

Next Generation Water Metering, Advanced Metering Infrastructure - Procurement Strategy

Date: October 16, 2025

To: Infrastructure and Environment Committee

From: General Manager, Toronto Water

Wards: All

SUMMARY

In 2015, the City of Toronto modernized its operations with the completion of its Automated Meter Reading (AMR) system, which enabled automated transmission of water consumption data to support water billing processes. While this system was considered state-of-the-art at the time, industry standards and technology have advanced significantly. The next generation of water metering, Advanced Metering Infrastructure (AMI), enables new features and functionality that extend well beyond basic meter reading to support broader strategic business outcomes.

In 2024, Toronto Water engaged an industry expert to assess options for the City's next generation of water metering. The assessment confirmed that the current system no longer meets the evolving customer experience expectations, engineering and operations requirements of Toronto Water, and recommended transitioning to AMI. The consultant further advised adopting a new approach to managing AMI assets that takes advantage of the flexibility offered by modular, "plug-and-play" solutions. Unlike the City's current proprietary AMR system, which limits flexibility and constrains asset management decisions, modern AMI systems can be tailored to a utility's needs and managed at the component level rather than a single integrated system.

AMI offers a range of advantages over the existing system, including real-time or near real-time water consumption data, improved leak detection, enhanced customer consumption management tools, better water demand forecasting, outage detection and alerting, and improved estimated billing logic. A critical enabler of this transition is the replacement of the City's 26-year-old legacy billing system (WMACS) used for billing water and solid waste rate-based services. Although the need to replace WMACS has been previously identified, no implementation planning is currently underway.

This report outlines the benefits of transitioning to AMI, identifies the key actions required for successful implementation, and recommends the initiation of the strategic procurement and implementation planning for a new AMI system and billing system for rate-based services.

RECOMMENDATIONS

The General Manager, Toronto Water, recommends that:

1. City Council authorizes the General Manager, Toronto Water, in consultation with the Chief Procurement Officer, to initiate the strategic procurement planning process for the City's advanced metering infrastructure system which will include:

- a) retaining an industry expert to develop a detailed implementation and procurement strategy, document requirements and specifications in support of the procurement process; assist in the evaluation of vendor submissions, and serve as contract administrator, system integrator, and program manager following award;
- b) collaborating with key City stakeholders, to ensure alignment of needs and responsibilities; and
- c) report back to Infrastructure and Environment Committee by Q1 2027 with the strategic procurement and implementation plan, which will include comprehensive Terms of Reference and a detailed Request for Proposal (RFP) that reflects the full range of technical, operational, and customer service requirements of the new AMI system, as well as funds necessary to support the implementation.

2. City Council direct the General Manager, Toronto Water, in consultation with the General Manager, Solid Waste Management Services, Director, Revenue Services, the Chief Financial Officer and Treasurer, and the Chief Technology Officer, to retain an industry expert to assist in:

- a) gathering requirements, analyzing options and preparing a recommendation for a new rate-based budget billing system;
- b) establishing a governance framework to ensure alignment of needs and responsibilities;
- c) developing a detailed implementation and procurement strategy in alignment with the work underway as part of recommendation 1; and
- d) reporting back to Infrastructure and Environment Committee by Q2 2026 the resulting recommendation and implementation plan for a new rate-based budget billing system, as well as funds necessary to support the implementation.

FINANCIAL IMPACT

The recommendations in this report have financial implications for Toronto Water and Solid Waste Management Services.

Recommendation 1 proposes retaining an industry expert to lead the implementation and procurement strategy, support the procurement process, oversee contract administration, and act as program manager for AMI system design and implementation. The estimated cost of over 2026–2034 can be accommodated within Toronto Water’s 2025-2034 Capital Budget and Plan.

Recommendation 2 proposes retaining an industry expert to assess requirements, evaluate options, recommend a new rate-based budget billing system, and develop an implementation and procurement strategy aligned with Recommendation 1. The estimated cost over 2026–2030 can be accommodated within the approved 10-Year Capital Plans (2025-2034 Capital Budget and Plan) of Toronto Water and Solid Waste Management Services.

Significant financial implications will arise from implementing the AMI system and replacing the billing system. The magnitude and funding strategies for these future costs are being addressed through Toronto Water’s 2026-2035 Capital Budget and Plan Submission.

As outlined in the recommendations of this report, staff will also provide Council with refined sequencing and cost estimates through future reports to be included in future year budget process as required.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting on May 21 and 22, 2025, City Council considered Item IE21.2, entitled "Recommended Strategies to Address Prematurely Failing Water Meter Transmission Units." City Council adopted confidential instructions to staff contained in Confidential Attachment 1 to the report (April 23, 2025) from the General Manager, Toronto Water, and the Chief Procurement Officer, as well as in Confidential Attachment 1 to Motion 1 by Councillor Amber Morley. A copy of the Council decision related to this item is available at: <https://secure.toronto.ca/council/agenda-item.do?item=2025.IE21.2>

At its meeting on November 13 and 14, 2024, City Council, by its adoption of Item IE17.2 “Meter Transmission Units Emergency and Emergency Non-Competitive Contract with Aclara Technologies LLC to Obtain Supply of Replacement Water Meter Transmission Units”, authorized, among other things, the General Manager, Toronto Water to enter into negotiations with Aclara, as the manufacturer and exclusive supplier of the MTUs, for the supply and delivery of additional MTUs, to procure additional MTUs and associated equipment from Aclara, by or before June 30, 2025 to a maximum \$3,000,000 in order to keep providing working meters and MTUs for new builds and high volume users pending Council decision on a long term strategy, and adopted the confidential instructions to staff in Confidential Attachment 1 to the report (October 7, 2024). City Council’s decision can be viewed here: <https://secure.toronto.ca/council/agenda-item.do?item=2024.IE17.2>

At its meeting on April 26, 27 and 28, 2017, City Council adopted the following: Auditor General's Report, "Audit of Water Billing and Collections - Phase II: Water Billing and Water Meter Management Controls Require Strengthening. The Auditor noted that the City's legacy water billing system, WMACS is due for replacement. A copy of this report is available at:

<https://www.toronto.ca/legdocs/mmis/2017/au/bgrd/backgroundfile-102139.pdf>

At its meeting on November 12, 2015, the Public Works and Infrastructure Committee received for information Item PW9.6 - "Water Meter Program - Final Report" whereby the General Manager of Toronto Water reported on the status of the project advising, among other things, that the project achieved substantial performance in March 2015, approximately nine months ahead of schedule, with total projected expenditures forecasted at \$168 million, or 77 per cent of the \$219 million funding limit. At the time, the financial benefits to the City were projected to be approximately \$32.8 million per year, including \$27.8 million in revenue recovery and \$5 million in operating savings. A copy of the Council decision related to this item is available at:

<https://secure.toronto.ca/council/agenda-item.do?item=2015.PW9.6>

At its meeting on December 16, 17 and 18, 2013, during consideration of report EX36.17 entitled "2014 Rate Supported Budgets - Toronto Water and 2014 Water and Wastewater Rates and Service Fees", City Council adopted amendments to Chapter 441 - Fees and Charges, Appendix D, Schedule 2, Water Services effective July 1, 2014 to include:

- A new manual water meter reading fee of \$80 per visit for consumers with water meters refusing to allow the installation of a new automatic water meter; and
- A new flat rate legacy fee of \$1,020 per year for residential flat rate consumers who refuse to allow the installation of an automatic water meter on their property.

A copy of the Council decision related to this item is available at:

<https://secure.toronto.ca/council/agenda-item.do?item=2013.EX36.17>

At its meeting on June 23 and 24, 2008, during consideration of report PW16.12 entitled "Request for Proposal (RFP) 0713-08-0001: Water Meter Replacement and Automated Meter Reading System", City Council authorized:

- The General Manager of Toronto Water and the Treasurer to negotiate and enter into an agreement, in a form satisfactory to the City Solicitor, with Neptune Technology Group (Canada) Limited in the total amount of \$191,756,663.14, net of GST including provisional items for the project; and
- An upset limit of funds required to finance the project be set at \$219 million (net of GST), including contingency, provisional item and inflationary indexing for labour and materials over the implementation period of six years.

A copy of the Council decision related to this item is available at:

<https://secure.toronto.ca/council/agenda-item.do?item=2008.PW16.12>

COMMENTS

This report seeks authority to begin strategic, collaborative procurement and implementation planning to replace the City’s Automated Meter Reading (AMR) system, which is nearing end-of-life, and to plan the replacement of the legacy rate-based billing system (WMACS) with a modern solution serving Toronto Water and Solid Waste Management Services. Authority is requested to retain industry expertise to design the approach, document requirements, align governance across divisions, and sequence activities across both streams.

Staff will report back to the Infrastructure and Environment Committee with a recommended billing solution and implementation plan by Q2 2026, and with an AMI procurement and implementation plan by Q1 2027. It is estimated that a new billing system could be in place by the end of 2030, which would enable Toronto Water to begin AMI implementation in 2029. This high-level schedule enables the City to balance the need to maximize the value of its investments in the existing AMR system, and the risks associated with operating a system nearing end of life, as well as the lost opportunities for innovation and service enhancements.

Figure 1: High-level Schedule of AMI and Billing System Planning and Implementation



The following sections provide details on the City’s current AMR system, the transition to AMI, the City’s existing billing system, and proposed next steps.

1. Overview of the City's Current Automated Meter Reading System

To modernize water billing and improve operational efficiency, the City undertook a six-year capital project, completed in 2015, to install Automated Meter Reading (AMR) technology in every home and business. AMR enabled automated transmission of water consumption data directly to the City, eliminating the need for manual meter readings by property owners or City staff.

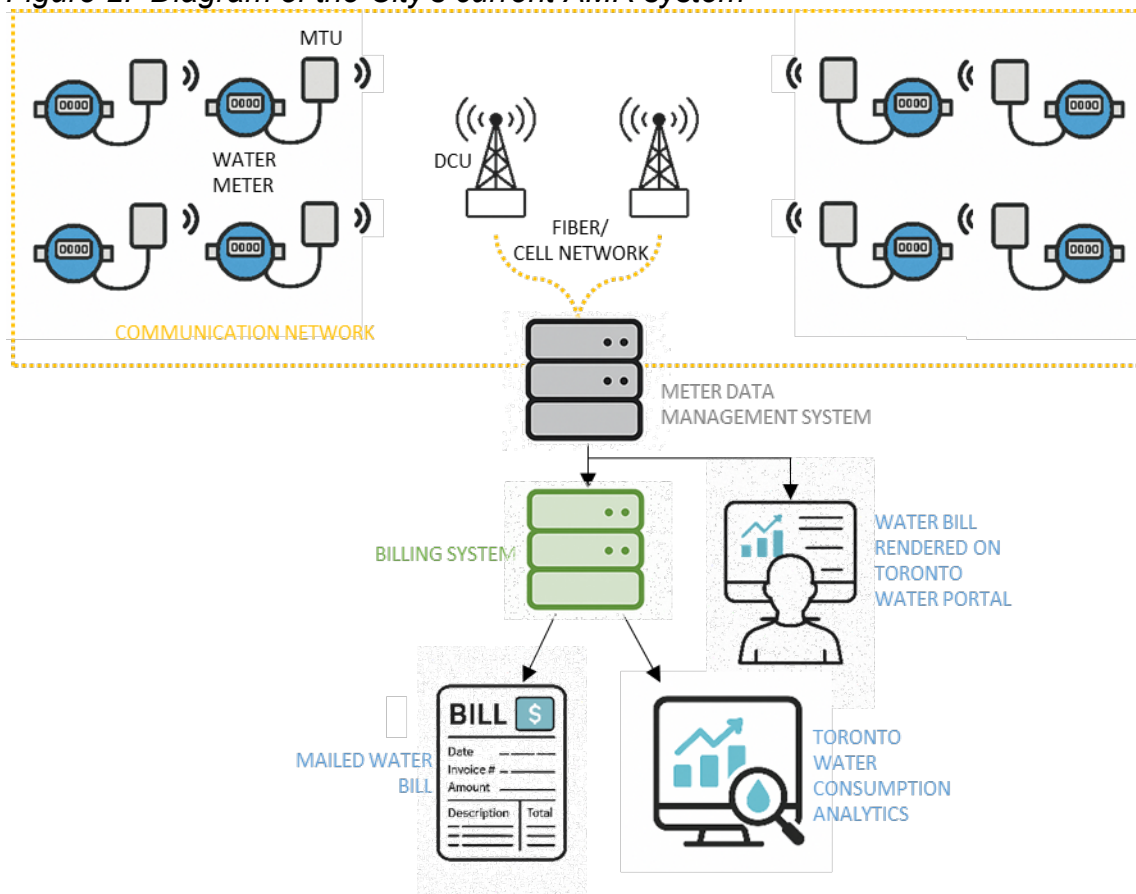
1.1 AMR System Components

The City's AMR system is a proprietary set of components that work together to capture, transmit, process and record water consumption of each metered account. The AMR system is comprised of the following key assets:

- **Water Meters** – mechanical meter devices installed at each serviced property to measure water consumption.
- **Communication Network** consisting of **Meter Transmission Units (MTUs)** – Devices attached to each meter that transmit the recorded consumption data via radio signal and **Data Collection Units (DCUs)** – Field-based units that receive radio transmissions from MTUs and forward the data to the City’s central Meter Data Management System.

- **Meter Data Management System (MDMS)** consisting of Network Control Computer (NCC) – a system that collects, validates, processes and stores the readings captured from DCUs, Middleware – software that pushes data from NCC to WDR and billing system, and Water Data Repository (WDR) that stores at least seven years of historical meter readings.
- **Billing System (WMACS)** – Software that receives and processes metered consumption data from MDMS to generate customer bills for water and solid waste. WMACS also manages outstanding receivable amounts, with a direct integration with the Tax Management and Accounting System (TMACS) to pursue collections and secure the outstanding receivable water and solid waste receivables against the property. WMACS is also used by customer service staff to create and dispatch service requests in response to citizen calls to 311.
- **Toronto Water Customer Portal (MyWaterToronto)** – A web application that uses the WDR database to provide citizens with a view of their daily water usage.

Figure 2: Diagram of the City's current AMR system



1.2 Management of AMR Assets

Toronto Water has managed AMR assets across their differing lifecycles and risk profiles, establishing replacement plans at critical junctures with the objective of sustaining the system's level of service. For example, in 2023 Toronto Water completed the replacement of all 284 Data Collection Units, which had reached the end of their 10-year useful life. In contrast, MTUs, originally estimated by the manufacturer to have a 20-year useful life, have demonstrated significant failure rates after only 10 years in service. This premature failure has required interventions well beyond what was

planned, degrading the AMR level of service and affecting the City's long-term strategic planning for AMI implementation.

Recognizing that the entire AMR system would eventually require replacement, Toronto Water engaged an industry expert in 2023 to refine its long-term transition strategy. This work examined:

- lifecycle of existing assets,
- financial implications of transition timing,
- risks of remaining on AMR as meters near end-of-life,
- opportunities from advances in metering technology, and
- strategies to address premature MTU failures.

The expert identified that the current AMR system, designed primarily for automated billing, constrains Toronto Water's ability to leverage data for broader business outcomes. In particular, it limits the data collection and two-way exchange of information that could support infrastructure planning, asset management, customer service, and day-to-day operational decision-making.

Toronto Water evaluated opportunities to maximize the value of the City's investments in the current AMR system prior to transitioning to the next generation of water meter technology. Based on this evaluation, Toronto Water has adopted a dual-track approach that sustains investment in AMR assets to maintain business processes and customer service in the near term, while simultaneously preparing for AMI. This approach balances the need to maximize the return on the City's recent investment in MTUs, the financial and operational risks of remaining on a system nearing end-of-life as other components such as water meters advance toward expiry, and the lost opportunities for financial efficiency, innovation, and enhanced customer service associated with delaying next-generation technology.

It is important to note that AMI implementation is expected to take approximately five years and therefore must begin at least six years before the expected end-of-life of existing AMR assets.

1.3 Current AMR System Challenges

The limitations of AMR are evident across business areas and underscore the need for modernization:

- **Meter Reading & Field Services** – delayed detection of MTU failures, reactive customer communication.
- **Billing Operations** – constrained integration, limited billing frequency, manual workflows impacting accuracy and efficiency.
- **Customer Service** – high manual inquiry volumes, limited self-service tools, and inflexible billing cadence.
- **Water Operations** – weak GIS integration, lack of real-time monitoring, high operational risk due to punctuated replacement
- **Supporting IT Systems** – fragmented data storage, minimal integration, reliance on manual estimation.

1.4 Lessons Learned from AMR Implementation

Toronto Water has identified several lessons from the 2015 implementation of AMR that will guide the strategic planning for AMI to ensure successful implementation and program sustainability:

Focus Area	Lesson from AMR	Application to AMI
Asset Management & Vendor Strategy	Reliance on proprietary assets locked the City into a closed system with a single vendor. Existing inventory strategies did not adequately anticipate supply-chain disruptions.	Prioritize open, modular systems that give flexibility to utilize technologies and assets from different vendors reducing supply-chain risk and increasing competition.
Future-Ready System	Scope centred on meter-reading efficiency, leaving limited flexibility for emerging smart-water functions.	Apply a future-focused lens by seeking expert advice on emerging municipal smart-water technologies and prioritize flexibility in system requirements to accommodate innovation and City's evolving needs.
Customer Experience	Digital-service demand has accelerated, outpacing current platform capabilities.	Design for online, user-friendly access to consumption data, alerts, billing options and outage management to meet modern service standards.
Data & Analytics	Repositories and models didn't fully enable cross-functional analytics/automation.	Leverage a meter data management repository to drive operational efficiency, engineering analysis, enhance customer service and support data-driven decision-making.
Deployment & Lifecycle	A single-wave rollout concentrated lifecycle replacements within a narrow timeframe. Created a challenge when faced with an unexpected event (e.g. MTU failure response).	Adopt a staggered installation schedule to distribute asset replacement, resource requirements, budget demands, and risk more evenly over the lifecycle of the entire system.

Focus Area	Lesson from AMR	Application to AMI
Real-Time Asset Performance Monitoring	Limited device diagnostics and delayed detection.	Specify two-way communications, real-time diagnostics and alerts to enable proactive maintenance and on-demand reads.

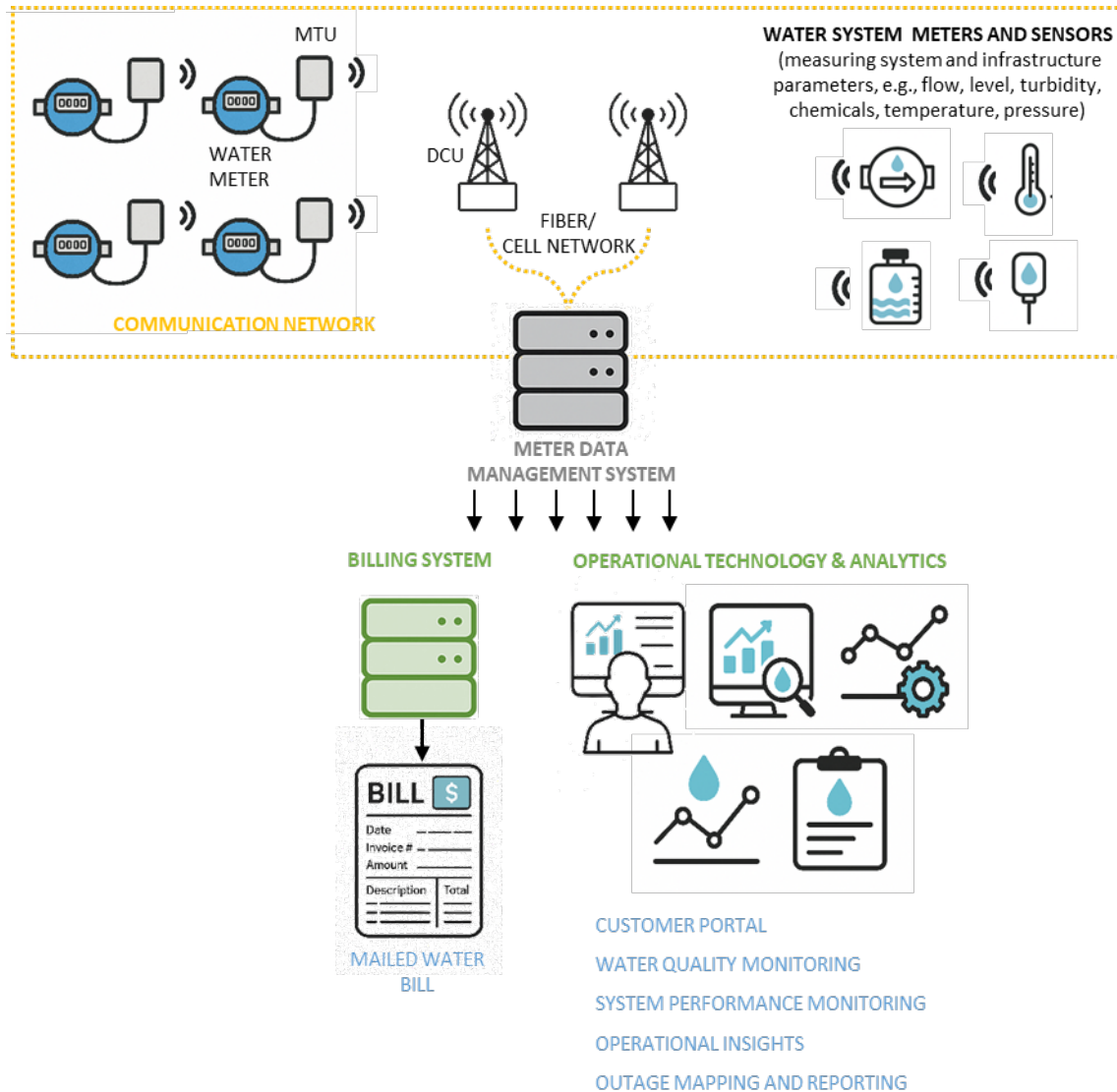
2. Transition to Advanced Metering Infrastructure (AMI)

AMI is a modern water metering system that enables two-way communication between the utility and the water meter. It includes smart meters, a communication network, and a data management platform that work together to automatically collect and transmit detailed water usage data and additional parameters such as temperature and pressure in near real-time. AMI improves billing accuracy, enables faster identification of leaks, and supports more efficient system planning and water management. Unlike the City's current AMR system, AMI gives both the City and customers timely access to actionable information. This includes management tools that enable water conservation and real-time outage and restoration information.

2.1 Toronto Water's Vision for Advanced Metering Infrastructure

Toronto Water envisions AMI as a transformative platform that leverages data, intelligent analytics, and integrated technologies to modernize water service delivery. It is envisioned that the future system will feature advanced smart meters, cloud-based data platforms, and robust communication networks. The City would have the information to support billing processes, optimize water maintenance and operations, and enhance customer service.

Figure 3: Toronto Water Vision for AMI



2.2 Key Benefits of Advanced Metering Infrastructure

AMI offers a broad range of operational, customer service, and strategic benefits that align with Toronto Water’s vision for AMI and its long-term strategic objectives. AMI enables:

- transition to new static meters for improved accuracy and lower ownership costs;
- collection of granular water consumption data, enhancing leak detection, demand forecasting, and supporting more responsive operational decision-making;
- two-way communication between the City and MTUs, facilitating remote diagnostics and proactive asset lifecycle management;
- enhanced analytics enabling more effective pressure zone management, anomaly detection, and reduction of non-revenue water and outage management;

- customer web portals and mobile applications that provide access to real-time usage data, high consumption alerts and outages. These tools improve transparency, reduce billing disputes, and enhance overall customer satisfaction;
- modern billing integration with enterprise systems such as customer information systems and financial platforms; and
- enablement of future smart city capabilities, including integration across water, wastewater, energy and conservation, and near real-time outage map and service restoration notification.

3. City's Existing Billing System

In 1999, Revenue Services Division implemented the Water Management and Collection System (WMACS) to bill water and solid waste charges. This system was developed in-house and has been in use since amalgamation. Ongoing upgrades have been required to respond to frequent legislative changes, and Revenue Services has prioritized uninterrupted billing to protect the City's cash flow. As noted in the Auditor General's report, *Audit of Water Billing and Collections – Phase II: Water Billing and Water Meter Management Controls Require Strengthening* (March 10, 2017), WMACS is due for replacement, and, at that time, management anticipated implementing a new utility billing system by 2018. Although that work has not yet been completed, both Toronto Water and Solid Waste Management Services are now prepared to move forward, as their programs increasingly depend on the capabilities offered by a modern, integrated billing system.

There are several limitations to the existing billing system, notably:

- **Maintenance Burden** – Legacy system requires constant patching, which ties up valuable IT resources. Revenue Services Division has dedicated Technology Services Division resources to maintain WMACS
- **Scalability Issues** – Older architectures struggle to handle increased data volumes or user loads.
- **Integration Limitations** – Poor compatibility with modern systems, APIs, or cloud platforms.
- **Knowledge Drain** – Original developers often have to be re-engaged, making the system hard to maintain or upgrade.
- **User Experience Gaps** – Interfaces are often outdated, leading to low user satisfaction and productivity.
- **High Cost of Ownership** – Ongoing support, manual workarounds, and performance issues drive up costs.
- **Innovation Roadblocks** – Slows down the adoption of new technologies or business models.
- **Limited Flexibility** – There is limited flexibility regarding billing for accounts that do not have a water meter but have solid waste services as the current system is predicated on customers having a water meter as the reading of the meter triggers billing. For these customers, manual steps are required to issue solid waste bills.

- **Limited Bill Customization** – Limited customization features make it challenging to explain specific line items/initiatives on the combined utility bill, which often leads to customer confusion.

As part of AMI planning, the City’s industry expert strongly recommends replacing the existing 26-year-old legacy rate-based budget billing system with a modern, integrated platform. This recommendation is consistent with earlier findings, including the 2014 Auditor General’s report. A modern billing system is critical to fully realizing the benefits of AMI by enabling digital service delivery, streamlining operations, and enhancing data integrity. *While the expert noted that sequencing could place a new rate-based billing system either before or after AMI implementation, continuing to rely on the legacy system exposes the City to operational and financial risk. The expert also cautioned against implementing both systems simultaneously, as this would introduce significant complexity and coordination challenges that could jeopardize success. Staff therefore recommend proceeding first with a new rate-based billing system for Toronto Water and Solid Waste Management Services.*

3.1 Benefits of a Modern Utility Billing System

Modern utility billing systems offer significant advancements over the City’s current WMACS platform, reflecting both technological innovation and the evolving operational and customer service expectations of municipal services.

Modernizing the City’s billing system for rate-based services would deliver benefits to both Toronto Water and Solid Waste Management Services and their customers.

Specific to water services, a modern billing system would provide:

- **Estimated reads and bill accuracy** – Integrated with AMI, a new billing system will enable advanced consumption estimation routines for accounts lacking complete reads (for accounts lacking complete reads (actual meter consumption data))
- **Advanced features and functionality** – variable billing cadence and payment method choices, bulk processing
- **Improved customer service** – Paired with AMI and customer portals, a modern billing system can provide more frequent usage data, helping customers spot and fix leaks sooner, self-service tools, and alerts to manage daily water use. It can also support faster resolution of billing questions and clearer bill information.
- **Enhanced security** – modernized technology products will strengthen resilience and reduce exposure to cyber risks.

Specific to solid waste services, a modern billing system would enable:

- **Flexible account management and billing** – A new billing system that allows for the flexibility with managing customer accounts and better handles the process of converting an account with a water meter to an account with no physical meter would simplify billing for SWMS by eliminating reliance on water meter readings for the issuing of bills, a significant constraint of the current system that requires manual workarounds for bills to be issued to customers without a physical water meter.

- **Improved customer clarity** – Improved bill customization for various customer groups will allow for more detailed explanations of specific line items/initiatives to reduce customer confusion.

Furthermore, Divisions such as Revenue Services and Technology Services Division could be freed from the burden of maintaining legacy code and infrastructure, allowing focus on strategic objectives and service delivery improvements.

4. Next Steps

Upon approval of this report, Toronto Water will initiate the following:

New Rate Billing System Planning (2025 - Q2 2026)

Toronto Water, in consultation with Revenue Services, Solid Waste Management Services, Finance, and Technology Services, will retain an industry expert to develop a detailed implementation and procurement strategy that may include: market testing, requirements gathering, options analysis, and the preparation of a recommendation for a new utility billing system. A governance framework will be established to ensure clear accountability and alignment of responsibilities. The expert will also develop a detailed implementation and procurement strategy in coordination with the AMI work. A report back to the Infrastructure and Environment Committee with a recommendation and implementation plan will occur by Q2 2026.

Advanced Metering Infrastructure Planning (2025 - Q1 2027)

Toronto Water, in consultation with the Chief Procurement Officer, will retain an industry expert to develop a detailed implementation and procurement strategy for the City's AMI system. This work may include: market sounding, documenting requirements and specifications from internal stakeholders in support of the procurement process, analysis of procurement staging and timeline options, evaluation of vendor submissions, and serving as contract administrator following award.

Toronto Water will collaborate with key City stakeholders, Revenue Services, Finance, and Technology Services, to ensure alignment of needs and responsibilities. A comprehensive Terms of Reference and detailed Request for Proposal will be prepared, with a report back to the Infrastructure and Environment Committee by Q1 2027.

Funding Requirements

Toronto Water, in consultation with the Chief Financial Officer and Treasurer, will refine funding requirements necessary to support implementation of the City's AMI and modern utility billing system. Required funds will be reported through the 2026 and future annual Budget Processes.

CONTACT

Kirill Cheiko, Manager, Customer Planning, Governance, and Reporting, Technology and Customer Experience, Toronto Water, 416-338-5556 , Kirill.Cheiko@toronto.ca

Sam Zurzolo, Director, Technology and Customer Experience, Toronto Water, 416-397-7336, Sam.Zurzolo2@toronto.ca

SIGNATURE

Lou Di Gironimo
General Manager, Toronto Water

ATTACHMENTS
