



**Alberta Capital Region
Wastewater Commission**

Wet Weather Flow Management Strategy

May 2021

Background

In 2014, the Board adopted the ACRWC's Wet Weather Flow Management Strategy. The strategy was the culmination of the input gathered through a series of workshops scheduled with our member community technical staff. The ACRWC had retained Urban Systems Limited to facilitate those workshops and develop the strategic document. The document was vetted by the Technical Advisory Committee and presented to the Board for approval.

The first implementation step was the development of a regulatory framework. This occurred over a number of years and workshops with technical staff from our member communities. In 2016 consensus on the framework was reached and waste discharge permits were issued to our member communities with the following requirements:

- Conduct an Inflow and Infiltration Assessments to identify and characterize inflow and infiltration sources according to a jointly developed Terms of Reference.
- Develop a Wet Weather Flow Management Plan based on the inflow and infiltration assessment results.
- Include inflow and infiltration management and testing criteria within their Development Control regulations and/or Infrastructure Design Standards and submit a summary report of compliance and verification on an annual basis.

Since 2017, member communities have been assessing their wet weather flows and, in some cases, have developed management plans.

The ACRWC has been monitoring progress against the discharge permits, following up on Development Control regulations and researching rate structures.

Wet Weather Flow – A Regional Issue

The Alberta Capital Region Wastewater Commission (ACRWC) provides wastewater transmission and treatment services to the following 13 municipalities in the Alberta Capital Region:

City of Leduc	Town of Bon Accord	Leduc County
City of St. Albert	Town of Stony Plain	Parkland County
City of Spruce Grove	Town of Gibbons	Strathcona County
City of Beaumont	Town of Morinville	Sturgeon County
City of Fort Saskatchewan		

Over the past 35 years, the ACRWC and its member municipalities have dealt with issues related to excess wet weather flow (WWF). This situation is not uncommon. All wastewater collection systems that have multiple service points and underground pipes have some degree of inflow and infiltration. Generally, inflow and infiltration are considered to be undesirable. Ideally, a wastewater system would strictly convey and treat sewage – precipitation would remain outside of the wastewater system. Excess WWF is a problem for the ACRWC and the region because it results in:

1. Risks to the environment

WWF causes increased volume and frequency of by-passes from local and regional sewers, pump stations, and the wastewater treatment plant to local watercourses. These bypasses pose risks to the environment.

2. Regulatory contraventions

WWF causes system bypasses, which contravene current regulations. The risk of future contraventions is increasing due to moves to adopt tighter CCME and Provincial regulations on sanitary sewer overflows and a potential shift to a load-based regulation by the Province.

3. Health and safety concerns

WWF brings high amounts of inert solids to the pump stations and wastewater treatment plant. Operations staff are required to frequently enter confined and dangerous spaces to clear the solids. As well, some member municipalities have reported incidents of basement flooding. This poses significant public health concerns.

4. Treatment process performance issues

WWF brings higher than planned flows that result in inefficient treatment performance and undesirable amounts of inert solids.

5. Higher costs

Excess flows result in unplanned capital expenditures to address capacity issues and higher than normal O&M costs from rapid wear and tear of the system. These higher costs must then be recovered from member municipalities.

This Wet Weather Strategy is essentially about helping the region work together to solve WWF issues. A regional problem necessitates a regional approach. This Wet Weather Flow Management Strategy will help the ACRWC and its members:

- Better understand the sources and impacts of excess WWF
- Coordinate efforts to reduce WWF or convey and treat it
- Find the most cost-effective solutions
- Establish roles and responsibilities
- Share resources/knowledge/data
- Allocate costs fairly across member municipalities
- Improve transparency
- Track progress

Wet weather flows to and from the City of Edmonton will be monitored, reported and managed through the Regional Wastewater Exchange Agreement between the ACRWC and the EPCOR.

What is “wet weather flow”?

Wet weather flow (WWF) is water that enters the sanitary sewer system under wet weather conditions. Water from rainfall or snow melt can enter the sanitary sewer system either directly or indirectly.

Water that enters directly is called **INFLOW**. Some sources of inflow are roof downspouts, foundation drains, cross-connections with storm drains, and manhole covers.

Water that enters indirectly is called **INFILTRATION**. A source of infiltration is groundwater seeping through cracks in sanitary sewer pipes and manholes. Wet weather flow is often called I&I for “inflow and infiltration”.

All communities deal with WWF to some degree, and all sanitary sewer systems are designed to handle a certain level of WWF. But when WWF levels become excessive, sanitary sewer systems can become overloaded, leading to significant environmental, public health, and financial impacts.

Goals

GOALS identify **WHY** the Strategy exists at all. Achieving the Goals is the purpose of the Strategy.

The goal of the Strategy is to:

- 1. Reduce the environmental impact of wet weather flows.***
- 2. Protect the health and safety of public and staff.***
- 3. Reduce the financial impact of managing wet weather flows.***

Together, these are the reasons **WHY** the Strategy exists. All other elements and details of the Strategy (including the related Implementation Plan) have been developed to meet these goals.

Guiding Principles

GUIDING PRINCIPLES articulate **HOW** we will work together to achieve the goals - or how we will do what we do.

The guiding principles of the Strategy are:

1. **Holistic Decision Making.** Decision making processes consider environmental, social, and economic benefits, costs, and risks. Decisions are evaluated from a whole system perspective.
2. **Evidence Based.** Investments in wet weather management initiatives will be informed by appropriate evidence. Investments in information collection will be proportionate to the expected return on investment.
3. **Continuous Improvement.** Uncertainty underlies many of the challenges of managing wet weather flows and much will be learned as flows are monitored and initiatives are evaluated. A Plan-Do-Monitor-Act cycle of continuous improvement will be applied to ensure that investments of time and resources continue to provide value throughout the implementation of the strategy.
4. **Cooperation and Coordination.** The ACRWC and its members will work together to manage wet weather flows on a regional and local scale. Resource and knowledge sharing is encouraged where possible to improve the overall effectiveness of the strategy.
5. **Independence.** The ACRWC and its members will be free to choose and implement their own projects and initiatives. There is no one-size-fits-all solution.
6. **User-pay.** Each municipality is accountable financially for the flows they contribute to the regional system.
7. **Communication.** Communication and education are proactive and ongoing with the aim of enabling member staff, councils, and the public to reduce wet weather flows.

The Programs and detailed Implementation Plan have been developed to be consistent with these Guiding Principles.

Programs

PROGRAMS are the action components of the Strategy. The Programs describe **WHAT** will be done. Program elements will align with the Goals and Guiding Principles. The Programs will be conducted in a way that builds continuous improvement. As the ACRWC and its municipalities learn more about the sources of WWF and of its impacts/risks, that information will be used to improve Program details.

A “program” is a set of related tasks with a common purpose. This Strategy is made up of five Programs [This should be explored and reconfirmed with the TAC.]:

1. Data Collection & Analysis
2. Communication & Education
3. Investment Planning & Decision-Making
4. Rate Setting
5. Program Management & Continuous Improvement

Although the Programs are identified separately, in reality they are interdependent. The outputs of one Program directly impact other Programs. For instance, the flow data collected under Program 1 – Data Collection & Analysis will be needed to develop an appropriate rate under Program 4 – Rate Setting. Because of this interdependence, progress will need to be made in all five Program areas in order to find lasting and effective solutions to WWF issues. The Strategy will be most effective if it unfolds in a comprehensive manner.

PROGRAM AREA	PURPOSE	KEY BENEFITS	KEY ACTIONS
Data Collection & Analysis	To quantify wet weather flows, the resulting impacts on the local and regional systems and the environment, and performance on overall strategy goals.	<ul style="list-style-type: none"> • WWF data improves decision making regarding: <ul style="list-style-type: none"> ○ rate setting ○ ACRWC investments ○ Municipal investments • Will track progress over time, enabling continuous improvement 	<p>Conduct flow and rainfall monitoring.</p> <p>Collect and analyze data in accordance with Waste Discharge permits.</p>
Communication & Education	To ensure effective engagement with stakeholders.	<ul style="list-style-type: none"> • The more well-informed stakeholders are, the better able they are to take suitable action on WWF issues • Improves acceptance of implementation activities • Facilitates knowledge sharing 	Develop and maintain a communication plan
Investment Planning & Decision-Making	To ensure investment planning and decisions are evidence-based and will be effective in managing WWF.	<ul style="list-style-type: none"> • More efficient and transparent decision-making • Helps ensure investments to address WWF are backed by evidence 	WWF Management Plans are supported by evidence
Rate Setting	To ensure the utility rate allocates wastewater service costs fairly across member municipalities.	<ul style="list-style-type: none"> • Ensures fairness – municipalities will pay in accordance with their impact on the regional system • Helps ensures financial sustainability of regional sanitary sewer services • Enables autonomy, encouraging municipalities to assess the cost-benefit of acting locally 	Develop wet weather flow rate structure
Program Management & Continuous Improvement	To ensure all Programs stay on track and demonstrate improvement.	<ul style="list-style-type: none"> • Identifies what's working, and what needs improvement • Ensures the Strategy is supported by needed resources • Strategy initiatives adapt and change over time 	<p>Identify required resources.</p> <p>Conduct annual review.</p> <p>Develop and maintain a regulatory framework.</p>

Implementation

The ACRWC will advance initiatives under all five Program areas, but the initial focus continues to be on establishing flow monitoring and reporting to better understand the sources and magnitude of WWF and its impacts in the region, which will inform both the rate review and the investment decisions of the members for their management plans.

Implementation initiatives are outlined on the following page – the first graphic shows Roles and Responsibilities, and the second graphic provides a timeline. They represent the most significant work that must be done in the near term – they outline the Strategy’s “critical path”. The ACRWC will engage its members on these initiatives throughout Strategy implementation.

Consistent with the ACRWC’s commitment to continuous improvement, the ACRWC and its members will conduct annual reviews of the Strategy to ensure goals are being met.

PROGRAM AREA	INITIATIVE	ROLES AND RESPONSIBILITIES
Data Collection & Analysis	Conduct flow and rainfall monitoring	ACRWC – Lead planning for and implementation of regional flow and rainfall monitoring. Make data available to members Members – Lead local flow monitoring and report to ACRWC.
	Analyze data in accordance with Waste Discharge permits	ACRWC – Monitor progress towards goals and report status Members – Collect and analyze data to inform management plans
Communication & Education	Develop and maintain a communication plan	ACRWC – Lead development of communication plan Members – Provide input and provide comments and feedback
Investment Planning & Decision-Making	Develop WWF Management Plans supported by evidence	ACRWC – Review and provide feedback on WWF Management Plans. Look for resource sharing opportunities Members – Develop and implement management plans
Rate Setting	Develop wet weather flow rate structure	ACRWC – Lead rate structure review Members – Review rate structure and provide comments
Program Management & Continuous Improvement	Identify required resources	ACRWC & Members – Identify resources and develop plans
	Conduct annual review	ACRWC – Lead annual review Members – Review and provide comments and implement improvements
	Monitor regulatory framework	ACRWC – Monitor regulatory framework Members – Comply with Regulatory Framework

IMPLEMENTATION TIMELINE

	2021	2022	2023	2024	2025
DATA COLLECTION & ANALYSIS	Conduct flow and rain monitoring and analysis				
COMMUNICATION & EDUCATION	Review communication plan				
INVESTMENT PLANNING & DECISION-MAKING	Members develop/implement management plans ACRWC implements Wet Weather Storage project(s)				
RATE SETTING	Engage with TAC to develop rate setting principles ACRWC implements flow monitoring improvements		Develop rate structure for Board approval	Implement rate structure	
PROGRAM MANAGEMENT & CONTINUOUS IMPROVEMENT	Strategy review and update	Annual review and reporting			