed wetland, and one dry stormwater pond. Dry stormwater ponds hold water for a given period of time (typically 24 to 72 hours) to allow pollutants to settle out. Wet stormwater ponds, on the other hand, maintain a permanent pool of water throughout the year. Figure 6 depicts how a typical stormwater pond would function. A constructed wetland operates similarly to a wet stormwater pond, with an added benefit of providing important habitat for local species. The City also owns two additional informal ponds (duck ponds) at Happy Rolph's Animal Farm. These informal ponds are not designed for formal stormwater management and are outside of the scope of the CLI-ECA. A list of the various City owned and operated wet and dry SWM ponds can be found in Table 1 and illustrated in Appendix A.

Table 1: Stormwater Management Facilities

Asset ID	Asset Type	Type
SWP3	Dry Stormwater Pond	Scullers Way Pond
SWP4	Wet Stormwater Pond	Erion Road Pond
SWP5	Constructed Wetland	Pelham Road Pond
SWP6	Wet Stormwater Pond	Garden City Golf Course West Pond
SWP7	Wet Stormwater Pond	Garden City Golf Course East Pond
SWP13	Wet Stormwater Pond	132 Cushman Road

Background

Figure 6: Typical Stormwater Pond

Stormwater Quality – Oil / Grit Separators

The City owns and operates 35 OGSs that contribute to protecting stormwater quality. Of these, 22 are part of St. Catharines' SWM System and listed in the CLI-ECA. The remainder are located at City-owned buildings and facilities (e.g. arenas, fire halls, etc.) and are not part of the SWM System and not included in the scope of the CLI-ECA. OGSs are installed in strategic locations to help remove suspended solids and debris from stormwater runoff. They can also trap oil and other floatable materials. These devices come in a variety of configurations but are generally unnoticeable and look like a typical manhole cover. Figure 7 illustrates the inside configuration of a typical OGS.

Figure 7: Typical OGS Configuration

View looking down inside the manhole chamber into the OGS device

2024 Annual Stormwater Activities

Each year the City undertakes a number of projects and programs related to the SWM System in 2024. For the purposes of this report the actions are categorized as Environmental Education and Public Outreach; Operations and Maintenance; Capital Works Projects; and System Monitoring. These actions were taken, in part, to address CLI-ECA requirements.

Environmental Education and Public Outreach Activities

Public education and awareness campaigns have always been an important and highly visible component of the City's stormwater activities. City staff participated in the annual Niagara Children's Water Festival held at Brock University. Last year, the festival was held from April 30 to May 3 and provided engaging presentations and activities focused on water themes, with approximately 3,620 students attending in person.

In addition to public education initiatives, the City has targeted awareness campaigns about flooding issues such as the seasonal property flood action checklist and a basement flooding guide for suggestions on how to best protect a home and help prevent urban community flooding.

Rain Barrel Subsidy

On Sept. 14, 2024, the City held its 17th annual rain barrel sale for residents. Approximately, 160 rain barrels were subsidized for sale, at a cost of $60 each. It is estimated that the installation of each new rain barrel removes 1.2 m^3 of stormwater annually, and that approximately 20 per cent are installed on properties serviced by a combined sewer, with the rest being installed on properties serviced by fully or partially separated sewers. On average each rain barrel is filled six times per year (Region of Waterloo).

2024 Annual Stormwater Activities

Urban Forestry Master Plan

The City is working towards a goal of 30 per cent canopy cover by the year 2030. Tree canopy can help slow down stormwater runoff and support erosion control measures Current canopy coverage within the urban boundary has been estimated at 22.5 per cent (2019). The Urban Forestry Management Plan (UFMP) created in 2011, outlines the action items necessary to be able to achieve target canopy goals including a robust tree planting program, public education on tree stewardship, the tree giveaway program, etc.

Annual Tree Planting

The City plants approximately 1,000 trees (50mm caliper size) per year on boulevards and parks throughout the local urban landscape. Approximately 90 per cent of those trees are native species, chosen to support the natural ecosystem.

Restoration Planting

The City partners with the Niagara Peninsula Conservation Authority (NPCA) to plant native shrub and tree species in strategic locations on City owned parks and greenspaces, with the goal of naturalizing those areas. Environmental restoration technicians from the NPCA assist with site and species selection for these projects. This initiative is hosted twice a year and typically includes riparian buffer zone protection areas.

Community partnerships, including with the NPCA, the Niagara Community Foundation, and other local environmental and community groups, result in approximately 1,400 trees planted per year.

Watercourse Erosion Control

St. Catharines is committed to maintaining sustainable natural watercourses to prevent the erosion of City owned property and reduce impacts to private property. The City has completed a Watercourse Flooding and Erosion Control Study to identify priority areas. Over time, watercourses will meander naturally within their valleys. Rehabilitation is undertaken if erosion is impacting public or private infrastructure. When possible, this is done using natural channel design techniques.

2024 Annual Stormwater Activities

Operations and Maintenance Activities

Inspection and maintenance activities are critical programs, designed to capture deficiencies, and proactively mitigate issues. The City has a variety of maintenance and inspection activities, to ensure sewer assets are operating as designed. These programs help identify operational issues and keep sewer assets in good working order. A summary of these initiatives can be found in Table 2.

Table 2: Inspections, Maintenance, and Service Requests 1 of 2

Inspections, Maintenance Programs and Service Requests		
Type	**Frequency**	**2024 Comments**
CCTV Sewer Inspections	Inspections based on budget	~10 km
Street Sweeping	All City roads twice a year, and roads with curbs an additional two times	Annual budget: $150,400
Watercourse and Drainage Corridor Inspections and Cleaning	Annual inspection and cleaning as required	Inspected by City staff Cleaned as needed
Watercourse and Drainage Corridor Complaints	As reported	13 Complaints
Outlet and Culvert Inspection and Maintenance	Bi-Annual Inspection and Priority Locations - monthly	160 Bi-Annual locations 32 Priority Locations
Road Culvert Inspection, Maintenance and Repair / Replacement	As reported	67 Complaints

2024 Annual Stormwater Activities

Inspections, Maintenance Programs and Service Requests		
Type	**Frequency**	**2024 Comments**
Roadside Ditch Inspection and Maintenance	As reported	87 Complaints
Catch Basin Cleaning, Maintenance and Repair	Once every five years	2,406 Catch Basins cleaned Annual budget: $108,420
Catch Basin Complaints	As reported	131 Complaints
Catch Basin Repairs	As requested	35 Repairs
Oil / Grit Separator Inspections	Annual Inspection	Inspected by City Staff
Oil / Grit Separator Cleaning	As Required	25 Cleaned Annual budget: $33,000
Storm Sewer Repairs / Replacement	As Required	6 Storm Sewer Repairs/ Replacement
Storm Flooding Response (over land / surface)	As Reported	As Reported
Storm Sewer Related Complaints	As Reported	23 Complaints

2024 Annual Stormwater Activities

Street Sweeping Program

The City has an annual street sweeping program, to help improve water quality in stormwater runoff. The removal of sediment including salt and debris accumulated on the side of roads, is an important part of protecting our local waterways. Street sweeping was completed on all City roads twice a year (spring and fall). In addition, all roads with curbs are swept two additional times during the summer months. The budget for the street sweeping program in 2024 was $150,400.

Watercourse and Drainage Corridor Inspections and Cleaning

The City has an annual drainage corridor cleaning program, in which watercourses and open channels are inspected. The objective of the program is to remove accumulations of debris (including organic and other debris such as garbage) that are obstructing, or may obstruct flow in watercourses, open channels, and storm outlets. Each year, all local watercourses are inspected and maintained throughout St. Catharines.

Additionally, in 2024, the City responded to 13 complaints related to obstructions, blockages and debris in watercourses, that required clearing.

Outlet and Culvert Inspection and Maintenance

The City has an inspection and maintenance program for grates located at ditch and culvert inlets and outlets. These grates help capture unwanted debris that would otherwise significantly impede stormwater flows. Typically, inspections are done, at minimum, twice per year while priority locations are inspected monthly and before significant rain events. Maintenance and repairs are completed as required. In 2024, there were 160 locations where grates were inspected bi-annually, and an additional 32 priority locations receiving enhanced inspections.

Catch Basin Cleaning, Maintenance and Repair

The City has a catch basin cleaning program that is designed to ensure they are operating properly and mitigate ponding on road surfaces. Catch basin sumps are proactively cleaned once every five years. In 2024, the City proactively inspected and cleaned 2,406 catch basins. The budget for this cleaning was $108,420.

Additionally, in 2024, the City responded to 131 complaints related to plugged or slow draining catch basins that were either cleared by hand or vacuum cleaned. As well, 35 catch basins received additional repair works including cracked frames, frame settling or broken leads.

2024 Annual Stormwater Activities

Oil / Grit Separator Inspections and Cleaning

The City inspects all OGSs annually, with cleaning performed as required. In 2024 the City cleaned 25 OGSs. The budget for this cleaning was $33,000.

Suspended Sewer Inspections

The St. Catharines wastewater system has eight elevated or suspended sewers. These sewers cross over sensitive areas such as watercourses. These sewers are visually inspected twice a year to ensure they remain in good working order.

Storm Sewer / Outlet Repairs

Storm sewer maintenance, repair and CCTV inspection is completed as required. In 2024, the City repaired or replaced six storm sewer mains. Additionally, 10 kms of storm sewer were CCTV inspected to identify operational deficiencies.

The City also repairs storm sewer outlets on an as needed basis when repairs are required. There were no storm sewer outlet repairs required in 2024.

Road Culvert Inspection and Maintenance

Culverts are inspected on an as required basis to identify maintenance needs related to structure, erosion measures and debris removal to ensure stormwater can flow freely. The City received 67 complaints regarding culverts which required maintenance services including cleaning, flushing, repair or replacement.

Roadside Ditch Inspection and Maintenance

Roadside ditch inspections are competed on a complaint basis. In 2024, the City received 87 complaints regarding ditch drainage issues. These complaints were responded to with an inspection and if required, maintenance was completed.

2024 Annual Stormwater Activities

Salt Management Plan

St. Catharines has a salt management plan with respect to winter control activities. The use of salt is vital to providing safe roadways throughout the winter season. The Plan's objective is to reduce salt's negative environmental impacts by using best management practices and using new technologies to ensure its most effective use over the road system. Some of the actions coming out of the Salt Management Plan include:

- Pre-wetting – At critical locations (such as bridges and hills, for example) a brine solution is applied to the road. Brine can reduce the total amount of salt needed as it reduces the amount of salt that is lost by bouncing or blowing off the road
- Electronic Spread Controls - which provide consistent application rates that are tied into a truck's speedometer.
- Automated Vehicle Locations – GPS systems are utilized to allow staff to monitor the deployment of the fleet including what streets have been done, whether or not the trucks have been plowing, salting, or sanding and what the application rates are.
- Information Tools – Vehicle-mounted infrared thermometers allow staff to determine the pavement temperature of the road and plan winter control operations accordingly.
- An indoor salt storage facility is in place at the Lake Street Service Centre. This not only keeps the salt itself inside, but also allows for trucks to be loaded indoors on an impermeable surface which reduces the amount of salt lost to wind and run-off.
- Sand (with a minimal amount of salt) is applied to the roads in agricultural areas, outside of the urban boundary.

Storm Response

In 2024, City staff responded to numerous surface flooding and water ponding events on the road. These events were generally the result of the accumulation of debris, sediment, or damage to existing infrastructure such as culverts or outfalls, resulting in capacity reduction in the system, or overland flooding during wet weather events. The City's typical response to these issues includes debris removal, replacement of damaged culverts, catch basin maintenance and dredging of ditches to restore the normal flow.

2024 Annual Stormwater Activities

Storm Sewer Related Public Complaints

In 2024, the City received 23 complaints regarding the SWM system, which included odour complaints, sink holes, missing catch basin covers and animal welfare (saving ducklings, more than once!). All complaints were investigated, and corrective actions were taken as needed. These complaints were in addition to the various service requests (e.g. ditch maintenance) noted elsewhere in this report.

Figure 8: Catch basin Service Requests - Saving Ducklings

On April 24, 2024, four ducklings were rescued by City staff from a catch basin on Fairington Drive in St. Catharines, ON. The mother duck closely watched the rescue operation and once all four were saved, she took them home though a neighbouring backyard.

2024 Annual Stormwater Activities

Equipment Calibration and Maintenance

All in-house monitoring equipment is calibrated / verified as per manufacturer's recommendations. Staff utilize the Ventis MX4 Gas Meters to conduct atmospheric testing before entering a confined space or opening manholes. These multi-gas monitors are capable of detecting oxygen, carbon monoxide, hydrogen sulphide and combustible gases. All meters are verified prior to daily use, using the bump testing method with methane, according to manufacture specifications. These meters are also calibrated by a third party on an annual basis.

Preventive maintenance is scheduled for all equipment at regular frequencies. The frequency depends on the equipment and type of maintenance.

2024 Capital Works Projects

Authorized Alterations

Under the CLI-ECA, the City is pre-authorized for alterations to the existing works including changes, additions and extensions. These pre-authorized alterations are completed in accordance with conditions in the CLI-ECA and guidance materials titled 'Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Pre-authorized' under a CLI-ECA.

Pre-Authorized Requirements

There are various requirements that must be met for pre-authorization including sewer capacity checks for both City and Regional sewers (if identified), permission if connecting into another system (e.g. connecting to a regional trunk) and works requiring Niagara Peninsula Conservation Authority permits and/or approvals.

Significant Drinking Water Threat Assessment Report

All proposed alterations to the Stormwater Management System are required to complete a Significant Drinking Water Threat (SDWT) assessment report. The City must ensure that any alteration to the authorized system(s) are designed, constructed, and operated in such a way as to be protective of sources of drinking water in vulnerable areas as identified in the Source Protection Plan. A copy of the SDWT assessment report can be found in Appendix C.

2024 Capital Works Projects

Direct Submissions

Activities that alter or modify the City's Stormwater Collection System and have not been included as a preauthorized condition in the CLI-ECA, require an amendment or direct submission to the ministry for approval. The City did not require any direct submissions in 2024.

Sanitary Sewer Improvement Projects

In 2024, the City invested $996,000 into several storm sewer projects. These capital investments resulted in improvements to the system specifically to reduce stormwater impacts in these catchments. In some cases these involve sewer separation projects, where new storm sewers are installed in areas with combined sewers, to help divert stormwater drainage. This reduces the risk for basement flooding and reduces the amount of flows treated at wastewater treatment plants. In addition, the City cost shared one storm sewer project in conjunction with regional roadworks, with the Regional Municipality of Niagara. A summary of budgeted projects is included in Appendix D.

2024 System Monitoring Activities

Niagara Peninsula Conservation Authority NPACA - Stream Flow Monitoring

The NPCA monitors stream flow, rainfall, and other meteorological information at two locations (Walker Creek and Port Dalhousie) in the St. Catharines watershed. The information is transmitted to the NPCA where it is monitored and analyzed. The data provides the NPCA an up-to-date picture of the conditions within the watershed. The data and location of these gauges can be found on the NPCA website at https://npca.ca/

Niagara Peninsula Conservation Authority - Watershed Report Card 2023

The NPCA prepares an annual report card every five years to provide a summary of the state of local forests, wetlands, and water resources. It involves analyzing data from groundwater quality, surface water quality, forest conditions, and watershed features across the watershed. The surface water quality is assessed using three indicators – phosphorus, E. coli, and benthic macroinvertebrates. While the water quality does vary, St. Catharines watercourses are rated as fair or poor water quality, which is typical for an urban area. The NPCA reports most watersheds in the Niagara Region as poor water quality.

Rainfall Monitoring

In 2024, the City retained GEI Consultants Canada Ltd (GEI) to complete an analysis of the wastewater system and included rainfall analysis. For F-5-5 requirements rainfall data is analyzed for the period of April to November. Table 2 summarizes the total rainfall volume, maximum one-hour volume and maximum twenty-four-hour volume for the seven-month period of April to November (F-5-5 Reporting Period).

2024 System Monitoring Activities

Table 3: Rainfall Summary compared to a Typical Year

		Typical Year	2024	Difference
St. Catharines – North[1]	Total (mm)	463.5	530.50	+14.5 per cent
	Max 1-hr (mm)	26.5	20.75	-21.7 per cent
	Max 24-hour (mm)	41.75	44.75	+7.2 per cent
St. Catharines – South[2]	Total (mm)	599.0	589.25	-1.6 per cent
	Max 1-hr (mm)	25.5	37.25	+46.1 per cent
	Max 24-hr (mm)	60.0	61.75	+2.9 per cent

Notes: 1 – As measured at the Port Dalhousie WWTP Climate Station | 2 – As measured at Niagara Region's Environmental Centre Climate Station | 2014 is used as a Typical Year

In north St. Catharines comparing the 2024 rainfall to a typical year, the 2024 total precipitation is 14.5 per cent greater, the maximum 1-hr rainfall is 21.7 per cent lower, and the maximum 24-hr rainfall is 7.2 per cent greater.

In south St. Catharines comparing the 2024 rainfall to a typical year, the 2024 total precipitation is 1.6 per cent lower, the maximum 1-hr rainfall is 46.1 per cent greater, and the max 24-hr rainfall is 2.9 per cent greater.

2024 System Monitoring Activities

Stormwater Model

In collaboration with Niagara Region, the City developed a hydraulic model of the Stormwater Management System. The model was developed using Info SWMM and Innovyze modelling software which predominantly utilizes the US EPA Stormwater Management Model (EPA-SWMM) structure and computation engine.

The City's GIS data, which includes storm sewer pipes, manholes and ditches, was used as the basis of the network development. The model will be refined and updated as the City investigates assets through various programs.

Response to Spills and Abnormal Events

The City of St. Catharines investigates all reported potential spills to the natural environment. If required upon investigation, contamination and clean-up measures are employed. Additionally, mandatory regulatory authorities are notified when required. In 2024, the City did not respond to any abnormal spills or flooding events.

Public Reporting

Public reporting is conducted through various social media platforms. Additionally, public reporting is posted on the City's public website at https://www.stcatharines.ca/

Publicly reported information includes:

- Annual Performance Reports
- Emergency repairs requiring road closures
- Water – Wastewater Budgets and Financial Plans
- Capital Programs and Asset Management Plans
- Upcoming / Ongoing construction projects (e.g. sewer rehabilitation projects)
- Environmental Assessments and related studies posted publicly at https://www.engagestc.ca/

2025 Planned Stormwater Activities

Planned 2025 Programs, Activities and Maintenance

The City will continue to monitor, improve and invest in maintaining the stormwater management system. Table 4 summarizes the various activities that the City of St. Catharines will continue to implement for 2025, of which includes system monitoring activities and programs, environmental education and public outreach activities and operations and maintenance activities. The City has approved a multi-year budget for 2024, 2025 and 2026. The approved capital budget investment for sanitary sewer is:

- $3.8 million in 2024
- $6.4 million in 2025
- $4.7 million in 2026

A copy of the approved multi-year capital budget can be found posted on the City of St. Catharines website at https://www.stcatharines.ca/

2025 Planned Stormwater Activities

Table 4: Planned 2025 Programs, Activities and Maintenance

System Monitoring Activities	
Project	**2025 Budget**
Sewer System Update	Ongoing
Rainfall Monitoring Program	Ongoing
Sewer Sampling	Ongoing
Sewershed Analysis	$10,500
City Owned Shoreline Protection Study	$100,000
Storm Sewer Capital Works	$6.4 million

Environmental Education and Outreach Activities	
Project	**2025 Budget**
Environmental Education	Ongoing
2025 Rain Barrel Program	$32,000
Tree Giveaway	Ongoing
Annual Tree Planting	Ongoing
Restoration Planting	Ongoing

2025 Planned Stormwater Activities

Operation and Maintenance Activities	
Project	**2025 Budget**
Street Sweeping	$150,400
Watercourse and Drainage Corridor Inspections and Cleaning	Ongoing
Outlet and Culvert Inspection and Maintenance	Ongoing
Catch Basin Cleaning, Maintenance and Repair	Ongoing
Oil / Grit Separator Cleaning	$33,500
Storm Sewer / Outfall Repair	$300,000
Road Culvert Inspection and Maintenance	Ongoing
Salt Management Plan	Ongoing

No additional information has been requested by the Niagara District MECP office.

Summary

The City of St. Catharines operates the St. Catharines Stormwater Management System, which services a population of approximately 144,800 residents.

This report details 2024 activities including system maintenance, capital investments, monitoring, and compliance efforts. A wide variety of activities were undertaken with budget approval and expenditures of approximately $3.8 million. A copy of the approved Water and Wastewater budget for 2024 to 2026 can be found on the City of St. Catharines website at https://stcatharines.ca/Budget. In 2024, City staff responded to over 350 service requests / repairs related to the stormwater system including roadside ditch and culvert maintenance, inspected, and cleaned over 2,400 catch basins, and maintained the core programs of inspection and cleaning of watercourses, outlets, and street sweeping. These activities demonstrate the City of St. Catharines is in full compliance with the various CLI-ECA requirements.

It is important to note some of the CLI-ECA requirements are phased in and not all the requirements are in place at this time. As additional requirements come into effect and additional information becomes available this will be reflected in future annual reports.

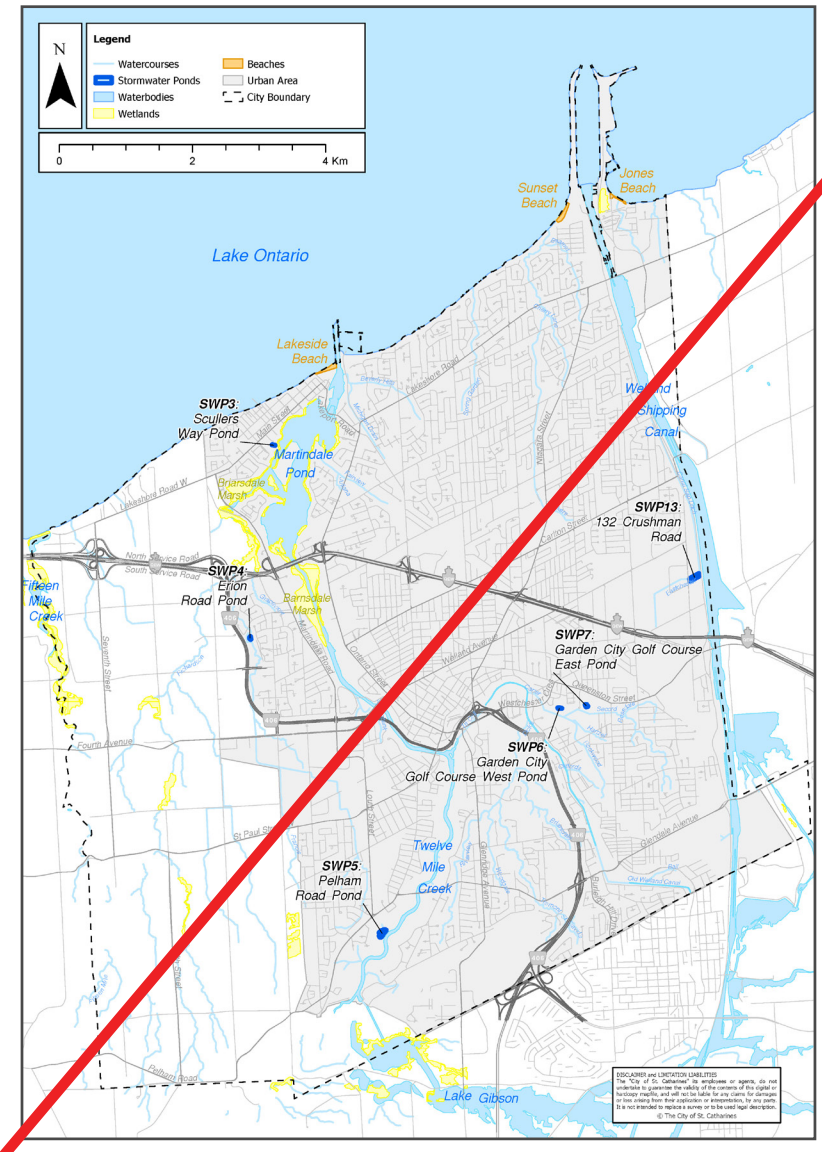
Moving forward, the City will maintain ongoing system improvements, capital investments, and regulatory compliance efforts to ensure the long-term sustainability and efficiency of the stormwater management system. For further details, visit https://www.stcatharines.ca

Notice

Please note that every reasonable effort has been made to ensure the accuracy of this report and it contains the best available information at the time of publication. In the event that errors or omissions occur, the online report will be updated. Please refer to the online report for the most current version

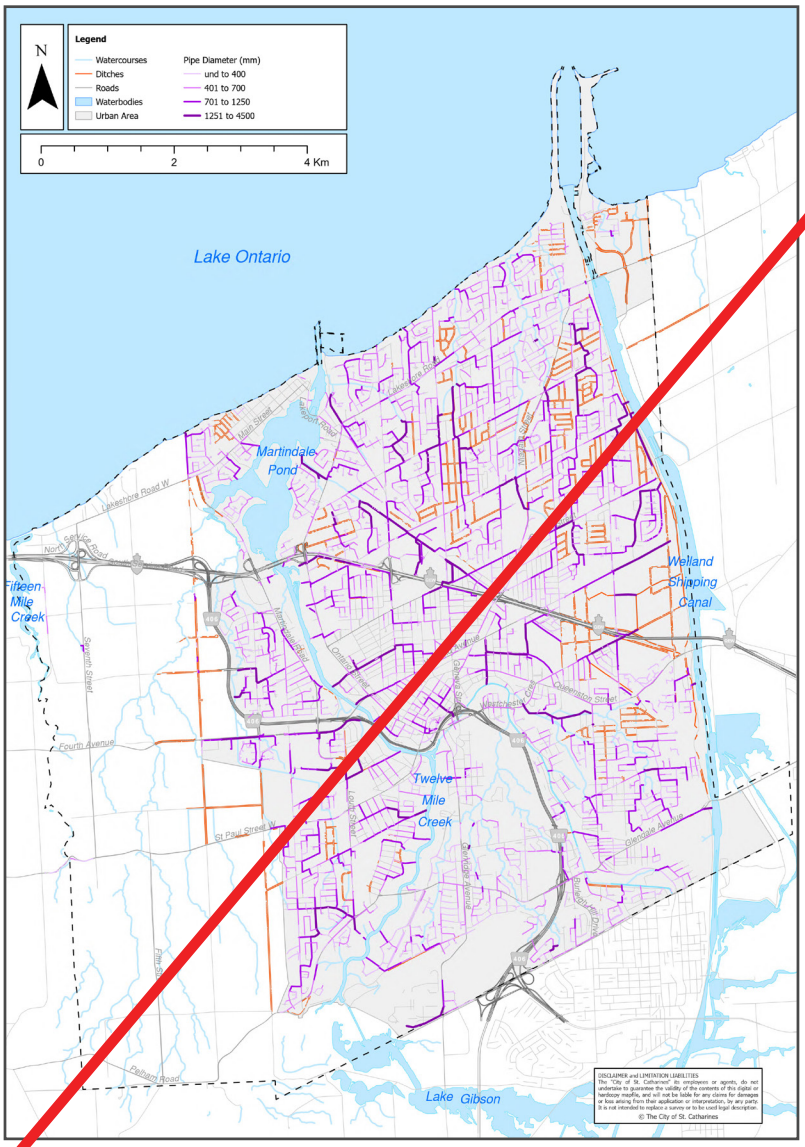
Appendix A:
City of St. Catharines Stormwater Ponds and Natural Watershed

St. Catharines Stormwater Ponds and Natural Watershed

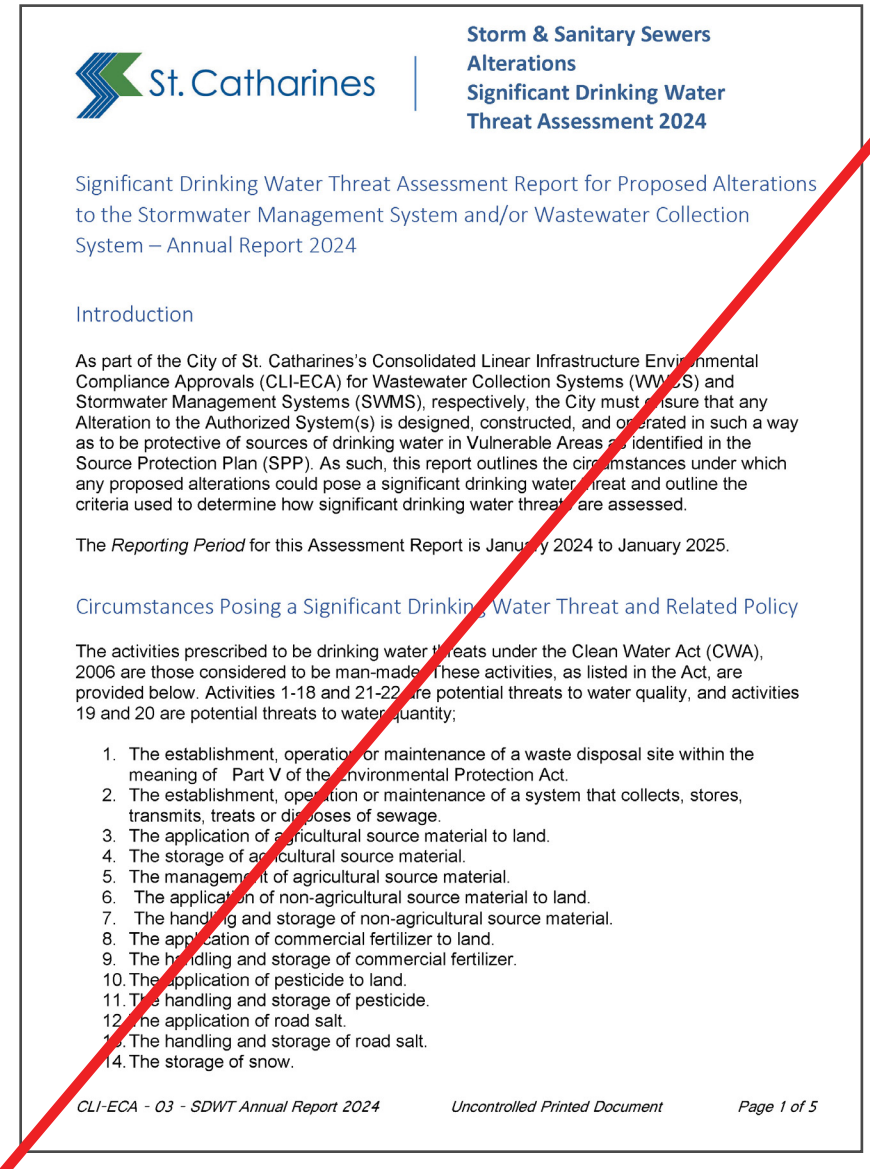


Appendix B:
City of St. Catharines Storm Sewers and Ditches

St. Catharines Storm Sewers and Ditches



Appendix C:
Significant Drinking Water Threat Assessment Report 2024



St. Catharines | Storm & Sanitary Sewers Alterations Significant Drinking Water Threat Assessment 2024

Significant Drinking Water Threat Assessment Report for Proposed Alterations to the Stormwater Management System and/or Wastewater Collection System – Annual Report 2024

Introduction

As part of the City of St. Catharines's Consolidated Linear Infrastructure Environmental Compliance Approvals (CLI-ECA) for Wastewater Collection Systems (WWCS) and Stormwater Management Systems (SWMS), respectively, the City must ensure that any Alteration to the Authorized System(s) is designed, constructed, and operated in such a way as to be protective of sources of drinking water in Vulnerable Areas as identified in the Source Protection Plan (SPP). As such, this report outlines the circumstances under which any proposed alterations could pose a significant drinking water threat and outline the criteria used to determine how significant drinking water threats are assessed.

The *Reporting Period* for this Assessment Report is January 2024 to January 2025.

Circumstances Posing a Significant Drinking Water Threat and Related Policy

The activities prescribed to be drinking water threats under the Clean Water Act (CWA), 2006 are those considered to be man-made. These activities, as listed in the Act, are provided below. Activities 1-18 and 21-22 are potential threats to water quality, and activities 19 and 20 are potential threats to water quantity;

1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.

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Appendix C:

15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid.
17. The handling and storage of an organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.
22. The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s.1.

Each prescribed drinking water threat has a set of circumstances that determine whether a particular instance of the activity is a significant, moderate, or low drinking water threat in each type of vulnerable area. These circumstances reflect various aspects of the activity. For some activities, there are separate sets of circumstances that determine if the activity is a chemical threat or a pathogen threat. Chemical threats are the aspects of an activity that can result in chemical contamination of a drinking water source, and include a wide variety of substances. A pathogen threat is a micro-organism that causes disease, and often comes from human or animal waste. Some activities are both chemical and pathogen threats. The details and definitions of each prescribed threat is contained in the 2021 Technical Rules under the CWA.

The City of St. Catharines Stormwater and Wastewater Systems

Stormwater Management System

The Municipal Stormwater Management (SWM) System serving the City of St. Catharines' drainage area, is a separate system for stormwater (i.e. designed not to convey sanitary sewage, combined sewage) within the Lake Ontario watershed. The Municipal SWM System consists of storm sewers, culverts, ditches, catch basins, stormwater management facilities (SWF) and outlets. The system is also connected to the Niagara Region's stormwater network.

Wastewater Collection System

The St. Catharines Wastewater Collection System (WWCS) consists of gravity sewers (including trunk sewers, separate sewers, partially separate sewers, nominally separate sewers, and combined sewers), sewage pumping stations, wet-weather storage facilities, and associated forcemains. Sewage is treated at one of two wastewater treatment plants, operated by the Region of Niagara.

Appendix C:

St. Catharines | **Storm & Sanitary Sewers Alterations Significant Drinking Water Threat Assessment 2024**

Potential Significant Drinking Water Threats

The City of St. Catharines falls within the Niagara Peninsula Source Protection Area and is subject to the policies within the NPSP Plan. The residents of St. Catharines receive drinking water solely from the DeCew Water Treatment Plant (DWTP) located in Thorold and operated by the Niagara Region. DWTP intake receives raw source waters upstream of St. Catharines. Therefore, St. Catharines is not located within a specified vulnerable area, and is not part of the Intake Protection Zone (IPZ), according to the NPSP Plan and the MECPs Source Information Protection Atlas (SIPA). Figure 1 depicts the IPZ intake and protection zones areas for the DWTP, in relation to the St. Catharines Municipal Boundary (SIPA).

Both a water quality and surface water vulnerability threat assessment, has been completed for the urban area of St Catharines. According to the water quality protection details from SIPA, the City of St. Catharines is listed as a Highly Valuable Aquifer (HVA) with a vulnerability score of 6, as indicated in Figure 2. This information was assessed using the Source Water Protection Information Portal (SWPIP), and no further action was listed (Figure 3). As noted, residents within the urban area of St. Catharines receive municipal drinking water supplied via the DWTP located in Thorold.

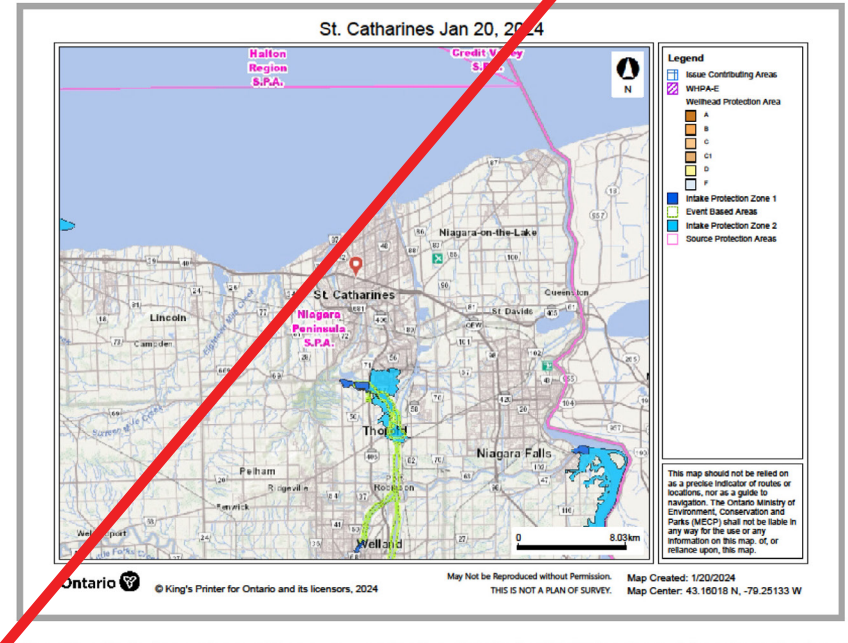
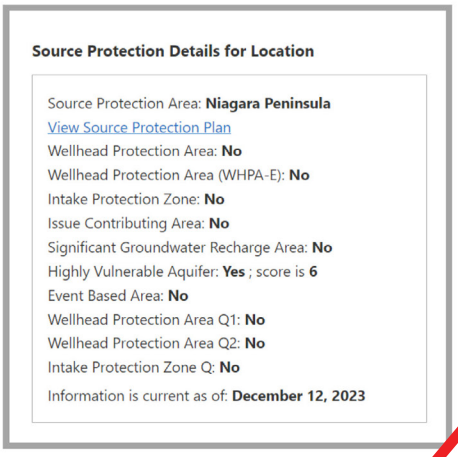


Figure 1: Search criteria for water quality source protection details for St Catharines, taken from the Source Information Protection Atlas, January 20, 2024.

Appendix C:

St. Catharines | Storm & Sanitary Sewers Alterations Significant Drinking Water Threat Assessment 2024



Source Protection Details for Location

Source Protection Area: **Niagara Peninsula**
View Source Protection Plan
Wellhead Protection Area: **No**
Wellhead Protection Area (WHPA-E): **No**
Intake Protection Zone: **No**
Issue Contributing Area: **No**
Significant Groundwater Recharge Area: **No**
Highly Vulnerable Aquifer: **Yes** ; score is **6**
Event Based Area: **No**
Wellhead Protection Area Q1: **No**
Wellhead Protection Area Q2: **No**
Intake Protection Zone Q: **No**
Information is current as of: **December 12, 2023**

Figure 2: Search criteria for water quality source protection results table for St Catharines, taken from the Source Information Protection Atlas January 20, 2024.

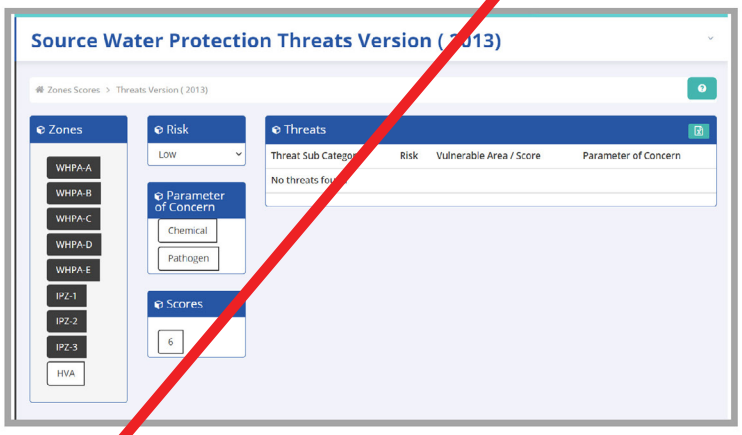


Figure 3: Search criteria for source water protection threats for HVA with a score of 6 for St Catharines, taken from the Source Water Protection Information Portal, January 20, 2024.

The Clean Water Act, 2006 established Director's Technical Rules which identified possible Significant Drinking Water Threats. The 2021 Technical Rules and threat circumstance tables were evaluated based on the vulnerable areas in the City of St. Catharines where significant threats are possible. Since St. Catharines is not identified as an Intake Protection Zone, there

Appendix C:

St. Catharines | Storm & Sanitary Sewers Alterations Significant Drinking Water Threat Assessment 2024

are no activities related to sewage and stormwater that need to be flagged as potential Significant Drinking Water Threats.

Identification of Existing Significant Threats

To evaluate the current significant drinking water threats related to stormwater and sewage collection, the City reviewed the Source Protection Plan, Assessment Report and the Explanatory Document, and the Technical Rules under the CWA. Currently, there are no identified significant threats in St. Catharines related to wastewater or stormwater (including components, equipment and all works).

Design Considerations to Mitigate Risks for Significant Drinking Water Threats

Currently, there are no significant drinking water threats related to sewage or stormwater identified in St. Catharines. If this changes, design considerations and mitigation and risk management measures will be required for those activities that flag as significant threats.

Conclusion

This assessment report has been prepared in accordance with the City of St. Catharines CLI-ECA's, to ensure that any Alteration to the Authorized System(s) is designed, constructed, and operated in such a way as to be protective of sources of drinking water in Vulnerable Areas as identified in the Source Protection Plan (SPP). During the *Reporting Period* of January 2024 to January 2025 the City has identified no significant drinking water threats from proposed alterations in accordance with the aforementioned CLI-ECA's. The City of St. Catharines will review this assessment report every 12 months as part of the annual reporting requirements of the CLI-ECA's, which includes an annual performance report submitted yearly. Any changes to the stormwater or wastewater systems will be evaluated for source water protection considerations. If any related activity is identified as a significant drinking water threat, then this report will be updated as such. This report is available to the Ministry or Source Protection Authority staff upon request.

Appendix D:
Summary - 2024 Sewer Improvement Projects

CITY OF ST. CATHARINES - ENGINEERING, FACILITIES & ENVIRONMENTAL SERVICES DEPARTMENT 2024 STORM SEWER IMPROVEMENT PROGRAM						
PROJECT NUMBER	**PROJECT TITLE**	**LOCATION**	**FROM**	**TO**	**PROJECT COST**	**REMARKS**
P17-068	Terry Lane Reconstruction	Terry Lane	Graham Avenue	Shelley Ave	$100,000.00	New storm sewer in conjunction with watermain and road work
P20-065	New Access Road	New access road	Ridley Road	Train Station	$134,000.00	Installation of storm infrastructure along new road to train station
P21-001	Princess/Westchester Underground Improvements	Princess Street	Westchester Cres	Melbourne Ave	$380,000.00	Installation of new storm sewer in conjunction with watermain replacement
P21-004	Forest Hill/Hillcrest/Rockcliffe Underground Improvements	1. Forest Hill Rd 2. Rockcliffe Rd	1. Hillcrest Ave 2. Glenridge Ave	1. South Dr 2. Highland Ave	$1,090,000.00	N/A
P21-101	Greenmeadow/Wood Underground Improvements	1. Greenmeadow Cres 2. Wood St	1. Woods St 2. Geneva St	1. End 2. Carlton St	$687,000.00	New storm sewer in conjunction with watermain and road work
P23-061	Brimley Crescent Road Rehabilitation & Underground Improvements	Brimley Cres	Gaywood Drive	Cul-de-sac	$378,450.00	Replacement of storm sewer sections in conjunction with watermain replacement
STM24003	Glen Morris Dr Slope Repair	Glen Morris Drive	85m east of Village Road	N/A	$220,000.00	Replacement of storm sewer in conjunction with repair of slope failure
STM24004	Lloyd Street Re-Construction	Lloyd Street	St Paul Street	Rykert Street	$88,000.00	Slope has failed and has impacted sidewalk and guiderail now delays could impact more infrastructure
STM24002	Design for the next years projects	Citywide	N/A	N/A	$20,000.00	Engineering services for future storm drainage system projects as required
P23-014	Storm CCTV Sewer Inspections	Citywide	N/A	N/A	$4,800.00	CCTV inspection for condition assessments of existing storm sewers including large diameter pipes

Appendix D:

CITY OF ST. CATHARINES - ENGINEERING, FACILITIES & ENVIRONMENTAL SERVICES DEPARTMENT
2024 SANITARY SEWER IMPROVEMENT PROGRAM

PROJECT NUMBER	PROJECT TITLE	LOCATION	FROM	TO	PROJECT COST	REMARKS
P21-001	Princess/Westchester Underground Improvements	1. Westchester Crescent 2. Princess Street	1. Argyle Cres 2. Weatchester Cres	1. Collier Cres 2. Melbourne Ave	$1,340,000.00	Replacement of sanitary sewer section in conjunction with watermain replacement
P21-004	Forest Hill/Hillcrest/Rockcliffe Underground Improvements	1. Hillcrest Ave 2. Forest Hill Rd 3. Rockcliffe Rd	1. Rockcliffe Rd 2. Hillcrest Ave 3. Hillcrest Ave	1. South End 2. South Dr 3. Highland Ave	$2,180,000.00	Additional funds for construction to address indentified deficiencies
P21-062	Eleanordale/Helm/Rochelle/ Tavistock/Viking Road and Underground Improvements	1. Eleanordale Circle 2. Helm St 3. Rochelle Dr 4. Tavistock Rd 5. Viking Dr	1. Tavistock Rd 2. Viking Dr 3. Tavistock Rd 4. Rochelle Dr 5. Helm St	1. End 2. Bunting Rd 3. 70m S of Goldsmith Ave 4. Scott St 5. End	$1,[illegible]2,000.00	Sanitary Sewer Repairs
P22-001	Mitchell/Morgan/Richmond	1. Mitchell St 2. Morgan St 3. Richmond Ave	1. Eastchest Ave 2. Mitchell St 3. Queenston St	1. North End 2. Richmond Ave 3. 140m north of Morgan St	$644,920.00	Replacement of existing sanitary sewer in conjunction with storm sewer installation and road works
P23-001	Phelps/Turner/Smythe	1. Smythe St 2. Ellis Ave	1. Ellis Ave 2. Ellis Ave	1. 25m West 2. Turner Cres	$130,000.00	Installation of a new sewer section in conjunction with works for the new development
P23-061	Brimley Crescent Road Rehabilitation & Underground Improvemeents	Brimley Crescent	Gaywood Drive	Cul-de-sac	$40,000.00	Replacement of sanitary sewer section in conjunction with watermain replacement
SAN24003	Lloyd Street Re-Construction	Lloyd Street	St. Paul Street	Rykert Street	$1,234,056.00	Construction fees for Sanitary Sewers
SAN24004	Oakdale Ave Roadworks	Oakdale Ave	Hickory Street	Smythe Street	$2,554.00	Design fees for sanitary sewer improvements
SAN24001	Extraneous Flow Elimination	Citywide	N/A	N/A	$50,000.00	Study to determine sources of inflow and infiltration into sanitary sewer system

Appendix D:

CITY OF ST. CATHARINES - ENGINEERING, FACILITIES & ENVIRONMENTAL SERVICES DEPARTMENT
2024 SANITARY SEWER IMPROVEMENT PROGRAM

PROJECT NUMBER	PROJECT TITLE	LOCATION	FROM	TO	PROJECT COST	REMARKS
SAN24002	Design for next years projects	Citywide	N/A	N/A	$50,000.00	Engineering Services for future sanitary collection system projects as required
SAN24005	Sanitary Sewer Flushing & Reaming	Citywide	N/A	N/A	$25,000.00	Sewer flushing and reaming for phyisical cleaning of selected sewer sections with operational issues
SAN24006	Sanitary Sewer Improvements Program	Citywide	N/A	N/A	$150,000.00	Annual - priorty location(s) to be determined
SAN24007	Sanitary Sewer Reaming and Lining	Citywide	N/A	N/A	$376,100.00	Sewer lining to address identified deficiencies Citywide
SAN24008	Sanitary Sewer Spot Repair Program	Citywide	N/A	N/A	$250,000.00	Spot repair for sanitary sewers as required
SAN24009	Sanitary CCTV Sewer Inspections	Citywide	N/A	N/A	$30,000.00	CCTV inspections of existing sewers to identify condition and future works
SAN24010	Sewershed Analysis	N/A	N/A	N/A	$10,000.00	Engineering services for sewershed capacity analysis as required
POL24001	Pollution Control Priority	N/A	N/A	N/A	$1,000,000.00	Implement Pollution Control Plan initiatives to reduce combined sewer overflows

CITY OF ST. CATHARINES & REGIONAL MUNICIPALITY OF NIAGARA
2024 COST SHARING OF STORM SEWER IMPROVEMENTS

PROJECT NUMBER	PROJECT TITLE	LOCATION	FROM	TO	PROJECT COST	REMARKS
RNxx-ONT	Region - Ontario Street (RR42) Reconstruction	Ontario Street	Linwell Road	Lakeshore Road	$704,000.00	Rehabilitate existing storm sewers in conjunction with Region's road urbanization

CITY OF ST. CATHARINES & REGIONAL MUNICIPALITY OF NIAGARA
2024 COST SHARING SANITARY SEWER IMPROVEMENTS

PROJECT NUMBER	PROJECT TITLE	LOCATION	FROM	TO	PROJECT COST	REMARKS
RNxx-ONT	Region - Ontario Street (RR42) Reconstruction	Ontario Street	Linwell Road	Lakeshore Road	$245,000.00	Repair existing in conjunction with Regions roadworks

ECA Number: 023-S701

City of St. Catharines

Stormwater Management System

April 2025

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St. Catharines, ON

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St. Catharines