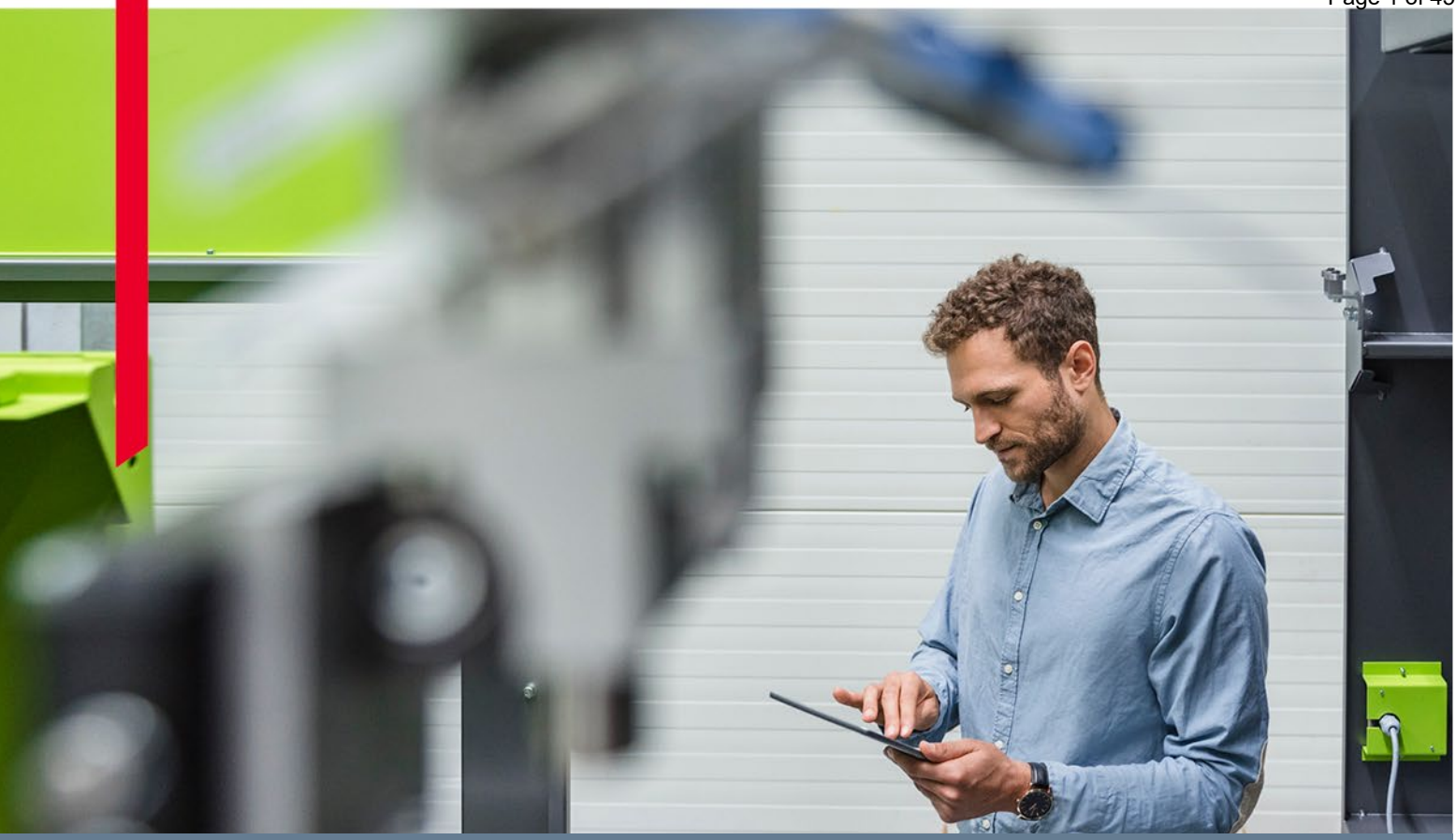

AUDIT OF HAMILTON WATER METER PROGRAM

CITY OF HAMILTON, OFFICE OF THE CITY AUDITOR

DECEMBER 16, 2022

FINAL REPORT

100 YEARS From one dream to a century of excellence

BDO

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EXECUTIVE SUMMARY

Introduction

Hamilton Water is responsible for the City of Hamilton's (the "City") Water Meter Program (the "Program") which includes the installation, testing, monitoring, repairing, and replacing of approximately 156,000 water meters. The main purpose of the Water Meter Program is to ensure the efficient, timely and accurate metering and billing for water that is used by the City's customers. Through the operation and monitoring of these meters, the program generates approximate $240 million in revenue each year.

Hamilton has two (2) contractors who are engaged in the delivery of the Program:

1. Alectra Utilities Corporation ("Alectra"), who provides meter reading, customer service, reporting and billing services on behalf of the City, through Corporate Finance; and
2. Neptune Technologies ("Neptune"), who provides meter operations services to the City, including but not limited to meter installation, meter repair, and meter maintenance, through Hamilton Water, Public Works Department.

Since 2019, there have been a number of significant events that have impacted the Water Meter Program's effectiveness, including at least five major billing adjustments totaling approximately $2 million since June 2021.

Audit Objective and Scope

The objective of this audit was to identify strengths and weaknesses of the City's Water Meter Program. This included a review of various aspects of the Program and assessing them against existing policies and procedures. In addition, a review of the Program against industry best practices was conducted to identify strengths, gaps, and opportunities for improvement regarding program delivery as well as existing policies and operational procedures. An assessment of the efficiency and effectiveness of program areas, as well as the identification of areas for improvement was also conducted.

The scope of the audit included reviewing the various aspects of the Water Meter Program and comparing them against existing corporate and departmental policies and procedures, as well as against industry best practices to identify strengths and potential gaps that may not currently be addressed in existing policies and procedures. The following Program areas were considered during the conduct of the audit:

- Effectiveness of recent corrective actions taken to address 2021-22 large billing issues;
- Applicable operational processes and procedures to verify completeness and gaps;
- Data transfer processes between the City, Alectra and Neptune;

- Work order creation, management and resolution including the transfer of work between Neptune, the City and Alectra;
- Management of consecutively estimated accounts;
- Management of account setup, transfer, and closure;
- Effectiveness of asset management of water meters, preventative/reactive maintenance, and asset renewal;
- Contractor management including inspections by City staff;
- Contractor invoicing;
- Review of program metrics and key performance indicators;
- Handling of soft and hard customer refusals;
- Handling of private plumbing issues affecting meter maintenance activities;
- Management of vacant properties;
- Management of flat rate accounts;
- Process for Large Valve Maintenance (broken valves on private property);
- Billing inquires/complaints process;
- Management of Master/Satellite meters (sub-metering);
- Top 100 Reporting process and procedure; and
- Comparison of meter programs from three (3) comparator municipalities to identify best/comparative practices.

The scope of the audit did not include policies, procedures or processes developed internally by City of Hamilton Water Meter Program vendors for the purposes of managing and overseeing their contractually obligated responsibilities under their respective City of Hamilton Water Meter Program agreements.

Audit Conclusion

The City of Hamilton's Water Meter Program is undergoing a period of rapid transformation, both in response to the 2021-22 large billing issues and the fact that their billing agent, Alectra, has notified the City that they are discontinuing their water billing services. Although these issues have brought on a wide array of challenges, they have also presented new opportunities to increase the operational effectiveness and efficiency of the Program as a service provider to the residents of the City of Hamilton.

The audit has identified opportunities for improvement for Hamilton's Water Meter Program. Although the Program has documented a strong operational procedure framework that clearly defines roles and responsibilities, the audit identified gaps in the policy framework that should be aligned to current procedures and practices. Further, the Program has begun to use data to support the management and oversight of operations through the development of key program metrics. However, program

reporting and key program metrics lack contextualization against established targets, baselines, outcomes, timelines, as well as lack clear methods for collection, reporting, and related accountabilities.

A noted strength of the Program includes the implementation of a proactive maintenance program, which is on target to achieve the expected number of completed annual proactive maintenance work orders for 2022 and the execution of two pilot projects to test new meter technology with a view to modernizing the Program, further aligning with industry best practices.

The audit observed ineffective, and in some cases, insufficient contract management mechanisms with regards to the City's billing agent, as evidenced by the absence of a contractor performance management framework, a sufficient governance structure, and a dedicated contract manager. It was also found that there is little to no contract mechanisms in place to identify, manage, and rectify poor vendor performance.

The Program has experienced high levels of staff turnover, both at the supervisory and frontline levels. This, combined with inefficient manual data transfer and reporting processes, has created a processing backlog of key operational reporting. This backlog increases the risk of inaccurate bills being sent to customers which in-turn could increase the risk of customer complaints and reputational damage to the City of Hamilton's Water Meter Program.

Lastly, in response to the identified 2021-2022 large billing issues, a root-cause analysis was performed by Hamilton Water that identified and implemented corrective and preventative actions to address the root causes. Overall, the actions implemented by the City support the correction of issues that contributed to the billing variances and the prevention of future issues; however, it should be noted that for some corrective and preventative actions, the audit was unable to fully assess effectiveness in preventing future billing issues due to the recentness of their implementation and lack of measurable results as of the period of the audit. As such, these actions should be reviewed by the City in the future to ensure that they are in fact effective in addressing root causes. Moreover, gaps were noted in the root-cause analysis which indicates that the corrective and preventative actions identified by Hamilton Water are incomplete and therefore not fully effective in eliminating the risk of future large billing issues. One such example includes the fact that there are some water meters being estimated at zero consumption which may mean that these meters are being improperly billed for their actual consumption. As such, the City should take action to ensure these accounts are being appropriately billed.

Recommendations and Management Responses

The following recommendations have been made to address the areas for improvement noted above:

Recommendation	Priority
Recommendation 1: The City should perform a job evaluation review of the key administrative, supervisory, and	**High**

superintendent roles within the Program to validate the appropriateness of competency requirements, job descriptions and compensation level within the organization structure of the program.	
Recommendation 2: The City should review its program policy and procedures framework to address identified gaps, as well as identify opportunities to strengthen the framework and enhance authorities to better meet the needs of the City and support appropriate enforcement action.	**Medium**
Recommendation 3: The City should develop and implement their program performance management regime by ensuring that each key metric has documented baselines, targets, timeframes for measurement and an outline of how/when the metric would be measured, including the applicable data source and accountabilities.	**Medium**
Recommendation 4: The City should ensure that all vendor contracts establish performance management frameworks, including minimum standards, KPIs and performance reporting; and have sufficient contract mechanisms, including corrective actions clauses where performance does not meet minimum standards, to oversee vendor performance. This includes establishing a dedicated and experienced contract manager tasked with the responsibility of managing and overseeing contract and vendor performance.	**High**
Recommendation 5: The City should implement a regular operational meeting attended by all relevant program stakeholders to ensure consistency and alignment of information and progress to support program oversight and delivery.	**Medium**
Recommendation 6: The City should develop a Program KPI to track City inspections of Contractor (Neptune) activities.	**Medium**
Recommendation 7: The City should develop a report of all intermediate and large meter assets that are currently being estimated at zero consumption to identify, prioritize, and investigate any accounts that are at risk of being improperly billed.	**High**
Recommendation 8: The City should perform follow-up assessments of the effectiveness of implemented corrective and preventative actions on at least an annual basis to ensure they are effectively addressing identified root causes of 2021-22 large billing issues.	**Medium**

Recommendation 9: Where possible, the City should examine opportunities to automate the processing and transfer of key data and information from program reporting into the City's asset management system, which is currently being manually performed by WOCs. Further, the implementation of formalized data validation tools would support accuracy of data and reporting. Opportunities to automate the processing, transfer, and validation of Water Meter Program data into the City's asset management system should be evaluated as a part of requirements for the procurement of a new billing solution/service provider.	**High**

1 BACKGROUND

General

Hamilton Water is responsible for the City of Hamilton's (the "City) Water Meter Program (the "Program"), which includes the installation, testing, monitoring, repairing, and replacing of approximately 156,000 revenue water meters. The main purpose of the Water Meter Program is to ensure the efficient, timely and accurate metering and billing for water that is used by the City's customers. Through the operation and monitoring of these meters, the Program generates approximate $240 million in revenue each year.

The City has two (2) contractors who are engaged in the delivery of the Program:

- Alectra Utilities Corporation ("Alectra"), who provides meter reading, customer service, reporting and billing services on behalf of the City, through Corporate Finance; and
- Neptune Technologies ("Neptune"), who provides meter operations services to the City, including but not limited meter installation, meter repair, and preventative meter maintenance, through Hamilton Water, Public Works Department

The main purpose of the Water Meter Program is to ensure the efficient, timely and accurate metering and billing for water that is used by the City's customers. There are many factors that can interfere with this process such as faulty/damaged meters, vandalism or tampering, property or meter access issues, and incorrect or untimely data transfer between the City and it is contractors. These issues can lead to accounts being estimated based on historical usage for long periods of time, resulting in significant over or under billing.

Over the years, there have been a number of processes developed to help identify potential issues as well as deal with them in a timely and consistent manner, ranging from official City policies to documented standard operating procedures.

Discontinuation of Water Billing Services by Alectra

On August 6, 2021, the City was advised at their May 21, 2021, board meeting that Alectra's Board of Directors approved an Alectra staff recommendation to discontinue water billing services. Alectra has committed to upholding the Water Billing Services Agreement (Service Agreement) that is currently in place with a focus on winding-down providing water billing services to the City at the time of the current contract expiry, being December 31, 2024.

Alectra has advised it will support the City to facilitate a smooth transition to a new billing supplier by:

- Providing support through established joint working teams to assist with the transition of services and related municipal data to a new billing provider; and

- Working closely with the City on joint communications, through multiple communication channels, to help water billing customers manage the related change with the transition to a new billing provider.

The City is currently working with other municipalities also affected by Alectra's discontinuation of water billing services and has engaged external consulting support to gather business requirements and assess future-state water billing service options.

2021-22 Large Billing Issues

Since 2019, there have been a number of significant events that have impacted the Program's effectiveness. Of note, these include several changes and turnover of key management and supervisory positions within Hamilton Water. In addition, it was identified that individuals who were Acting in supervisory/management roles were not provided with adequate process documentation to inform them of their roles.

During this same period, Alectra switched their billing management system from Daffron to Oracle Utilities Customer Care and Billing (CC&B), resulting in reporting changes and delays in sending/receiving data to and from Hamilton Water, as well as data accuracy. Following this, in 2020 the COVID-19 pandemic struck, severely limiting the City's ability to complete required field work for the Program (e.g. entering properties/sites to access water meters for maintenance).

The culmination of these events has resulted in at least five (5) major billing adjustments of over $100,000 each, for a total of just under $2 million in billing adjustments made since June 2021.

In response to these large billing adjustments, Hamilton Water conducted a root-cause analysis that identified the following findings:

1. The historical Consecutive Estimate (CE) reporting data process used prior to 2019 from Infor Public Sector (IPS) Hansen, the City of Hamilton's asset management system, stopped in 2019 because of data transfer issues when Alectra moved from Daffron to Oracle Utilities Customer Care and Billing (CC&B). As a result, there was no quality assurance (QA) / quality control (QC) in place to catch errors in the Alectra Utilities Corporation (AUC) Daily Report Processing.
2. High turnover of supervisors and lack of critical processes documentation provided to the supervisors who were an acting capacity.
3. When data transfer issues were identified with Alectra, there was no resolution implemented in a timely manner (data transfer issues were present from 2019 to June 2022).
4. The CE procedure was updated to use AUC Daily Report for CE review, there was a gap in controls to identify errors in the AUC Daily Report for report processing.
5. The AUC Daily Report included identification of CE service orders; however, this identification was stopped in December 2020 by Alectra.

It was noted that a vendor non-conformance (NC) for Neptune was completed and sent to City of Hamilton procurement on March 22, 2022. The NC was for 165 Barton St East

(Barton St Jail) and 50 Charlton Ave East (St Joes Hospital). The vendor failed to program the meter correctly, failed to network the register heads and touch pads correctly, failed to provide the production report within 7 days of service, failed to provide the City with a reading to ensure successful operations, and failed to provide details regarding multiplication factors on the production report. Further, Hamilton Water issued a Self-Declared non-conformance on March 7, 2022.

Overall, this has raised concerns regarding the current effectiveness of the City's Water Meter Program. While both the City, and its contractor (Alectra), have conducted their own analysis and identified preventative and corrective actions, the City believed an independent audit of the City's Water Meter Program was necessary.

2 AUDIT OBJECTIVE AND SCOPE

Audit Objective

The objective of this audit was to identify strengths and weaknesses of the City's Water Meter Program. This included a review of various aspects of the program and assessing them against existing policies and procedures. In addition, a review of the program against industry best practices was conducted to identify strengths, gaps, and opportunities for improvement regarding existing policies and operational procedures. An assessment of the efficiency and effectiveness of program areas, as well as identification of areas for improvement was also be conducted.

Audit Scope

The scope of the audit included reviewing the various aspects of the Water Meter Program and comparing them against existing corporate and departmental policies and procedures, as well as against industry best practices to identify strengths and potential gaps that may not currently be addressed in existing policies and procedures. The following Program areas were considered during the conduct of the audit:

- Effectiveness of recent corrective actions taken to address 2021-22 large billing issues;
- Applicable operational processes and procedures to verify completeness and gaps;
- Data transfer processes between the City, Alectra and the City's Contractor;
- Work order creation, management and resolution including the transfer of work between Neptune, the City and Alectra;
- Management of consecutively estimated accounts;
- Management of account setup, transfer, and closure;
- Effectiveness of asset management of water meters, preventative/reactive maintenance, and asset renewal;
- Contractor management including inspections by City staff;

- Contractor invoicing;
- Review of program metrics and key performance indicators;
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- Management of vacant properties;
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- Top 100 Reporting process and procedure; and
- Comparison of meter programs from three (3) comparator municipalities to identify best/comparative practices.

The scope of the audit did not include policies, procedures or processes developed internally by City of Hamilton Water Meter Program vendors for the purposes of managing and overseeing their contractually obligated responsibilities under their respective City of Hamilton Water Meter Program agreements.

Please refer to Appendix B for alignment between the audit scope areas and coverage as part of the audit criterion.

Approach and Methodology

The audit was planned and performed to obtain reasonable assurance that the audit objective was achieved. During the conduct phase, BDO systematically administered the audit program, which included a combination of interviews, documentation review, file testing, and benchmarking. The structure of these activities was tailored to directly inform and conclude on each audit control objective as well as their associated audit criteria. This comprised the following:

- Reviewing key documentation;
- Conducting interviews with key stakeholders;
- Conducting benchmarking / comparative practices assessment (see Appendix A for the results of this assessment);
- Conducting a site visit office to meet with program management, operational supervisors, and frontline roles. This visit included:
    - A walkthrough of the Water Operations Clerk (WOC) daily responsibilities and a systematic review of the program’s asset management system.
    - The observation of field activities with Meter Technicians/Investigators (MTIs), which included the execution of three different work order types.

3 OBSERVATIONS

This section presents the findings from the audit, which are based on evidence and analysis identified through the audit procedures performed in accordance with the audit program and work plan.

Please refer to Appendix B for the Audit Control Assessment Scale and Appendix C for the results of the Audit Control Assessment.

Finding 1: Resource Management

Staff turnover and vacancies within the Program have strained program operations.

There has been a significant amount of turnover in manager, supervisor and frontline employee roles within the Program. There are two (2) main supervisor positions as part of the Program, including the Supervisor of Dispatch and Operations Support, and the Supervisor of Meter Operations and Cross Connection Control. These supervisor positions primarily provide oversight, support, and coordination of the three (3) key Program frontline positions, including the Scheduler/Dispatchers, the WOCs and the MTIs. Scheduler/Dispatchers and WOCs report into the Supervisor of Dispatch and Operations Support, while MTIs report into the Supervisor of Meter Operations and Cross Connection Control.

In addition, both supervisors are responsible for the overall oversight and management of their respective Program areas. As a part of this, supervisors are responsible for attending and providing operational status updates at the Program's weekly and monthly Meter Operations Update Meetings.

While the Supervisor of Meter Operations and Cross Connection Control position has remained consistent, the Supervisor of Dispatch and Operations Support has experienced a significant level of instability with three (3) Acting Supervisors having been in the position between late 2019 until February 2022. Moreover, the Manager of Customer Service and Community Outreach (CS&CO) position has seen five (5) different individuals in the role since 2019. This issue was manifested during Hamilton Water's recent billing issues and self-declared non-conformance, the root-cause analysis of which identified that high turnover of supervisors and lack of critical processes documentation provided to the Supervisors who were in an Acting capacity was a contributing factor.

There are two (2) full-time and two (2) part-time Scheduler/Dispatcher positions within the Program. Up until September 2022, all positions were filled, but there has since been turnover in one of the part-time positions resulting in a vacancy. There are two (2) full-time and one (1) part-time WOC positions within the Program. The part-time position has not been filled for a significant period of time and has historically seen a lot of turnover. Most recently, one of the existing fulltime WOCs has left their position, leaving only one (1) WOC within the Program. There are currently only two (2) MTIs employed by the City, although there are three (3) full-time positions available in the Program.

Staff retention is an issue that many organizations face today and Hamilton Water is no exception. The CS&CO Sectional Annual Report 2021 stated that *"for the duration of 2021, there was on average one out of five position vacant, in other words there were four people doing the work of five people throughout the year"*. The culmination of these staff challenges has resulted in various areas of the Program struggling to manage their workload.

Perhaps the most pertinent example of this is the role of the WOC. WOCs are responsible for processing daily Neptune and Alectra reports, tasking and closing out work orders to MTIs and Neptune, sending letters to customers and generally managing the process flow of program data and information. Over the years, the number of customer accounts has grown and with that, so have the responsibilities of WOCs. Given the critical nature of the WOC role in relation to the success of the Program, as well as the turnover in this role, concerns have been raised by program management as to whether the current role is appropriately aligned to the related duties and responsibilities within the Program. In part, this is because WOCs need to have an in-depth knowledge of program operations (i.e., understand how different meters and their components work, understand the work orders notes from MTIs, etc.) to be successful in their role. The role of the WOC is less clerical and data entry driven, and much more program coordination and operational analysis.

Program management should take steps to address the retention challenges that the Program currently faces. This should include reviewing key program roles to ensure that job descriptions and compensation levels match the actual responsibilities they are required to execute.

RECOMMENDATION 1:

The City should perform a job evaluation review of the key administrative, supervisory, and superintendent roles within the Program to validate the appropriateness of competency requirements, job descriptions and compensation level within the organization structure of the program.

Priority: High

Finding 2: Procedure and Policy Framework

The Water Meter Program has a strong procedure framework which clearly defines program roles and responsibilities to City staff. However, some policy and procedure gaps were identified.

The Program's procedure framework guides all program activities. There are over 40 procedures in place and stored in the main document control database for the Program, Intelex. Intelex acts as a document quality management system, allowing for the controlled access of pertinent program documents, including program procedures. When a new document is added to the system, the Quality Assurance (QA) Analyst for CS&CO ensures that management reviews it for approval. Once approved, it is then made accessible for program staff and obsolete documents are removed.

The *Control of Documents* procedure details the process to manage the issuance, change, and approval of documents, ensuring that only relevant and approved documents are used by the Hamilton Water Division. It also ensures that staff can locate and access internal and external controlled documents relevant to their work, in the format most suitable to their work. Key features of this procedure include a requirement for a unique title and/or document number for all documents, guidance on document management practices for controlled documents, as well as minimum time intervals for document updates. Procedures are reviewed at a minimum of every three (3) years and Intelex will automatically flag documents when they are due for review.

All program staff are required to review procedures through the City's Learning Management System, which includes the completion of related assessments to test their knowledge and comprehension. The QA Analyst for CS&CO tracks training and awareness progress of CS&CO staff, and ensures they review new or updated procedures as required.

Few gaps were noted in the Program's procedure framework, where nearly every task and activity within the Program is documented through an associated procedure. Each procedure defines the associated roles and responsibilities of program staff, which provides a clear reference for all program areas and positions regarding required activities. However, worth noting is that the Program's comprehensive procedure framework results in a large volume of Program documentation for staff, making it difficult to distinguish between critical and non-critical tasks.

Further, in response to high turnover in some supervisory roles within the Program and a high volume of documented Program procedures, a *Meter Operations Critical Tasks* procedure was created in April 2022 to identify critical tasks related to meter operations and to ensure that there is frequent oversight of these critical tasks. The content of this procedure differs from most, as it does not outline instructions or workflows to complete Program activities. Instead, it acts as a reference document and provides an overview of critical tasks, as well as related procedures and assigned responsibilities for supervisory roles within the Program. This includes the two (2) supervisor positions, Superintendent of Service Coordination, Project Manager of Service Coordination, Manager of CS&CO and QA Analyst of CS&CO. Annually, the staff listed above are expected to meet and review the list of critical tasks to ensure that they remain relevant, as well as the frequency of the task to be completed and related output. Given that there is such a large volume of procedures within the Program, this streamlined approach is an effective way to ensure that the highest-risk areas are being appropriately prioritized for management oversight. In addition, if turnover continues in the supervisory roles of the Program, this procedure acts as an effective tool to introduce incoming supervisors to critical Program tasks.

The audit assessed the design effectiveness of the *Meter Operations Critical Tasks* procedure, whereby the six (6) tasks and accompanying procedures were confirmed to be those considered critical for those in supervisory roles to understand and execute. Although the audit did not test the operating effectiveness of the *Meter Operations Critical Tasks* procedure (which was not feasible due to the nature of the procedure as a reference document), the audit did review each of the identified procedures for critical Program tasks. This included testing the effectiveness of the *Water Meter 38mm Above,*

Processing ICI Meter Issue Letters, and *Large Meter 5 Year Program* procedures. This testing found that the procedures identified in the *Meter Operations Critical Tasks* procedure are designed and operating effectively.

Overall, this program procedure framework is expansive and effectively covers most areas of the Program; however, the following points are identified as inconsistencies between these established procedures and related City policies as well as some policy and procedure gaps that have been identified.

Master/Satellite Meter Maintenance

From a procedure standpoint, one gap that was identified relates to Master/Satellite meter maintenance. Since work associated with these meters tends to be more complex, the Program has opted to conduct maintenance on Master/Satellite meters "in-house", although this has not been formally documented. It may be beneficial to formally document this approach in a program procedure, including instructions on how to calculate new meter reads once a satellite meter is installed to ensure that maintenance is effectively carried out.

Water and Wastewater Consecutive Estimated Accounts Policy

From a policy perspective, a noted gap relates to the *Water and Wastewater Consecutive Estimated Accounts Policy,* which details the protocol followed by Hamilton Water and Alectra in rendering estimated accounts where actual water consumption cannot be confirmed due to City's inability to obtain access to a water meter or water metering equipment, for the purpose of meter reading, installation, inspection, maintenance, or repair of utility property. This policy clearly outlines the protocol for both single residential and multi-residential/Industrial, Commercial and Institutional (ICI) properties for each consecutive month of estimates.

For single residential properties, the policy states that Alectra creates work orders after the second consecutive estimate, which triggers the process to investigate, triage and/or fix the issue that is causing the meter to be consecutively estimated. If the property is still being estimated after four (4) consecutive months, the policy states that Alectra is to issue a letter acknowledging their right to put them on double historical consumption billing.

After six (6) months of consecutive meter estimation, Hamilton Water issues a letter notifying the customer that they are being put on triple historical consumption billing and at the twelve-month mark and thereafter, Hamilton Water can shut off water in certain circumstances. For multi-residential/ICI properties, the process is the same except that after twelve months, Hamilton Water is not allowed to turn off water.

Notwithstanding the documented escalation process described above, and as per the *Processing Consecutive Estimates* procedure and the *Escalated Billing Procedure* implemented by Hamilton Water, the Program has adopted an approach of creating consecutive estimate work orders after three (3) months, not two (2) months as detailed in the *Water and Wastewater Consecutive Estimated Accounts Policy.* Although this is a relatively minor misalignment, Program procedures should be aligned with City policies

to avoid any confusion among staff and to ensure that the quality of services provided by the City of Hamilton is maintained.

Processing ICI Meter Issue Letters Procedure

A more significant gap noted regarding the alignment of policies and procedures concerns the *Processing ICI Meter Issue Letters* procedure. This procedure describes the required steps for notification, distribution and follow up for ICI property owners that are required to make repairs at their own expense before the City can repair or replace their water meter. The procedure outlines that Hamilton Water will send out two letters to the customer, each 30 days apart. 30 days after the second letter is sent, the customer will be moved to double historical billing consumption.

Although compliance testing against this procedure found that the Program was following the procedure as designed in all cases reviewed, it was noted that there is no policy instrument that provides Hamilton Water with the authority to move ICI customer accounts to double historical consumptions (such as in the case of Consecutive Estimates under the *Water and Wastewater Consecutive Estimated Accounts Policy)* when customers do not address their private plumbing issues in a timely manner.

In these cases, City Finance is required to reimburse customers put on multiple historical billing consumption after their repairs have been made. It is also worth noting that in the cases reviewed, only 22% of instances where customers were put on multiple historical billing consumption resulted in customers addressing their private plumbing issues, which suggests that the procedure itself may not being working as intended.

Aside from the potential ineffectiveness of the procedure as designed, the implication of not having the authority to move customers onto double historical consumption is that it creates inefficient billing processes and increases the risk of reputational damage in the event that customers question the City of Hamilton's authority in these situations.

Based on the best practices assessment, it was found that some comparative municipalities have opted to transfer similar cases to municipal by-law officers who can issue fines to property owners for not completing the required repair work requested by the municipality in accordance with the authority granted in their by-laws. This type of enforcement option should be considered by the City of Hamilton, especially as the City is currently in the process of reviewing its own *Waterworks By-Law.*

Lastly, it should be noted that the majority of Program policies and procedures contain language and direction that is specific to the current Program operating context (i.e., Alectra as City's billing service provider). However, upon the expiry of the current service agreement with Alectra in 2024, policies and procedures will need to be updated to reflect the operational realities of the new Program billing solution/service provider.

RECOMMENDATION 2:

They City should review its program policy and procedures framework to address identified gaps, as well as identify opportunities to strengthen the framework and

enhance authorities to better meet the needs of the City and support appropriate enforcement action.

Priority: Medium

Finding 3: Program Reporting and Metrics

Hamilton Water has begun to adopt a data driven approach to program management and oversight; however, data insights and key program performance metrics require enhancement.

The main governance mechanism within the Water Meter Program is the internal weekly and monthly Meter Operations Update Meetings, which are attended by representatives of all pertinent functions of the CS&CO group, including the Manager of CS&CO and the Superintendent of Service Coordination. Both weekly and monthly Meter Operations Update Meetings are guided by the contents of the current week's Meter Operations Update Report. This report outlines various meter operations metrics, key action items, meter operations commitments, and major initiative updates.

Meter operations metrics have been developed pursuant of improvements in accuracy, effectiveness, and efficiency of Program operations. This is aligned with the Program's purpose of ensuring the efficient, timely, and accurate metering and billing for water that is used by the City's customers.

For each meter operations metric, related information is presented through a visual aid. Meter operations metrics are created by manually exporting data and information from a variety of Program reports and IPS Hansen into Excel, where visual aids are manually created and updated as required. Metrics presented as a part of Meter Operations Update Report include production report backlog, consecutive estimates, Alectra daily report backlog, no problem found work orders, status of Top 100 consumption accounts, unactioned Alectra work orders, properties on two times consumption and aging work orders. As of September 14, 2022, the Program is reviewing additional metrics to include to this reporting, such as vacant properties, volume of emails in the meter operations inbox and curb stops.

It was noted that the metrics included as a part of this reporting have evolved significantly during 2022, in an effort to effectively track and report the most critical metrics to Program operations. As a part of this, a number of metrics have been refined, including categorization of Large Meter Valve Replacement Program progress, aging work orders and the consecutive estimate metrics. The adoption of a continuous improvement approach to program metrics by management is a program management strength that should be upheld. It is also noted that, compared to other municipalities that were engaged as part of the best practices assessment (please refer to Appendix A), Hamilton's Water Meter Program use of program data and metrics appears to be above the industry standard.

Notwithstanding, there are opportunities to further enhance the use of program data and metric design. It was noted that there are no established targets, baselines, or desired outcomes for any of the meter operations metrics currently tracked and reported. For

example, while tracking the number of properties on double historical consumption is important, it is unclear what the Program's risk tolerance is for this metric (i.e., the point at which the number of properties on double historical consumption is so high that the potential impacts are beyond what the Program is willing to risk and therefore mitigating action is required by management).

Without clearly defined and documented targets, baselines, and desired outcomes, it is unclear whether the Program is achieving its goals. By addressing this gap, management will be able to enable more effective decision making and take a more proactive approach to mitigating Program risks.

RECOMMENDATION 3:

The City should develop and implement their program performance management regime by ensuring that each key metric has documented baselines, targets, timeframes for measurement and an outline of how/when the metric would be measured, including the applicable data source and accountabilities.

Priority: Medium

Finding 4: Proactive Maintenance

The City has an effective proactive maintenance program in place for large meters, as well as pilot projects to test new meter technology (e.g., Mach 10 and Cellular Meter Interface Unit) to evolve the program and align with industry best practices.

Large meters present the highest risk of creating large billing discrepancies as they have the highest rates of consumption. The Hamilton Water Meter Program is currently undertaking two large meter proactive maintenance (PM) initiatives:

- The *Large Meter 5 Year Program*, which includes the annual testing and maintenance of large meters to ensure that every large meter within the Program's jurisdiction is scheduled for testing and maintenance within a five-year cycle.
- The *2022 Large Meter Inspection Project*, which was created in response to the Barton Street billing issues with the objective to review all large meters to ensure accuracy of meter programming and networking to identify accounts currently being billed incorrectly.

Given that large meter PM is conducted on a five-year cycle and there are 640 large meters in Hamilton, it is expected that 128 large meters (20% of all large meters) are tested/inspected per year. As of June 30, 2022, the Program appears to be on track to reach their 2022 targets as they have completed 60 work orders out of 128 expected for the year, demonstrating a completion rate of 47% for the first six months of 2022. It should be noted, however, that this data combines work order completion rates for the *Large Meter 5 Year Program* and the *2022 Large Meter Inspection Project*. This is because the *2022 Large Meter Inspection Project* is a top priority of the Program to ensure there are no additional large billing issues and the meters being inspected under

this program are mutually exclusive from those tested under the *Large Meter 5 Year Program*.

Based on the comparative practices assessment, the City of Hamilton's large meter PM initiatives exceeds industry best practice. Comparator municipalities generally did not have an implemented large meter PM program and do not proactively test their meters, but rather they have meter replacement cycles and conduct testing as new meters are installed. Further, Hamilton's Water Meter Program proactively tracks progress against their large meter PM program as part of weekly and monthly status updates through the "Physical Inspections" metric, which is a strong management oversight practice.

In addition to the large meter PM programs outlined above, Hamilton's Water Meter Program is also currently running two pilot programs for new meter technology, namely the *Mach 10 Project* and the *Cellular Meter Interface Unit (CMIU) Project*.

Hamilton's current compound meters have two register heads, which require more complicated programming to read correctly, and two Meter Interface Units (MIU) to be read with an Advanced Metering Infrastructure (AMI) system. Due to the complexities associated with these compound meters, there have been many problems with meter reading and billing customers with compound meters (exampled by the Barton Street billing issue).

Solid State meters, such as Ultrasonic Flow meters, do not have any moving parts and therefore the accuracy does not degrade over time and have guaranteed accuracy for 10 years. This means they will have much lower maintenance and repair costs, and a longer life span. The Neptune Mach 10 have a much greater flow range than a turbine meter and can accurately read both high and low flow rates, meaning they can replace both turbine and compound meters.

Additionally, since one Ultrasonic meter utilizes one register head instead of two, the programming and reading issues that compound meters experience could be solved with the replacement. Hamilton Water is currently installing 14 of these meters within the City as part of the Mach 10 Pilot Project, which will be monitored for a one-year period to determine if this is the correct path forward. As of September 14, 2022, 10 Mach 10 meters have been installed (71%). The CMIU Pilot Project is also being undertaken to enable cellular reading devices for meters where live reads are sent directly to the Neptune 360 asset management system without the need for a physical read from the meter pad.

Some comparable municipalities consulted as part of the audit had already implemented similar technology as part of their respective water meter programs, while one was still in the process of piloting this technology. As such, Hamilton's Water Meter Program is not exceeding industry best practices with regards to modernization and digitization, but they are aligned and should continue to work towards implementing modern meter technology.

Finding 5: Work Order Management

The Water Meter Program has established processes and procedures to manage work orders (i.e., creation, execution, and verification of work) to facilitate the

completion of program operations. Although there are some opportunities for improvement, work order management is operating effectively.

Hamilton's Water Meter Program uses work orders to manage all program operations/activities, including proactive and corrective meter maintenance, meter changeouts, customer service requests, pad relocations and replacements, meters investigations, inspections of contractor work, etc. There are several documented procedures that detail the processes for managing different work order types and there is a work order management system in place called IPS/Hansen with access management controls based on program roles and responsibilities.

The *Water 38mm Above Procedure* outlines the process whereby intermediate and large meter work orders are created, executed, and closed out. Alectra is responsible for generating work orders to the City when they cannot obtain a read from a given meter or if they observe an issue with a meter. The City's MTIs will then investigate the meter based on the information contained in the work order. MTIs will fix the issue during the investigation, if possible, otherwise they will assign the work order to Neptune who will address the issue and close-out the work order. When Neptune completes the work order, MTIs will then inspect their work to ensure it is done properly.

The audit assessed compliance against the *Water 38mm Above Procedure*, as it is the primary procedure that guides work order management of the highest risk assets (i.e., most consumption and highest revenue-generating), including those that were the root of the identified billing issues. In assessing this, it is worthy to note that Hamilton Water does not conduct inspections of Neptune's work on meters smaller than 38mm so this assessment tested to ensure that City inspections were being appropriately executed on meters larger than 38mm as per the procedure.

The results of this assessment demonstrated that in all cases where the audit team expected to see an MTI investigation work order, a Neptune work order, and an MTI inspection work order, the work orders had all been appropriately initiated, executed, and closed out. Some exceptions were noted; however, reasonable justification was provided. For example, cases where no problem was found during investigation, cases where small repairs were conducted by the MTI during the initial investigation that did not require further work by Neptune, and cases where the Neptune work order had been created but not yet executed due to reasonable work order prioritization.

Notwithstanding the results above, interviews suggested that notes/comments left in work orders by MTIs and contractors were not consistently recorded and they often created challenges for WOCs to understand the context of the work order. Program management is aware of this issue and new procedures are being developed to address this.

Finding 6: Contract Management

There is no established contractor performance management framework and limited contractual mechanisms for managing and overseeing the performance of the City's outsourced billing agent.

The Program has two (2) primary contracts in place:

1) Contract between the City and Neptune for the supply, delivery, installation, and maintenance of new and existing water meters, managed by CS&CO, Hamilton Water, Public Works; and
2) Contract and renewal agreement between the City and Alectra (formerly Horizon Utilities) for the staffing, administration, operation, and maintenance of the meter reading and billing services and service expenses, managed through Corporate Finance.

The audit team reviewed the contract and agreements to become familiar with the obligations of all parties including the City, Neptune, Alectra, and related subcontractors. However, the audit team is not trained or licensed in the law profession. Therefore, the review of the Program contracts and agreements was limited to identifying areas of potential non-compliance by any of the named parties, where there may be conflicts, or contract language where interpretations may be nebulous or no longer relevant. The objective was to highlight and recommend areas of the contracts for future legal expert review and identify sections which might be revised for better clarity in future contracts and best serve the City.

Billing Services Contract

The City has a suite of policies, procedures and processes in place related to billing and the management of customer accounts (e.g., *City of Hamilton Water and Wastewater/Storm Arrears Policy; Water and Wastewater / Storm Back-billing Policy; Escalated Billing Procedure; Processing ICI Meter Issue Letters; Water Operations Clerks – Water Billing Inquiries; New Meter Installation and Account Set Up Flowchart*; etc.). Alectra is responsible for performing billing services on behalf of the City as detailed in their renewal agreement, effective January 1, 2020 (Original contract was effective January 1, 2015 and expired December 31, 2019). As part of these services, Alectra is required to follow some of the City's policies and procedures, while they can rely on their own internal processes not covered under the noted policies and procedures (e.g., account set-up, transfer and closure).

Through the renewal of the billing services agreement, most terms and conditions remained in place from the original contract and a variety of terms and conditions were amended. However, in some cases these amendments missed opportunities to strengthen contract terms and mechanisms.

One of the most impactful cases of this is related to contract key performance indicators (KPIs). Within Alectra's renewal agreement, three (3) KPIs were identified for measurements to be developed against in conjunction with the City as part of the term of the contract. The identified KPIs included meter reading accuracy, percentage of estimated accounts and tax roll transfer accuracy. Alternatively, the original contract identified five (5) KPIs to be measured, which were not identical to those in the renewal agreement.

It also defined a timeline for the establishment of related standards and targets for those KPIs (second year of the term), as well as an interval for measurement of Alectra's performance against them (during the third year of the term and annually thereafter). This additional language regarding targets and performance measurement intervals was

removed as a part of the renewal agreement. As a result, these KPIs were not formally established as part of the contract when the agreement between the City and Alectra was renewed in 2020.

Additionally, the dispute resolution terms and conditions from the original contract remained in the renewal. However, no amendments were made to further strengthen this contract mechanism by adding terms to allow the City to take corrective action in the event that Alectra fails or defaults in the performance of work as defined in the contract.

It should also be noted that, while terms were amended as a part of the renewal agreement to strengthen the City's right to audit or inspect Alectra's operations, the City has never exercised this right in its management and oversight of Alectra's performance as the billing services agent.

Further, there is no dedicated and experienced contract manager tasked with the responsibility of managing and overseeing Alectra to ensure compliance with the requirements of their contract and the quality expectations of the City. The contract is managed by the City's Senior Policy Advisor, Financial Planning; however, until recently, this individual was not fully dedicated to the management and oversight of Alectra, until the identification of the 2021-22 large billing issues.

In response to the large billing issues, the City and Alectra have established bi-weekly meetings where Alectra provides the City with updates on key program billing metrics, as well as their progress against them. These meetings are led by the City's Meter Operations and attended by Finance. Meeting minutes are recorded for each of these meetings between the City and Alectra. However, for key program billing metrics discussed between the City and Alectra, no evidence was found of any established targets or related consequences for failure to meet targets. Similar meetings occur with the Program's meter operations contractor, Neptune, on a weekly basis. Notwithstanding, there are no established operational meetings that are inclusive of all relevant program stakeholders (i.e., Hamilton Water, Neptune, Alectra, City Finance). As a result, the ability to share relevant program information to all key stakeholders involved is limited and the possibility that key information is not being raised to key stakeholders in a timely manner is increased. Moreover, since the contract authority for the Alectra contract rests with City Finance, Hamilton Water is limited at times in their ability to provide oversight of Alectra or to elicit appropriate action/response when issues are raised. Currently there is no mechanism inclusive of all relevant program stakeholders and contractors to discuss key objectives, risks and outcomes for the year as part of the Water Meter Program.

Overall, contract management and oversight of the billing services agent has been more reactive than proactive, which has increased the likelihood of Program risks being realized. This, as well as a lack of prescriptiveness in Alectra's contract, is evidence that oversight mechanisms in place to oversee and manage billing and customer management activities have been ineffective. This has manifested in several ways, examples of which include:

1) Alectra did not consistently provide required reporting (e.g., Consecutive Estimate reporting) as identified in the root-causes of the 2021-22 large billing issues;

2) Alectra implemented and adopted a new billing system without consulting/informing the City of Hamilton, and did not effectively migrate the City's historical customer consumption data; and
3) Alectra's automated system was generating work orders for meters that did not require maintenance due to there being an issue with "No Problem Found" work orders (the same problem was found in a comparative municipality who used the same billing agent).

As a result of these limitations, the impact for the City is that there is a higher risk of billing discrepancies, inefficient use of the program budget (i.e., higher labour costs to fix issues or triage non-issues) and reputational damage resulting from customer complaints.

RECOMMENDATION 4:

The City should ensure that all vendor contracts establish performance management frameworks, including minimum standards, KPIs and performance reporting; and have sufficient contract mechanisms, including corrective actions clauses where performance does not meet minimum standards, to oversee vendor performance. This includes establishing a dedicated and experienced contract manager tasked with the responsibility of managing and overseeing contract and vendor performance.

Priority: High

RECOMMENDATION 5:

The City should implement a regular operational meeting attended by all relevant program stakeholders to ensure consistency and alignment of information and progress to support program oversight and delivery.

Priority: Medium

Finding 7: Corrective Action for 2021-22 Billing Issues

The Program has implemented preventative and corrective actions that address the identified root-causes of the 2021-22 large billing issues; however, there are gaps in the City's root-cause analysis that should be addressed to increase the effectiveness of these actions.

In response to the large billing issues identified the Water Meter Program conducted a root-cause analysis of the issues and developed the following set of corresponding corrective actions and preventative actions:

CORRECTIVE / PREVENTATIVE ACTION	DESCRIPTION	STATUS
Corrective	Issuance of a vendor non-compliance for Neptune.	Completed (March 30, 2022)
Corrective	Creation of critical process procedure for meter operations.	Completed (April 30, 2022)
Corrective	Update of the *Water Operations Clerks – Processing Work Orders from AUC* procedure (PW-WW-CS-CS-P-011-042) and provide training to staff in LMD.	Completed (April 15, 2022)
Corrective	Update of the *Processing Consecutive Estimates Related Tasks* procedure (PW-WW-CS-CS-P-020-018) and provide training to staff in LMD.	Completed (May 1, 2022)
Preventative	Work with AUC to fix the data transfer issues.	Completed (June 15, 2022)
Preventative	Once the data transfer issues are resolved, review of the manual AUC CE report to the automated CE report from IPS to determine the best process for meter operations.	Completed (July 1, 2022)

The audit confirmed through documentation review and consultations with program management that all corrective and preventative actions identified by the City have been implemented.

In addition to the actions noted above, Hamilton Water also introduced the *2022 Large Meter Inspection* project to ensure that all large meters are operating effectively. This project is a Program priority and Hamilton Water has made appropriate progress to date.

Overall, the actions implemented by the City support the correction of issues that contributed to the 2021-22 large billing issues and the prevention of future issues; however, it should be noted that for some corrective and preventative actions, the audit was unable to fully assess effectiveness in preventing future billing issues due to the recentness of their implementation and lack of measurable results as of the period of the audit. Moreover, gaps were noted in the root-cause analysis that indicate that the corrective and preventative actions identified by Hamilton Water are incomplete and therefore not fully effective in eliminating the risk of future large billing issues.

Contractor Inspections

One of the root-causes of the billing issues at one site was that Neptune did not properly program the meter in question, which was confirmed through the vendor non-conformance letter that was issued to that organization. However, not included in root-cause analysis was the fact that Hamilton Water did not schedule an inspection of Neptune's work, which is required for large meters as per the *Water Meter 38mm Above* procedure. This was confirmed through interviews and had Hamilton Water inspected Neptune's work in a timely manner upon completion of the maintenance activities, the improper meter programming could have been identified earlier.

Contract Management

The second significant gap that was not identified in the root-cause analysis by Hamilton Water was the lack of an established contractor performance management framework and limited contractual mechanisms for managing and overseeing the performance of the City's outsourced billing agent, Alectra. Ultimately, this resulted in issues with reporting by the contractor, improper migration of City data and information without prior notice, and operational inefficiencies that are further described in Finding 6: Contract Management.

For example, one of the root causes of the billing issues identified by Hamilton Water was that when the data transfer issues associated with the migration of Alectra's new billing system were identified by Alectra, there was no resolution implemented in a timely manner. Had a contractor performance management framework, as well as contractual mechanisms such as corrective actions been established and leveraged, it's likely that the contractor issues experienced would have been proactively identified and addressed.

Zero Consumption Meters

The third gap identified in the root-cause analysis and corresponding corrective actions and preventative actions is related to those accounts that are being estimated at zero consumption. As noted in the root-cause analysis, Alectra switched billing systems, and in that process, historical consumption data was not migrated to the new system. In doing so, Hamilton Water's business requirements were not effectively identified or considered by Alectra during this business transformation initiative; however, the larger implication is that when an account is estimated (i.e., in scenarios when an actual meter read cannot being obtained), it is estimated based on the historical consumption of that meter.

If there is no historical consumption data, that means that the customer will receive a bill only for the fixed rate fees on their account and may not be billed for any water consumption (i.e., the account may be underbilled) since the estimate was zero consumption. In other scenarios, customers were not being billed at all. This presents a significant risk, especially for large meters, as there is the potential for additional billing discrepancies.

Hamilton's Meter Operations has capability to produce a zero-consumption report, which as of January 2022 shows the following meters with zero consumption:

METER SIZE	ESTIMATED ZERO CONSUMPTION	ACTUAL ZERO CONSUMPTION
SMALL (<= 25MM)	907	2,077
INTERMEDIATE (38 & 50MM)	106	148
LARGE (>= 100MM)	39	77
TOTALS	1,052	2,302
	3,354	

It should be noted that it is possible that the actual consumption on any given meter could be zero (i.e., a customer is on an extended vacation and therefore their property is not consuming any water). Notwithstanding, the meters that are being estimated at zero consumption pose a significant risk, especially the 145 combined intermediate and large meters whose actual consumption tends to be higher due to their size.

To address this risk Hamilton Water offered to provide the data to Alectra whose billing system is currently under a code freeze, whereby modifications are not permitted to the system and therefore restrict the ability to create new reports to analyze data, but this was rejected by City Finance. The rationale was that:

1) Alectra is responsible for reviewing zero consumption and producing work orders; and
2) Corporate Finance does not have capacity to review these reports.

Although both rationales are true this should not void the Program's responsibility to oversee and manage this risk. Initiatives such as the *2022 Large Meter Inspection* project may help to mitigate this risk. It is clear; however, that Alectra is unable to fulfill their responsibilities of reviewing zero consumption assets and producing work orders accordingly due to their system code freeze so an alternative solution is required. As a result, these zero consumption assets continue to pose a risk of future large billing issues such as those experienced in 2021-22. For example, the incorrect billing estimations at 50 Charlton was a compounding factor to the significant underbilling associated with this account between 2019-2022 ($343,000). This is another example of how the absence of a contractor performance management framework and other oversight mechanisms has resulted in a greater risk exposure for Hamilton's Water Meter Program.

RECOMMENDATION 6:

The City should develop a program KPI to track City inspections of Contractor (Neptune) activities.

Priority: Medium

RECOMMENDATION 7:

The City should develop a report of all intermediate and large meter assets that are currently being estimated at zero consumption to identify, prioritize and investigate any accounts that are at risk of being improperly billed.

Priority: High

RECOMMENDATION 8:

The City should perform follow-up assessments of the effectiveness of implemented corrective and preventative actions on at least an annual basis to ensure they are effectively addressing identified root causes of 2021-22 large billing issues.

Priority: Medium

Finding 8: Data Transfer and Reporting

Data transfer and reporting between Hamilton Water, Alectra, and Neptune are highly manual processes resulting in operational inefficiencies.

The Water Meter Program relies on data and information provided through reporting by its Program stakeholders to support effective and efficient operations. Many of these reports are manually developed and processed by WOCs, including the Alectra Daily reports, Neptune Production reports, and Top 100 reports.

Alectra Daily reports are Excel documents created by Alectra and provided to Hamilton Water on a daily basis. They document the water meters that Alectra has been unable to read for a number of reasons, including stopped meters, missing pads, lack of access to the property, etc. WOCs receive these Alectra daily reports and check for an existing work order for the identified issue in each line item of the report. If no existing work order is found a new one is created by the WOC based on the information provided in the Alectra daily report for that item. Neptune Production reports are Excel documents that provide an overview of work orders completed by Neptune, which are provided to Hamilton Water on a daily basis. There are multiple types of Neptune production reports, each one representing a different category of work completed by Neptune.

The Top 100 report outlines a list of the City's top 100 water accounts by consumption, which are developed by Alectra and received by Hamilton Water on a monthly basis. These reports are used to review consumption history and try to proactively address issues with these accounts if there are discrepancies in their month-to-month consumption trends.

Overall, the volume of manual data transfer and reporting processes between Program stakeholders is contributing to measurable inefficiencies and data integrity risks within Hamilton's Water Meter Program. For example, the Top 100 report is provided in a PDF

format and can be 200+ pages long, rendering it challenging for Program staff to identify consumption discrepancies effectively and efficiently compare it to other report formats.

Another example concerns the Neptune Production report. Upon completion of a maintenance activity on a given meter, Neptune will provide an updated actual read on that meter in the Neptune Production report. If the maintenance activity was a meter change out this report will include the new asset ID of the new meter. The WOCs will then manually transcribe the data contained in these reports into IPS Hansen. However, due to the volume of manual reporting and the inefficiency of this process, a backlog of report processing has emerged.

As of September 14, 2022, the oldest report waiting to be processed was from July 6, 2022, meaning that this backlog is over two months long. With recent turnover and retention issues identified in the WOC role (currently, only one WOC for the entire Program), management is expecting this backlog to grow. Moreover, as this data is manually entered into the system, there is a high risk of human error, meaning either meter reads or asset IDs may be incorrectly entered into the asset management system.

To the credit of Hamilton Water there has been some automation introduced recently. For example, the Consecutive Estimates reports, which are monthly reports providing a list of all water meter accounts for which consumption data has been estimated for three or more consecutive months, was recently automated. It is currently in the process of being evaluated by Program management to determine if this approach is the best path forward. Additionally, for most production reports relating to small meter work, automation is in place to process and close out work orders, as well as add/update any required information within IPS Hansen. However, any larger meter work orders are required to be manually processed and closed out by a WOC. Lastly, pilot projects such as the *Mach 10 Project* and the *CMIU* bring the potential for more automated reporting should they be successful and eventually rolled out more broadly across Hamilton Water's jurisdiction.

Nevertheless, these current inefficient processes and reporting backlogs negatively impacts the effectiveness of overall Program operations, including the accuracy of bills being sent to customers. If there is a backlog of Alectra daily reports that means that work orders for meter maintenance may not be conducted in a timely enough manner to fix a potentially critical issue. If there is a backlog in Neptune Production reports accurate meter reads and new asset IDs might not be communicated to Alectra in time for them to produce accurate bills against the right asset in the current billing cycle. If customers receive inaccurate bills or delayed maintenance on their meters it will likely lead to more customer billing inquiries and complaints. This is a feedback cycle that will continue to negatively impact the program holistically if management does not reduce report processing backlogs by hiring more WOCs in the short-term and introducing more efficient automated processes in the long-term.

RECOMMENDATION 9:

Where possible, the City should examine opportunities to automate the processing and transfer of key data and information from program reporting into the City's asset

management system, which is currently being manually performed by WOCs. Further, the implementation of formalized data validation tools would support accuracy of data and reporting. Opportunities to automate the processing, transfer, and validation of Water Meter Program data into the City's asset management system should be evaluated as a part of requirements for the procurement of a new billing solution/service provider.

Priority: High

4 AUDIT CONCLUSION

The City of Hamilton's Water Meter Program is undergoing a period of rapid transformation, both in response to the 2021-22 large billing issues and the fact that their billing agent, Alectra, has notified the City that they are discontinuing their water billing services. Although these issues have brought on a wide array of challenges, they have also presented new opportunities to increase the operational effectiveness and efficiency of the Program as a service provider to the residents of the City of Hamilton.

The audit has identified opportunities for improvement for Hamilton's Water Meter Program. Although the Program has documented a strong operational procedure framework that clearly defines roles and responsibilities, the audit identified gaps in the policy framework that should be aligned to current procedures and practices. Further, the Program has begun to use data to support the management and oversight of operations through the development of key program metrics. However, program reporting and key program metrics lack contextualization against established targets, baselines, outcomes, timelines, as well as lack clear methods for collection, reporting, and related accountabilities.

A noted strength of the Program includes the implementation of a proactive maintenance program, which is on target to achieve the expected number of completed annual proactive maintenance work orders for 2022 and the execution of two pilot projects to test new meter technology with a view to modernizing the Program, further aligning with industry best practices.

The audit observed ineffective, and in some cases, insufficient contract management mechanisms with regards to the City's billing agent, as evidenced by the absence of a contractor performance management framework, a sufficient governance structure, and a dedicated contract manager. It was also found that there is little to no contract mechanisms in place to identify, manage, and rectify poor vendor performance.

The Program has experienced high levels of staff turnover, both at the supervisory and frontline levels. This, combined with inefficient manual data transfer and reporting processes, has created a processing backlog of key operational reporting. This backlog increases the risk of inaccurate bills being sent to customers which in-turn could increase the risk of customer complaints and reputational damage to the City of Hamilton's Water Meter Program.

Lastly, in response to the identified 2021-2022 large billing issues, a root-cause analysis was performed by Hamilton Water that identified and implemented corrective and preventative actions to address the root causes. Overall, the actions implemented by the City support the correction of issues that contributed to the billing variances and the prevention of future issues; however, it should be noted that for some corrective and preventative actions, the audit was unable to fully assess effectiveness in preventing future billing issues due to the recentness of their implementation and lack of measurable results as of the period of the audit. As such, these actions should be reviewed by the City in the future to ensure that they are in fact effective in addressing root causes.

Moreover, gaps were noted in the root-cause analysis which indicates that the corrective and preventative actions identified by Hamilton Water are incomplete and therefore not fully effective in eliminating the risk of future large billing issues. One such example includes the fact that there are some water meters being estimated at zero consumption which may mean that these meters are being improperly billed for their actual consumption. As such, the City should take action to ensure these accounts are being appropriately billed.

Appendix A COMPARATIVE PRACTICES ASSESSMENT

As part of the audit, comparative practices were identified through the review and comparison of meter programs from three (3) comparator municipalities. The municipalities for comparison were City of London, Ontario; City of Markham, Ontario; and Regional Municipality of Halton, Ontario. The audit team conducted consultations/walkthrough with representatives from the comparator municipality's water meter program to identify best practices in each of the audit control areas. In some cases, documentation was provided and reviewed accordingly. To maintain confidentiality of comparator municipalities interviewed, identifiers have been removed.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
GOVERNANCE AND REPORTING STRUCTURES			
• **Governance Structure:** Meter Operations (Hamilton Water) responsible for water meter program management. This includes 2.5 WOC positions, 3 Scheduler/Dispatcher positions, 3 MTIs and 2 supervisors.	• **Governance Structure:** Finance team is responsible for water meter program management. This includes 2.5 staff responsible for consumption management/reporting and 30 full-time water operators; however, these operators provide services to all municipal water functions and not all operators are capable of water meter	• **Governance Structure:** Dedicated administrative team of two (2), including a Controller position. This also includes two (2) plumbers and four (4) meter servicers in place.	• **Governance Structure:** Finance team is responsible for water meter program management. This includes Supervisor, three (3) Analysts, and two (2) Senior Clerks.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
	maintenance and repairs.		
• **Governance Meetings:** Internal weekly and monthly governance meetings.	• **Governance Meetings:** Biweekly meeting with vendors individually.	• **Governance Meetings:** Daily internal program meetings occur.	• **Governance Meetings:** Quarterly governance meetings take place.
• **Program Reporting:** Program statistics and KPIs are established, but no targets set.	• **Program Reporting:** Previous audit recommendations have been made to incorporate additional oversight over program reporting. As a result, there are now eight (8) people responsible for reviewing reports. No formal program KPIs established.	• **Program Reporting:** There is reporting on program staffing levels, which was introduced during the Covid-19 pandemic.	• **Program Reporting:** Track program statistics and KPIs.
• **Risk:** No program risk register in place.	• **Risk:** No program risk register in place.	• **Risk:** No program risk register in place.	• **Risk:** Unclear whether program risk register in place.
VENDOR MANAGEMENT			
• **Vendors:** Vendor in place for meter operations (Neptune).	• **Vendors:** Vendor in place for meter operations (Neptune).	• **Vendors:** Vendor in place for meter reading and billing.	• **Vendors:** Four (4) vendors in place for

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
Vendor in place for meter reading and billing (Alectra).	Vendor in place for meter reading and billing (Alectra).		meter reading and billing.
• **Contract Oversight:** Meter Operations team is responsible for contract management oversight of meter operations vendor. Finance team is responsible for contract management oversight of billing services agent.	• **Contract Oversight:** Meter Operations team is responsible for contract management oversight of meter operations vendor and billing services agent.	• **Contract Oversight:** Water Demand Office is responsible for contract management oversight of meter operations vendor and billing services agent. Dedicated point of contact for the vendor is established.	• **Contract Oversight:** Finance is responsible for contract management oversight.
• **Vendor Performance:** No formal KPIs in place for vendor contracts.	• **Vendor Performance:** No formal KPIs in place for vendor contracts.	• **Vendor Performance:** There is a service level agreement in place for the vendor, which outlines performance measurements/expectations related to service delivery. These include costs, scheduling, and service delivery and could include timeliness in providing reports, delivery time on Service Change Request, customer feedback, or	• **Vendor Performance:** There are established KPIs in place, including: number of estimated accounts, dollar value of write-offs, number of calls, call response time, etc.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
		actions taken to address issues.	
• **Contract Mechanisms:** Right to audit clause in place.	• **Contract Mechanisms:** No right to audit clause with Neptune contract. Included right to audit clause with Alectra contract as part of contract amendment.	• **Contract Mechanisms:** Right to audit clause in place.	• **Contract Mechanisms:** Right to audit clause in place. Contract incudes technology change notice requirement.
• **Contractor Invoicing:** Monthly invoicing occurs for vendors.	• **Contractor Invoicing:** Monthly invoicing occurs for vendors.	• **Contractor Invoicing:** Monthly invoicing occurs for vendors.	• **Contractor Invoicing:** Monthly invoicing occurs for vendors.
• **Best Practices:** Does not share best practices among vendors.	• **Best Practices:** Does not share best practices among vendors.	• **Best Practices:** Does not share best practices among vendors.	• **Best Practices:** Since there are multiple vendors, best practices among them are identified more easily and incorporated by others.
PROJECT MANAGEMENT AND METER MAINTENANCE			
• **Number of Accounts:** Services approximately 160,000 meters.	• **Number of Accounts:** Services approximately 85,000 meters.	• **Number of Accounts:** Services approximately 123,000 meters.	• **Number of Accounts:** Services approximately 165,000 meters.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
• **Meter Operations Responsibility:** Meter operations are outsourced, although municipality staff (MTIs) perform meter inspections.	• **Meter Operations Responsibility:** Meter operations are outsourced, although municipality staff perform meter maintenance.	• **Meter Operations Responsibility:** Meter operations (including installation and maintenance) is conducted in-house.	• **Meter Operations Responsibility:** Meter reading issues are initiated by billing services agents and entered into the public works system. Based on system information, work orders are created manually by municipality staff.
• **Work Order Management:** Alectra initiates work orders, WOCs assign and manage work orders, and MTIs execute work orders. IPS/Hansen system is used for work order management.	• **Work Order Management:** Automated work order management system which vendors have direct access to.	• **Work Order Management:** Program Supervisor is responsible for work order management and oversight.	• **Work Order Management:** Public works team is responsible for assigning work orders.
• **Inspections:** There are inspections of meter operations contractor work performed.	• **Inspections:** There are no inspections of meter operations contractor work performed.	• **Inspections:** Inspections are not required since operations is in-house, however meter installation is included in the municipality's housing inspections	• **Inspections:** Inspections are conducted on hardware (ad hoc) and large meter maintenance programs.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
		checklist for all new homes.	
• **Enforcement:** By-laws are not leveraged to enable access to meters.	• **Enforcement:** Exploring opportunities to charge customers more where refusals are made to incentivize access to meters.	• **Enforcement:** By-laws are leveraged to enable access to meters.	• **Enforcement:** By-law makes participation in meter maintenance mandatory. Customers receive communications, which identify the potential involvement of by-law enforcement. These are dealt on a case-by-case basis, and decisions would be made by water operations management.
• **Large Meter Preventative Maintenance:** Large meter maintenance program (100mm and above) and large meter inspection project in place.	• **Large Meter Preventative Maintenance:** No preventative maintenance program in place.	• **Large Meter Preventative Maintenance:** No preventative maintenance program in place.	• **Large Meter Preventative Maintenance:** Large meter maintenance program (75mm and above) in place that is outsourced.
• **Master Satellite Meters/Sub-metering:** Municipality uses master	• **Master Satellite Meters/Sub-metering:** No master satellite meters/sub-metering.	• **Master Satellite Meters/Sub-metering:** One master satellite meter/sub-metering.	• **Master Satellite Meters/Sub-metering:** No master satellite meters/sub-metering.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
satellite meters/sub-metering.			
BILLING AND CUSTOMER MANAGEMENT			
• **Billing Responsibility:** Meter reading and billing services are outsourced.	• **Billing Responsibility:** Meter reading and billing services are outsourced.	• **Billing Responsibility:** Meter reading and billing services are outsourced.	• **Billing Responsibility:** Meter reading and billing services are outsourced to four (4) local vendors in each of the City's four (4) regions.
• **Customer Penalties:** Double historical consumption in cases of customer refusals.	• **Customer Penalties:** Desire to establish penalties for customer refusals, however billing services agent has not agreed.	• **Customer Penalties:** Unclear whether customer penalties are used.	• **Customer Penalties:** By-law enforces customer penalties, as required.
• **Consecutive Estimate:** There is a consecutive estimate policy in place, whereby residential/ICI is every two (2) months.	• **Consecutive Estimate:** There is a consecutive estimate policy in place, whereby residential is every two (2) months and commercial is monthly.	• **Consecutive Estimate:** There is a consecutive estimate policy in place which occurs after three (3) months.	• **Consecutive Estimate:** There is a consecutive estimate policy in place, whereby residential is every twelve (12) months and commercial is every six (6) months. If consecutive estimates are used for accounts, the billing services agents will review

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
			electrical consumption and billing for the properties to identify whether properties are vacant.
• **Customer Account Management:** Account set up/closure managed by vendor.	• **Customer Account Management:** Account set up/closure managed by vendor.	• **Customer Account Management:** Two (2) customer service representatives and one (1) Supervisor in place, who take phone calls from customers, manage work orders, etc.	• **Customer Account Management:** Account set up/closure managed by vendors.
• **Flat Rate:** Minimum charges for accounts on a monthly basis, regardless of consumption, for unmetered properties. Processes in place for new builds to ensure timely metering.	• **Flat Rate:** Exploring opportunities to include minimum charges for accounts on a monthly basis, regardless of consumption.	• **Flat Rate:** Minimum charges for accounts on a monthly basis, regardless of consumption.	• **Flat Rate:** Only some flat rate accounts in place and no new flat rate accounts are being approved.
• **Meter Reading:** Manual reads conducted by vendor's subcontractor, with some AMI technology being piloted.	• **Meter Reading:** Manual reads conducted by vendor's subcontractor.	• **Meter Reading:** Leverages drive-by meter reading.	• **Meter Reading:** Each vendor uses their own meter reading processes and/or technology.

CITY OF HAMILTON	COMPARATOR MUNICIPALITY #1	COMPARATOR MUNICIPALITY #2	COMPARATOR MUNICIPALITY #3
• **Billing Validation:** Billing processes are managed by the vendor.	• **Billing Validation:** Billing processes are managed by the vendor.	• **Billing Validation:** Unclear whether billing validation occurs.	• **Billing Validation:** Municipality undertakes a revenue assurance process on a daily basis, where billing and customer account information provided by the vendors is validated. Multiple reports are reviewed regularly including multi-residential, low consumption, zero consumption report, etc.

Appendix B AUDIT CONTROL ASSESSMENT SCALE

Based on the evidence collected during our audit, we formally assessed the effectiveness of each practice described within the Audit Program using a four-point scale, provided below.

SCALE	DEFINITION
NOT EFFECTIVE AT ALL – 1	Significant management attention is needed to improve these practices.
SOMEWHAT EFFECTIVE – 2	Some parts of this element are in place, but key deficiencies exist.
MOSTLY EFFECTIVE – 3	Most parts of this element are working as intended, but more work is needed in some areas.
FULLY EFFECTIVE – 4	No action is required. Everything is working as intended.

We consolidated findings and observations with formal substantiation provided through fully indexed and peer reviewed working papers. For each line of inquiry that comprises the Audit Program, we documented observations and findings using the following scheme.

HEADING	CONTENT
CRITERIA	Provide a summary of the expected practice, as specified in the review program.
CONDITION	Summarize the observed condition of the practice or area being reviewed, as determined by the outcome of the review procedures.
CAUSE	Identify the probable causes for any deficiencies or instances of non-compliance, as determined through the outcome of the review procedures.
EFFECT	Detailed the potential impact of the deficiency in terms of risk, as determined through analysis of risk and control.

Appendix C AUDIT CONTROL ASSESSMENT

CONTROL AREA	AUDIT CRITERIA	CONTROL ASSESSMENT
A. GOVERNANCE AND REPORTING	A.1: The City has established governance structures, frameworks, roles and responsibilities that are working effectively, staffed with the appropriate capacity, to enable management and oversight of the Water Meter Program.	SOMEWHAT EFFECTIVE – 2
	A.2: The City has established a Water Meter Program policy and procedure framework which is effectively managed and communicated with appropriate City staff.	MOSTLY EFFECTIVE - 3
	A.3: The City has an effective reporting framework in place to report on program risks, intended objectives, expected efficiencies, cost savings and service improvements.	MOSTLY EFFECTIVE – 3
	A.4: The City has established appropriate communication channels between all relevant Water Meter Program stakeholders in order to support program oversight and delivery.	SOMEWHAT EFFECTIVE - 2
	A.5: The governance and reporting structures for the City align with industry best practices.	MOSTLY EFFECTIVE – 3
B. VENDOR MANAGEMENT	B.1: The City has effective vendor management frameworks and mechanisms (including KPIs, service-level agreements (SLAs), communication channels, audit and inspection rights, and remedies) in place to oversee contractor performance related to the Water Meter Program.	SOMEWHAT EFFECTIVE - 2
	B.2: The City ensures the accurate and timely invoicing of Water Meter Program contractors.	FULLY EFFECTIVE - 4
	B.3: The vendor management framework and mechanisms for the City align with industry best practices.	MOSTLY EFFECTIVE – 3
C. PROGRAM OPERATIONS MANAGEMENT	C.1: The City effectively manages work orders (i.e., creation, execution, and verification of work) to allow for completion of program	FULLY EFFECTIVE - 4

CONTROL AREA	AUDIT CRITERIA	CONTROL ASSESSMENT
[redacted]	operations in a fulsome, accurate, and timely manner.	
	C.2: Data integrity and transfer processes exist between the City and the City's contractors that are designed and operating effectively to allow for completion of program operations in a fulsome, accurate, and timely manner.	SOMEWHAT EFFECTIVE - 2
	C.3: Work order and data integrity processes and procedures for the City align with industry best practices.	MOSTLY EFFECTIVE – 3
D. BILLING AND CUSTOMER MANAGEMENT	D.1: The City has established effective billing processes and controls to identify, mitigate, and resolve billing issues and errors in a timely manner.	SOMEWHAT EFFECTIVE – 2
	D.2: The City has established policies, processes, and procedures to effectively manage customer accounts, inquiries, complaints, or site access.	MOSTLY EFFECTIVE – 3
	D.3: Billing policies, processes, and procedures for the City align with industry best practices.	MOSTLY EFFECTIVE – 3

Appendix D RECOMMENDATION AND MANAGEMENT ACTION PLAN PRIORITY SCALE

The following scale has been used to assess the priority associated with recommendations noted as part of the audit to facilitate management's action planning.

PRIORITY	MANAGEMENT RESPONSE
HIGH	The risks identified have a high level of exposure and should be addressed in the immediate or short-term, as a result of significant deficiencies in control structures and systems or required financial adjustments that are material to the organization.
MEDIUM	The risks identified have a medium level of exposure and should be addressed in a timely manner to ensure that they do not escalate or result in a higher level of exposure for the organization.
LOW	The risks identified represent lower priority or minor process improvement observations, which should be addressed where practical to improve the overall efficiency and/or effectiveness of the operations of the organization.