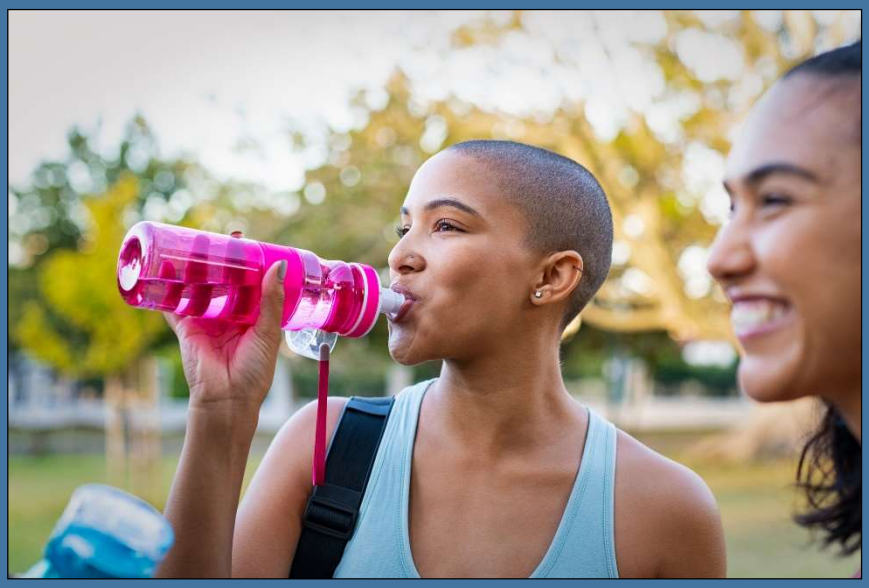
2024 Summary Report



Water and Wastewater Services

Region of Waterloo




Region of Waterloo

Presented to Regional Council

March 4, 2025

This document is available in alternate formats upon request

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1. OVERVIEW & BACKGROUND

This summary report represents all the drinking water supply and transmission systems in the Region of Waterloo and the distribution systems in North Dumfries and Wellesley Townships, and addresses the requirements as defined under the Safe Drinking Water Act and the Drinking Water Quality Management System.

1.1 SAFE DRINKING WATER ACT

Schedule 22-2 of Ontario Regulation 170/03 states that owners of municipal drinking water systems shall ensure that, no later than March 31 of each year, a summary report is prepared for the preceding calendar year and presented to the members of municipal council. This report includes:

(1) A list of the requirements in the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water license, and any order applicable to the system that was not met at any time during the period covered by the report;

(2) for each requirement in (1), specify the duration of the failure and the measures that were taken to correct the failure;

(3) a summary of the quantities of flow rates of water supplied during the period covered by the report, including monthly average and maximum flows;

(4) a comparison of the summary referred in (3) to the rated capacity flow rates in the system's approval, drinking water works permit, or municipal drinking water license.

This report captures non-compliance issues and corresponding corrective action(s) or mitigating measure(s).

1.2 DRINKING WATER QUALITY MANAGEMENT SYSTEM (QMS) CONFORMANCE AND MUNICIPAL DRINKING WATER LICENSING PROGRAM

To obtain and maintain a Municipal Drinking Water License (MDWL), the Region must hold: a valid Drinking Water Works Permit (DWWP), a valid Permit to Take Water (PTTW) for each water source, operational plans as approved by the Ministry of the Environment, Conservation and Parks (MECP), operating authority accreditation (based on a third party audit of the Drinking Water Quality Management Standard (DWQMS) 21 Elements), and financial plans approved by Regional Council. Each Municipal Drinking Water License and each Financial Plan must be renewed every 5 years. Eleven (11) MDWL were issued to the Region in 2021.

In 2024, the MECP provided the Region a Notice of Intention to Issue an Order under Section 114 of the Safe Drinking Water Act (SDWA). The Notice required the Region to take charge of, operate, and maintain the Petersburg non-municipal, year-round residential water system. A DWWP was issued, an operational plan was developed, significant upgrades were completed to the supply facility, and ownership was transferred from the private owner to the Region. A third party audit was performed in January 2025 in order to achieve operating authority accreditation for the

system with the intent to apply for a MDWL in the Fall of 2025 following completion of the Financial Plan.

MANAGEMENT REVIEW

The management review must be conducted annually to evaluate the suitability, adequacy, and effectiveness of the Quality Management System (QMS) with the results being communicated to Regional Council as the system owner. The management review provides evidence of continued endorsement and commitment to the QMS from Top Management.

The QMS annual management review was conducted on November 26, 2024 and included discussion of non-compliance issues and corresponding corrective/preventative action(s). The 2024 management review minutes, identified deficiencies, decisions and action items, are included in Appendix A. There were no major non-conformances identified with the QMS.

INFRASTRUCTURE REVIEW

DWQMS (Element 14 and 15) requires that the operational plan document a summary and monitor the effectiveness of the Operating Authority's infrastructure maintenance, rehabilitation and renewal programs and to communicate these programs and any updates to the Owner. Asset management and maintenance programs are established and maintained to ensure repair and replacement of water system infrastructure. An overview of the infrastructure maintenance is found in section 5.

2. HEALTH RELATED NOTIFICATIONS – BOIL WATER ADVISORIES (BWA)/DRINKING WATER ADVISORIES (DWA)

The Region of Waterloo Water and Wastewater Services Division, in collaboration with the Public Health Department, ensures a safe water supply. There were no BWA or DWA issued during 2024.

3. REGULATORY COMPLIANCE

The MECP's annual drinking water system inspections focus on compliance with the SDWA and related regulations. The following legislative requirements apply to municipally owned and operated drinking water systems:

- proper documentation;
- sampling and analytical testing;
- adverse water quality incident reporting (AWQI);
- proper treatment and maintenance;
- corrective actions;
- Municipal Drinking Water Licenses;
- Drinking Water Works Permits;
- accreditation;
- continuous water quality monitoring;
- flow monitoring;

- calibration/verification of flow meters and instrumentation and,
- certified operators.

A summary of the non-compliances related to the above can be found in Table 1.

The 2023-24 MECP Chief Drinking Water Inspector's report, released in December 2024, identifies 19 inspection reports with an average compliance rating of 99.6% for the Region of Waterloo, with 16 of 19 inspections receiving 100%. Chart 1 below compares the average MECP inspection compliance ratings over the past 5 years and Appendix B summarizes the most recent ratings for Region owned systems.

CHART 1 – **MECP AVERAGE INSPECTIONS RATINGS**

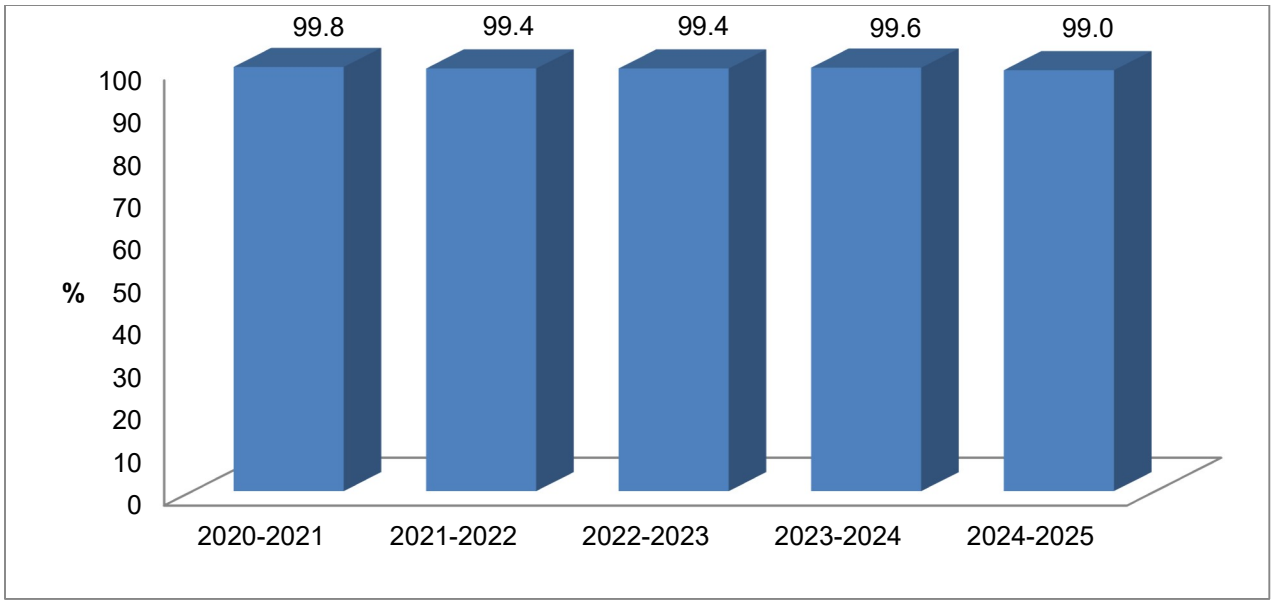

TABLE 1 – **SUMMARY OF NON-COMPLIANCE ISSUES UNDER THE SAFE DRINKING WATER ACT (SDWA), MUNICIPAL DRINKING WATER LICENSES (MDWL), DRINKING WATER WORKS PERMITS (DWWP), PERMITS TO TAKE WATER (PTTW), AND THE ONTARIO WATER RESOURCES ACT (OWRA)**

Date	Description	Root Cause	Preventative/ Corrective Action
O. Reg 170/03, 1-2(1)1 – Treatment Equipment			
December 9, 2024	Wellesley The production well was not maintained in a manner sufficient to prevent entry	An electrical conduit was not properly attached to well WY6 at the time of inspection. Cause was a failure due to installation issues (no expansion joint).	Repair on conduit completed. Provided well inspection training to relevant staff.

Date	Description	Root Cause	Preventative/ Corrective Action
	into the well of surface water and other foreign materials.		
O. Reg 170/03, 1-2(2)5 – Operator certification			
January 8, 2024	Maryhill An unlicensed contractor shut off well MH2 without Regional operations staff present.	A formal process did not exist to provide contractors authorization to assume control of the site.	Followed up with the contractor to emphasize the implications of not following regulatory requirements. Formalize a process to request facility isolation. Draft a communication emphasizing the certification requirements for facility operation.
May 23, 2024	The Region of Waterloo became aware that a contracted individual was working in Regional water systems with an expired water licence.	Checks and balances, both internal and external, were ineffective.	Immediately informed relevant Region supervisors to discontinue all work using the individual in question. Add any external operators to internal tracking system. Ensure supervisors verify licensing for any contractors performing operational tasks.
May 23, 2024	It was identified that several Regional operators held only an Operator in Training (OIT) Water Treatment (WT) certificate while potentially performing operational duties in a Water	It was incorrectly assumed that OIT WT certificates offered transferability to OIT WD certificates, as is the case for higher certification levels.	The operators were directed not to work on Regional WD systems until the appropriate OIT Certificates were issued. Ensure all new staff obtain both WT and WS/WD OIT licences.

Date	Description	Root Cause	Preventative/ Corrective Action
	Distribution (WD) system.		
O. Reg 170/03 – Schedule 6-5, Continuous Monitoring			
January 8, 2024 08:45-09:10 (duration – 25 minutes) January 10, 2024 08:20-09:42 (duration – 82 minutes)	<u>Well K50</u> Primary disinfection free chlorine residual data was not recorded for greater than 5 minutes.	During Site Acceptance Testing, inadequate preparation and communication by the contractor led to unexpected impacts on regulatory monitoring requirements. Insufficient care and attention by the contractor when setting up the temporary power supply for the regulatory analyzer.	Debrief was held with the contractor. To reduce the likelihood of recurrence, the project team implemented process improvements including improved planning so staff can be better prepared.
March 11, 2024 07:52-08:14 (duration – 22 minutes)	<u>Foxboro</u> Primary disinfection free chlorine residual data was not recorded for greater than 5 minutes.	During Site Acceptance Testing, ineffective communication by the contractor led to staff not being informed when FCR readings were required to be recorded.	Debrief was held with the contractor. To reduce the likelihood of recurrence, include assigned staff in the co-ordination meetings & clarify expectations and responsibilities. Investigate visual indication on the regulatory analyzers and other impacted equipment at site Ensure plan indicates when manual readings must be recorded.
May 22, 2024 11:00-12:32 (duration – 92 minutes)	<u>St. Clements</u> Discharge free chlorine residual was noted to be gradually trending down.	Staff determined that there was no water supply to the analyzer.	Analyzer water supply restored.

Date	Description	Root Cause	Preventative/ Corrective Action
May 30, 2024 10:56-11:04 (duration – 8 minutes)	St. Clements Primary disinfection free chlorine residual data was not recorded for greater than 5 minutes.	Following a power loss and subsequent loss of pressure in the distribution system, a booster pump was started locally in order to re-pressurize the system. Regulatory monitoring requirements were unclear to the operator at site.	Power, pressure, and continuous monitoring restored to site. Email reminder regarding regulatory monitoring requirements sent to staff.
O. Reg 170/03 – Schedule 13-7, Chemical Sampling and Testing			
July and October 2024	Wells K50, K51, K23, K24, K26, Strange Street WTP, New Hamburg WTP Although the required number of samples were collected, the sampling timelines for nitrate/nitrite sampling were not met.	Misinterpretation of three month vs. quarterly sampling requirements.	Discussed scheduling requirements, and expectations were clearly provided. Confirmed that the Master Drinking Water Sampling Schedule was accurate for parameters with either quarterly or 3 month sampling requirements.
Municipal Drinking Water Licence (MDWL) – Schedule E, UV Disinfection			
June 27, 2024	Middleton Monthly UV sensor checks were not performed within the required 20-40 day interval.	Workorder software scheduling limitations, exacerbated by staffing challenges.	Investigate modifications to current work order scheduling process. Investigate upgrades to scheduling capabilities from the vendor.

Date	Description	Root Cause	Preventative/ Corrective Action
Permit to Take Water (PTTW)			
July 9 – 15, 2024 (duration – 916 minutes)	Petersburg – Well PE1 Permitted instantaneous flow rate exceeded.	During upgrades and ownership transfer of the facility, online flow monitoring was initiated. The pre-existing flow rate setpoint was above the PTTW.	Investigate setpoint review process for new facilities. Investigate impacts to performance grading for consultants to incentivize avoiding non-compliances.

4. HYDRAULIC PERFORMANCE

A summary of the monthly average and maximum flow rates of water supplied are identified in Appendix C. There was one non-compliance attributed to MDWL or PTTW flow limit exceedances in 2024, as identified in Table 1.

The Region of Waterloo Drinking Water systems have 38 Permits to Take Water (PTTW), 11 Municipal Drinking Water Licenses (MDWL) and 12 Drinking Water Works Permits (DWWP). Refer to Appendix D for a full list of PTTW, MDWLs and DWWPs.

5. PREVENTATIVE MAINTENANCE PROGRAMS

Elements 14 and 15 of the DWQMS require that the operational plan document a procedure for the annual review of infrastructure necessary to operate and maintain the system. Element 14 requires that the operating authority carry out the review and report to the owner. This reporting ensures that the owner is regularly informed of infrastructure needs and can plan accordingly. Element 15 is about documenting a summary of the maintenance, rehabilitation and renewal programs for the infrastructure. These summaries must be updated as changes occur, and must be communicated to the owner. Monitoring the effectiveness of the maintenance program is achieved by periodically reviewing the maintenance program and confirming the effectiveness of the program.

In 2019, the Water and Wastewater Services Division adopted a Corporate wide Enterprise Asset Management System (Lucity) which replaced the previous computerized maintenance management software. Lucity is a system that manages the installation, maintenance and replacement of infrastructure, equipment and components at water facilities. The system is used to develop, monitor, and report on preventative maintenance plans for the equipment. Preventative maintenance is based on industry standards, regulatory requirements, past history, manufacturers' recommendations and risk analysis. The following preventative maintenance programs are in place:

- As per the MDWL and/or Reg. 170/03, instrumentation is calibrated and/or verified in accordance with manufacturer's instructions with the exception of the billing meters; a third party calibrates and/or verifies the billing meters annually.
- Instrumentation such as ultraviolet sensors, ultraviolet transmittance, chlorine, and turbidity analyzers, ozone monitors, and other equipment are calibrated and/or verified in-house as per manufacturer's recommendations.
- A software program monitors the status of the SCADA communication system.
- Process and Instrumentation Diagrams (P&IDs) and Process Flow Diagrams (PFDs) are reviewed, updated and maintained as required.
- Electrically, the UV ballasts are run to failure and the UV lamps are replaced as per manufacturer's instructions.
- Canadian Standards Association (CSA) guidelines have specific requirements for diesel generators, such as an annual load bank test, run under load for rated power, oil changes, coolant, filters, electrical test of alternator, test oil for engine problems and efficiency. There is a contract with a third party to ensure CSA requirements are met.
- In house backup diesel generators are run monthly under load and preventative maintenance is conducted in accordance with CSA guidelines.
- Sub Station Maintenance, involving visual inspections, are performed several times per year.
- All other electrical components are replaced as required.
- Mechanically, sodium hypochlorite injectors are rebuilt monthly at all sites, booster pumps are maintained as required, chemical pumps are checked monthly and rebuilt as required. Piping and valve work is done as required. Air chambers are checked yearly and pumped out as required.
- Distribution system maintenance for North Dumfries and Wellesley Townships includes annual water main flushing and hydrant maintenance. All valves are operated over a 5-year span. Water main repairs, service leaks, meter replacement, and locates occur as required.
- Distribution maintenance, including water main repairs on the trunk mains are performed by the cities, townships or a third party contractor. Programs exist and vary by city for leak detection analysis, locates, and flushing. A more enhanced program continues to be developed to ensure that valves are exercised and remain operational.

6. WELL MAINTENANCE

Wells are maintained in accordance with Reg. 903, (Ontario Water Resources Act) and O. Reg. 170/03 (Schedule 1). Routine internal well inspections and annual MECP inspections indicated that production wells and monitoring wells were in compliance, with the exception of well WY6 as identified in Table 1.

7. ASSET MANAGEMENT AND CAPITAL INFRASTRUCTURE REPLACEMENT PROGRAM

The Region's overall objective is to support the achievement of service levels goals, and manage risk, while minimizing lifecycle costs. Risk events, such as an asset failure, are events which may compromise the delivery of the Region's strategic objectives.

The Region's asset risk framework takes into account potential losses to services, financial loss, and potential safety hazards. All assets are considered according to the impact of asset failure against these criteria and the likelihood of that failure occurring based on asset age, condition and performance.

Renewal work involves replacing or rehabilitating assets or components of assets to avoid service failure or interruption. For those assets with a higher risk profile, renewal works are timed to minimize any risk of failure, while obtaining the longest economic and service life from the assets. The objective is to replace critical assets before condition deteriorates into a poor or very poor state (which would increase the risk of failure).

The predominant drivers of renewals investment are as follows:

- Current condition and performance: The Region regularly inspects its assets to monitor their condition and performance, according to Water and Wastewater Service's Inventory, Condition, and Capital Planning Assessment Protocol and supporting Template. Asset specific programs, targeting assets that have higher replacement values, higher consequence of failure and/or are more challenging to inspect continue to be developed and updated to help further refine requirements for renewal investment.
- Rate of deterioration: Examination of the rate of deterioration over time based on current condition, compared to expected service life.
- Renewals intervention point: Establishing a renewals intervention point based on the level of service required and its risk categorization.
- Coordination with other planned capital work such as upgrades or expansion, or coordination with other business units or local municipalities.

Asset renewal requirements are bundled into capital projects based on the type of renewal required and the required timing. Asset Management has also defined a prioritization framework to help define capital project priority. Project prioritization criteria, include the following:

- Project to address capacity deficiency or to support planned growth
- Project to address compliance requirements (Design / Regulatory)
- Project with funding from higher orders of government with defined timelines
- Project to address a health and safety concern
- Project to provided needed redundancy
- Project to address asset condition / end-of-life

- Project to undertake a time-sensitive rehab to extend service life
- Project to address a performance deficiency or opportunity to improve process performance
- Project that addresses corrective maintenance requirements / reliability concerns
- Project that will reduce energy consumption / greenhouse gases
- Project that improves climate change resiliency

The above framework has established the foundation upon which asset management and capital infrastructure investment decisions are made. In addition, regular preventative maintenance is also performed to maintain the condition of assets and help ensure expected service lives are achieved.

In 2024, key asset management activities are summarized below.

- **Corporate Asset Management System Program**

The Corporate Asset Management System includes the following:

1. Work Management System (Lucity) - an enterprise level software product to be used by asset-owning Divisions at the Region of Waterloo to perform maintenance and all other work on assets. Water and Wastewater Services' implementation of Lucity was completed in early 2019. Continuous improvements are on-going.

- **Asset Management Planning**

The Asset Management Plan (AM Plan) is a long-range planning document that is used to provide a rational framework for managing the Region's assets. The Region's AM Plan contains consolidated information that is currently available for the Region's assets to provide both a short term (10 year) and a long term (50 year) focus. The AM Plan is a written representation of proposed risk reduction programs and strategies for the Region's assets based on understanding of customer requirements, regulatory compliance, and the ability of the assets to meet required levels of service. This AM Plan forecasts future costs and assists in predicting future problems that may hinder service delivery. This creates opportunities for the Region's asset managers and operators to remove physical, financial and political barriers before they negatively affect customer levels of service.

Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure, requires that Asset Management Policy be reviewed and updated as required at least every five years. That asset management policy establishes the framework and guiding principles and process for asset management practice. The asset management policy is based on the following:

- Corporate strategies, organization and culture
- Customer and stakeholder requirements
- Industry and Regional asset management practice maturity including process, people and technology.

In 2023, the Asset Management Policy review and update was completed and approved by Council (November 2023). Updates to the policy included alignment with the Region's current Strategic Plan.

The regulation also requires that every municipality prepare an AM Plan for all of its municipal infrastructure assets by July 1, 2025. In 2024, the Region retained a consultant to support the development of the 2025 AM Plan. Ongoing efforts were made in 2024 to support the 2025 Asset Management Plan.

- **Lucity Data Standardization and Data Uploads**

Lucity, in addition to being a corporate work management system (WMS), is also the Region's asset registry: a single source of data for the Region's vertical and linear infrastructure assets. The goal is to have a single asset repository that will also support the corporate decision support system (DSS), regulatory asset management reporting, and other required reporting through Power BI.

In 2021, a data standardization initiative was initiated. This ongoing initiative has the following objectives:

- Develop a consistent data standard
- Establish a process for data uploading in Lucity
- Apply a data standard to data already loaded into Lucity from previous work management systems
- Pair and load data collected through Water and Wastewater Services' Inventory, Condition, and Capital Planning Assessments

In 2021, existing data within Lucity was updated according to the defined data standard, and a process for bulk updates of asset data in Lucity was established. The focus in 2022 was to begin the process of pairing and loading data collected from recent Water Inventory, Condition, and Capital Planning Assessments (2018 or more recent) in Lucity. The process was completed in 2023 with more than 15,000 new equipment assets added in Lucity. Numerous updates were also made through the data cleansing process. A similar process is on-going for wastewater assets.

Significant progress in data quality will support the 2025 Asset Management Plan referenced above. By the end of 2024 approximately 80% of asset registry data now resides in Lucity.

Inventory Management Protocol

In 2022, a project to formalize the workflow for inventory management associated with capital and Operation & Maintenance work was initiated. The objective of this project was to identify and define improvements to the Inventory Management Protocol (IMP) and develop clear workflow(s) for implementation. The goal is to ensure changes to assets resulting from all types of work, both capital and operations and maintenance, are accurately and efficiently reflected in Lucity, in support of data management and effective lifecycle management of Water and

Wastewater assets. The project continued into 2023/2024 and included consultation with all stakeholders that oversee capital or operation and maintenance work. Collaboration with stakeholders and documentation of workflow(s) were completed, increasing alignment on the "what", "why", and "how" to manage assets within Lucity, as well as improve the timeliness of updating asset data, consistency, and completeness within Lucity.

A training program was developed and offered to staff in February 2024 to support use of the protocol and template.

- **Project Tracking Tool: "PeTey"**

PeTey is a web-based application used to identify and track water and wastewater projects. Project Managers within Water and Wastewater Services and Design and Construction have been provided access to this tool to track project scope, schedule, budget, spending and prioritization of capital projects. PeTey provides a consolidated list of capital projects: completed projects, projects that are in progress, as well as planned future projects. This tool is used to support Project Status Reporting (PSR), preparation of the capital program each year, as well as to monitor project spending against capital budgets.

The following summarizes the improvements made to the system in 2024:

  - Continued administrative support of the PeTey web-based tool as well as providing ongoing training and support to staff.
  - Continued support of the Power BI PSR Dashboard.
  - Addition of 295 capital projects, 208 of which are future year projects.

- **Project Requests Tracking System: Bitrix**

Bitrix is an online application used to track water and wastewater capital project requests, with the objective of improving consistent and transparent review of new capital project requests as well as communication. In 2024, 52 project requests were submitted by staff, 40 were reviewed and recommended for the capital budget as required, four (4) were not recommended for capital planning, and eight (8) requests are still in review. Project requests approved in Bitrix are incorporated into the Project Tracking Tool – PeTey, for input into the capital program.

- **Annual Project Prioritization**

Each year a meeting is conducted to review and prioritize capital infrastructure projects identified to start the following year. Meeting stakeholders include representation from Engineering & Planning, Infrastructure & Program Planning, Water Operations, SCADA & Operational Technology, Hydrogeology & Water Programs, and others as required. The objectives of the project prioritization meeting are as follows:

  - Review the water capital project list
    - Consistent with DWQMS – Element 15, 4.8.5 The Manager, Water Operations and Maintenance Shall Ensure:

In collaboration with the Manager, Infrastructure & Program Planning, a long-term forecast for infrastructure maintenance, rehabilitation, and renewal programs are reviewed at least every calendar year.

- Confirm Project Prioritization
    - Consistent with DWQMS – Element 14, 4.1.3: The Manager, Infrastructure & Program Planning Shall Ensure:

      A capital works priority projects list is developed and updated annually, in collaboration with Hydrogeology and Water Programs, and Engineering and Planning personnel, to include:
        - new supply and distribution system infrastructure
        - existing infrastructure upgrades, identified through the Master Plans, studies and maintenance plans
        - priorities are confirmed through the 10 year budget process, containing the required infrastructure
    - New asset renewal projects are prioritized based on a number of criteria, ranked between 1 to 10, and assigned an overall project priority of High, Medium, Low.
    - Project prioritization will inform the order of execution as well as support decision making related to budget, supply, and/or resource constraints.

The annual meeting serves to create increased project awareness, provide an opportunity for open dialogue, and identify if changes or alternative actions are required to projects such as risk mitigation measures or modified project scope.

- **Water Facility Inventory, Condition, and Capital Planning Assessments**

These assessments are performed to recognize/update all major building, process, and site works assets and components, as well as to assess the current physical condition and performance (capacity, suitability, quality, quantity, and cost or energy efficiency). This information is then used to support a 10 year capital renewal plan and long-term renewal forecast (50 year) for the facility/system.

The following assessments were ongoing in 2024:

- Northfield Pumping Station
- St. Andrews Pumping Station
- Mannheim Water Treatment Residual Management Plant
- Mannheim WTP Chambers
- Mannheim Reservoir and Pumping Station Chambers
- Mannheim Raw Water Transmission Main Chambers
- St. Jacobs and Elmira Transmission Main Chambers

- Shades Mill, Turnbull WTP Filter Wall Cracks Study
- Environmental Enforcement and Laboratory Services Facility
- Petersburg Ground Water Supply System
- Greenbrook Ground Water Supply System
- Laurel Ground Water Supply System / Elevated Tank Discharge Piping
- St. Clements Ground Water Supply System
- Zone 7 Pumping Station and Wells W7 and W8

- **Annual Review and Coordination of Watermain Replacements**

Watermain replacement requirements are reviewed based on the age, material, and condition (break history and leakage reports where available) and are coordinated with both Regional and Local transportation capital programs. Coordination meetings with area municipalities occurred in June/July 2024 in support of capital budgeting processes.

- **Priority Watermain Chamber Assessments**

In 2024, condition assessments were completed for chambers along the Mannheim Raw Water Transmission Main, and the St. Jacobs / Elmira Transmission Main. Both transmission mains currently have no redundancy, and have a very high consequence of failure. The assessments will confirm condition of each chamber and associated assets and provide recommendations for required short and long-term renewal. Report and recommendations will be completed in 2025.

- **Grand River Intake Weir System Assessment**

In 2024, a consultant was retained to undertake a Public Safety Assessment of the Mannheim Water Treatment Plant Grand River Intake Weir. The assessment was completed in 2024; reporting and recommendations will be completed in 2025.

- **Elevated Tank Program**

The Region's Water System includes 10 treated water elevated tanks, in addition to two (2) raw water elevated tanks. The Elevated Tank Program includes regular inspections and rehabilitation as described below.

  - Elevated Tank Inspections: The Region undertakes an annual tank inspection program to examine ladders, landings, handrails, appurtenances, venting and overflow screens. These inspections meet or exceed the recommended requirements set out in the AWWA Standard M42-Steel Water Storage Tanks. In addition to annual safety inspections, ROV (Remotely Operated Underwater Vehicle) inspections were carried out for selected tanks as part of the ongoing inspection program while storage facilities are kept online. Cathodic protection inspections were also completed where applicable.
  - Reservoir cleaning and re-coating: The Region is continuing to optimize the capital and O&M program for elevated water storage tanks, with consideration of levels of service, alignment of maintenance or warranty inspections, coating

replacement/rehabilitation or maintenance work with other capital projects. The overall program objective is to define service levels goals, manage risk, minimize lifecycle costs, and improve alignment with other capital projects to minimize downtime.

- In 2024, the Elmira West Elevated tank re-coating warranty inspection and the Laurel tank re-coating warranty inspections were completed. The Mannheim West Raw Water tank was also drained, cleaned and inspected.

- **In-Ground Reservoir/Tank Inspection Program**

The Region's Water System includes many underground or at grade water storage structures (raw water storage tanks, potable water storage tanks, chlorine contact chambers, ozone contact chambers, backwash feed and storage tanks, other storage tanks). The physical condition of these assets and the assets located within are difficult to inspect. Assessment of these structures is facilitated by either ROV (Remotely Operated Underwater Vehicle) while the asset is in service, or physical inspection through person entry. Inspection requires significant advanced planning and may require isolation, draining, cleaning and confined space entry to undertake the inspection. The objective for the reservoir inspection program is to develop a consistent approach to reservoir inspections and renewal to ensure that all assets (i.e. structural, process, electrical, and instrumentation) are captured, and quality information is generated for capital planning.

In 2022, a document to support site-specific Terms of Reference for reservoir inspection and renewal was developed. The document identifies three (3) phases that can be executed as a single project or multiple projects as required:

Phase I is an in-service assessment:

- Inspection undertaken via a Remotely Operated Underwater Vehicle (ROV)
- Accompanied by exterior inspection and chamber inspection
- Minimal operational interruption / involvement required

A Phase I assessment provides an initial look at condition of the reservoir and indication of renewal requirements. This assessment is used to prioritize when the Phase II inspection should be planned.

Phase II is an offline assessment followed by immediate renewal before the reservoir is put back in service:

- Before the reservoir is taken out of service, the necessary planning is completed to ensure efficient project delivery and minimized downtime.
- Reservoir isolation, draining, cleaning, and inspection via person entry (structural and process specialists).
- Following the inspection, a scope of work recommended to be completed prior to putting the reservoir back online is developed. The goal is to undertake the necessary repairs such that there is not a need to take the reservoir offline again for a least 5 years.
- Contractor retained and repairs completed.

- Disinfection, sampling, and reservoir put back in service.
- Standardized deliverables, including future recommended works.

Phase III is a tender for renewal (if required):

Phase III will be planned and undertaken if additional future renewal work was recommended by the consultant at a later date (ideally a minimum of 5 years following Phase II).

Reservoir Inspection and Renewal work that progressed in 2024 included the following:

- Wellesley Ground Water Supply System – Initiated in 2022, in coordination with upgrades to the Facility, Phase II inspection and renewal was completed in 2023. Final documentation and future recommendations provided in 2024.
- Greenbrook Ground Water Supply System –In coordination with upgrades to the Water Treatment Facility, Phase II inspection and renewal of Reservoirs and Tanks was initiated in 2022. Recommended renewal for Treated Reservoir 2, and the treatment tanks was completed in 2023. Inspection of the Raw Water Reservoir and Treated Water Reservoir 1 resulted in recommendations to decommission both reservoirs. By-passes for both reservoirs were constructed to enable the plant to return to service in 2024. A future reservoir replacement project is identified in the Capital Program.
- Turnbull Reservoir - A Phase I in-service reservoir assessment was undertaken in 2023/2024. Phase II / III design for renewal is now in progress.
- Mannheim Reservoir (5 Cells) – A Phase I in-service reservoir assessment was undertaken in 2023/2024. The scope of work also included interior investigation of the Concrete Pressure Pipe within the reservoir. This project is ongoing with final recommendations anticipated in 2025.
- Linwood Ground Water Supply System – In coordination with upgrades to the Facility, Phase II inspection and renewal was completed in 2024. Final documentation and future recommendations to be provided in 2025.

- **Water Filters Asset Program Development**

Initiated in late 2021, the key objective of this initiative is to refine the filtration system asset hierarchy in the corporate work management system, Lucity, and recommend best practice life-cycle management strategies for filtration assets. The deliverables of the program will include a 10 year capital program for filter assets, a 50 year forecast, operation and maintenance recommendations, as well as technical levels of service and key performance indicators. Final documentation and future recommendations were provided in 2024. The existing asset data is currently being reviewed to be updated to represent the recommended hierarchy. Further development and implementation will continue in 2025.

- **Flow Meter Replacement Program**

In 2024, a flow meter replacement strategy was developed to identify and prioritize all flow meters that were nearing or at end of life. The objective was to align flow meter replacement with other planned capital works, or identify logical groupings for new projects. Over 200 flow meters are identified for replacement.

- **Facility/Asset Imaging**

LiDAR (light detection and ranging) is a technology that is being used by Water and Wastewater Services to generate virtual imagery of the Region's water and wastewater facilities.

This technology is used to facilitate discussion during meetings and project planning activities, assist design, tendering and construction activities. The imaging of the water and wastewater facilities enables staff, consultants, and contractors to view the sites, without the need for in-person site visits. The imaging is a widely and routinely used resource for staff for many purposes, and has the added benefit of reducing Greenhouse Gas (GHG) emissions by reducing the travel to sites.

The library of virtual tours includes 336 active spaces at both water and wastewater sites. Imaging has been expanded to include assets when they are taken out of service for inspection such as chambers, reservoirs, and tanks.

APPENDIX A – QMS MANAGEMENT REVIEW

DATE: November 26, 2024

TIME: 12:30pm – 4:30pm

PLACE: Mannheim Training Room

PRESENT: Peter Clarke, Dale Wiens, Kathy Taylor, Mark Chen, Ryan Snider, Mari MacNeil, Jennifer Rose, Aldo Franco (Public Health), Bernadette Moussa (Public Health), Frank Kosa (Design & Construction)

REGRETS: None

1) QMS Management Review Process

A summary was provided of the Management Review purpose and objectives - to evaluate the effectiveness and appropriateness of the QMS and to address any deficiencies.

2) QMS Policy Review and Approval

The QMS policy was reviewed and continues to be appropriate.

3) DWQMS Management Review Requirements

Required Management Review agenda items were discussed in accordance with the procedure.

4) Roundtable Discussion

Management Review discussion conducted as per presentation and agenda.

5) Previous Action Items - Follow-up

Reviewed 2023 Management Review action items and status:

I. Review/Implement 2023 Internal and External Audit Findings

Zero (0) non-conformance issues were identified. Sixteen (16) opportunities for improvement (OFI) were identified. Implementation to be assessed and decided by management staff.

Action: QMS Team, Operations & Maintenance (O&M) Supervisors

Status: Ongoing - 8 OFI implemented, 7 in progress, 1 closed.

II. Provide QMS Training to the Design & Construction and Engineering & Planning Groups

Including Municipal Drinking Water Licence (MDWL) and Drinking Water Works Permit (DWWP) training.

Action: QMS Team

Status: Complete. To be provided annually.

III. DEVELOP A MEMO SUMMARIZING POTENTIAL WATER QUALITY REGULATORY CHANGES AND ASSOCIATED IMPACTS TO WATER OPERATIONS & MAINTENANCE CAPITAL PROJECTS

Action: Manager, O&M

Status: Complete

IV. CONTINUE THE DEVELOPMENT AND PROVISION OF IN-HOUSE TRAINING SESSIONS TO ASSIST WITH ACHIEVING REQUIRED ON THE JOB TRAINING HOURS

Particularly beneficial for new staff and supervisors.

Action: QMS Team, O&M Supervisors

Status: Ongoing. Several additional training sessions provided in 2024.

6) INCIDENTS OF REGULATORY NON-COMPLIANCE REVIEW

Ten (10) regulatory non-compliance issues occurred in 2024. For non-compliance issues a corrective/preventative action plan was implemented.

7) OPERATIONAL PLANS AND MUNICIPAL DRINKING WATER LICENSES

- Organizational Changes in Water & Wastewater Services Division.
    - Addition of the Infrastructure and Project Planning Group
    - Updates made to Roles, Responsibilities and Authorities Tables for several positions. Competency Tables to be updated.
- Splitting existing Water and Wastewater Division into 'Water and Wastewater Infrastructure Management' and 'Water and Wastewater Operations'.
- Form 2s generated for the following:
    - Zone 4, 5 Diesel Fuel day tank replacements
    - Well K50 pump replacement
    - Well K21/K21A flow meter removal
    - Well K34 & K29 VFD installation
    - Parkway FCR analyzer feed location relocated

    <u>Upcoming</u>
    - Wellhouse K22A demolition
    - Erb Street Reservoir ammonium sulphate dosing point change
    - Twinning Mannheim Raw Watermain
- Schedule C received for the following:
    - New well W6C commissioned

- Laurel WTP commissioned
- New Pinebush WTP wells commissioned
- Greenbrook raw and treated reservoir bypasses
- St. Clements to Heidelberg watermain
- Linwood significant upgrades underway
- Petersburg upgrades completed

Upcoming

- William Street new wells connected to Strange Street WTP
- Chlorine gas system upgrades at Mannheim WTP

- Construction of the watermain connecting the Heidelberg and St. Clements distribution systems will result in end-dating the Heidelberg waterworks system.
- Operational Plans updated to reflect 2024 Risk Assessment Outcomes

8) General Discussion

- The Ministry of Environment Conservation and Parks (MECP) is in the process of revising the GUDI Terms of Reference and associated Procedure for Disinfection of Drinking Water in Ontario. New facilities and system wells require 4 log virus inactivation vs. current 2 log inactivation. New groundwater wells classified as provisional groundwater may require additional monitoring for potential surface water influence.
- MECP has a working group in place to review and revise the disinfection requirements for water treatment plants, storage facilities and wells in Ontario. Currently, O&M must follow American Water Works Association (AWWA) Standards.
- MECP indicated an application for Regulatory Relief from Schedule 6-2 of Regulation 170/03 (sampling locations) required. Inventory of all IUS facilities underway to determine where relief will be required.
- Increase awareness of the QMS Policy and document review with new hires. Included in the onboarding presentation for O&M staff.
- Discussed occurrences of unlicensed individuals making adjustments to the drinking water system. Letter to be drafted for inclusion at project kick-off meetings.
- Frank K. requests to be notified of any compliance issues related to projects performed by D&C. O&M staff to verify validity of certification for any contracted operators.
- The potential benefits of pairing Transportation D&C Project Managers with Environmental D&C Project Managers on select watermain and road restoration projects was discussed. This approach would provide opportunities to improve

compliance with the Watermain Project Delivery Protocol and the associated design, construction, and commissioning of watermains.

- Linwood iron/manganese filters to be bypassed for approximately 2 months in early 2025. Letter to be sent to homeowners indicating the potential for discoloured water. Commissioner to provide notification to Wellesley Township mayor.
- Discussed MDWL renewals and potential future changes to regulatory requirements. MDWL application submissions required in Fall 2025. Current Licenses expire April 2026.
- New MDWL requirements may include changes to harmful algal bloom response, NSF14 (polyvinyl chloride (pvc) piping) requirements, below grade well inspection frequency, increased primary disinfection requirements from 2 log to 4 log virus inactivation, changes to compliance implications for adverse distribution chlorine residuals among others.
- Discussion on increasing Nitrate levels in the Grand River, particularly in winter. Region has blending with groundwater sources in the Mannheim Reservoir keeping finished water nitrate levels in an acceptable range.
- Discussion on increased cybersecurity risks and control measures. Consider including in an emergency management training session.
- Discussed the requirement for the Region to take over the ownership and operation of the small non-municipal water treatment system in Petersburg. Operational Plan required; Risk Assessment completed. To be included in the 2025 External Reaccreditation Audit. Numerous documents revisions are required.
- Discussed the benefits of reviewing the Public Health AWQI Communication Protocol. Set up a meeting with Public Health, Water Operations and the Corporate Communications Group to review.
- Discussed resources required to maintain and improve the QMS, including:
    - Several internal and external QMS audits and a Municipal Benchmarking exercise completed in late 2023 indicate additional staffing is required to maintain and improve the QMS. Additionally, it has been identified that in the period of 2019-2024 water infrastructure grew by 24.7% and the 10-year capital program grew by 46%, while staff grew by only 3.3%. The Region has become the fastest growing community in Canada, at a time when much of our above ground infrastructure is reaching end of life; the combination of increased equipment failures and increased population-based demand has increased pressure to enhance preventative maintenance, maximize production, and respond quickly to equipment failures.
    - Specific staffing requirements identified were as followed:
        - Administrative (Complete – position approved in March 2024)

  - Health and Safety (Complete – Divisional position approved in 2024 budget process)
  - Operational and Maintenance (In Progress – requested with 2025 budget). Specific request was three specialists to support capital projects, enhance work order development and asset management data analysis, improve succession planning by creating a pathway from union to management, provide enhanced administrative support for future growth of front-line operational staff, and alleviate on-call and Overall Responsible Operator (ORO) staffing restraints.
- Additional equipment, specifically equipment to support distribution system maintenance and repairs (service repairs, valve exercise, isolations, etc.). (In Progress – identified equipment costs requested with 2025 budget)
- Increased internal and external training hours due to staff turnover and retirements

9) ACTION ITEMS

I. REVIEW/IMPLEMENT 2024 INTERNAL AND EXTERNAL AUDIT FINDINGS

- Three (3) minor non-conformances identified.
- Four (4) opportunities for improvement were identified, implementation to be assessed and decided by management staff.

Action: QMS Team, O&M Supervisors

Timeline: Fall 2024

II. PROVIDE QMS TRAINING TO THE DESIGN AND CONSTRUCTION AND ENGINEERING AND PLANNING GROUPS

- Include Compliance requirements as well.

Action: Supervisor, Process and Compliance

Timeline: Spring 2024

III. FINALIZE LETTER TO PROJECT MANAGERS CLARIFYING COMPLIANCE REQUIREMENTS, ASSOCIATED EXPECTATIONS AND POTENTIAL IMPLICATIONS FOR NON COMPLIANCE. LETTER TO BE DISTRIBUTED TO ALL PROJECT DELIVERY STAFF AND ASSOCIATED VENDORS.

Action: Manager, O&M

Timeline: Winter 2025

IV. SET UP MEETING WITH PUBLIC HEALTH TO REVIEW THE AWQI COMMUNICATION PROTOCOL

Action: Supervisor, Process and Compliance

Timeline: Spring 2025

V. CONTINUE THE DEVELOPMENT AND PROVISION OF IN-HOUSE TRAINING SESSIONS TO ASSIST WITH ACHIEVING REQUIRED ON THE JOB TRAINING HOURS

- Particularly beneficial for new staff and supervisors.

Action: QMS Team, O&M Supervisors

Timeline: 2025

10) NEXT STEPS

- Prepare for External (NSF) Reaccreditation Audit, scheduled for January 6-7 and 22-24, 2025.
- Review and implement previous audit findings and staff suggestions as applicable.
- Continue development and provision of in-house training presentations.

APPENDIX B – MECP INSPECTION COMPLIANCE RATINGS

Drinking Water System	Water Works #	Inspection Period	Compliance Rating %
Ayr	220004199	Oct 1, 2023 to Sept 18, 2024	100
Branchton	260002538	May 31, 2023 to May 13, 2024	100
Cambridge	220000166	April 1, 2023 to March 31, 2024	97.02
Integrated Urban Water Distribution System	260097331	September 13, 2023 to August 15, 2024	100
Foxboro	220009210	October 1, 2023 to July 31, 2024	94.18
Heidelberg	220007310	November 9, 2023 to November 14, 2024	100
Kitchener	220003092	October 6, 2023 to October 17, 2024	100
Linwood	220000102	January 1, 2024 to October 30, 2024	100
Lloyd Brown	260002759	January 15, 2023 to January 31, 2024 (current report not received at time of issue)	100
Mannheim WTP	220006981	August 1, 2023 to August 7, 2024	100
Mannheim Village	260002668	August 1, 2023 to June 30, 2024	99.10
Maryhill	220004171	January 5, 2024 to December 16, 2024	100
New Dundee	220004180	November 1, 2023 to October 31, 2024	100
New Hamburg/Baden	220000111	September 1, 2023 to May 31, 2024	100
Petersburg	260006269	N/A	
Roseville	220007301	July 16, 2023 to July 17, 2024	100
Shingletown	260002707	November 1, 2023 to August 31, 2024	94.25
St. Clements	220005811	December 16, 2022 to January 20, 2024 (current report not received at time of issue)	100
Waterloo	220000157	November 1, 2023 to September 30, 2024	100
Wellesley	220004215	September 15, 2023 to October 15, 2024	97.70

APPENDIX C – TREATED WATER FLOW DATA

The following tables summarize the flow rates for 2024, including MDWL Schedule C - Table 1 flow limits and treated water monthly average daily volumes.

Cambridge Drinking Water System – Wells G4/G4A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1900 m^3/day)	**Monthly Average** (m^3/d)
January	17.65	1477	1222
February	16.40	1383	1376
March	16.51	1388	1381
April	16.53	1392	1384
May	18.78	1395	1376
June	16.59	1388	1370
July	17.04	1383	1233
August	16.44	1371	1317
September	16.29	1375	1346
October	16.57	1386	1376
November	16.55	1435	1372
December	16.58	1385	1378
Average			**1344**
Maximum	**18.78**	**1477**	

Cambridge Drinking Water System – Wells G5/G5A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4320 m^3/day)	**Monthly Average** (m^3/d)
January	16.57	1260	1215
February	17.66	1383	1338
March	19.35	1383	1369
April	16.77	1379	1317
May	17.22	1379	1379
June	16.93	1379	1376
July	16.73	1379	1288
August	16.86	1379	1353
September	16.90	1383	1378
October	17.95	1383	1296
November	18.31	1440	1381
December	17.31	1405	1376
Average			**1339**
Maximum	**19.35**	**1440**	

Cambridge Drinking Water System – Well G9			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3,280 m^3/day)	**Monthly Average** (m^3/d)
January	20.28	1492	1431
February	19.05	1479	1434
March	18.66	1457	1394
April	18.70	1453	1370
May	18.60	1521	1378
June	18.17	1442	1372
July	18.19	1415	1334
August	21.13	1371	1316
September	18.29	1455	1343
October	19.38	1358	1260
November	17.44	1345	1214
December	17.26	1292	1214
Average			**1338**
Maximum	**21.13**	**1521**	

Cambridge Drinking Water System – Well H3/H3A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1642 m^3/day)	**Monthly Average** (m^3/d)
January	9.47	778	778
February	9.40	778	778
March	12.40	778	776
April	12.26	778	743
May	11.43	778	774
June	12.12	878	781
July	12.13	881	841
August	14.34	879	836
September	12.07	868	847
October	14.25	1019	840
November	12.28	1059	998
December	16.35	1037	761
Average			**813**
Maximum	**16.35**	**1059**	

Cambridge Drinking Water System – Well H4A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2074 m^3/day)	**Monthly Average** (m^3/d)
January	12.84	1037	1023
February	12.86	1037	1034
March	16.91	1037	1023
April	12.77	1037	1037
May	12.89	1037	1031
June	14.72	1037	1029
July	12.81	1037	999
August	12.69	1037	999
September	14.93	1037	1035
October	12.73	1037	1036
November	12.84	1080	1038
December	12.99	1037	1037
Average			**1027**
Maximum	**16.91**	**1080**	

Cambridge Drinking Water System – Well H5/H5A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1987 m^3/day)	**Monthly Average** (m^3/d)
January	13.34	1037	1036
February	13.03	1037	1037
March	13.37	1037	1035
April	14.05	1037	905
May	12.35	864	851
June	12.16	864	864
July	12.13	864	837
August	11.82	864	848
September	12.13	864	863
October	12.02	864	807
November	10.78	900	865
December	10.73	864	864
Average			**901**
Maximum	**14.05**	**1037**	

Cambridge Drinking Water System – Middleton Wells (G1, G1A, G2, G3, G14, G15)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 40349 m^3/day)	**Monthly Average** (m^3/d)
January	397.97	23701	19500
February	397.81	21656	19911
March	397.85	20956	19313
April	397.56	23580	19830
May	398.67	24190	20747
June	396.36	21999	20291
July	305.88	23326	20680
August	303.75	21609	19830
September	358.43	23330	20248
October	343.48	22936	19921
November	330.83	20642	19569
December	309.81	22524	19969
Average			**19984**
Maximum	**398.67**	**24190**	

Cambridge Drinking Water System – Pinebush Wells (P10A, P10B, P11, P17, P19)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 10368 m^3/day)	**Monthly Average** (m^3/d)
January	57.83	3462	2429
February	83.04	3242	533
March	76.07	3811	1809
April	75.96	3687	2960
May	55.71	3364	2725
June	49.98	3364	2786
July	45.85	3113	2854
August	43.55	3109	2727
September	43.73	2760	2641
October	45.79	2930	2205
November	45.76	3106	2217
December	43.69	3109	2577
Average			**2372**
Maximum	**83.04**	**3811**	

Cambridge Drinking Water System – Well P16			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1961 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			0
Maximum	0	0	

Cambridge Drinking Water System – Well P9			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1728 m^3/day*)	**Monthly Average** (m^3/d)
January	18.40	1556	1555
February	18.46	1556	1555
March	18.52	1556	1553
April	18.37	1556	1555
May	18.46	1556	1555
June	18.46	1556	1555
July	18.42	1556	1507
August	19.07	1556	1527
September	18.46	1556	1555
October	18.55	1556	1555
November	18.44	1601	1557
December	18.48	1556	1511
Average			**1545**
Maximum	**19.07**	**1601**	

Cambridge Drinking Water System – Well P15A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1728 m^3/day)	**Monthly Average** (m^3/d)
January	16.82	1383	1352
February	16.54	1383	1373
March	16.55	1383	1364
April	16.60	1383	1327
May	20.40	1728	1493
June	20.12	1728	1332
July	15.53	1297	1255
August	16.18	1297	1272
September	15.64	1296	1291
October	15.68	1296	1274
November	15.59	1334	1268
December	15.61	1297	1213
Average			**1318**
Maximum	**20.40**	**1728**	

Cambridge Drinking Water System – Shades Mill Wells (G7, G8, G38, G39, G40)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 12960 m^3/day)	**Monthly Average** (m^3/d)
January	102.36	6805	3352
February	101.57	4766	3548
March	100.55	4996	3440
April	101.42	4175	2808
May	102.38	7561	4391
June	102.18	7027	5432
July	104.17	6853	4882
August	103.69	6396	4857
September	103.03	6897	4626
October	102.78	5943	4006
November	102.59	5031	4367
December	102.00	7113	4867
Average			**4215**
Maximum	**104.17**	**7561**	

Cambridge Drinking Water System – Turnbull Wells (G6, G16, G17, G18)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 10368 m^3/day)	**Monthly Average** (m^3/d)
January	104.13	4689	2838
February	104.19	5078	3719
March	127.16	4775	2927
April	121.91	5058	2818
May	103.54	5315	3170
June	101.66	5555	3565
July	105.99	4948	3311
August	105.00	5008	3355
September	104.52	6618	3529
October	88.79	4493	2322
November	92.55	3249	1706
December	91.86	3133	2077
Average			**2945**
Maximum	**127.16**	**6618**	

Kitchener Drinking Water System – Greenbrook Wells (K1A, K2A, K4C, K5A, K8)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 12269 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	180.59	8554	7322
June	156.54	8086	7219
July	128.11	8788	7942
August	165.94	8393	7887
September	158.49	8085	7317
October	159.37	6460	6365
November	148.64	6670	6428
December	137.17	6460	6369
Average			**7106**
Maximum	**180.59**	**8788**	

Kitchener Drinking Water System – Wells K34/K36			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6868 m^3/day)	**Monthly Average** (m^3/d)
January	59.74	3876	3442
February	56.36	3844	3209
March	57.59	3845	3661
April	50.56	3028	1940
May	58.13	3877	3448
June	57.20	3849	3655
July	56.79	3857	3704
August	56.21	3911	3655
September	56.43	3908	3654
October	56.67	3871	3562
November	55.58	3884	3596
December	57.17	3841	3060
Average			**3382**
Maximum	**59.74**	**3911**	

Kitchener Drinking Water System – Parkway Wells (K31, K32, K33)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 13737 m^3/day)	**Monthly Average** (m^3/d)
January	59.00	6110	4495
February	57.36	6829	4210
March	53.01	5787	4205
April	52.47	6163	4407
May	62.94	5537	4085
June	65.11	5701	4154
July	63.13	6596	4268
August	63.96	7489	4222
September	61.15	6550	3951
October	59.50	3449	250
November	0	0	0
December	0	0	0
Average			**3825**
Maximum	**65.11**	**7489**	

Kitchener Drinking Water System Strange St. Wells (K10A, K11A, K13B, K18, K19)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 15854 m^3/day)	**Monthly Average** (m^3/d)
January	103.13	8214	8074
February	102.58	8236	7545
March	101.97	8231	6216
April	99.91	8098	5001
May	108.25	8108	7849
June	96.81	8041	7789
July	110.27	8787	8011
August	113.24	8801	8321
September	99.48	8143	6774
October	100.66	7921	7701
November	98.91	7904	7471
December	99.86	7412	7293
Average			**7337**
Maximum	**113.24**	**8801**	

Kitchener Drinking Water System – Woolners Wells (K80, K81, K82)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 11146 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			0
Maximum	0	0	

Mannheim WTP Drinking Water System – Well K21			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2765 m^3/day)	**Monthly Average** (m^3/d)
January	27.95	2160	1589
February	25.49	2161	2159
March	25.60	2161	2147
April	28.90	2160	2155
May	26.75	2160	2149
June	27.00	2161	2147
July	25.47	2160	2145
August	25.47	2160	2134
September	25.25	2130	2090
October	25.62	2077	2033
November	25.05	2051	2009
December	25.12	2060	1983
Average			**2062**
Maximum	**28.90**	**2161**	

Mannheim WTP Drinking Water System – Well K21A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2160 m^3/day)	**Monthly Average** (m^3/d)
January	25.68	1728	1270
February	20.33	1729	1728
March	20.50	1728	1719
April	27.05	1728	1728
May	23.99	1728	1726
June	23.92	1729	1724
July	20.74	1728	1726
August	26.64	2091	1762
September	20.33	1729	1721
October	21.05	1729	1713
November	24.16	1951	1715
December	22.33	1729	1701
Average			**1686**
Maximum	**27.05**	**2091**	

Mannheim WTP Drinking Water System – Well K25			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6826 m^3/day)	**Monthly Average** (m^3/d)
January	64.35	5299	4293
February	56.10	4605	4515
March	56.68	4580	4509
April	60.02	4583	4538
May	77.91	5183	4562
June	50.42	3795	3699
July	52.50	3731	3702
August	51.69	3898	3725
September	62.05	4458	4006
October	64.38	4526	4331
November	63.98	4476	4425
December	60.04	4627	4433
Average			**4228**
Maximum	**77.91**	**5299**	

Mannheim WTP Drinking Water System – Well K29			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5270 m^3/day)	**Monthly Average** (m^3/d)
January	61.13	4859	3545
February	58.86	3716	3572
March	59.27	3626	3549
April	56.23	3633	3547
May	58.37	3999	2740
June	58.96	4308	4119
July	52.91	4219	4018
August	57.47	4297	3948
September	59.45	4296	3924
October	57.91	3737	3571
November	59.38	3792	3694
December	54.49	3880	3573
Average			**3650**
Maximum	**61.13**	**4859**	

Mannheim WTP Drinking Water System – ASR1			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5010 m^3/day)	**Monthly Average** (m^3/d)
January	16.06	410	27
February	9.49	541	90
March	7.53	316	18
April	8.31*	0	0
May	11.36*	0	0
June	14.08*	0	0
July	12.54*	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			**45**
Maximum	**16.06**	**541**	

*Running to waste.

Mannheim WTP Drinking Water System – ASR2			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3283 m^3/day)	**Monthly Average** (m^3/d)
January	13.38	658	50
February	14.76	1057	187
March	12.79	580	32
April	0	0	0
May	0	0	0
June	16.63	335	21
July	18.21	83	5
August	17.15	1049	98
September	17.08	1108	245
October	15.25	350	24
November	0	0	0
December	0	0	0
Average			**83**
Maximum	**18.21**	**1108**	

Mannheim WTP Drinking Water System – ASR3			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3974 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	6.17*	0	0
May	0	0	0
June	12.11*	0	0
July	13.70*	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			**0**
Maximum	**13.70**	**10**	

*Running to waste.

Mannheim WTP Drinking Water System – ASR4			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5443 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			**0**
Maximum	**0**	**0**	

Mannheim WTP Drinking Water System – ASR5			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5504 m^3/day)	**Monthly Average** (m^3/d)
January	29.00	1322	112
February	45.28	3888	621
March	45.23	3792	345
April	45.24	241	24
May	45.23	1399	71
June	45.94	3368	441
July	45.25	3738	282
August	45.25	3888	409
September	45.23	3888	878
October	45.27	1649	270
November	45.28	1871	443
December	45.26	3888	349
Average			**354**
Maximum	**45.94**	**3888**	

Mannheim WTP Drinking Water System – RCW2			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5443 m^3/day)	**Monthly Average** (m^3/d)
January	37.72	1894	158
February	37.24	3024	557
March	34.97	2782	255
April	35.28	158	19
May	35.26	1025	48
June	34.77	2471	320
July	34.79	2718	205
August	35.14	2851	292
September	56.23	2852	642
October	35.30	1210	198
November	35.77	1373	325
December	34.58	2851	253
Average			**273**
Maximum	**56.23**	**3024**	

Mannheim WTP Drinking Water System – RCW3			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2592 m^3/day*)	**Monthly Average** (m^3/d)
January	26.83	1355	114
February	28.71	2160	262
March	26.67	688	30
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	29.34	2160	195
September	30.23	2160	488
October	30.23	916	123
November	30.32	1039	246
December	29.94	2160	194
Average			**207**
Maximum	**30.32**	**2160**	

Mannheim WTP Drinking Water System – RCW4			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3888 m^3/day)	**Monthly Average** (m^3/d)
January	40.24	2159	180
February	40.27	3024	572
March	35.96	2951	270
April	35.59	192	20
May	36.42	186	19
June	42.01	2619	344
July	36.16	2873	219
August	35.26	3024	318
September	36.97	3024	683
October	36.45	1283	206
November	37.52	1456	345
December	38.26	3024	272
Average			**287**
Maximum	**42.01**	**3024**	

Mannheim WTP Drinking Water System – Well K91			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	40.10	3310	2986
February	39.53	3322	2790
March	39.90	3292	1998
April	39.88	3280	2670
May	40.14	3289	1894
June	40.23	3279	1654
July	40.21	3277	1947
August	40.11	3288	2046
September	39.90	3294	2649
October	40.17	3268	1924
November	40.29	3317	882
December	39.32	3236	2251
Average			**2141**
Maximum	**40.29**	**3322**	

Mannheim WTP Drinking Water System – Well K92			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	41.96	3460	3071
February	41.94	3393	2858
March	42.72	3416	2084
April	41.61	3356	2697
May	41.99	3355	1938
June	42.54	3358	1718
July	42.46	3353	1988
August	42.44	3461	2126
September	42.32	3366	2706
October	44.08	3684	2131
November	45.09	3753	2653
December	42.18	3455	2300
Average			**2356**
Maximum	**45.09**	**3753**	

Mannheim WTP Drinking Water System – Well K93			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	44.40	3574	3057
February	43.34	3454	2896
March	50.36	3556	2264
April	49.87	3418	2754
May	46.45	3428	1970
June	49.48	3422	1768
July	46.41	3426	2041
August	45.11	3431	2147
September	52.15	3421	2758
October	45.18	3485	2240
November	44.17	3496	798
December	51.77	3433	2372
Average			**2255**
Maximum	**52.15**	**3574**	

Mannheim WTP Drinking Water System – Well K94			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	43.25	3423	2896
February	41.20	3411	2858
March	43.74	3546	2262
April	45.20	3455	2715
May	44.03	3364	1946
June	43.84	3396	1757
July	44.32	3332	1986
August	75.00	3489	2125
September	45.20	3367	2695
October	43.43	3511	2162
November	44.12	3697	2563
December	43.82	3429	2301
Average			**2356**
Maximum	**75.00**	**3697**	

Mannheim WTP Drinking Water System – Grand River Intake (Mannheim WTP)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 72576 m^3/day)	**Monthly Average** (m^3/d)
January	775.57	46543	39281
February	705.34	55113	36735
March	779.03	46573	35721
April	1000.00*	43225	36371
May	683.28	41822	36163
June	729.10	48980	39139
July	573.89	45052	39115
August	476.49	44221	38275
September	1000.00*	54580	43460
October	1000.00*	47040	37771
November	817.94	43753	38805
December	704.37	55461	40121
Average			**38413**
Maximum	**1000.00**	**55461**	

*Less than 5 minute flow spike.

Mannheim Village Drinking Water System – Well K22A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			**0**
Maximum	**0**	**0**	

Mannheim Village Drinking Water System – Well K23			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	28.02	2218	2122
February	29.02	2207	2150
March	32.50	2203	1710
April	25.29	1999	1803
May	23.85	1989	1958
June	25.69	1988	1941
July	26.46	1987	1980
August	23.70	1986	1970
September	25.01	1986	945
October	25.57	1905	1823
November	24.46	1983	1883
December	22.87	1905	1851
Average			**1845**
Maximum	**32.50**	**2218**	

Mannheim Village Drinking Water System – Well K24			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	34.58	2592	2586
February	51.76	3026	2795
March	43.61	3024	3000
April	46.38	3025	3022
May	39.25	3025	3022
June	39.10	3025	3019
July	43.21	3025	3024
August	40.27	3456	3013
September	38.62	3024	3010
October	45.66	3025	2972
November	42.49	3303	3035
December	46.80	3025	2984
Average			**2957**
Maximum	**51.76**	**3456**	

Mannheim Village Drinking Water System – Well K26			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 9850 m^3/day)	**Monthly Average** (m^3/d)
January	96.52	7777	6827
February	98.57	8468	6430
March	94.29	7604	5669
April	94.22	7604	5584
May	96.61	7604	4155
June	96.10	7604	4618
July	102.63	7604	3628
August	100.41	8640	4408
September	95.99	7604	6256
October	93.35	7603	5084
November	100.39	8275	5235
December	102.15	7604	4491
Average			**5199**
Maximum	**102.63**	**8640**	

Shingletown Drinking Water System – Wells K50/K51			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 13651 m^3/day)	**Monthly Average** (m^3/d)
January	145.57	11225	4889
February	139.57	11664	9019
March	138.48	11234	10641
April	138.69	11234	11193
May	139.43	11234	11166
June	139.68	11234	11213
July	139.53	11234	11198
August	163.14*	11751	10332
September	73.58	6051	6047
October	148.45	11578	10750
November	140.99	11610	11234
December	140.27	11232	7419
Average			**9592**
Maximum	**163.14**	**11751**	

*Less than 5 minute flow spike.

Waterloo Drinking Water System – Erb Street Wells (W6B, W6C, W7, W8)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 24139 m^3/day)	**Monthly Average** (m^3/d)
January	155.80	13448	12371
February	156.71	13634	12350
March	151.09	14021	12483
April	165.86	13994	12141
May	154.99	13305	11821
June	150.74	13880	12148
July	151.63	13196	12338
August	161.60	12985	10701
September	148.50	13736	11558
October	156.04	13191	12027
November	150.58	13146	10713
December	144.69	13500	11591
Average			**11854**
Maximum	**165.86**	**14021**	

Waterloo Drinking Water System – William Street Wells (W1B, W1C, W2, W3)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 16753 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			0
Maximum	0	0	

Waterloo Drinking Water System – Well W10			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2160 m^3/day)	**Monthly Average** (m^3/d)
January	22.52	1901	1889
February	22.57	1901	1837
March	22.60	1901	1891
April	22.69	1901	1879
May	22.63	1901	1897
June	22.65	1901	1682
July	19.50	1556	1532
August	22.57	1901	1631
September	20.75	1728	1715
October	20.85	1728	1700
November	20.87	1800	1184
December	21.55	1728	1250
Average			**1674**
Maximum	**22.69**	**1901**	

Waterloo Drinking Water System – Well W25			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6,826 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	70.94*	2536	352
March	66.94*	4756	4151
April	62.74*	4791	4644
May	59.04	4560	3995
June	57.84	4579	4511
July	72.49*	4623	4472
August	57.83	4700	4501
September	65.48*	4528	4300
October	69.45*	4244	4011
November	66.00*	4093	3841
December	73.66*	3987	3413
Average			**3836**
Maximum	**73.66**	**4791**	

*Less than 5 minute flow spike.

New Hamburg/Baden Drinking Water System – Wells (NH3, NH4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3542 m^3/day)	**Monthly Average** (m^3/d)
January	45.95*	1897	1739
February	44.24*	1940	1726
March	43.22*	1988	1763
April	44.27*	1890	1787
May	48.72*	2364	1962
June	42.93*	2317	1978
July	42.25*	2283	1977
August	40.37	2117	1865
September	39.79	2115	1910
October	35.74	2043	1807
November	40.04	1959	1733
December	43.90*	2110	1818
Average			**1839**
Maximum	**48.72**	**2364**	

*Less than 5 minute flow spike.

Ayr Drinking Water System – Wells (A1, A2, A3)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5478 m^3/day)	**Monthly Average** (m^3/d)
January	66.17	2421	2174
February	70.18	2664	2209
March	71.14	2404	2101
April	69.83	2280	2057
May	71.87	2982	2316
June	71.43	3086	2385
July	70.25	3112	2198
August	68.33	2863	2199
September	74.42	2910	2275
October	69.34	2261	1902
November	70.01	2124	1788
December	71.97	2143	1847
Average			**2121**
Maximum	**74.42**	**3112**	

Branchton Drinking Water System – Wells (BM2, BM3)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 130 m^3/day)	**Monthly Average** (m^3/d)
January	1.27	47	35
February	1.29	42	36
March	1.24	45	38
April	1.27	62	44
May	1.26	76	51
June	1.30	78	55
July	1.23	79	60
August	1.20	78	66
September	1.28	79	67
October	1.30	80	72
November	1.31	109	90
December	1.30	113	40
Average			**54**
Maximum	**1.31**	**113**	

Roseville Drinking Water System – Wells (R5, R6)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 357.7 m^3/day)	**Monthly Average** (m^3/d)
January	4.18*	60	42
February	3.49	48	41
March	3.48	50	41
April	3.44	60	44
May	3.43	76	57
June	3.38	93	64
July	3.41	111	69
August	3.38	84	69
September	3.39	87	65
October	3.39	73	54
November	3.42	79	51
December	3.36	54	45
Average			**53**
Maximum	**4.18**	**111**	

*Less than 5 minute flow spike.

Heidelberg Drinking Water System – Wells (HD1, HD2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1373.8 m^3/day)	**Monthly Average** (m^3/d)
January	9.35	177	146
February	9.28	164	143
March	9.10	178	141
April	8.92	174	148
May	8.92	222	172
June	9.02	264	187
July	8.69	260	184
August	8.84	212	171
September	8.88	237	189
October	8.87	193	160
November	8.92	201	59
December	0.00	0	0
Average			**155**
Maximum	**9.35**	**264**	

Maryhill Drinking Water System – Maryhill WTP- Wells (MH1, MH2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 157 m^3/day)	**Monthly Average** (m3/d)
January	1.66	50	26
February	1.80	50	29
March	1.62	41	30
April	2.00*	38	31
May	2.00*	48	35
June	1.82*	58	41
July	1.74	51	36
August	1.98*	50	39
September	1.73	54	37
October	2.01*	42	28
November	2.00*	16	1
December	0	0	0
Average			**30**
Maximum	**2.01**	**58**	

*Less than 5 minute flow spike.

Maryhill Drinking Water System – Maryhill Heights- Wells (MH4A, MH5)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 812 m^3/day)	**Monthly Average** (m^3/d)
January	5.85	74	35
February	6.17	41	26
March	7.18	36	27
April	5.83	46	30
May	8.50	84	46
June	10.00	125	67
July	14.77	142	77
August	11.73	144	94
September	14.77	148	90
October	14.76	107	50
November	14.63	75	62
December	12.90	85	66
Average			**56**
Maximum	**14.77**	**148**	

Linwood Drinking Water System – Wells (L1A, L2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 604.8 m^3/day)	**Monthly Average** (m^3/d)
January	7.58	273	252
February	7.56	285	267
March	7.48	350	312
April	7.58	402	342
May	7.57	315	254
June	7.62	292	251
July	7.60	272	231
August	7.55	223	207
September	9.73	263	214
October	10.00	202	182
November	11.26	196	171
December	7.59	192	169
Average			**238**
Maximum	**11.26**	**402**	

St. Clements Drinking Water System – Wells (SC2, SC3, SC4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1771.2 m^3/day)	**Monthly Average** (m^3/d)
January	16.46	234	203
February	16.41	221	203
March	16.58	232	199
April	27.50*	237	208
May	29.96*	304	242
June	16.79	364	262
July	16.61	115	223
August	16.83	198	135
September	17.13	311	194
October	16.55	306	132
November	16.57	340	217
December	16.62	409	328
Average			**212**
Maximum	**29.96**	**409**	

*Less than 5 minute flow spike.

Wellesley Drinking Water System – Wells (WY1, WY5, WY6)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3006 m^3/day)	**Monthly Average** (m^3/d)
January	20.21*	698	596
February	20.99*	690	595
March	20.74*	724	599
April	20.85*	709	601
May	20.97*	776	643
June	21.09*	859	686
July	20.68*	782	664
August	21.23*	675	590
September	21.26*	701	624
October	20.98*	777	630
November	21.26*	663	596
December	20.76*	726	635
Average			**622**
Maximum	**21.26**	**859**	

*Less than 5 minute flow spike.

Foxboro Drinking Water System – Wells (FG1, FG2A, FG4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 288 m^3/day)	**Monthly Average** (m^3/d)
January	2.64	83	73
February	2.52	91	67
March	2.45	84	67
April	6.12	83	70
May	3.76	87	76
June	4.39	83	73
July	2.30	82	70
August	2.60	82	72
September	2.12	92	80
October	2.73	95	82
November	2.38	102	82
December	2.19	114	92
Average			**75**
Maximum	**6.12**	**114**	

New Dundee Drinking Water System – Wells (ND4, ND5)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 982.2 m^3/day)	**Monthly Average** (m^3/d)
January	6.76	236	168
February	6.80	208	167
March	15.67*	197	167
April	6.62	214	170
May	6.44	316	207
June	6.34	254	202
July	6.60	299	210
August	6.29	255	198
September	6.19	265	208
October	6.17	217	174
November	5.97	181	162
December	6.09	232	182
Average			**185**
Maximum	**15.67**	**316**	

*Less than 5 minute flow spike.

Petersburg Drinking Water System – Well PE1			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 288 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	1.93*	77	25
July	6.37	80	58
August	4.02	78	53
September	4.02	66	43
October	4.00	56	37
November	3.99	73	37
December	3.99	35	27
Average			**40**
Maximum	**6.37**	**80**	

*Estimated based on average day. Facility commissioning in progress.

APPENDIX D – SYSTEM INFORMATION

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	System Type
Cambridge Drinking Water Supply System (IUS)	Galt Wells	G4/G4A	012-102 / 012-202	P-300-2229080479	WT Class III #8125	Large
		G5/G5A		P-300-6117976847		
		G9		Grandfathered		
	Hespeler Wells	H3/H3A		P-300-3214426699		
		H4A		1008-BW6L62		
		H5/H5A		P-300-1161883172		
	Middleton WTP	G1, G1A, G2, G3, G14		7214-AMGR5G		
		G15		6132-AKURBN		
	Pinebush WTP	P10, P10A, P10B, P11 P17, P19		7858-BXUUUH		
	Preston Wells	P16		2004-AKXNEB		
	Rahmans Wells	P9 P15/P15A		7600-A27N5B		
	Shades Mill WTP	G7, G8, G38, G39, G40		3004-A9GHYU		
	Turnbull WTP	G6, G16, G17, G18, G19		5552-BUKM94		
Kitchener Drinking Water Supply System (IUS)	Greenbrook WTP	K1A, K2A, K4C, K5A, K8	012-102 / 012-202	0071-BUKPU5	WT Class III #8126	Large
	K34 WTP	K34 K36		6732-A3FJYA		
	Parkway WTP	K31, K32		Grandfathered		
		K33		3115-AMHHXH		

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	System Type
	Strange Street WTP	K10A K11A K13B K18, K19		P-300-6221899077		
	Woolners Wells	K80, K81, K82		0288-BA8LR8		
Mannheim Drinking Water Supply System (IUS)	Mannheim WTP	Grand River	012-102 / 012-202	Hidden Valley 0366-AYCP5A (Mannheim WTP supply only) Mannheim Consolidated P-300-3130244509 (Mannheim Wells, Peaking Wells and ASRs)	WT Class IV #1843	Large
	ASR Wells	ASR1 ASR2 ASR3 ASR4 ASR5 RCW2 RCW3 RCW4				
	K90 Peaking Wells	K91 K92 K93 K94				
	Mannheim Wells	K21/K21A K25 K29				
Waterloo Drinking Water Supply System (IUS)	Erb Street Wells	W6B W6C W7 W8	012-102 / 012-202	1541-AWGPZR	WT Class II #8127	Large
	Waterloo Wells	W10 W25 W5A		0061-BLHQ45		
	William Street Wells	W1B W2B W2C W3A		P-300-5049623280		

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	System Type
Integrated Urban Water Distribution System	Cambridge, Kitchener, Waterloo, Wilmot and Woolwich	IUS Sources	012-102 / 012-202	N/A	WD Class IV #8128	Large
North Dumfries Township Drinking Water Supply Systems	Ayr WTP	A1 A2 A3	012-113 / 012-213	P-300-2094925631	WT Class II #2591 & WD Class II #362	Large
	Branchton WTP	BM1 BM2 BM3	012-111 / 012-211	2577-9TPMWL	Limited Groundwater	Small
	Lloyd Brown Distribution		012-102 / 012-202	N/A	Limited Groundwater	Small
	Roseville WTP	R5 R6	012-101 / 012-201	P-300-3116859114	Limited Groundwater	Small
Wellesley Township Drinking Water Supply Systems	Heidelberg WTP	HD1 HD2	012-104 / 012-204	2437-B8FR7E	WT Class II #3101 Class II WD 3610	Large
	Linwood WTP	L1A L2	012-108 / 012-208	2680-B8HT58	WT Class II #3594 WD Class II #1951	Large
	St. Clements WTP	SC2 SC3 SC4	012-110 / 012-210	P-300-5118893858	WT Class II #2598 WD Class II 1952	Large
	Wellesley WTP	WY1 WY5 WY6	012-115 / 012-215	P-300-4214409441	WT Class II #2601 WD Class II 1953	Large

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	System Type
Wilmot Township Drinking Water Supply Systems	Foxboro	FG1 FG2A FG4	012-105 / 012-205	2544-BBHP4S	WT Class I #2599	Large
	Mannheim Village Wells	K23 K24 K26	012-102 / 012-202	P-300-3130244509	WT Class I #3603	Large
	New Dundee Wells	ND4 ND5	012-107 / 012-207	5581-B84PGT	WDS Class I #3595	Large
	New Hamburg WTP	NH3 NH4	012-102 / 012-202	7021-AQRK39	WT Class II #2930	Large
	Shingletown Wells	K50 K51	012-102 / 012-202	P-300-4271733410	WDS Class I #3593	Large
	Petersburg	PE1	N/A, 012-216	3478-D83LM9	N/A	Non-Municipal Year-Round Residential
Woolwich Township Drinking Water Supply Systems	Maryhill Village Heights Wells	MH4A MH5	012-106 / 012-206	1746-BBWLJR	WT Class I #8867	Large
	Maryhill WTP	MH1 MH2		2613-BBKR76	WT Class I #8867	Large