

City of Regina

Semi-Annual Sewer Source Control Report (July - December 2022)

Environmental Services
Water, Waste & Environment
Citizen Service
City of Regina

April 2023

EXECUTIVE SUMMARY

The City of Regina (City) treats wastewater from residential, commercial, industrial, and institutional (ICI) properties. The quality of wastewater entering the sewage collection system is regulated by *The Wastewater and Storm Water Bylaw, 2016* (Bylaw). The Bylaw sets allowances for various parameters that have been determined by weighing the needs of the wastewater treatment and collection system against realistic industrial, commercial, and institutional wastewater quality.

Sewer source control is the practice of tracking and managing what enters the sewer systems. Sewer source control programs use the Bylaw to ensure the wastewater quality is met so it can effectively and efficiently be treated by the wastewater treatment plant (WWTP). The City's various sewer source control programs are in place to allocate costs fairly, protect the sewer infrastructure from harmful materials that can damage the collection and/or treatment system, and to prevent detrimental releases to the environment as a result. The program functions through site inspections, sampling, and education campaigns, and when appropriate bylaw enforcement and compliance actions.

This report outlines the various sewer source control programs, their main functions, goals, and costs. It does not present information on releases to the environment. That information can be found in the annual Environmental Discharge & Release Report (Appendix B).

The next step in the program will be to continue to increase inspections on ICI customers to further help prevent issues, increase effective wastewater treatment, and promote consistency in compliance activities including surcharges to businesses.

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DEFINITIONS

Regulatory Release is a spill or discharge that meets federal or provincial regulatory limits and is required to be reported as per the Saskatchewan Ministry of Environment Discharge and Discovery Reporting Standard. Information on these releases is in the annual Environmental Discharge & Release Report (Appendix A).

Non-Regulatory Release is a spill or discharge that does not meet the Saskatchewan Ministry of Environment Discharge and Discovery Reporting Standard. It has the potential to cause minor harm to the environment but is not serious enough to be reportable to regulatory agencies. Information on these releases is in the annual Environmental Discharge & Release Report (Appendix A).

Sewer Release is a spill or discharge into the either the wastewater or storm water system that could cause an adverse impact to the sewer system but does not have a negative impact on the environment and is not reportable as per the Discharge and Discovery Reporting Standard.

1.0 INTRODUCTION

The City of Regina (City) treats wastewater from residential, commercial, and industrial properties. The City's Permit to Operate a Sewage Works (Permit) and *The Wastewater and Storm Water Bylaw, 2016* (Bylaw) regulate the treatment and collection of the wastewater. The Permit and Bylaw include stipulations around what is and is not allowed in the City's infrastructure, and at what concentrations, to protect the wastewater collection and treatment system as well as stormwater sewer system from any adverse effects. Except in very rare situations, commercial and industrial clients are required to pre-treat any wastewater, where the wastewater's quality is outside the Bylaw's requirements, before it enters the wastewater sewer system.

Sewer source control is the practice of tracking and managing what enters the sewer systems. The City's various sewer source control programs are in place to allocate costs fairly, protect the sewer infrastructure from harmful materials that can damage the collection and/or treatment system and to prevent detrimental releases to the environment as a result. The program functions through site inspections, sampling, monitoring, and education campaigns and when appropriate, Bylaw enforcement and compliance actions.

The programs were developed with consideration to *The Wastewater Master Plan (WWMP)* which provides a comprehensive wastewater overview designed to support the *Official Community City Plan (OCP) Community Priorities*. The WWMP defines sewer source control and how the initiatives help to reduce parameters of concern that industrial, commercial, and institutional (ICI) and residents discharge into the wastewater sewer system. The WWMP sets out standards to ensure work is completed in a sustainable and cost-effective way to provide reliable and affordable wastewater services to citizens.

This summary report will include (but is not limited) to the following information:

- Sewer Releases into the City wastewater sewer system with the potential to cause adverse effects that are contained within the wastewater system;
- offending parties and the associated costs;
- summarized wastewater quality;
- mitigation strategies to help prevent, reduce, control, and assist in the recovery of compensation resulting from harmful material entering to the wastewater system; and
- Initiatives and metrics to assess the effectiveness of the municipal wastewater systems and their associated costs and overall effectiveness.

Information on the municipal sewer systems, including associated infrastructure for the collection, treatment and hauling of wastewater; Sewer Releases; and strategies implemented to address the issues is included. Regulatory and Non-Regulatory Releases to the environment are reported in the annual Environmental Discharge & Release Report (Appendix B).

2.0 BACKGROUND

The City operates two separate sewer systems (Appendix A). The wastewater sewer system collects wastewater (i.e., sewage) from residents, commercial business, institutions, and industries across the city. Wastewater enters the collection system and travels into one of four wastewater sewer trunks. From there, it enters the McCarthy Boulevard Pumping Station (MBPS) on the west side of the city where it is pumped through a force main to the Wastewater Treatment Plant (WWTP). At the WWTP, the wastewater undergoes treatment before it is discharged into Wascana Creek, west of Regina. The storm water sewer system collects runoff from precipitation events and directs the untreated water to Wascana Lake or Creek.

Wastewater Sewer System:

- WWTP
- Wastewater Collection System
 - MPBS
 - Hauled Wastewater Station (HWS)
 - 19 lift stations
 - More than 960 km of pipes and 704 km of building service connections
 - More than 10,580 maintenance holes

Stormwater Sewer System:

- 20 lift stations
- Approximately 20,700 storm drains
- Approximately 10,321 storm maintenance holes,
- More than 1,1320 kilometers (km) of storm mains
- No treatment system

3.0 SEWER SOURCE CONTROL

Sewer source control exists to track, control, and reduce the occurrence of potentially damaging substances in the wastewater and storm water sewer systems from industries, businesses, institutions, and households. The primary role of the program is to reduce, through education, inspections and other preventative measures, the occurrence of harmful substances entering one of the sewer systems. In the event a harmful substance does enter the system, processes are in place to help mitigate damage, track back the substance to the source and recover costs.

Due to the size and nature of the sewer system, the City takes a varied approach to source control.

For wastewater source control, EPCOR Water Prairies Inc. (EPCOR) currently operates and maintains the City-owned WWTP and hauled wastewater station. EPCOR performs approximately 15,000 analyses per year on routine laboratory testing. The testing includes a combination of regulatory, quality control, process control, and downstream creek samples. Approximately half of the samples are required by the City's contract with EPCOR or by regulators. The remaining samples are related to source control initiatives and process control. EPCOR conducts additional testing when the WWTP experiences influent contamination.

The City and EPCOR both conduct extensive sampling within the wastewater system and the WWTP as part of the source control program:

- to monitor the wastewater sewer system for potentially harmful compounds that could adversely impact the WWTP or the collection system
- to gather information to help the City and EPCOR effectively operate collection and treatment systems

Other information that the City and EPCOR gather is used internally to help make informed decisions on technical adjustments to the WWTP's operations. This reduces the impact on the environment and on the City's sewer systems and helps improve the efficiency of the City's wastewater related processes.

For stormwater source control, the City's focus to date has been on educating residents and industry about the two sewer systems and to only put "rain down the drain." However, a number of other programs also exist:

- The City requires industrial business with stormwater ponds to submit the analytical results for review before approval to discharge to the storm sewer is given;
- "Adopt a Drain" communication campaign;
- Requiring businesses using a hydrant cart to submit a Water Discharge Plan to prevent discharges into natural waterways; and
- Sampling of stormwater during spring runoff to better understand the effects city runoff has on Wascana Creek water quality.

3.1 WASTEWATER AND STORM WATER BYLAW

All the sewer source control programs are governed by the Bylaw. In 2016, the City repealed *The Sewer Service Bylaw*, Bylaw No. 5601 and replaced it with the new Bylaw. The bylaw changes were made based on the City's new biological nutrient removal WWTP requirements, through comparison to other municipalities, and industry best practice (Canadian Council of Ministers of the Environment – Canada-wide Strategy for the Management of Municipal Wastewater Effluent).

The current Bylaw is more restrictive in terms of allowed substances and concentrations of those substances into the wastewater sewer system, but still takes into consideration realistic ICI wastewater quality. When the new Bylaw came into effect in 2016, the City, with Council

approval, implemented a two-year phase in approach to allow businesses time to introduce the necessary changes to meet the new Bylaw.

If the City discovers or is informed of an infraction, depending on the severity, the City will issue a remedial order letter with respect to the Bylaw subsection(s) that has been violated to inform the offending party of the violation details and to require a remedial action be completed within a practical timeframe. In the event the City incurred costs and expenses, the City requires the offending party to reimburse the City for such costs. In the event the offending party does not complete the corrective action in a practical timeframe, the City may perform the work and seek to recover those costs from the offending party. For minor infractions, the City will work with the individual or business to ensure they understand the Bylaw and the requirements they need to meet to discharge into the wastewater sewer system.

When the City issues the letter, the offending party must respond in writing to the City, outlining the remedial plan and timeframe and pay any fees back to the City. If the offending party does not reimburse the City and/or no improvements in the offending party's processes occur after a reasonable timeframe, the City may then enter into litigation to recoup costs and/or fine under the Bylaw or a wastewater discharge contract, if applicable.

In the event of a Sewer Release into the wastewater sewer system where damage to the WWTP or the collection system occurs, the City and EPCOR will complete additional sampling within the treatment and collection system to prove where the Sewer Release originated and the sections of the Bylaw that were in violation. The City uses this information to identify the offending party and then recoup the City's costs from the offending party. To date, this form of enforcement has been successful in educating users about the Bylaw and an offending party's non-compliance, as well as obtaining compliance and cost recovery.

3.2 WASTEWATER QUALITY MONITORING

To effectively run the collection and treatment systems and track back any Sewer Releases, the City has appropriate monitoring programs in place. The City and EPCOR work seamlessly together to monitor and understand Regina's wastewater quality.

EPCOR performs approximately 15,000 analysis per year on routine laboratory testing. The testing includes a combination of regulatory, quality control, process control, and downstream creek samples. Approximately half of the samples are required by the City's contract or regulators, the remaining samples are related to source control initiatives and process control. Additional testing is also conducted when the WWTP experiences influent contamination.

The City has made significant improvements and progress has been made over the years to the City's wastewater quality monitoring as technology improves, and as the City's wastewater processing methodology changed. In addition to the samples EPCOR completes, the City implemented its own wastewater quality program following the completion of the WWTP upgrades to better understand Regina's wastewater and to monitor the system for potentially harmful substances.

Since inception, the City's wastewater quality program has evolved from discrete manual sampling to automated sampling at six key locations within the wastewater system, with the added ability to sample at additional locations as required. The permanent locations allow the system to be divided to determine if differences exist between the areas and if those differences need to be further investigated. The City conducts sampling at the six permanent locations routinely. Sampling frequency is determined based on the need for the information to make informed decisions, and/or in the event of a Sewer Release to determine the source and potential damage.



Figure 1. Wastewater Sewer Trunks and Associated Routine Sampling Locations

3.2.1 McCarthy Boulevard Pump Station (MBPS)

The MBPS receives approximately 95 per cent of the wastewater that enters the WWTP. Therefore, MBPS is an ideal location to monitor the wastewater before it enters the WWTP to help prevent harmful substances from entering the WWTP. It takes approximately three hours for wastewater from MBPS to reach the valve chamber at the WWTP that is upstream of the treatment process. This delay provides the City with an opportunity to warn EPCOR in the event a harmful substance has been identified at MBPS.

In addition to visual observation completed by the knowledgeable, qualified and diligent operators at MBPS, the City has sampling and real time monitoring location at MBPS to help identify unwanted and harmful substances (that may be undetectable by just sight or smell) before they reach the WWTP.

The City further augmented these processes with an automated emergency MBPS call-out procedure in August 2022. MBPS is not monitored with staff for 24 hours a day.

In the event a predetermined wastewater quality parameter at MBPS reaches a level which may be detrimental to the WWTP treatment process, a notification is automatically sent to a City employee to investigate the situation and determine next steps.

From July to December, one toxic event occurred. This event aligned with a hydrocarbon odor occurrence at the WWTP. The City completed an intensive investigation process including inspection, canvassing, and monitoring to track down the cause of the elevated hydrocarbons. Although the general area of the City in which the issue arose was identified, the source was not confirmed.

EPCOR managed the discharge at the WWTP so that the Permit was met, but final effluent showed an exceedance of the Discharge and Discovery Standard. The exceedance was reported to Ministry of Environment (MOE) Spill Control Centre. Further information can be found in the annual Environmental Discharge & Release Report (Appendix B).

3.2.2 Hauled Wastewater Station (HWS)

The HWS is a disposal location for commercially hauled wastewater by permitted haulers. Accepted wastewater comes from construction and excavation sites, septic and holding tanks, portable toilet and other wastewater holding structures. Users are from both inside and outside Regina city limits. Users and generators must ensure that any ICI wastewater has City approval before it is disposed at the HWS. Sampling can be conducted on the disposed wastewater to help identify loads that have resulted in contamination. Haulers are monitored using Radio Frequency Identification Device (RFID) Tag, which provides site usage information for billing purposes.

In 2022, between July and December, Administration communicated with the haulers and generators approximately 50 times via email or phone to discuss permits, onsite rules, wastewater quality allowances, testing requirements and other inquiries.

3.2.3 Industrial/Commercial/Institutional (ICI) Engagement

To ensure business are aware of their requirements under the Bylaw, and under what conditions surcharges are required, the City conducted an ICI questionnaire in 2020 and 2021. The questionnaire focused on high water users who, through the nature of their businesses, were more likely to have an impact on the overall wastewater quality and thereby may be contributing to metal levels within the wastewater sewer system. The City's wastewater quality monitoring program identified metals as a potential parameter of concern in previous years. The City contacted 72 businesses and respondents provided answers to the City's questionnaire through multiple conversations with Administration. The results of these survey questions identified no major concerns. From the questionnaire process, the City identified three additional businesses to inspect. During the second half of 2022, the City followed up and inspected the three identified business and one additional business. The City's investigation and inspection identified no major concerns. During the inspection, the City observed that these businesses were meeting the Bylaw's requirements for the proper handling, disposal and storage of material that had the potential to impact the sewer system.

The City has further inspections planned for 2023. The objective of the questionnaire and inspections are to:

- better understand ICI wastewater within Regina;
- help make informed decisions from a wastewater treatment perspective and to better understand the impacts those decisions can have on businesses within Regina;
- further educate businesses as to what is acceptable to put in the wastewater sewer system based on the Bylaw, and how the businesses wastewater can impact the wastewater collection and treatment system;
- increase City presence within ICI businesses through conversations, questions, and inspections;
- increase the effectiveness of the WWTP processes and support regulatory compliance for wastewater; and
- prevent the release of harmful substances into the wastewater sewer system.

The above questionnaire and inspections work in collaboration with the wastewater sampling results to identify parameters of concern and corresponding businesses that may be the cause. Through the ICI engagement program, businesses became more aware of what type of wastewater they produce and how their wastewater should properly be disposed of or pre-treated, to not cause damages and/or increase costs to the City and the public as a whole.

When a new ICI business comes to Regina, they go through the City's Servicing & Infrastructure Approval process, where the City investigates the new ICI business for compliance with all bylaws, including the Bylaw. Through this process, the City flags businesses who potentially have wastewater that could be detrimental to the wastewater sewer system. If the investigation reveals that the wastewater is detrimental to the City's infrastructure, including the WWTP, then the City requires such business to pre-treat their wastewater and, if necessary, enter into an agreement with the City. The City then tests or requires the business to provide the City with tests from a certified laboratory to demonstrate that its wastewater complies with the Bylaw. Businesses that have wastewater that is not detrimental to the Public Sewer System, but discharge wastewater that costs more to treat, are required to pay surcharges based on the heightened parameter and the volume of water.

3.2.4 Parameters of Concern

Through the Administration's investigations and testing, there was no parameter of concern documented in 2022 for the HWS.

The Administration's investigations and data analysis did not identify any ongoing parameters of concern within the collection system for 2022. During the release event in July, the City and EPCOR's testing and investigation identified toluene, ethylbenzene, and xylene as exceeding limits in the Bylaw. As discussed above, the City was unable to identify the offender for this incident.

Appendix A includes the average, minimum and maximum values of parameters in the wastewater that enters the WWTP.

3.2.5 Wastewater Quality Monitoring Total Costs

As discussed above, in July of 2022 there was an event that resulted in wastewater entering the WWTP, causing operational issues at the WWTP where several parameters exceeded Bylaw parameters from an unknown source. The City's costs associated with harmful wastewater and the amounts the City recouped can be found in Table 1.

The 2022 total costs for the wastewater quality monitoring activities were approximately \$300,000.00. Table 2 provides a cost breakdown for wastewater quality monitoring program.

All Relief Claims issued by EPCOR, including the costs and causes can be found in Table 3.

Table 1. Costs associated with harmful wastewater events.

Source	Cost	Amount Recouped	Remaining
2022 Costs associated with harmful wastewater events from CRC	\$69,942.97	\$69,942.97	\$0.00
2022 Costs associated with harmful wastewater events from unknown sources	\$117,801.70	\$0.00	\$117,801.70
Total 2022 costs associated with harmful wastewater events	\$187,744.67	\$69,942.97	\$117,801.70
Total 2021 costs associated with harmful wastewater events	\$142,060.00	\$142,060.00	\$0.00

*This table does not include costs associated with sampling within the environment. Those can be found in the Discharge & Release Report. Costs do include costs associated with claims from EPCOR.

Table 2. Costs Associated with the Wastewater Quality Monitoring Program.

Source	2021 Cost	2022 Cost
Wastewater Quality Monitoring Labour Costs	\$202,420.00	\$206,468.00
Wastewater Source Control Quality Monitoring Lab Testing Costs	\$53,618.00	\$37,621.00
Wastewater Source Control Monitoring Other Costs	\$60,495.00	\$59,474.00
Total Wastewater Quality Monitoring Costs	\$316,532.00	\$303,563.00

*This table does not include costs associated with harmful wastewater events.

Table 3. List of Claims submitted by EPCOR.

Relief Claim	Year	Costs (GST excluded)	Cost Recouped	Cause	Comments	
Relief Claim 1	2015	\$ -	N/A	Unknown	Issue during construction. Epcor requested permit relief.	
Relief Claim 2	2015	\$ -	N/A	Unknown	Issue during construction. Epcor requested permit relief.	
Relief Claim 3	2015	\$ -	N/A	Unknown	Issue during construction. Epcor requested permit relief.	
Relief Claim 4	2018	\$ -	N/A	High Zinc Level	Issue during construction. Epcor requested permit relief. Die off of bacteria, missed permit levels, addition of chemical to treat.	
Relief Claim 5	2019	\$ -	N/A	CRC	Elevated PAHs in wastewater causing WWTP issues. Epcor requested permit relief.	
Relief Claim 7	2020	\$ 71,789.74	Yes	PROCOR	Feb 2020 hydrocarbon event.	
Relief Claim 6	2019	\$ 144,892.15	The City recouped payment of \$4,974,826.41 from CRC. This total payment is comprised of invoices paid by CRC and a global settlement payment provided by CRC in court action QBG-RG-01132-2022.	CRC	Elevated PAHs in wastewater causing WWTP issues.	
Relief Claim 8	2020	\$ 246,586.03		CRC	May 2020 Oil Event, elevated hydrocarbons, PAHs released the environment.	
Relief Claim 9	2020	\$ 196,543.31		CRC	PAHs	
Relief Claim 10	2020	\$ 523,545.06		CRC	May 2020 Oil Event - Lagoon clean up	
Relief Claim 11	2020	\$ 282,479.42		CRC	May 2020 Oil Event - Lagoon clean up	
Relief Claim 12	2020	\$ -		CRC	May 2020 Oil Event. Requested contract relief.	
Relief Claim 13	2020	\$ -		CRC	May 2020 Oil Event. Epcor requested contract	
Change Order 12	2020	\$ 3,546,147.44		CRC	May 2020 Oil Event - Lagoon Clean up	
Relief Claim 14	2021	\$ 69,196.85		Yes	CRC	CRC had issues with their wastewater treatment process.
Relief Claim 15	2021	\$ 106,451.26		Yes	CRC	Elevated benzo(a)pyrene in WWTP final effluent, on and off Aug-Sept. Ongoing issues at WWTP until the end of 2021.
Relief Claim 16	2022	\$ 68,852.86	Yes	CRC	Leak into wastewater caused a contamination event at the WWTP.	
Relief Claim 17	2022	\$ 113,136.06	N/A	High BTEX levels	Release of BTEX into the sewer system. Following an investigation the source was not able to be determined.	

3.3 FATS, OILS AND GREASE SOURCE CONTROL

The primary objective of the Fats, Oils and Greases (FOG) Source Control Program is to reduce sewer overflows and blockages and protect public health and the environment by minimizing public exposure to unsanitary conditions. FOG released to the wastewater sewer system can accumulate along pipe walls, coating pipes until wastewater flow through the line is restricted, causing backups, and blockages. By controlling FOG to the wastewater collection system, sewer surcharge occurrences are reduced, and the system operating efficiency is increased. In addition, an effective FOG Source Control Program can reduce financial liabilities and revenue losses associated with enforcement actions and the associated impacts.

The City has three main approaches to reduce FOG in the system (1) education and awareness communications, (2) inspecting restaurants grease traps, and (3) inspecting industrial/commercial oil and grit separators.

Over the past few years, the City has increased emphasis on sewer blockage prevention through FOG initiatives, including public campaigns to educate the relevant stakeholders on

how FOG causes blockages in wastewater collection systems and how to properly dispose of FOG. The campaigns target the relevant stakeholder groups including residents, restaurants, and other industry associations.

The FOG Source Control 2022 campaign that ran from October 3 to 30, targeted new Canadians, women aged 25-65, and people living in the geographic locations in Regina where the City had identified FOG issues in the City's infrastructure. From the FOG Source Control's social media campaign Facebook, Instagram, YouTube, and Google proved to be main contributors to the campaign's success. Key performance indicators showed that the reach was over 70,000 users, 15,000 page views on Regina.ca/sewer. Residents spent an average time of 2 minutes 15 seconds spent on the website showed that people stayed to learn about the content. This FOG Source Control campaign produced click through rates of 0.69% on social media (which is higher than the City's benchmark in Q3 of social media being 0.34%.)

In addition to the above social media marketing, the FOG Source Control program developed 30 second spots which were featured on CJME Radio, and in-home billboards presented on television. A tool kit was also crafted to help our residents find all the necessary information on how to use social posts, video, web banners, and posters.

Along with the public education campaigns, the City also performs regular inspections of restaurant grease traps to ensure restaurant owners are cleaning grease traps effectively and frequently. In the last half of 2022, the City conducted over 600 inspections ensuring grease pre-treatments were properly installed, did not exceed capacity, were in proper working condition, and that all proper documentation was available for City review as required under the Bylaw. When the City observed non-compliant conduct, the City issues a letter requiring modifying process and compliance with the Bylaw. In 2022, the City issued three non-compliance letters to three businesses. Through these letters, all three businesses modified their practices and became compliant with the Bylaw. The City has not prosecuted generators because the City has been able to achieve compliance with the Bylaw through education and follow-up inspections.

In 2022, the City, in partnership with the Global Transportation Hub (GTH), set up educational meetings with stakeholders in the GTH because the wastewater lift station in the GTH was continuously experiencing wipes and rags becoming entangled in pump impellers. These meetings with the GTH, GTH businesses and the City provided education to wastewater infrastructure users in that area on the detrimental impact these wipes and rags were having on City infrastructure. These meetings were highly successful, as GTH businesses have modified their processes to reduce wipes and rags in the wastewater infrastructure and as a result, the City has been experiencing less frequent issues at the GTH lift station.

Continual education to residents and business owners were essential in continuing the success of this program.

3.4 STORM WATER SOURCE CONTROL PROGRAMS

3.4.1 Adopt a Storm Drain Educational Campaign

The City introduced an Adopt a Storm Drain campaign in 2021 with a campaign focused on educating the public on proper items for the storm sewer and encouraging citizens to participate

in adopting and naming a storm drain. This program has been very successful, as during spring melt and large rainstorm events where the storm drain had been adopted and cleared off, those storm drains reduced the risk of street and property flooding.

Looking forward to 2023, the City is anticipating another city-wide campaign to engage even more residents into participating in the program.

3.4.2 Industrial and Commercial Storm Source Control

The City has a storm sewer source control programs for industrial and commercial businesses, some of which include:

1. Testing of industrial stormwater ponds before release into the City's storm sewer.

The City requires industries with stormwater ponds to test the pond water for specific parameters that have the potential to be elevated based on the specific industry. The City reviews the submitted analytical information against provincial guidelines and regulations for surface water and approves discharge only if the industry's stormwater meets those requirements;

2. Businesses that apply to rent a hydrant cart are required to inform the City of the water use and, how water will be discharged and if the water will be dechlorinated before discharge. This information is required to help reduce the occurrence of chlorinated water from entering surrounding water bodies and having potentially negative effects. The process also acts as a touchpoint with business keep them aware of the Bylaw and the potential negative impacts; and
3. Businesses are not allowed to discharge potentially contaminated standing water from construction sites into the storm sewer. They must use the HWS if there is a potential for elevated levels of parameters of concern.

3.4.3 Spring Runoff Sampling

Each spring, the City samples Wascana Creek and the City's storm sewer system to better understand the effects of the winter runoff and the City's snow storage site has on Wascana Creek's water quality. The results of this work help make decisions on the running of the snow storage site and the Roadways & Transportation Department salting program.

4.0 SUCCESSES AND CHALLENGES

Since the inception of the Wastewater Sewer Source Control Program, there have been many successes. The major ones from 2022 are listed below:

- The amount communication in regard to wastewater between the City and its businesses improved through increased communication and more routine meetings;
- ICI businesses achieved a greater understanding of the wastewater bylaw, their wastewater, and the impacts it can have on the wastewater sewer system;
- The MBPS analyzer was functioning well for the July-December 2022 period.

- The City is in a good position to not only identify, but also track down Sewer Releases and recoup costs. Multiple Sewer Releases have been identified and the source confirmed. Before the program when issues at the WWTP occurred, there was no means to identify why the issues were occurring or what may be causing them. This process has led to increased efficiency at the WWTP and the ability to recoup costs;
- The City's FOG Source Control Program has become a regular name within the food service establishments and an improved working relationship with property management companies, and maintenance personnel in hospitals has occurred; and
- Educational campaigns have reached a large portion of Regina and have helped educate residents on what can and can't go down the drain.

Although the City's Wastewater Sewer Source Control Program has seen many successes, there are still challenges within the program. The wastewater sewer and the treatment of wastewater is a large, complex system that is constantly changing and is different for each municipality. The main limitations to the programs are listed below:

- There has not been a reduction in cleanings that the City needs to be performed to remove FOG from the wastewater sewer system following the Don't Abuse the Sewers communication campaign and restaurant inspections. The Don't Abuse the Sewers campaign was an educational campaign that told residents what not to put down the drain. The Administration is doing further analysis and preparing a new campaign to help improve the situation and determine if more targeted communication tactics and other enforcement options may result in increased results.
- Real-time analyzers for all parameters of concern do not exist, and without technology available yet, correlations and trends must be reviewed by trained staff to understand much of the information. This is challenging, time-consuming work that only specifically trained staff can do, which takes these experts away from other technical work. Further, test results from external laboratories can take up to two weeks to receive, limiting the ability to quickly act in specific situations.

Although the source control programs have challenges, the improvements and successes over the last years highlight the importance of the programs and the need for them to continue to grow and reach more ICI businesses and individual residents to improve overall wastewater, while maintaining economic development.

Appendix A

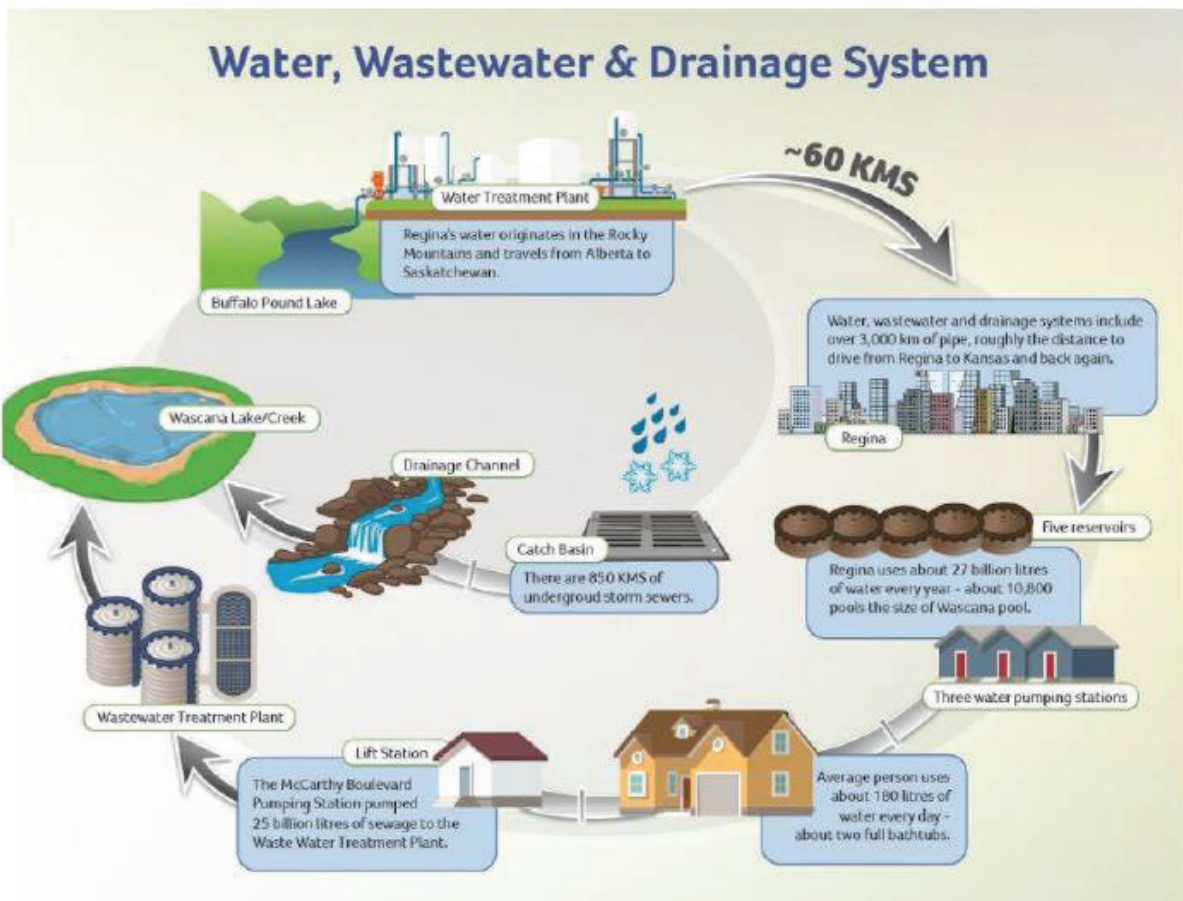


Figure A. Water, Wastewater & Drainage System

Table A. Summary of parameters tested in the wastewater entering the WWTP during July-Dec 2023

Category	Parameters	Average	Minimum	Maximum
Hydrocarbons (PAHs)	Acridine	0.001000	0.001000	0.001000
	Benzo(b,j,k)fluoranthene	0.001000	0.001000	0.001000
	Benzo(e)pyrene	0.0010000	0.0010000	0.0010000
	Benzo(g,h,i)perylene	0.0010000	0.0010000	0.0010000
	Dibenzo(a,h)anthracene	0.0010000	0.0010000	0.0010000
	Indeno(1,2,3-c,d)pyrene	0.001000	0.001000	0.001000
	Perylene	0.001000	0.001000	0.001000
	Naphthalene	0.000536	0.000100	0.006200
	2-MethylNaphthalene	0.000350	0.000100	0.003100
	1-MethylNaphthalene	0.000246	0.000100	0.001800
	Chrysene	0.000200	0.000200	0.000200
	Phenanthrene	0.000132	0.000100	0.000400
	Quinoline	0.000125	0.000100	0.000400
	Fluoranthene	0.000125	0.000100	0.000300
	Benzo(a)pyrene	0.0001075	0.0000200	0.0002700
	Fluorene	0.000104	0.000100	0.000200
	Acenaphthene	0.000100	0.000100	0.000100
	Acenaphthylene	0.000100	0.000100	0.000100
	Anthracene	0.000100	0.000100	0.000100
	Benzo(a)anthracene	0.000096	0.000040	0.000250
Pyrene	0.000051	0.000040	0.000290	
Metals	Iron	1.346	0.140	5.900
	Aluminum	0.6491	0.0460	2.4000
	Strontium	0.48703	0.39000	0.65000
	Boron	0.299	0.230	0.380
	Manganese	0.24162	0.10000	0.41000
	Zinc	0.1425	0.0190	0.2600
	Copper	0.11108	0.01600	0.28000
	Barium	0.07473	0.04200	0.12000
	Titanium	0.02883	0.00690	0.07300
	Molybdenum	0.013543	0.006200	0.028000
	Selenium	0.007343	0.003600	0.015000
	Nickel	0.00453	0.00250	0.01100
	Chromium	0.00434	0.00100	0.01500
	Lead	0.003768	0.000400	0.008200
	Vanadium	0.00356	0.00100	0.01500
	Uranium	0.002827	0.001200	0.010000
	Tin	0.00269	0.00060	0.00560
	Arsenic	0.00150	0.00090	0.00320
	Antimony	0.00115	0.00070	0.00230
	Cobalt	0.00075	0.00040	0.00180

	Silver	0.000421	0.000050	0.001500
	Thallium	0.000200	0.000200	0.000200
	Cadmium	0.0001416	0.0000200	0.0002700
	Beryllium	0.00010	0.00010	0.00010
	Mercury	0.0000370	0.0000100	0.0002900
Hydrocarbons (others)	F3	2.22	0.58	4.80
	F4	0.67	0.50	1.50
	F2	0.50	0.50	0.50
	F1-BTEX	0.06	0.05	0.28
	Xylenes	0.02088	0.00050	0.42000
	Toluene	0.01606	0.00050	0.33000
	m+p-Xylene	0.01431	0.00050	0.28000
	o-Xylene	0.00697	0.00050	0.14000
	EthylBenzene	0.00376	0.00050	0.06700
	Benzene	0.00173	0.00050	0.02900
Disinfection byproducts	Total trihalomethanes (THM)	0.00232	0.00200	0.00260
	THM1: Chloroform	0.00224	0.00160	0.00260
	THM4: Bromoform	0.00200	0.00200	0.00200
	THM3: Chlorodibromomethane	0.00100	0.00100	0.00100
	THM2: Bromodichloromethane	0.00050	0.00050	0.00050
Surchargeable	Oil & Grease	13.7	5.0	26.7
	Mineral Oil & Grease	5.0	5.0	5.0
	Biochemical Oxygen Demand	227	162	328
	Chemical Oxygen Demand	526	266	795
	Total Kjeldahl Nitrogen	46.2	20.3	60.7
	Total Phosphorus	5.28	2.70	8.14
	Total Suspended Solids	217.5	96.0	416.0
General Chemistry and Nutrients	pH	7.53	7.31	7.70
	Bicarbonate	348.5	304.0	392.0
	Sulfide	8.26	1.50	14.60
	Sulfates	268.75	240.00	290.00
	Manganese- ext.	0.24132	0.10000	0.41000
	NH3-N	32.10	12.00	39.90
	Nitrate + Nitrite	0.76	0.13	4.96
	Nitrogen NO3-	2.52	0.13	3.23
	Nitrogen NO2-	0.15	0.02	1.73
Total Phosphorous	5.39	2.88	8.11	
Others	Sulfur	92.90	64.00	456.00
	Total Organic Carbon	37	24	50
	Total Phenols	0.1144	0.0400	0.1600

*Values in mg/L unless otherwise indicated