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ST. THOMAS WATER DISTRIBUTION SYSTEM

License Number: 057-101
Permit Number: 057-201

Ontario Regulation 170/03
Summary Report

For the Period
January 1, 2021 – December 31, 2021



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1 Summary Report Requirements

1.1 Introduction

The 2021 Summary Report for the St. Thomas Water Distribution System is being submitted to satisfy Schedule 22 of Ontario Regulation 170/03, the requirement to prepare and distribute a summary report of water system operations, outlining regulatory non-compliance with respect to water quality and water system management and administration and evaluating the water system infrastructure adequacy, with respect to its ability to continue to meet the communities water demands).

As per Ontario Regulation 170/03, the summary report must:

- a. List the requirements of the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report; and
- b. For each requirement referred to in clause (a) that was not met, specify the duration of the failure and the measures that were taken to correct the failure.

The report must also include the following information for the purpose of enabling the owner of the system to assess the capability of the system to meet existing and planned uses of the system:

- A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows.
- A comparison of the summary to the rated capacity and flow rates approved in the system's approval, drinking water works permit or municipal drinking water licence, or if the system is receiving all of its water from another system under an agreement, to the flow rates specified in the written agreement.

The information provided is for the purpose of enabling the owner of the system to assess the capacity of the system. This report covers the reporting period from January 1, 2021 to December 31, 2021.

1.2 System Description

The St. Thomas Water Distribution System has three entry points into the network from the St. Thomas Area Secondary Water Supply System, the East Chamber located at the Elgin Middlesex Booster Station (490 South Edgeware Road), the West Chamber located in Water Works Park (2 South Edgeware), and the Wellington Road Chamber (Ford Line and Wellington Road). The system also receives water from one entry point into the network from the Elgin Area Primary Water Supply System at the Albert Robert Booster Station (8754 Tyke Road) in the Municipality of Central Elgin and one entry point into the network from the Southwold Water Distribution System on Fingal Line at the municipal boundary.

1.3 System Approvals and Regulatory Requirements

Operation and Maintenance of the STDWS is governed by the Safe Drinking Water Act, 2002, and the regulations established under this Act. In accordance with the Safe Drinking Water Act, The City of St. Thomas holds a Municipal Drinking Water Licence and Drinking Water Works Permit, which provide approval for the establishment of drinking water infrastructure and provide the authority to operate and maintain said water system.

During the reporting period, The St. Thomas Drinking Water System was operated pursuant to the approvals, licences and permits listed below:

- City of St. Thomas Water Distribution System
 - MDWL No. 057-101, issued on June 30, 2021
 - DWWP No. 057-201, issued on June 30, 2021

Ontario Regulation 170/03 – Drinking Water Systems, governs the operation, maintenance and water quality monitoring requirements for municipal drinking water systems in Ontario. Ontario Regulation 128/04 – Certification of Drinking Water System Operations and Water Quality Analysts sets out the requirements for persons performing operational or maintenance activities on the water system. The Safe Drinking Water Act, 2002 and the associated regulations are enforced by the Ministry of Environment, Conservation and Parks (MECP) and monitored through annual inspections by Ministry personnel. Any non-compliant conditions identified during the course of the annual inspection are listed in the Inspection Report issued at the conclusion of the inspection period and are summarized in section 4.1 of this report.

Ontario Regulation 169/03 – Ontario Drinking Water Quality Standards sets the limits for parameters of concern in drinking water. Drinking water quality is monitored by the Operating Authority and any exceedance of the Drinking Water Quality Standards must be reported to the MECP and Public Health Unit, verbally and in written form through the use of a Notice of Adverse Test Results and Issue Resolution Form. Any non-compliant conditions identified through water quality monitoring exercises over the reporting period have been documented on a Notice of Adverse Test Results and Issue Resolution Form and are summarized in section 4.2 of this report.

2 Evaluation of Water Quantities and Flow Rates

2.1 Albert Roberts Booster Station – Elgin Area Primary Water Supply System

The Albert Roberts Booster Station (ARBS) receives treated water from the Elgin Area Primary Water Supply System, which pumps water from the water treatment plant located on the shores of Lake Erie to the east of the Town of Port Stanley. Water is pumped from a connection point on the transmission main that connects the water treatment plant to the Elgin Middlesex Pump Station and reservoir.

The ARBS is comprised of four high lift pumps that deliver water through a transmission main that services the St. Thomas Distribution System. The station maintains the operating pressure and includes a flow meter, chlorine analyzer, monitoring control, alarm system and instrumentation. Remote monitoring and control of the pumps are possible through the St. Thomas SCADA system.

All pumps use a common header and the firm rated pumping capacity (2 pumps operating) of the ARBS is 170.3 l/s or a total of 14,714 m³/d.

The Table below compares the flows experienced in 2021 to the capacity of the Albert Roberts Booster Station's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2021 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity	2021 Max Day Flow (m ³ /day)	Max Day % of Entry Point Capacity
Albert Roberts BS	14,714	7098	48	10,850	73

2.2 East Chamber – St. Thomas Area Secondary Water Supply System

The East Chamber is one of three entry points into the St. Thomas DWS from the St. Thomas Area Secondary Water Supply System. The East Chamber is located on the grounds of the Elgin Middlesex Pumping Station. Flow through the East Chamber is restricted to 25,920 m³/day, based on the maximum instantaneous flow rate being 300 L/s.

Monthly flows experienced through the East Chamber for the 2021 calendar year are provided in Appendix B to this report.

The Table below compares the flows experienced in 2021 to the capacity of the East Chamber's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2021 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity	2021 Max Day Flow (m ³ /day)	Max Day % of Entry Point Capacity
East Chamber	25,920	2842	11	6847	26

The peak instantaneous flow rate experienced in 2021 at the East Chamber was 180 L/s.

2.3 West Chamber – St. Thomas Area Secondary Water Supply System

The West Chamber is the second of three entry points into the St. Thomas DWS from the St. Thomas Area Secondary Water Supply System. The West Chamber is located at 2 South Edgeware Road, within Waterworks Park. Flow through the West Chamber is restricted to 25,920 m³/day, based on the maximum instantaneous flow rate being 300 L/s.

Monthly flows experienced through the West Chamber for the 2021 calendar year are provided in Appendix B to this report.

The Table below compares the flows experienced in 2021 to the capacity of the West Chamber's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2021 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity	2021 Max Day Flow (m ³ /day)	Max Day % of Entry Point Capacity
West Chamber	25,920	1073	4	3064	12

The peak instantaneous flow rate experienced in 2021 at the West Chamber was 110 L/s.

2.4 Wellington Road Chamber – St. Thomas Area Secondary Water Supply System

The Wellington Road Chamber is the third entry point into the St. Thomas DWS from the St. Thomas Area Secondary Water Supply System. The Chamber is located at the intersection of Wellington Road and Ford Line. Flow will typically only enter the St. Thomas DWS through the Wellington Road Chamber during periods of very high demand in the WDS. 45 m³ went through the Wellington Road Chamber during 2021, as a result of maintenance and testing activities.

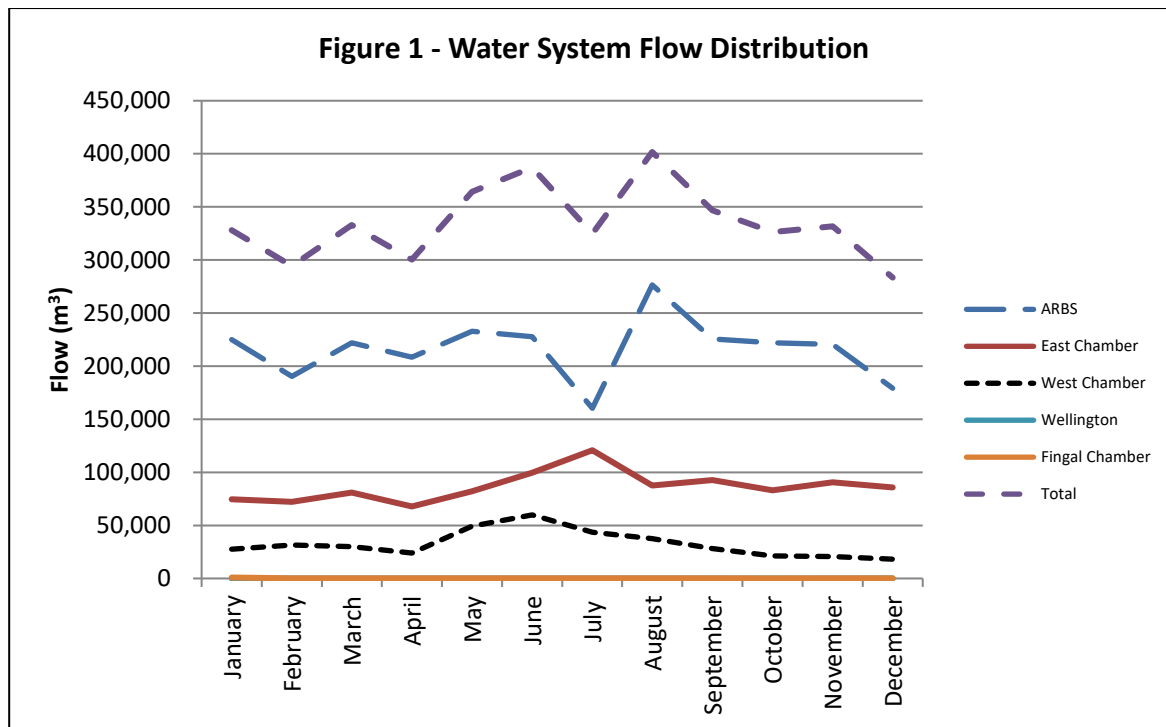
2.5 Fingal Line Chamber – Southwold Water Distribution System

The Fingal Line Chamber supplies water from the Southwold Water Distribution System to a section of the St. Thomas Water Distribution System along Fingal Line. The water in the Southwold Water Distribution System originates from the St. Thomas Area Secondary Water Supply System. The water is rechlorinated within the Southwold Water Distribution System. Flow through the Fingal Line Chamber is restricted to 13,824 m³/day, based on the maximum instantaneous flow rate being 160 L/s.

The Table below compares the flows experienced in 2021 to the capacity of the Fingal Line Chamber’s entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2021 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity
Fingal Line	13,824	6	4

Figure 1 provides a graphical overview of the flows entering the St. Thomas Water Distribution System. Based on the 2021 flow data, the distribution of flows into the distribution system between the water supplied from the Albert Roberts Booster Station versus the St. Thomas Area Secondary Water Supply System (through the East, West, Wellington, and Fingal Chambers).

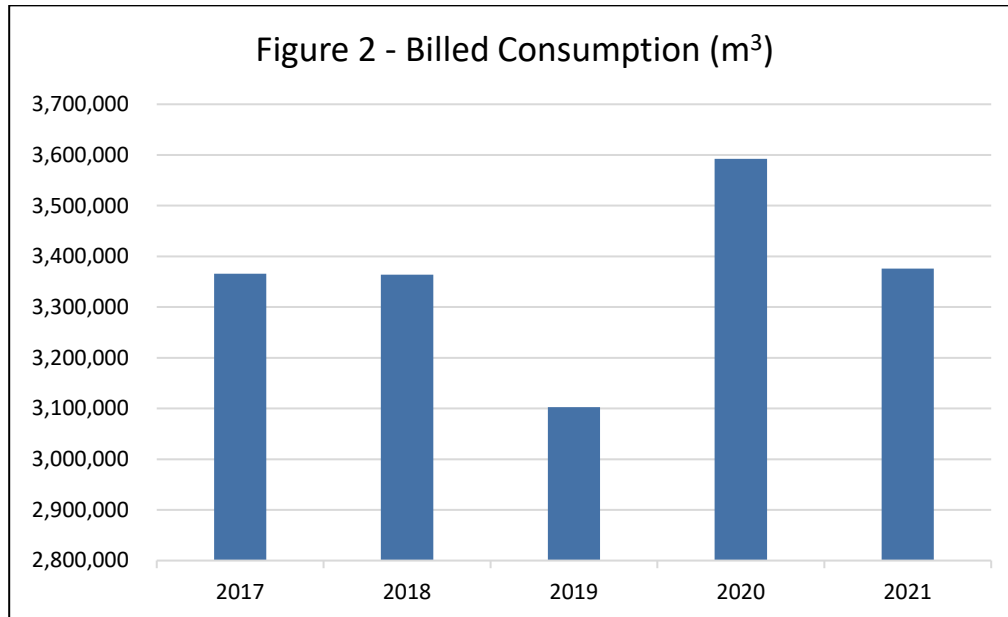


The total consumption by customers of the St. Thomas Water Distribution System decreased by 6% from 3,592,206 m³ in 2020 to 3,375,765 in 2021.

The total flow into the St. Thomas Water Distribution System decreased by 7% in 2020 from 4,050,391 m³ in 2020 to 4,022,091 m³ over the 2021 year.

The unaccounted water loss in the St. Thomas Water Distribution System was 15%. This can be attributed capital improvements and monitoring of all water uses from fire fighting and training exercises, maintenance programs and capital projects.

Figure 2 provides an overview of the billed consumption flows in the St. Thomas Water Distribution System over the last number of years.



3 Water Quality Summary

A summary of water quality testing completed by the City of St. Thomas – Environmental Services Dept. over the course of the reporting period is available in the Annual Report, attached as Appendix A.

4 Summary of Non-Compliant Conditions

4.1 Ministry of the Environment, Conservation and Parks Inspection

The Ontario Ministry of the Environment, Conservation and Parks (MECP) conducts an inspection of the St. Thomas Drinking Water System annually. An MECP inspection took place on October 8, 2021. The final inspection report was issued on November 10, 2021. Non-compliances identified in the inspection report, and actions taken to rectify the non-compliant condition are summarized in the table below.

MECP Inspection Finding	Action Taken
<p>All Haloacetic acid water quality monitoring requirements prescribed by legislation are not being conducted within the required frequency and/or at the required location.</p> <p>Haloacetic Acid samples are required to be collected and tested each calendar quarter from the distribution system in accordance with Schedule 13-6.1 of O. Reg 170/03 with the frequency stipulated in Schedule 6-1.1(4). According to documentation the following samples were taken:</p>	<p>From herein, the Owner/Operating Authority shall ensure that Haloacetic Acid samples are collected within the prescribed frequency as stipulated in Schedule 6-1.1(4) of O.Reg 170/03. Compliance shall be assessed during the next inspection period</p>

<p>1) October 14, 2021 = 6.0 ug/L 2) June 7, 2021 = <5.3 ug/L 3) March 8, 2021 = <5.3 ug/L 4) December 7, 2020 = <5.3 ug/L</p> <p>During the inspection period the Owner/Operating Authority diligently collected Haloacetic Acid samples, however the Owner/Operating Authority failed to ensure that samples were collected within the prescribed frequency as per Schedule 6-1.1(4) of O.Reg 170/03. Samples that are required be collected every three (3) months or in each calendar quarter shall be collected at least 60 days apart and not more than 120 days apart. The following samples were not taken within the prescribed frequency:</p> <p>1) June 7, 2021 to October 14, 2021 = 129 days</p> <p>All trihalomethane water quality monitoring requirements prescribed by legislation were not conducted within the required frequency and at the required location. Trihalomethane samples are required to be collected and tested every calendar quarter from the distribution system in accordance with O. Reg 170/03, Schedule 13-6 with the prescribed frequency stipulated in Schedule 6-1.1(4). According to documentation, the following samples were collected:</p> <p>1) October 14, 2021 = 32 ug/L 2) June 7, 2021 = 20 ug/L 3) March 8, 2021 = 17 ug/L 4) December 7, 2020 = 18 ug/L</p> <p>During the inspection period the Owner/Operating Authority diligently collected Trihalomethane samples, however the Owner/Operating Authority failed to ensure that samples were collected within the prescribed frequency as per Schedule 6-1.1 (4) of O.Reg 170/03. Samples that are required be collected every three (3) months or in each calendar quarter shall be collected at least 60 days apart and not more than 120 days apart. The following samples were not taken within the prescribed frequency:</p> <p>1) June 7, 2021 to October 14, 2021 = 129 days</p>	<p>From herein, the Owner/Operating Authority shall ensure that Trihalomethane samples are collected within the prescribed frequency as stipulated in Schedule 6-1.1(4) of O.Reg 170/03. Compliance shall be assessed during the next inspection period</p>
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4.2 Adverse Test Results and Issue Resolution

Any non-compliant conditions identified through water quality monitoring exercises over the reporting period, and actions taken are summarized in the table below.

Adverse Test Result (Date / Location)	Action Taken

5 List of Appendices

Appendix A – St. Thomas Distribution System – 2021 Annual Report

Appendix B – Chamber and Station Flows - 2021

APPENDIX A



Ontario Drinking-Water Systems Regulation O. Reg. 170/03

Drinking-Water System Number:	260002187
Drinking-Water System Name:	St. Thomas Water Distribution System
Drinking-Water System Owner:	Corporation of the City of St. Thomas
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2021, through December 31, 2021

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [] No [X]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>City of St. Thomas, City Hall Environmental Services 545 Talbot Street St Thomas, Ontario</p> </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served: <div style="border: 1px solid black; padding: 2px; display: inline-block;">NA</div></p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to: <div style="border: 1px solid black; padding: 2px; display: inline-block;">NA</div></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
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List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
Municipality of Central Elgin	260004761
Township of Southwold	210001362

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?

Yes [X] No []

Indicate how you notified system users that your annual report is available and is free of charge.

[x] Public access/notice via the web

City of St. Thomas Website – www.city.st-thomas.on.ca

[x] Public access/notice via Government Office

[] Public access/notice via a newspaper

[x] Public access/notice via Public Request

[] Public access/notice via a Public Library

[] Public access/notice via other method _____



Describe your Drinking-Water System

The St. Thomas Water Distribution System services over 17,100 customers including 900 customers within the Municipality of Central Elgin and 53 customers within the Township of Southwold (Lynhurst Subdivision). The system purchases its water from the Elgin Area Primary Water Supply System, which extends from Lake Erie to the City of London. The St. Thomas Distribution System consists of approximately 226,000 metres of water main ranging in size from 50 mm to 450 mm in diameter with the oldest installation in 1909. Material types include Asbestos Cement, Cast Iron, Concrete Ductile, Iron Polyethylene, and PVC.

List all water treatment chemicals used over this reporting period

12% Sodium Hypochlorite (Disinfection/Repairs)

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Fairview Ave. Construction	\$1,080,327.07
Locust St. Construction	\$408,301.18
2021 Road Rehabilitation Program	\$1,230.00
Inkerman St. & Weldon Ave. Construction	\$162,228.76
Edgeware Line Servicing	\$405,191.57

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
NA	NA	NA	NA	NA	NA



Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	NA	NA	NA	NA	NA
Treated	NA	NA	NA	NA	NA
St. Thomas	616	(0)-(0)	(0)-(0)	615	(<10)-(>2000)
Central Elgin	64	(0)-(0)	(0)-(0)	64	(<10)-(10)
Southwold	13	(0)-(0)	(0)-(0)	13	(<10)-(970)
Distribution Total	693	(0)-(0)	(0)-(0)	692	(<10)-(>2000)

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Chlorine (Grab Samples)	693	(0.24) - (1.71)
*Chlorine (Continuous Monitoring)	8760	(0.0) - (2.00)

NOTE: For continuous monitors use 8760 as the number of samples.

*Online locations- East and West chamber, Albert Roberts, Wellington and Southdale Panels. All incidents of <0.05 were investigated and determined to be under 5 minutes in duration.

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
NA	NA	NA	NA	NA

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
NA	NA	NA	NA	NA

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	NA	NA	NA
Distribution	8	(0.01) – (0.75) ug/L	0

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
HAA5	Mar 11, 2021 Jun 9, 2021 Oct 18, 2021 Dec 22, 2021	5.48	ug/L	no
THM (NOTE: show latest annual average)	Mar 11, 2021 Jun 9, 2021 Oct 18, 2021 Dec 22, 2021	21.21	ug/L	no

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
NA	NA	NA	NA

APPENDIX B

Albert Roberts

Month of the Year	Avg Daily Flow Rate	Max Daily Flow	Discharge Volume
	l/s	l/s	m ³
January	75	170	225,150
February	63	134	190,484
March	78	134	222,061
April	75	170	208,330
May	75	170	232,886
June	78	170	227,776
July	64	170	160,296
August	84	165	276,500
September	78	148	225,748
October	80	156	221,845
November	78	160	220,565
December	66	128	179,257
Average	75	156	215,908
Yearly Total			2,590,898

East Chamber

Month of the Year	Avg Daily Flow Rate	Max Daily Flow	Volume
	<i>l/s</i>	<i>l/s</i>	<i>m³</i>
January	57	126	74,466
February	45	145	72,190
March	39	143	80,868
April	38	139	67,822
May	43	139	81,992
June	52	164	99,522
July	50	180	120,786
August	43	125	87,627
September	37	121	92,613
October	38	131	83,134
November	31	148	90,517
December	38	135	85,852
Average	43	138	86,449
Yearly Total			1,037,389

West Chamber

Month of the Year	Average Daily Flow Rate	Max Daily Flow	Volume
	<i>l/s</i>	<i>l/s</i>	<i>m3</i>
January	11	51	22,446
February	14	61	31,592
March	12	57	30,049
April	13	45	24,085
May	16	65	49,315
June	20	110	59,857
July	18	57	43,611
August	14	54	37,485
September	12	40	28,248
October	12	38	21,291
November	11	37	20,600
December	10	45	18,168
Average	14	55	32,645
Yearly Total			391,747