South Huron Water Distribution System

2017 Annual Report to Council

March 5, 2018

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I. DESCRIPTION OF SOUTH HURON WATER DISTRIBUTION SYSTEM

System Overview

The South Huron water distribution system provides service to approximately 8,000 residents in Exeter, Stephen and a few customers in Usborne Ward, in the vicinity of the former Exeter well sites. The system consists of 209 km of distribution piping, booster pumping stations, reservoirs and water towers. The system is continuously monitored by online analyzers and a computerized Supervisory, Control and Data Acquisition System (SCADA). Source of supply is the Lake Huron Primary Water Supply System (LHPWSS). South Huron residents along our south boundary are serviced from the adjacent North Middlesex water system; who also obtain treated water from the LHPWSS. South Huron supplies customers in Municipality of Bluewater along our north boundary and in the village of Dashwood.

Water Source

The Municipality of South Huron obtains its drinking water supply from the Lake Huron Primary Water Supply System. The LHPWSS Joint Board of Management owns and governs the area water system using the City of London as the Administering Municipality. City of London, Regional Water Supply Division provides all administrative services on behalf of the Joint Board. The LHPWSS is operated by The Ontario Clean Water Agency (OCWA), under contract to the LHPWSS Joint Board of Management.

The LHPWSS water treatment plant is located in South Huron near the intersection of Highway #21 and County Road #83. The WTP has a treatment capacity of 340 million litres per day and supplies water to the City of London and several municipalities in our region. The South Huron connections to LHPWSS system are at the following locations:

- B-Line Connection - Gore Road and B-Line
- Shipka connection - Crediton Road, east of Shipka
- Dashwood connection - Huron Street and Bronson Line
- Exeter south connection - Huron Street and Airport Line
- Exeter north connection - Airport Line and Thames Road

Detailed System Description

Distribution System

The South Huron water distribution system is comprised of approximately 181km of watermains ranging in size from 50mm to 400mm diameter. The 50mm mains are polyethylene (PE); 100mm to 300mm mains are polyvinylchloride (PVC) and larger mains are also cast iron, ductile iron, steel and concrete pressure pipe.

The oldest water system in the municipality is in Exeter, where pipes were installed in 1900 as a street watering system. Between 1910 and 1915 the system expanded to provide water for the Grand Trunk Railway Yard, for

plumbing purposes and fire protection. The Exeter Public Utilities Commission was established in 1917; however, potable drinking water wasn't provided until1936 with the development of the Springs well site and Main Pump House on MacNaughton Drive. Some of the early cast iron watermains are still in service; however, many of the older mains have been replaced and the majority now date from the mid 1960's.

The Huron Park distribution system was constructed in the early 1940's by the RCAF, as part of the Airforce Station Centralia. The Base closed in 1967 and the system transferred to the former Stephen Township in 1983. The entire water distribution system in the Huron Park residential area was replaced in 2006. In 2010 the watermains on Canada Avenue in the Industrial area were replaced and upgraded.

The Stephen distribution system dates to the mid to late 1960's. After the completion of the Lake Huron Water Treatment Plant in 1965, watermain systems started to be built in the lakeshore area of the former Stephen Township. Significant expansion of the Stephen system occurred in 1983 with systems being constructed in Crediton, Centralia and Dashwood. In 2010 a new 300mm watermain was constructed from Huron Park to Centralia (Airport Line & Canada Ave to Victoria Drive & Melbourne Street). This watermain, in combination with the new Huron Park water tower, provides improved fire protection to the village of Centralia.

Pressure Zones

- **Stephen Pressure Zone 1 (HGL 250m) -** A connection to the LHPWSS transmission main through a pressure reducing valve (PRV) and metering chamber located west of the intersection of B-Line and Gore Road, provides water supply to the Stephen Pressure Zone 1. It is through this connection that LHPWSS also provides water to the Hwy #21 corridor in the Municipality of Bluewater.

  LHPWSS is responsible for maintaining the water supply to Bluewater, water quality and billings through a deduct meter at Waterworks Road and Hwy #21. This connection also provides an emergency backup water supply to the Municipality of Lambton Shores through a normally closed valve in an inter-connect chamber on Highway #21, at the boundary between Lambton Shores and South Huron.

  Stephen Pressure Zone 1 is separated from Stephen Pressure Zone 2 by a pressure zone control chamber located on County Road #83, immediately west of Shipka Line. This chamber is equipped with a normally closed gate valve with a 19mm bleeder valve to maintain a minimum circulation of water at this location.

  If the normal feed to Stephen Pressure Zone 1, from the LHPWSS transmission main connection on B-Line is disrupted, an emergency backup feed can be provided from the Lambton Shores distribution system. In an emergency the

normally closed gate valve in the inter-connect chamber, located on Highway #21 at the Lambton Shores/South Huron boundary, can be opened to feed Stephen Pressure Zone 1 through the 350mm watermain on Highway #21.

If the feed to Stephen Pressure Zone 1 from the LHPWSS Water Treatment Plant is disrupted; minimum flow and pressure at the LHPWSS B-Line connection can be sustained for approximately twelve (12) hours from the head pressure in the LHPWSS 1200mm pipeline.

- **Stephen Pressure Zone 2 (HGL 263m) (County Rd #10, west of village of Shipka) -** A connection to the LHPWSS transmission main through a pressure reducing valve (PRV) and metering chamber; then through a separate valve chamber, provides water supply to the Stephen pressure Zone 2 including the community of Shipka.

  Stephen Pressure Zone 2 is separated from Stephen Pressure Zones 1, 3 and 4 by three pressure zone control chambers. The first chamber is located County Road #83, immediately west of Shipka Line; the second at Blackbush Line, north of Crediton Road; and the third on County Road #83 west of the village of Dashwood. The chambers located at County Road #83/Shipka Line and Blackbush Line/Crediton Road are equipped with a normally closed gate valve with a 19mm bleeder valve to maintain a minimum circulation of water at these locations.

  The chamber located on County Road #83 west of the village of Dashwood is equipped with pressure sustaining valve that will sense a pressure drop in Stephen Pressure Zone 2 and automatically open to provide an emergency backup feed from Zone 4 to Stephen Pressure Zone 2.

- **Stephen Pressure Zone 3 (HGL 281m) (County Rd #10, east of village of Shipka) -** A connection to the LHPWSS transmission main through a pressure reducing valve (PRV) and metering chamber provides water supply to the Stephen Pressure Zone 2 between the village of Shipka and Crediton. Some rural areas north and south of this route also receive water directly from the County Road 10 feedermain. A portion of the feedermain along County Road 10 from Shipka to Goshen Line is twinned for additional capacity.

  Stephen Pressure Zone 3 is separated from Stephen Pressure Zones 2, 3 and 4 by four pressure zone control chambers. The first chamber is located on Blackbush Line, north of Crediton Road; the second at Bronson Line & Huron Street; the third at Goshen Line & Huron Street; and the fourth at Babylon Line & Huron Street.

  The chambers located at Blackbush Line/Crediton Road; Goshen Line/Huron Street; and Babylon Line/Huron Street are equipped with a normally closed gate valve with a 19mm bleeder valve to maintain a minimum circulation of water at these locations.

The chamber located on Bronson Line south of Huron Street is equipped with pressure sustaining valve that will sense a pressure drop in Stephen Pressure Zone 3 and automatically open to provide an emergency backup feed from Stephen Pressure Zone 4.

- **Stephen Pressure Zone 4 (HGL 293m) (Dashwood Connection)** - The connection to the LHPWSS Exeter-Hensall transmission main through a pressure reducing valve (PRV) and metering chamber at Bronson Line and Huron Street services the village of Dashwood and the surrounding pressure zone. A series of pressure control zone chambers are installed at the limits of the pressure zone.

  Stephen Pressure Zone 4 is separated from Stephen Pressure Zones 2 and 3 by four pressure zone control chambers. The first chamber is located on County Road #83, east of the village of Dashwood; the second at Bronson Line & Huron Street; the third at Goshen Line & Huron Street; and the fourth at Babylon Line & Huron Street.

  The chambers located at Goshen Line/Huron Street and Babylon Line/Huron Street are equipped with a normally closed gate valve with a 19mm bleeder valve to maintain a minimum circulation of water at these locations.

  The chamber located on Bronson Line south of Huron Street is equipped with pressure sustaining valve that will sense a pressure drop in Stephen Pressure Zone 4 and automatically open to provide an emergency backup feed from Stephen Pressure Zone 3.

  The chamber located on County Road #83 west of the village of Dashwood is also equipped with pressure sustaining valve that will sense a pressure drop in Stephen Pressure Zone 4 and automatically open to provide an emergency backup feed from Stephen Pressure Zone 2.

- **Stephen Pressure Zone 5 (HGL 307m) (County Rd #10, east of village of Crediton) -** A connection to the LHPWSS transmission main through a pressure reducing valve (PRV) and metering chamber at Shipka that provides water supply to the Stephen Pressure Zone 3, also supplies water to the Stephen Pressure Zone 5 and to Crediton, Huron Park and Centralia. Water is conveyed to Stephen Pressure Zone 5 via a watermain located along County Rd #10 from Shipka to Crediton; where an inline Booster Pumping Station, re-pumps the water on to the Stephen Pressure Zone 5 and to Crediton, Huron Park and Centralia.

  Stephen Pressure Zone 5 is separated from Stephen Pressure Zone 3 by check valves located in the Crediton BPS. Stephen Pressure Zone 5 is separated from the Exeter South Pressure Zone by a control chamber located at Airport line and Huron Street. This chamber has a normally closed electrically operated valve that can be monitored and operated through the SCADA system. In an emergency the electrically operated valve in this chamber can be opened remotely to provide

an emergency backup feed from Exeter South Pressure Zone to Stephen Pressure Zone 5.

The Exeter Water Tower HGL is at the same elevation as the Huron Park Water Tower and can operate as a backup for the Huron Park Water Tower and Stephen Pressure Zone 5 and to varying degrees can provide an emergency backup feed to Stephen Pressure Zones 3, 4, 2 and 1.

- **Exeter North Pressure Zone (HGL 313m) -** Exeter is serviced by two connections; the north connection to the LHPWSS Exeter-Hensall transmission main is through a pressure reducing valve (PRV) and metering chamber at Thames Road West and Airport Line. This connection provides water to the Exeter north pressure zone, north of the Ausable River and is separated from the Exeter South pressure zone by a control zone chamber located at William and Church Street. The chamber has a control valve, check valve and by-pass piping to control the pressure zones and allow feed from the north pressure zone to the south pressure zone to facilitate and an emergency feed in either direction.

  The normal operation of the Exeter north pressure zone is a direct feed and with constant pressure provided by the LHPWSS pipeline on Airport Line. System pressure is constantly monitored and controlled through an integrated SCADA system and a by pressure control at the PRV at the north connection point. The backup for the north pressure zone is provided by the reconfigured MacNaughton Drive Booster Pumping Station, controlled by a VFD and PRV control of the high lift and fire pump discharges. Additional back up for the north pressure zone is provided by the Exeter south pressure zone and the elevated water tower located within that zone.

- **Exeter South Pressure Zone (HGL 307m) -** Exeter is serviced by two connections; the south connection to the LHPWSS is through a connection at the LHPWSS Exeter-Hensall Booster Pumping Station located at Huron Street and Airport Line. This connection provides water to the Exeter south pressure zone, south of the Ausable River and is separated from the Exeter North pressure zone by a control zone chamber located at William and Church Street. This chamber has a control valve, check valve and by-pass piping to control the pressure zones and allow feed from the north pressure zone to the south pressure zone to facilitate and an emergency feed in either direction.

  The normal day time operation of the Exeter south pressure zone is to fill and drain the elevated water tower as required during the day from the Exeter south LHPWSS connection at Huron Street and Airport Line. Water tower levels are constantly monitored and controlled by the South Huron SCADA system and requests for water are automatically sent to the LHPWSS SCADA system. During the night the in-ground reservoirs at MacNaughton Drive are slowly filled from the Exeter distribution system. Water enters the in-ground concrete storage reservoirs through an inlet control pipe in the MacNaughton Drive Booster Pumping Station. During the early morning hours, water is pumped from the reservoir cells, by pumps located in the MacNaughton Drive BPS, to fill the

elevated water tower, as required. This process continues until the reservoirs reach their low level setting and the system automatically switches over to the normal day time operation (ie. tower filled by the Exeter south LHPWSS connection).

The backup for the south pressure zone is provided by the reconfigured MacNaughton Drive Booster Pumping Station, controlled by a VFD and PRV control of the high lift and fire pump discharges. Additional redundancy for the south pressure zone is provided by the Exeter north pressure zone.

Booster Pumping Stations

- **Crediton Booster Pumping Station** – An in-line booster pumping station (BPS) located at the west end of Crediton supplies water to the Stephen Pressure Zone 5, including Crediton, Huron Park and Centralia by pumping water along County Rd #10 and Airport Line to the new Huron Park Water Tower. The Crediton BPS has three pumps with VFD's; control valves; and is also equipped with a diesel powered backup emergency generator. The normal mode of operation of the BPS is that it is controlled by the Huron Park Water Tower levels. When the Huron Park Water Tower is taken out of service, the Crediton BPS is configured so that it can by-pass the Huron Park Water Tower and directly supply the water distribution system in the entire Stephen Pressure Zone 5 by using the VFD's.

  The Crediton BPS and the pipeline on Airport Line is configured so that it can be used as an emergency backup supply to Exeter, by opening up a normally closed valve in a chamber at Airport Line and Huron Street. The Crediton BPS is also equipped with a control valve that can be opened in an emergency to back feed the Stephen Pressure Zone 3.

- **MacNaughton Drive Booster Pumping Station** - A booster pumping station (BPS) is located at 62B MacNaughton Drive, Exeter that supplies water to the Exeter North and the Exeter South Pressure Zones, including the Exeter Water Tower, when either pressure zone is not being supplied by the LHPWSS Exeter-Hensall pipeline connection.

  The MacNaughton Drive BPS has three vertical turbine pumps with VFD's, including one that is a fire pump; control valves; and is also equipped with a diesel powered backup emergency generator located in the adjacent Generator Building at 62A MacNaughton Drive. One pump and the fire pump are dedicated to the Exeter North Pressure Zone; one pump is dedicated to the Exeter South Pressure Zone.

  The BPS is controlled by the SCADA system and it's normal mode of operation is to fill and drain the MacNaughton Drive in-ground reservoirs; and to provide a backup for the Exeter North and Exeter South Pressure Zones. See section 6.4.1 "Exeter North Pressure Zone" and "Exeter South Pressure Zones" for description of normal mode of operation related to the MacNaughton Drive BPS.

Storage Facilities

- **Huron Park Elevated Water Tower** - Elevated water tower consists of a 2,700 m^3 elevated tank located at 69751 Airport Line. The elevated tank provides "floating storage" and pressure regulation for the water distribution system in Stephen Pressure Zone 5, including Crediton, Huron Park and Centralia. Water level in this tank is used to control the pumps at the Crediton Booster Pumping Station. The Water tower is also equipped with a stand-alone natural gas powered backup emergency generator, located adjacent to the tower. Chlorine residual is continuously monitored at this location by an on-line analyzer in the mechanical room in the base of the water tower and chlorine gas can be injected into the water at this location to supplement any diminishing chlorine residual from the LHPWSS source water.

  The Huron Park Water Tower HGL is at the same elevation as the Exeter Water Tower and the distribution system is configured so that it can operate as a backup for the Exeter Water Tower and associated pressure zones.

- **Exeter Water Tower** - Elevated water tower consists of a 1,515 m^3 elevated tank located at 66 Nelson Street. The elevated tank provides storage and pressure regulation for the Exeter South Pressure Zone and can be used in an emergency, as a backup for the Exeter North Pressure Zone at reduced pressure. Water level in this tank is used to control the source of supply for the Exeter South connection to the LHPWSS at the Exeter-Hensall Booster Pumping Station.

  The Exeter Water Tower HGL is at the same as the Huron Park Water Tower and the distribution system is configured so that it can operate as a backup for the Huron Park Water Tower and associated pressure zones.

- **MacNaughton Drive Reservoirs** – Additional storage capacity for Exeter North and Exeter South Pressure Zones is provided by three in-ground concrete reservoir cells. The original 1,140 m^3 single cell in-ground reservoir (with a pump well) is located adjacent to the MacNaughton Drive Booster Pumping Station (BPS) and the 2,490 m^3 single cell in-ground reservoir is located in MacNaughton Park, south of the MacNaughton BPS. Both reservoirs normally operate in series as a single reservoir. Additional storage for the Exeter North and Exeter South Pressure Zones is provided by the LHPWSS 8,000 m^3 two cell in-ground concrete reservoir, located adjacent to the LHPWSS BPS at Huron Street and Airport Line. The LHPWSS BPS and reservoir is equipped with a stand-alone diesel powered backup emergency generator.

Control System

The South Huron Water Distribution system is controlled by a PLC based Supervisory, Control and Data Acquisition system (SCADA) located at the Water/Sewer Operations Centre, 82 Nelson Street, Exeter. Remote processing units (RPUs) are situated at the MacNaughton Drive Booster Pumping Station,

Crediton Booster Pumping Station**,** Exeter Water Tower, new Huron Park Water Tower, the monitoring chamber on Huron Street and the control zone chamber at Church & William Street. The PLC's communicate with the central SCADA computer at the Water/Sewer Operations Centre and this allows monitoring of all operational parameters, monitoring, annunciating, and forwarding of alarms, control of set points, duty sequences, and other operating parameters, and recording and print out of alarms and data collected from the remote sites.

II. MOECC INSPECTION, ORDERS AND COMPLIANCE ISSUES

Ministry of Environment and Climate Change Annual Inspection
There was no Ministry inspection of the South Huron Water Distribution System in 2017.

Non-compliance issues, Adverse Reports and Orders
There were no non-compliance issues, MOECC Orders, or Adverse Reports for the South Huron Water Distribution System in 2017.

III SUMMARY OF QUANTITIES AND FLOW RATES

Flow data is an indicator of the performance of the system and demonstrates seasonal variations in water consumption. An analysis of the Exeter flow data indicates that the Exeter-Hensall pipeline feeds are operating at approximately half of the design capacity, with significant capacity for growth and development.

In Stephen Ward the Crediton Booster Pumping Station rarely exceeds 50% of its design capacity. The fill and drain rates for the Huron Park Water Tower are very moderate and the water tower comfortably services the surrounding area, including Huron Park and Centralia.

STEPHEN 2017 MAX DAY- DATE AND AVERAGE DAY FLOWS (m^3)									
	CREDITON BOOSTER PUMPING STATION			HURON PARK WATER TOWER			HURON PARK /CENTRALIA		
MONTH	MAX	DATE	AVG	MAX	DATE	AVG	MAX	DATE	AVG
JAN	874	30th	512	782	26th	495	214	10th	192
FEB	1,141	18th	541	1,069	17th	549	214	27th	191
MAR	1,491	17th	578	1,130	17th	537	297	2nd	203
APR	952	10th	586	643	3rd	526	480	10th	219
MAY	965	31st	614	596	1st	358	258	25th	200
JUN	1,262	3rd	797	536	3rd	396	313	13th	259
JUL	1,083	21st	723	477	27th	369	282	4th	247
AUG	1,478	15th	752	576	25th	363	406	25th	227
SEP	1,294	26th	805	578	26th	409	452	26th	270
OCT	1,392	26th	662	1,347	26th	366	249	4th	210
NOV	2,047	27th	747	503	23rd	325	294	13th	213
DEC	1,922	10th	1,296	581	22nd	297	264	20th	230

EXETER 2017 MAX DAY- DATE AVERAGE DAY FLOWS (m^3)									
	LHPWSS- EXETER NORTH			LHPWSS- EXETER SOUTH			HURON ST MONITORING CHAMBER		
MONTH	MAX	DATE	AVG	MAX	DATE	AVG	MAX	DATE	AVG
JAN	778	5th	498	1,122	26th	744	1,333	3rd	744
FEB	1,528	18th	652	956	15th	587	1,706	18th	824
MAR	963	24th	682	987	10th	542	1,179	28th	713
APR	1,136	25th	860	974	21st	537	1,179	21	732
MAY	1,237	19th	888	1,128	25th	615	1,334	25	787
JUN	1,335	4th	1,097	1,433	11th	779	1,653	4	968
JUL	1,393	27th	1,106	2,143	26th	820	2,244	26	983
AUG	2,108	25th	1,148	1,395	14th	806	1,592	14	956
SEP	1,302	27th	1,036	1,341	25th	617	1,534	25	791
OCT	1,002	1st	759	1,598	26th	661	1,437	10	742
NOV	1,474	24th	650	1,263	20th	332	1,399	20	595
DEC	470	6th	302	N/A	N/A	N/A	1,534	22	853

Note: LHPWSS – EXETER SOUTH "N/A" due to errors in SCADA software. Data is not available.

IV. SUMMARY OF BACTERIOLOGICAL SAMPLING

The number of bacteriological samples taken in the South Huron water system are in accordance with *Schedule 10* of *O. Reg. 170/03 - Ontario Drinking Water Quality Standards* made under the *Safe Drinking Water Act*. Bacteriological samples are also required weekly, at each POE UV location listed in Schedule C – "System Specific Conditions" in the South Huron Drinking Water Licence Number: 054-101. Throughout the year additional bacteriological samples are taken in response to customer water concerns, after watermain break repairs or other incidents of potential contamination.

524 bacteriological samples were taken in 2017, including 159 that were tested for HPC (Heterotrophic Plate Counts). All the samples were within the regulatory limits.

2017 BACTERIOLOGICAL TESTING					
Month	Number of Samples		Sample Results		Range of Results
	Distribution	HPC	E.Coli	Total Coliform	
JAN	50	15	0	0	<10
FEB	40	12	0	0	<10
MAR	40	12	0	0	<10-130
APR	40	12	0	0	<10-20
MAY	51	15	0	0	<10-30
JUN	40	12	0	0	<10-10
JUL	40	12	0	0	<10-270
AUG	50	15	0	0	<10-20
SEP	41	14	0	0	<10-10
OCT	50	15	0	0	<10-40
NOV	42	13	0	0	<10-530
DEC	40	12	0	0	<10
TOTAL	**524**	**159**	**0**	**0**	

Notes:

1. Heterotrophic Plate Counts (HPC) results are used to measure the overall bacteriological quality of drinking water and are not an indicator of pathogens in drinking water.

2. Escherichia coli (E.Coli) is a type of fecal coliform that can cause intestinal illness. One strain is E. coli O157: H7 and is found in the digestive tract of cattle.

3. Total Coliform bacteria are a colony of relatively harmless microorganisms that live in the intestines of humans and animals. Fecal coliform by themselves are usually not pathogenic. However, they are indicator organisms that may indicate the presence of other pathogenic bacteria.

4. The presence of fecal contamination is an indicator that a potential health risk exists in water. Examples of waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis and hepatitis A.

V. SUMMARY LEAD SAMPLING

Lead sampling requirements for the South Huron water distribution system is set out in the *Safe Drinking Water Act* under *Schedule 15.1* of O. Reg. 170/03 - Ontario Drinking Water Quality Standards.

Based on historical lead sampling results, the South Huron water system is exempt from Community Lead Testing and annual samples are no longer required to be taken from plumbing and tested for lead. Exempt status still requires lead samples to be taken every three (3) years in every “winter” and “summer” period. Results must remain below the regulatory limit in order to maintain the exempt status.

The previous lead samples were taken in 2016 and a full regiment of lead samples are required to be taken in 2019. The following are the sampling results for 2017:

2017 LEAD SAMPLES						
FREQUENCY	**RESIDENTIAL**	**EXCEEDANCES**	**NON-RESIDENTIAL**	**EXCEEDANCES**	**DISTRIBUTION**	**EXCEEDANCES**
WINTER	0	0	0	0	0	0
SUMMER	0	0	0	0	0	0

pH AND ALKALINITY TESTING IN DISTRIBUTION

SEASON	DISTRIBUTION	ALKALINITY	pH
WINTER	3	97	7.01
March 28, 2017		95	7.15
		91	7.03
SUMMER	3	76	7.95
Sept 12, 2017		76	8.00
		81	8.27

The lead risk is relatively low in the South Huron drinking water system. The former Exeter PUC had removed the remaining lead water services within the road allowance in the early 1990's and the majority of the Stephen water system was originally constructed with PVC and PE pipe. Additional protection was provided 2008 when a corrosion control system was installed at the LHPWSS water treatment plant to adjust the pH of treated water in order to mitigate elevated levels of lead in the City of London drinking water system. To further assist our customers, a subsidy program is available annually on street reconstruction projects, to remove lead services on private property.

VI. SUMMARY of WATERMAIN MAIN BREAKS and SERVICE LEAKS

Watermain breaks and service leaks are an indicator of the overall condition and performance of the water distribution system. Historical main breaks and service leak data is also used to develop priority rankings for future watermain replacements in the Asset Management Plan.

There were an average number of watermain breaks in 2017. The Exeter distribution system continues to have relatively few watermain breaks and service leaks. This is a result of the high standards for materials/workmanship and life cycle replacement program of the former Exeter PUC. The only watermain failure of concern is the main break on the 350mm ductile iron watermain on Main Street near James Street. This will be reviewed in greater detail in 2018 to determine the extent the issue and to develop a remediation or replacement plan, as required.

The Stephen distribution system continues to experience a relatively high number of watermain breaks and service leaks. This due to higher system pressures, lower grade material and substandard construction practices used in the original installation.

2017 WATERMAIN MAIN BREAKS and SERVICE LEAKS		
DATE	**Size/Type of Failure**	**LOCATION**
EXETER		
Jan 6	150mm Cast Iron - Ring Break	56 Victoria St West
March 26	150mm Cast Iron - Ring Break	Victoria St / Main St
April 21	150mm Cast Iron - Ring Break	236 Carling St
Aug 29	350mm Ductile Iron - Corrosion	Main St at James St
Nov 18	350mm Ductile Iron - Corrosion	Main St between James and John St
STEPHEN		
Jan 31	300mm Ductile Iron - Blow out	37200 Crediton Rd (Blackbush Line and Bronson Line)
Feb 22	150mm PVC - Joint	Oakwood - Lakeshore and Oakwood Ave
March 13	19mm PE - Split pipe	36312 Huron St West
April 10	100mm Cast Iron - Ring Break	Quebec Ave Huron Park
July 10	150mm PVC - Service saddle leak	Oakwood - Indian Rd and Oakwood Ave
July 12	25mm PE - Split pipe	70696 Shipka Line
Sept 15	100mm PVC - Service saddle leak	36935 Dashwood Rd
Sept 20	19mm PE - Split pipe	70829 Corbett Line
Nov 1	25mm PE - Split pipe	69721 Shipka Line
Nov 22	19mm PE - Split pipe	Dashwood - 124 Philp Street
Nov 29	100mm PVC - Hit by contractor	36501 Dashwood Rd
Dec 7	19mm PE - Split pipe	70032 Shipka Line
Dec 7	50mm PVC - Hit by contractor	70335 Mollard Line

VII. SUMMARY of FROZEN WATER SERVICES

For twenty years prior to 2014 there were very few recorded frozen water service in Exeter and no records of frozen services could be found for Stephen Township. During the winter of 2014 (January to March) there were eight frozen services, four of which could not be thawed and were back-fed from an adjacent property for the duration of the winter. During the winter of 2015 (January to March) there were eleven frozen services, three of which could not be thawed and were back-fed for the duration of the winter.

As a result of recent history of frozen water services, a plan was implemented to lower services that froze to mitigate the problem in the future. Over the last couple of years water services that froze under the road allowance were lowered or replaced. During the winter of 2017 (January to March) there were no frozen water services.

APPENDIX “A”

APPENDIX "A"

OWNER REQUIREMENTS UNDER THE SAFE DRINKING WATER ACT

Safe Drinking Water Act, 2002

S.O. 2002, CHAPTER 32

Consolidation Period: From March 22, 2017 to the e-Laws currency date of February 12, 2018.

Last amendment: 2017, c. 2, Sched. 11, s. 6.

PART III
GENERAL REQUIREMENTS

Potable water

10. Despite any other Act, a requirement that water be "potable" in any Act, regulation, order or other document issued under the authority of any Act or in a municipal by-law shall be deemed to be a requirement to meet, at a minimum, the requirements of the prescribed drinking water quality standards. 2002, c. 32, s. 10.

Duties of owners and operating authorities

11. (1) Every owner of a municipal drinking water system or a regulated non-municipal drinking water system and, if an operating authority is responsible for the operation of the system, the operating authority for the system shall ensure the following:

1. That all water provided by the system to the point where the system is connected to a user's plumbing system meets the requirements of the prescribed drinking water quality standards.
2. That, at all times in which it is in service, the drinking water system,
    i. is operated in accordance with the requirements under this Act,
    ii. is maintained in a fit state of repair, and
    iii. satisfies the requirements of the standards prescribed for the system or the class of systems to which the system belongs.
3. That the drinking water system is operated by persons having the training or expertise for their operating functions that is required by the regulations and the licence or approval issued or granted for the system under this Act.
4. That all sampling, testing and monitoring requirements under this Act that relate to the drinking water system are complied with.
5. That personnel at the drinking water system are under the supervision of persons having the prescribed qualifications.

6. That the persons who carry out functions in relation to the drinking water system comply with such reporting requirements as may be prescribed or that are required by the conditions in the licence or approval issued or granted for the system under this Act. 2002, c. 32, s. 11 (1).

Duty of owner to report to public

(2) If an owner of a municipal drinking water system or regulated non-municipal drinking water system is required by the regulations to report on any matter to the public, the owner shall report in accordance with the regulations. 2002, c. 32, s. 11 (2).

Out-of-province drinking water testing service

(3) No owner or operating authority of a municipal drinking water system or regulated non-municipal drinking water system shall obtain a drinking water testing service from a person who is not licensed under Part VII to offer or provide the service unless,

(a) the laboratory at which the testing is to be conducted is located outside Ontario and is an eligible laboratory in respect of the particular tests to be conducted;

(b) the person agrees in writing to comply with section 18 and any prescribed requirements; and

(c) the owner or operating authority provides to the Director appointed for the purposes of Part VII,

(i) written notice of the use of the testing service,

(ii) a copy of the accreditation referred to in clause (4) (a), if applicable, and

(iii) a copy of the agreement referred to in clause (b). 2002, c. 32, s. 11 (3).

Eligible laboratory

(4) For the purposes of this section, a laboratory located outside Ontario is an eligible laboratory in respect of a particular test if the laboratory is on a list maintained by the Director appointed for the purposes of Part VII and,

(a) the laboratory is accredited for the conduct of the test and, in the Director's opinion, the accreditation is equivalent to the accreditation standard of an accreditation body for drinking water testing under Part VII; or

(b) in the Director's opinion,

(i) it is desirable for the purposes of this Act that the test be available,

(ii) there is no laboratory, or there are insufficient laboratories, in the area for the conduct of the test under a licence issued under Part VII, and

(iii) the person who is to provide the drinking water testing service will be capable of conducting the test at the laboratory, or causing the test to be conducted there. 2002, c. 32, s. 11 (4).

List of out-of-province laboratories

(5) For the purposes of subsection (4), a laboratory may be added to the list maintained by the Director, and may be retained on the list, only if,

(a) any fee required under this Act has been paid in respect of the laboratory; and

(b) the laboratory complies with the prescribed requirements. 2002, c. 32, s. 11 (5).

Director's direction

(6) The Director may issue a direction to one or more owners or operating authorities prohibiting them from obtaining drinking water testing services from a laboratory located outside Ontario if the Director has reason to believe that the laboratory has ceased to be an eligible laboratory or has failed to comply with section 18 or a prescribed requirement. 2002, c. 32, s. 11 (6).

Same

(7) Every person who receives a direction under subsection (6) shall comply with the direction and advise the Director in writing of the alternative laboratory from which the person will obtain drinking water testing services. 2002, c. 32, s. 11 (7).

Revocation of direction

(8) The Director may revoke a direction issued under subsection (6) if he or she is of the opinion that the reasons for issuing the direction no longer exist. 2002, c. 32, s. 11 (8).

Operator's certificate

12. (1) No person shall operate a municipal drinking water system or a regulated non-municipal drinking water system unless the person holds a valid operator's certificate issued in accordance with the regulations. 2002, c. 32, s. 12 (1).

Transitional

(2) For the purposes of subsection (1), a valid operator's licence issued under section 6 of Ontario Regulation 435/93 under the *Ontario Water Resources Act* shall be deemed to be an operator's certificate until the day the operator's licence expires or is cancelled or suspended. 2002, c. 32, s. 12 (2).

Same

(3) For the purposes of subsection (1), a valid operator's licence issued under section 7 or 8 of Ontario Regulation 435/93 under the *Ontario Water Resources Act* shall be deemed to be an operator's certificate until the earlier of,

(a) the day the operator's licence is cancelled or suspended; and

(b) the day that is the second anniversary of the day of filing of a regulation made under this Act governing the application and issue of operator's certificates. 2002, c. 32, s. 12 (3).

Same

(4) If an operator's licence mentioned in subsection (3) expires before the day described in clause (3) (b) and is not renewed, the licence ceases to be deemed to be an operator's certificate on the day it expires. 2002, c. 32, s. 12 (4).

Duty to have accredited operating authority

13. (1) Every owner of a municipal drinking water system shall ensure that an accredited operating authority is in charge of the system at all times on and after the day specified in the regulations for the municipality, the system or the owner of the system. 2002, c. 32, s. 13 (1).

Same

(2) If the Minister makes a regulation requiring an accredited operating authority to be in charge of a non-municipal drinking water system, the owner of the system shall ensure that an accredited operating authority is in charge of the system at all times. 2002, c. 32, s. 13 (2).

Agreement with accredited operating authority

14. (1) If an accredited operating authority is in charge of a drinking water system and it is not the owner of the system, the accredited operating authority and the owner of the system shall enter into an agreement that contains the following:

1. A description of the system or the parts of the system for which the operating authority is responsible.
2. A description of the respective responsibilities of the owner and the operating authority to ensure that the operation, maintenance, management and alteration of the system comply with this Act, the regulations, any order under this Act and the conditions in,
   i. the drinking water works permit and the municipal drinking water licence for the system, in the case of a municipal drinking water system, or
   ii. the approval for the system, in the case of a non-municipal drinking water system.
3. A description of the respective responsibilities of the owner and the accredited operating authority in the event a deficiency is determined to exist or an emergency occurs.
4. A description of the respective responsibilities of the owner and the accredited operating authority to ensure that the operational plans for the system are reviewed and revised appropriately and that both parties are informed of all revisions.
5. Any other provisions required by the regulations. 2002, c. 32, s. 14 (1).

Delegation of duty

(2) If an owner of a drinking water system enters into an agreement with an accredited operating authority, the owner may, in the agreement, delegate a duty imposed on the owner under this Act to the accredited operating authority. 2002, c. 32, s. 14 (2).

Exception

(3) A delegation referred to in subsection (2) shall not relieve the owner of the drinking water system from the duty to comply with section 19 or the duty,

(a) to ensure that the accredited operating authority carries out its duties under this Act and the agreement in a competent and diligent manner while it is in charge of the system; and

(b) upon discovery that the accredited operating authority is failing to act in accordance with clause (a), to take all reasonable steps to ensure that the operation of the system complies with the requirements under this Act. 2002, c. 32, s. 14 (3).

Agreement to be made public

(4) The contents of every agreement referred to in subsection (1) between an owner of a drinking water system and an accredited operating authority shall be made public by the owner of the system in accordance with the requirements prescribed by the Minister. 2002, c. 32, s. 14 (4).

Directions, operational plans

15. (1) The Director shall, on or before the prescribed date, issue directions governing the preparation and content of operational plans for municipal drinking water systems and may issue

such additional directions as the Director considers necessary for the purposes of this section. 2002, c. 32, s. 15 (1).

Same

(2) If the Minister makes a regulation requiring a non-municipal drinking water system or a class of non-municipal drinking water systems to have operational plans, the Director shall, on or before the date prescribed by the Minister, issue directions governing the preparation and content of operational plans for the system or systems. 2002, c. 32, s. 15 (2).

Same

(3) The Director may amend, revoke or replace a direction issued under this section. 2002, c. 32, s. 15 (3).

Content of direction

(4) The direction shall include,

(a) minimum content requirements for operational plans;

(b) rules respecting the retention of copies of versions of operational plans;

(c) rules respecting the public disclosure of the contents of operational plans; and

(d) such other requirements as the Director considers necessary for the purposes of this Act and the regulations. 2002, c. 32, s. 15 (4).

Same

(5) A direction issued under this section may,

(a) be general or limited in its application;

(b) apply in respect of any class of drinking water systems;

(c) require the preparation of operational plans for a treatment system, a distribution system or any part of either or both of them. 2002, c. 32, s. 15 (5).

Publication

(6) A direction, amendment to a direction or revocation of a direction takes effect when a notice of the direction, amendment or revocation, as the case may be, is given in the Registry. 2002, c. 32, s. 15 (6).

***Legislation Act, 2006*, Part III**

(7) Part III (Regulations) of the *Legislation Act, 2006* does not apply to a direction issued under this section. 2002, c. 32, s. 15 (7); 2006, c. 21, Sched. F, s. 132 (1).

Operational plans

16. (1) If operational plans are required for a drinking water system under this Act, every owner and accredited operational authority of the system shall,

(a) ensure that the plans comply with such directions issued under section 15 that apply in respect of the system; and

(b) make public the contents of the operating plans in accordance with the Director's directions. 2002, c. 32, s. 16 (1).

Submission of plans, municipal drinking water system

(2) Every owner of a municipal drinking water system shall provide a copy of all operational plans for the system to the Director on or before the day prescribed by the regulations for the municipality, the system or the owner of the system. 2002, c. 32, s. 16 (2).

Review of plans

(3) The Director shall review the operational plans for the municipal drinking water system and shall issue a notice,

(a) accepting the plans if the Director is satisfied that the plans satisfy the directions; or

(b) rejecting the plans for the reasons set out in the notice, if the Director is not satisfied that the plans satisfy the directions. 2002, c. 32, s. 16 (3).

Resubmission of plans

(4) The owner of a municipal drinking water system whose operational plans are rejected by the Director shall revise and resubmit the revised plans to the Director in accordance with the directions specified in the notice. 2002, c. 32, s. 16 (4).

Ownership of operational plans

17. (1) All operational plans for a drinking water system remain the property of the owner of the system, irrespective of who prepares or revises the plans. 2002, c. 32, s. 17 (1).

Retention of plans

(2) Every accredited operating authority of a drinking water system for which operational plans are required under this Act shall retain copies of the operational plans for the system in accordance with the Director's directions under section 15. 2002, c. 32, s. 17 (2).

Same

(3) Upon termination of an agreement between the owner and the accredited operating authority of a system, the accredited operating authority shall ensure that the owner has copies of the most recently prepared and revised operational plans for the system. 2002, c. 32, s. 17 (3).

Duty to report adverse test result

18. (1) Each of the following persons shall report every prescribed adverse result of a drinking water test conducted on any waters from a municipal drinking water system or a regulated non-municipal drinking water system to the Ministry and the medical officer of health immediately after the adverse result is obtained:

1. The operating authority responsible for the system or, if there is no operating authority responsible for the system, the owner of the system.
2. The person operating the laboratory at which the adverse result was obtained. 2002, c. 32, s. 18 (1); 2007, c. 10, Sched. D, s. 3 (6).

Same

(2) A report under subsection (1) shall be made in accordance with the regulations. 2002, c. 32, s. 18 (2).

Duty to report to the owner

(3) If an operating authority is required to report an adverse test result under subsection (1), the operating authority shall also immediately report the adverse test result to the owner of the system for which the operating authority is responsible. 2007, c. 10, Sched. D, s. 3 (7).

Duty of laboratory to report

(4) Every person operating a laboratory who is required to report an adverse test result under subsection (1) shall also notify the operating authority responsible for the system or, if there is no operating authority responsible for the system, the owner of the system, of every adverse test result relating to the system, immediately after the adverse result is obtained. 2007, c. 10, Sched. D, s. 3 (7).

Duty to report adverse test result

18.1 (1) The person operating the laboratory at which an adverse result was obtained shall report every prescribed adverse result of a drinking water test conducted on any waters from a small drinking water system within the meaning of the *Health Protection and Promotion Act* to the Ministry of Health and Long-Term Care and the medical officer of health immediately after the adverse result is obtained. 2007, c. 10, Sched. D, s. 3 (8).

Same

(2) A report under subsection (1) shall be made in accordance with the regulations. 2007, c. 10, Sched. D, s. 3 (8).

Duty of laboratory to report

(3) Every person operating a laboratory who is required to report an adverse test result under subsection (1) shall also notify the operator responsible for the system or, if there is no operator responsible for the system, the owner of the system, of every adverse test result relating to the system, immediately after the adverse result is obtained. 2007, c. 10, Sched. D, s. 3 (8).

Standard of care, municipal drinking water system

19. (1) Each of the persons listed in subsection (2) shall,

(a) exercise the level of care, diligence and skill in respect of a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation; and

(b) act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the municipal drinking water system. 2002, c. 32, s. 19 (1).

Same

(2) The following are the persons listed for the purposes of subsection (1):

1. The owner of the municipal drinking water system.
2. If the municipal drinking water system is owned by a corporation other than a municipality, every officer and director of the corporation.
3. If the system is owned by a municipality, every person who, on behalf of the municipality, oversees the accredited operating authority of the system or exercises decision-making authority over the system. 2002, c. 32, s. 19 (2).

Offence

(3) Every person under a duty described in subsection (1) who fails to carry out that duty is guilty of an offence. 2002, c. 32, s. 19 (3).

Same

(4) A person may be convicted of an offence under this section in respect of a municipal drinking water system whether or not the owner of the system is prosecuted or convicted. 2002, c. 32, s. 19 (4).

Reliance on experts

(5) A person shall not be considered to have failed to carry out a duty described in subsection (1) in any circumstance in which the person relies in good faith on a report of an engineer, lawyer, accountant or other person whose professional qualifications lend credibility to the report. 2002, c. 32, s. 19 (5).

Prohibition

20. (1) No person shall cause or permit any thing to enter a drinking water system if it could result in,

(a) a drinking water health hazard;

(b) a contravention of a prescribed standard; or

(c) interference with the normal operation of the system. 2002, c. 32, s. 20 (1).

Exception

(2) Subsection (1) does not apply to prohibit activities that are carried out,

(a) in the course of the proper operation, maintenance, repair or alteration of a drinking water system; or

(b) under a statutory authority or for the purposes of complying with a statutory requirement. 2002, c. 32, s. 20 (2).

Dilution no defence

(3) For the purposes of prosecuting the offence of contravening subsection (1), it is not necessary to prove that the thing, if it was diluted when or after it entered the system, continued to result in or could have resulted in a drinking water health hazard. 2002, c. 32, s. 20 (3).

APPENDIX "B"

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DRINKING-WATER-RELATED ACTS AND REGULATIONS

Bill 66 Great Lakes Protection Act, 2015	
Clean Water Act, 2006, S.O. 2006, CHAPTER 22	✓ O. Reg. 287/07 - General ✓ O. Reg. 231/07 - Service of Documents ✓ O. Reg. 284/07 - Source Protection Areas and Regions ✓ O. Reg. 288/07 - Source Protection Committees
Safe Drinking Water Act, 2002, S.O. 2002, CHAPTER 32	✓ O. Reg. 128/04 - Certification Of Drinking Water System Operators And Water Quality Analysts ✓ O. Reg. 242/05 - Compliance And Enforcement ✓ O. Reg. 172/03 - Definitions Of "Deficiency" and "Municipal Drinking Water System" ✓ O. Reg. 171/03 - Definitions Of Words And Expressions Used In The Act ✓ O. Reg. 170/03 - Drinking Water Systems ✓ O. Reg. 248/03 - Drinking Water Testing Services ✓ O. Reg. 453/07 - Financial Plans ✓ O. Reg. 188/07 - Licensing Of Municipal Drinking Water Systems ✓ O. Reg. 169/03 - Ontario Drinking Water Quality Standards ✓ O. Reg. 243/07 - Schools, Private Schools And Day Nurseries ✓ O. Reg. 229/07 - Service Of Documents
Ontario Water Resources Act, R.S.O. 1990, CHAPTER O.40	✓ O. Reg. 525/98 - Approval Exemptions ✓ O. Reg. 450/07 - Charges for Industrial and Commercial Water Users ✓ O. Reg. 129/04 - Licensing of Sewage Works Operators ✓ O. Reg. 387/04 - Water Taking ✓ R.R.O. 1990, Reg. 903 - Wells
Water Opportunities and Water Conservation Act, 2010 S.O. 2010, CHAPTER 19 Schedule 1	✓ O. Reg. 40/11 – Water Technology Acceleration Project
Environmental Bill of Rights, 1993 S.O. 1993, CHAPTER 28	✓ O. Reg. 73/94 - General ✓ O. Reg. 681/94 – Classification of Proposal for

	Instruments
Environmental Protection Act, R.S.O. 1990, CHAPTER E.19	✓ O. Reg. 524/98 - Environmental Compliance Approvals — Exemptions From Section 9 of the Act
Health Protection and Promotion Act (Ministry of Health and Long-Term Care)	✓ O. Reg. 318/08 - Transitional – Small Drinking Water Systems ✓ O. Reg. 319/08 - Small Drinking Water Systems
Development Corporations Act, R.S.O. 1990, CHAPTER D.10	✓ O. Reg. 304/04 – The Walkerton Clean Water Centre

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APPENDIX “C”

APPENDIX “D”

APPENDIX “E”

APPENDIX “F”