
TOWNSHIP OF WELLINGTON NORTH

MOUNT FOREST

SANITARY AND WATER SERVICING

TECHNICAL UPDATE



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TOWNSHIP OF WELLINGTON NORTH

MOUNT FOREST

SANITARY AND WATER SERVICING

TECHNICAL UPDATE

January 29, 2026

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File No. 24249

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TOWNSHIP OF WELLINGTON NORTH MOUNT FOREST SANITARY AND WATER SERVICING TECHNICAL UPDATE

1.0 INTRODUCTION AND BACKGROUND

1.1 Background

A Mount Forest Water Supply and Sanitary Sewage Collection Master Plan study was completed in 2003, which focused on water storage, trunk watermain and trunk sanitary sewer servicing extensions to undeveloped growth areas within the urban boundaries, and to servicing potential expansions of the urban boundaries and/or servicing adjacent municipal industrial lands. The results of this study are summarized in a document entitled “Township of Wellington North, Class Environmental Assessment for a Water Supply and Sanitary Sewage Collection Master Plan, Community of Mount Forest,” December 2003.

A Municipal Class EA for Servicing the South End Development Area, Community of Mount Forest, Project File document, July 27, 2004, summarizes the results of a study completed for Phase 1 municipal servicing of future development lands within the urban boundary south of the South Saugeen River. Those Phase 1 works included a forcemain, watermain and electrical conduits across the South Saugeen River, which were constructed in 2005.

A Class Environmental Assessment (Class EA) for Improvements to the Sanitary Sewage Collection System, Community of Mount Forest, Project File document, Rev. January 28, 2009, summarizes the results of a study completed for key sewage pumping station (SPS) facilities within the community. This study documented evaluations and public consultation for the replacement and expansion of the Cork Street SPS, the replacement and expansion of the Durham Street SPS, and the creation of a new South Water Street SPS for unserviced lands within the urban boundary south of the South Saugeen River. The recommended Cork Street SPS and Durham Street SPS facilities have since been constructed. The South Water Street SPS is designed and approved (approval expired in November 2025), but it has not yet been constructed since it depends on the timeline of a nearby residential subdivision.

A Servicing Master Plan Update report was completed in 2010-2011, in order to review and update the recommendations of the 2003 study report, due to the completion of several of the key

works identified in the 2003 report, and to update the servicing recommendations based on updated projections of growth patterns and anticipated priorities.

A Mount Forest Sanitary and Water Servicing Technical Update report was completed in January 2021, which focused on water and sanitary sewage servicing requirements for future anticipated significant growth within the urban boundary of Mount Forest, and to consider potential servicing to the Municipality of West Grey's adjacent industrial park.

The rate of residential development within Mount Forest has grown considerably since the last study was completed, and it is anticipated to grow significantly for the foreseeable future. This current study update report reviews the results of past studies based on new growth projections as included in the Township's Growth Management Action Plan report dated August 16, 2024.

1.2 Purpose of Study

The purpose of this report is to assist the Township with determining what key changes (e.g. extensions) to the existing sanitary collection and water distribution systems will be required to service future development areas in the existing urban boundary, though future capacity requirements for existing and new SPSs, water supply and water storage will be summarized as well. Generally, the following system components were evaluated as part of this study:

- Well pumpage records and metered customer records.
- Water supply capacity.
- Water storage capacity.
- Water distribution system, based on a previous WaterCAD™ model updated with current information and based on the previously selected elevated storage alternative (i.e. keep the existing standpipe and construct a second new elevated storage facility at the north end of Mount Forest adjacent to the existing industrial park on lands owned by the Township in the Municipality of West Grey).
- Past 5 years of WWTP and SPS flow records.
- Evaluation of the existing sanitary sewer collection system through the establishment of a SewerCAD™ model.
- Trunk gravity sanitary sewer extension evaluations.
- SPS capacities.
- Key infrastructure upgrades required in 20 years and 50 years.
- Water and Sanitary infrastructure improvements including costs.

This study does not include an evaluation of the following:

- Consulting with adjacent Municipality and County about proposed works within West Grey, or of the possibility of servicing the adjacent West Grey industrial area. The Township indicates that there are no active current considerations for servicing West Grey industrial area, so this is not considered in this updated study.
- Well supply treatment, operations and maintenance.
- Water distribution system quality.
- Current condition of the water distribution system.

- Sewage treatment, operations and maintenance.
- Infiltration & inflow issues within the sanitary sewage collection system (general comments only provided).
- Current condition of sanitary collection system.
- County interest in co-treatment of Riverstown landfill leachate at the Mount Forest WWTP.
- Inclusion of servicing that is being completed as part of new developments where those servicing works are the responsibility of the developer.

This study also did not follow the Class Environmental Assessment. Therefore, some of the recommended Activities will require the completion of the appropriate level of Class EA study work, including public and government agency consultation, prior to their implementation (detailed design, approvals, and construction).

1.3 Study Location and Service Area

The community of Mount Forest is located at the northern limit of Wellington County. Mount Forest is intersected by Provincial Highways No. 6 and No. 89 and is bisected by the South Saugeen River which flows generally from east to west through the southern portion of the community.

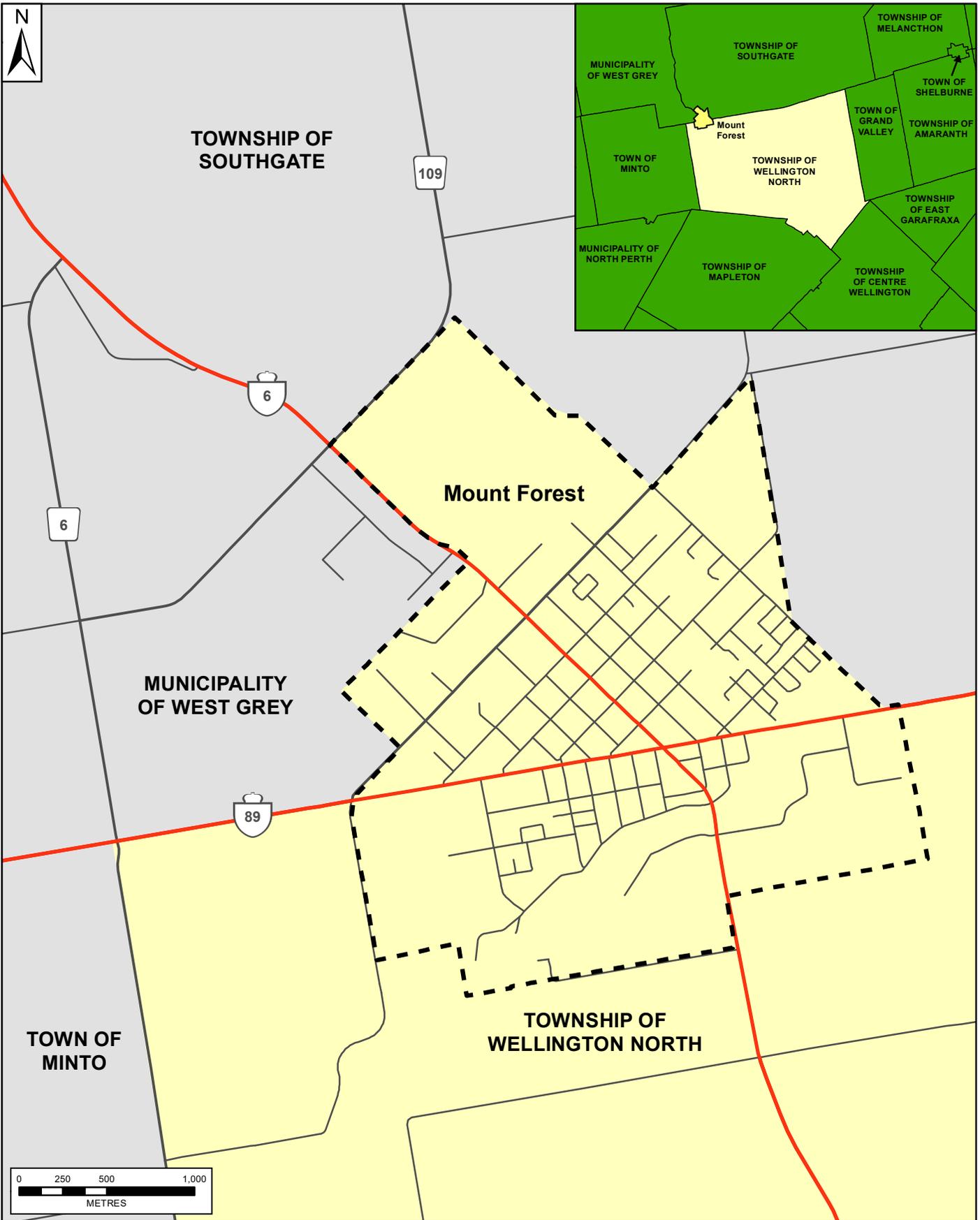
Figure 1.1 illustrates the general location of the Township of Wellington North and the community of Mount Forest.

Figure 1.2 illustrates the urban boundaries of the community of Mount Forest and the Official Plan designations of the various areas of the community.

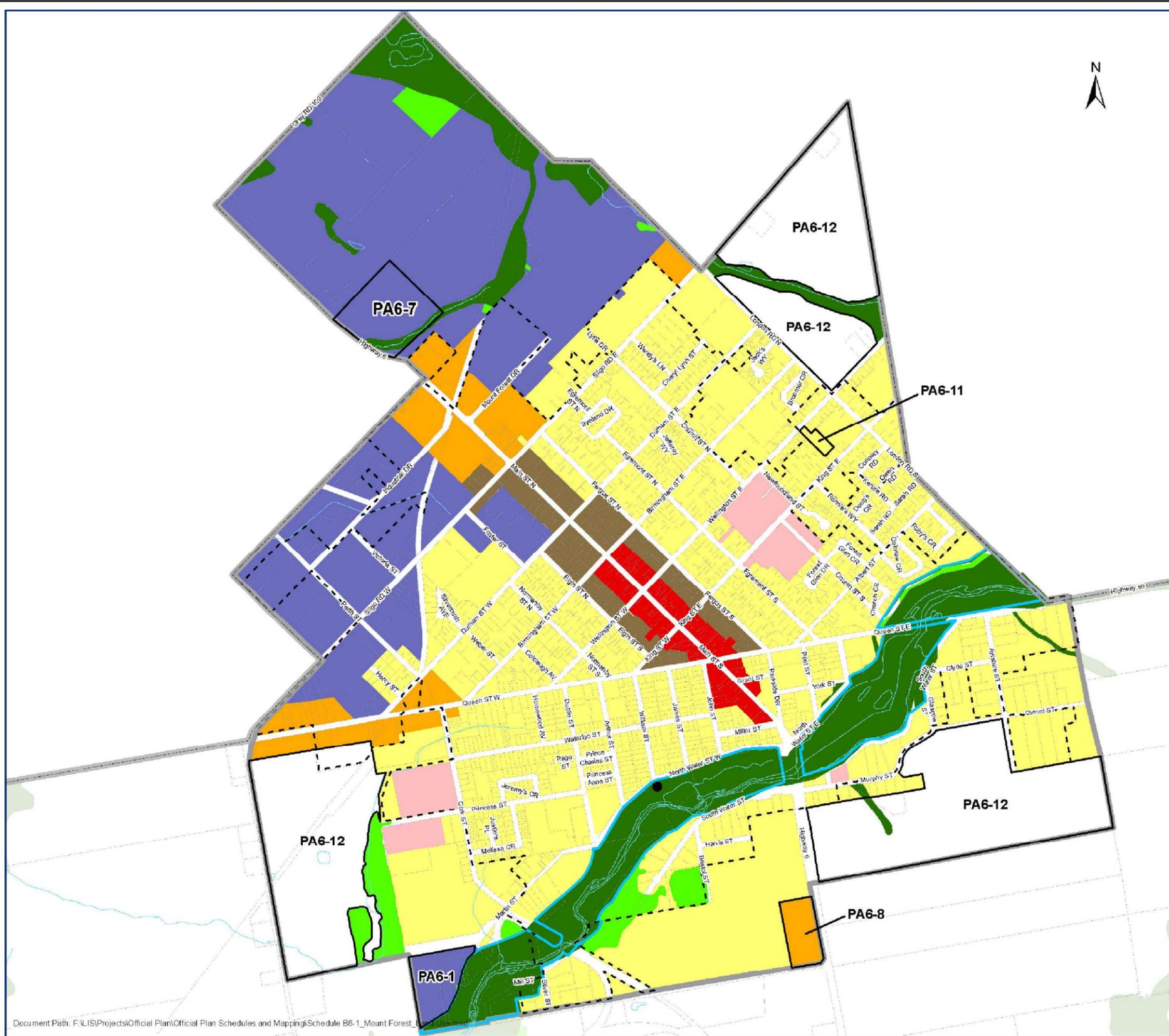
1.4 Existing Servicing

Mount Forest is currently serviced by a municipal Drinking Water System. This system is comprised of four drilled bedrock well supplies, a 2,080 m³ elevated water storage standpipe complete with a booster pumping station (i.e. 2,000 m³ effective storage), and a water distribution network. Some areas within the urban boundary are serviced by individual well supplies (e.g. parts of the community that are south of the South Saugeen River).

The sanitary sewage system consists of a network of collection sewers, four SPSs, and an extended aeration wastewater treatment plant (WWTP), with discharge to the South Saugeen River. Some areas are serviced by low pressure sanitary collection sewers (e.g. private grinder pumps), or by private SPSs (e.g. Victoria Street industrial plaza; OPP Station). Some areas within the urban boundary are serviced by individual Class IV sewage disposal (septic) systems (e.g. area south of the South Saugeen River).



	TOWNSHIP OF WELLINGTON NORTH MOUNT FOREST		DATE NOV. 25, 2025	PROJECT No. 24249
	SANITARY AND WATER SERVICING TECHNICAL UPDATE GENERAL LOCATION PLAN		SCALE AS SHOWN	FIGURE No. 1.1

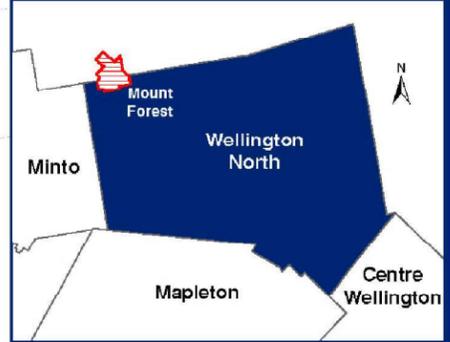


Land Use

MOUNT FOREST

WELLINGTON NORTH

- Legend**
- Residential
 - Central Business District
 - Residential Transition Area
 - Highway Commercial
 - Industrial
 - Recreational
 - Future Development
 - PA Policy Area
 - Core Greenlands
 - Greenlands
 - Regulatory Floodline
 - Built Boundary
 - Urban Centre Boundary
 - Waste Water Facility
 - Waterbody
 - Watercourse



Produced by: County of Wellington Planning & Development Department

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Sources:
 County of Wellington 2025,
 Ministry of Natural Resources and Forestry,
 Saugeen River Conservation Authority,
 Teranet 2002,
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Last Revised: November 2025



Schedule B6-1

County of Wellington Official Plan

Source: County of Wellington Official Plan (2025)

	TOWNSHIP OF WELLINGTON NORTH MOUNT FOREST		DATE NOV. 25, 2025	PROJECT No. 24249
	SANITARY AND WATER SERVICING TECHNICAL UPDATE OFFICIAL PLAN DESIGNATIONS		SCALE AS SHOWN	FIGURE No. 1.2

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Water and Sanitary Works, as constructed since the last study, have included:

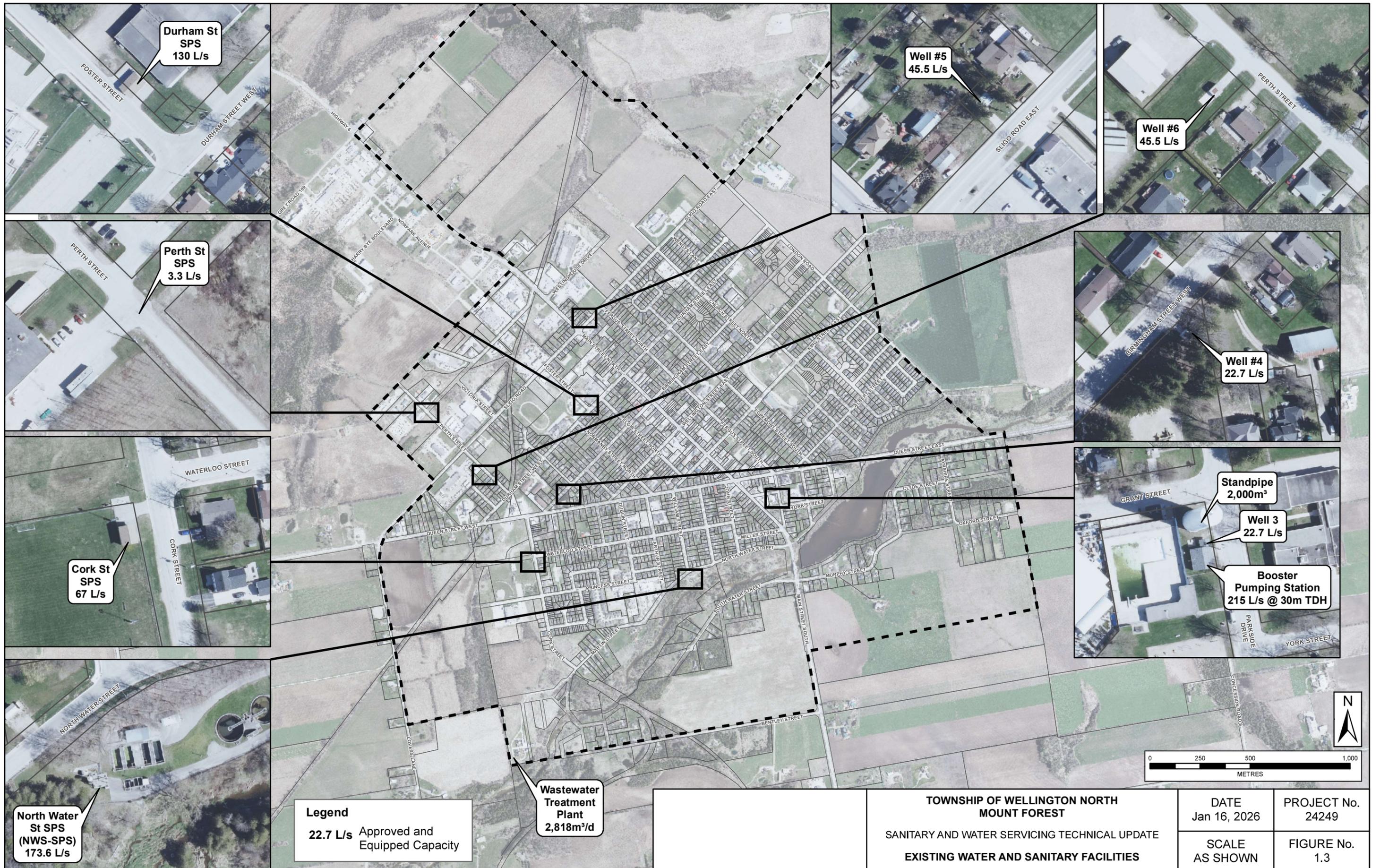
Growth related works (i.e. new developments):

- Construction of an extension to Newfoundland Street south of King Street East to service a new subdivision (Marlanna), which includes new sanitary sewer and watermain.
- Construction of Jefferey Way to service a new subdivision, which includes new sanitary sewer and watermain.
- Westerly extension of the Durham Street East sanitary sewer from west of Church Street North to west of Jefferey Way to service a new subdivision and some existing unserviced Durham Street lots.
- Construction of Jack's Way to service a new subdivision, which includes new sanitary sewer and watermain
- Construction of sanitary sewer in the unopened Birmingham Street East road allowance from east of Church Street East to a servicing Block from Jack's Way, to service a new subdivision.
- Construction of new watermain in the unopened Birmingham Street East road allowance from London Road North to a servicing Block from Jack's Way, to service a new subdivision.
- Construction of an extension to Broomer's Crescent to service a new subdivision, which includes new sanitary sewer and watermain.

Replacement & refurbishing (capital) works (i.e. to replace/refurbish aging infrastructure):

- Queen Street East reconstruction, from Main Street South to York Street, which included replacing the watermain with 250mm dia. watermain from Main Street South to Egremont Street South and 150mm dia. watermain from Egremont Street South to York Street, and new 200mm dia. sanitary sewer from Main Street South to Fergus Street South and from Egremont Street South to York Street.
- Cork Street reconstruction, from Waterloo Street to Princess Street, which included replacing the 150mm dia. watermain with a 300mm dia. watermain, and existing sanitary sewer repairs.
- Fergus Street South reconstruction, from Wellington Street East to Birmingham Street East, which included new watermain.
- Replacement of sanitary sewer across Main Street North at Durham Street, to replace clay tile sewer.
- Replacement of watermain across Main Street North at Durham Street, to replace old cast iron watermain.
- John Street reconstruction from Waterloo Street to Queen Street West, which included new sanitary sewer and watermain.
- Recoating of the Grant Street water storage standpipe.
- Various work on Well No. 3 including the installation of a liner.

The locations of the key municipal water and sewage facilities are presented in Figure 1.3.



North Water St SPS (NWS-SPS)
173.6 L/s

Durham St SPS
130 L/s

Perth St SPS
3.3 L/s

Cork St SPS
67 L/s

Well #5
45.5 L/s

Well #6
45.5 L/s

Well #4
22.7 L/s

Standpipe
2,000m³

Well #3
22.7 L/s

Booster Pumping Station
215 L/s @ 30m TDH

Legend
22.7 L/s Approved and Equipped Capacity

Wastewater Treatment Plant
2,818m³/d

**TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST**
SANITARY AND WATER SERVICING TECHNICAL UPDATE
EXISTING WATER AND SANITARY FACILITIES

DATE Jan 16, 2026	PROJECT No. 24249
SCALE AS SHOWN	FIGURE No. 1.3

2.0 INFRASTRUCTURE MAPPING

Annually, the Township has its water distribution system and sanitary sewer collection system mapping updated to depict the general location of existing and new works added to these systems. The WaterCAD™ and SewerCAD™ models used for this study and the evaluation of servicing extensions were based on this mapping information as well as available record drawings.

3.0 POPULATION & GROWTH

Growth forecasting was not part of this study. Reliance was made on the August 2024 Township of Wellington North Growth Management Action Plan (Growth Plan) population forecasts. That document projected the following, for Mount Forest:

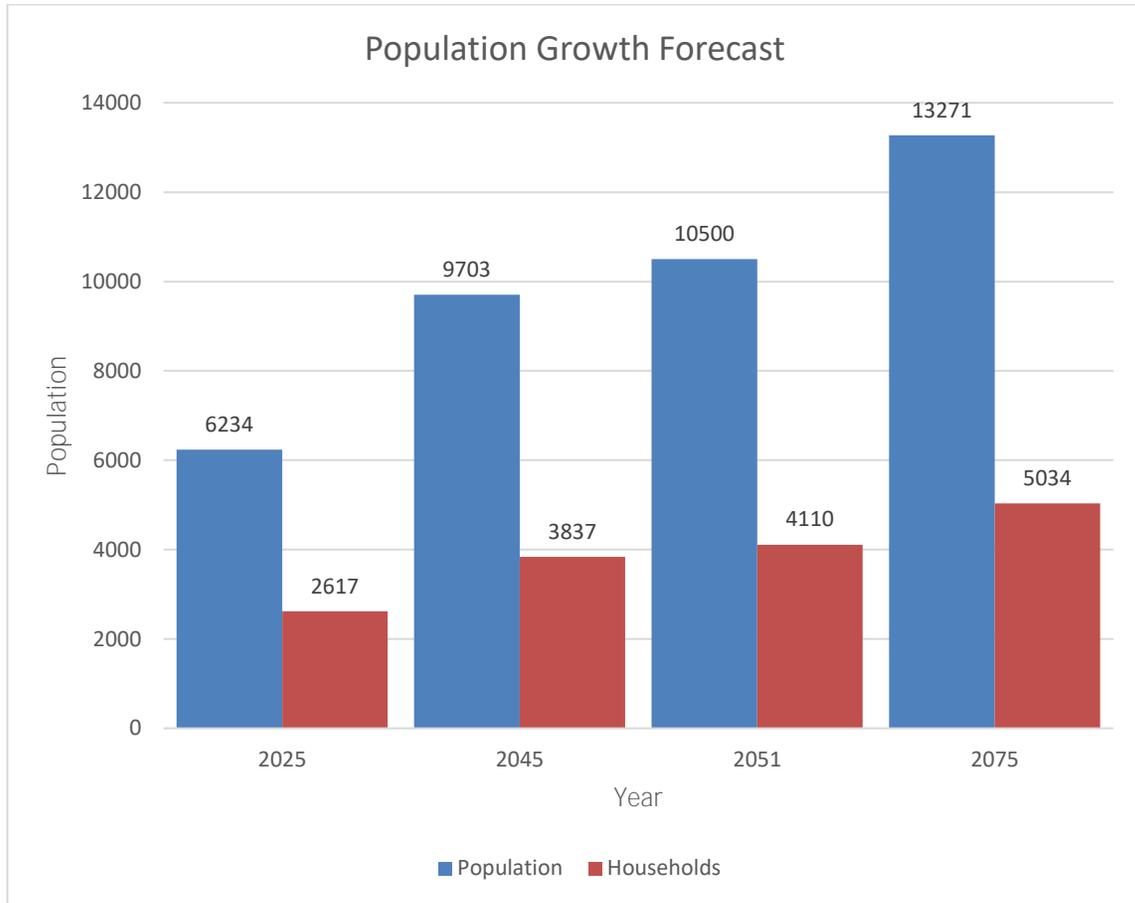
Table 3.1 - Population Growth Forecast

Year	Population	Annual Growth	Households	Annual Growth	Capita/Unit
2021	5,300	-	2,290	-	2.32
2024	5,800	3.05%	2,490	2.83%	2.33
2026	6,700	7.48%	2,750	5.09%	2.44
2031	7,600	2.55%	3,100	2.42%	2.45
2036	8,500	2.26%	3,410	1.92%	2.49
2041	8,600	0.23%	3,450	0.23%	2.49
2046	10,000	3.06%	3,940	2.69%	2.54
2051	10,500	0.98%	4,110	0.85%	2.55

Source: Township of Wellington North Growth Management Action Plan - Final Report – Figure E-2 (Mount Forest). These are “mid-year” projected populations.

This Technical Update study utilized the above and assumed a continued long-term (2051 to 2075) sustained growth rate of 0.98%. The following Figure 3.1 chart summarizes the calculated population and household projections, for Mount Forest:

Figure 3.1 - Population Growth Forecast



This report is based on the following planning periods and the key municipal works that were evaluated within those planning windows.

Table 3.2 - Planning Periods

Planning Period	Year	Population	Infrastructure evaluation
Current	2025	6,234	Base year conditions and needs
20-year	2045	9,703	Water (well) supply. SPSs (e.g. mechanical – pumps) Costing of such works if needed during this planning period
26-year	2051	10,500	This is the target year used in the Township’s Growth Plan
50-year	2075	13,271	Water storage Water distribution Sanitary collection Select costing of such works

It is assumed that industrial, commercial, and institutional (ICI) growth will match the residential growth rate, in terms of increases to community water demands and sanitary sewage flows.

The Township of Wellington North Growth Management Action Plan identified four Future Development (FD) land areas for the community, as depicted in Figure 3.2. As can be seen on this map, the main growth areas are located around the outskirts of the existing built area. The Growth Plan recommends that development be phased to align with planning for infrastructure. Additionally, out of the four FD Areas they recommend FD Area #2 & FD Area #3 which they indicate would accommodate most of the land needed for future growth to Yr. 2051. Based on a Growth Plan slideshow presentation, the advantages for each of these sites was noted to be as follows:

FD Area #2 (10 ha)

- *Provides good connectivity with the existing urban area and allows for the opportunity to*

FD Area #3 (39 ha)

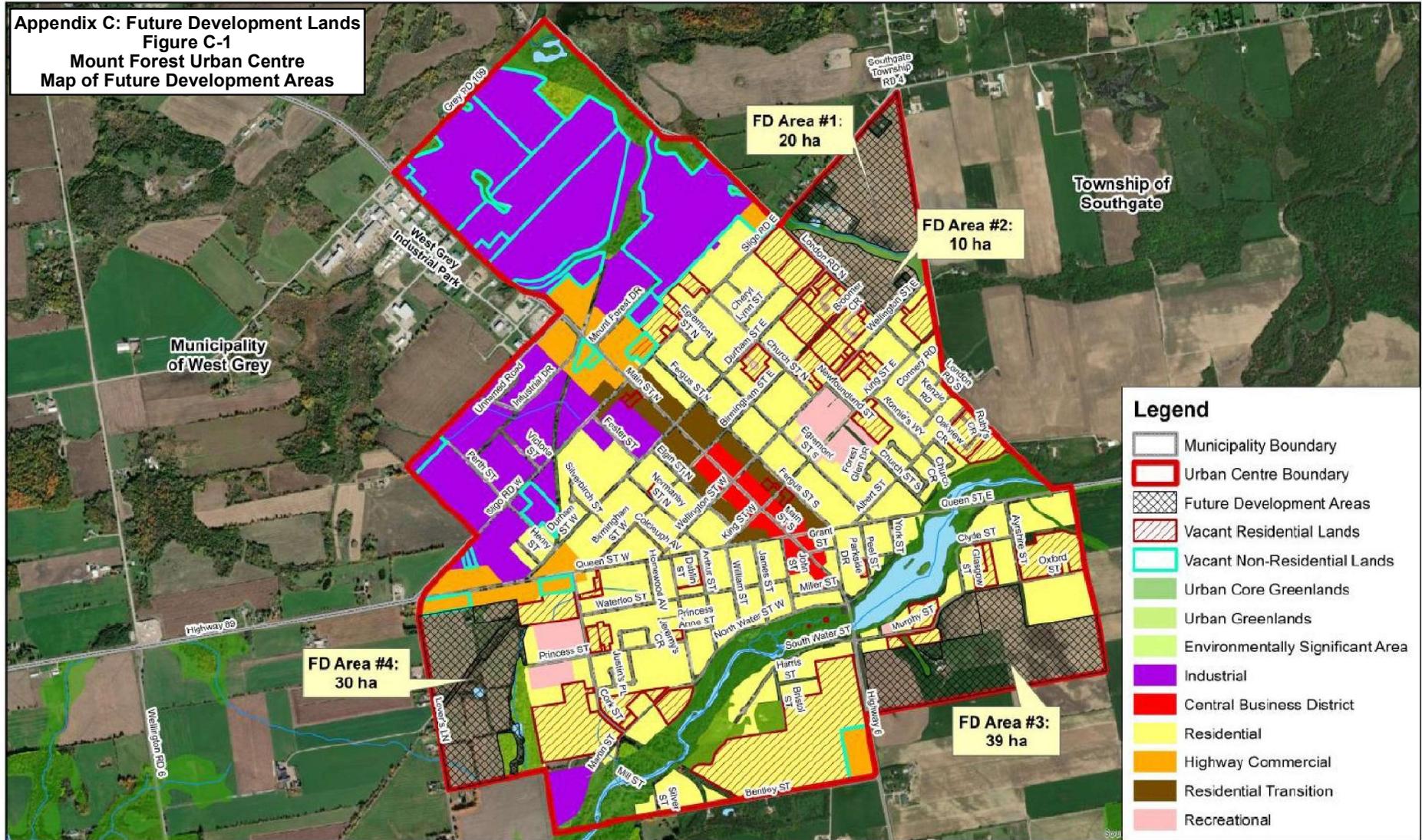
- *A large site area that provides good connectivity with the existing urban area. Provides a logical extension of a larger active development area, creating an opportunity for a cohesive new community area.*
- *Additional residential development in the area may provide opportunities to improve the market viability of the vacant designated commercial lands along Highway 6.*

This Technical Update study focused on municipal sanitary and water infrastructure to service growth with a focus on the probable 20-year growth areas as well as consideration for any key works required to continue servicing the existing serviced built area.

The Township's Growth Management Action greenfield density target is a minimum of 32 residents and jobs per hectare, and this has been assumed for this Technical Update study. We note this is different than the Wellington County Official Plan which indicates "the designated greenfield area of the County will be planned to achieve an overall minimum density of not less than 40 residents and jobs per hectare" and "strive to attain at least 16 units per gross hectare (6.5 units per gross acre) in newly developing subdivisions."

Source: Watson & Associates Growth Management Action Plan Report for the Township of Wellington North (2024)

Appendix C: Future Development Lands
 Figure C-1
 Mount Forest Urban Centre
 Map of Future Development Areas



Note: Future Development lands have been refined to exclude the proposed O.P.A. 123 which proposes to remove Future Development lands that are largely already developed.
 FD = Future Development
 Source: Watson & Associates Economists Ltd.

0 0.5 1 2 Kilometers



**TOWNSHIP OF WELLINGTON NORTH
 MOUNT FOREST**
 SANITARY AND WATER SERVICING TECHNICAL UPDATE
FUTURE SERVICE AREAS

DATE
 NOV. 25, 2025

PROJECT No.
 24249

SCALE
 AS SHOWN

FIGURE No.
 3.2

4.0 DRINKING WATER SYSTEM

4.1 Water Demands

Well pumpage records for the past five years were reviewed. Water demands are summarized in the following Table 4.1 and Table 4.2:

Table 4.1 - Average Day and Maximum Day Well Pumpage Rates (2020-2024)

Month	Average Day Flow (m ³ /day)						
	2020	2021	2022	2023	2024	3 yr	5 yr
January	1251	1324	1359	1269	1436	1355	1328
February	1258	1314	1334	1314	1409	1352	1326
March	1316	1343	1343	1288	1320	1317	1322
April	1260	1318	1323	1358	1320	1334	1316
May	1377	1504	1393	1807	1397	1533	1496
June	1574	1806	1610	1932	1551	1698	1695
July	1751	1559	1620	1799	1619	1680	1670
August	1521	1595	1493	1714	1521	1576	1569
September	1357	1392	1344	1406	1514	1421	1402
October	1315	1349	1316	1341	1403	1353	1345
November	1281	1353	1277	1346	1356	1326	1323
December	1256	1323	1276	1407	1339	1341	1320
Annual Average	1376	1432	1391	1498	1432	1440	1426
Max Day	2322	2870	2240	3268*	1960	2489	2532
Max Day Factor	1.7	2.0	1.6	2.2*	1.4	1.7	1.7

**In 2023, the existing standpipe was out of service from May 19 to August 14 for recoating activities. During that time, well supplies were operated continuously to maintain system pressures with system pressure relief valves such that water usage was higher.*

The per capita water use calculations are summarized as follows:

Table 4.2 - Per capita Average Day Demand (2020-2024)

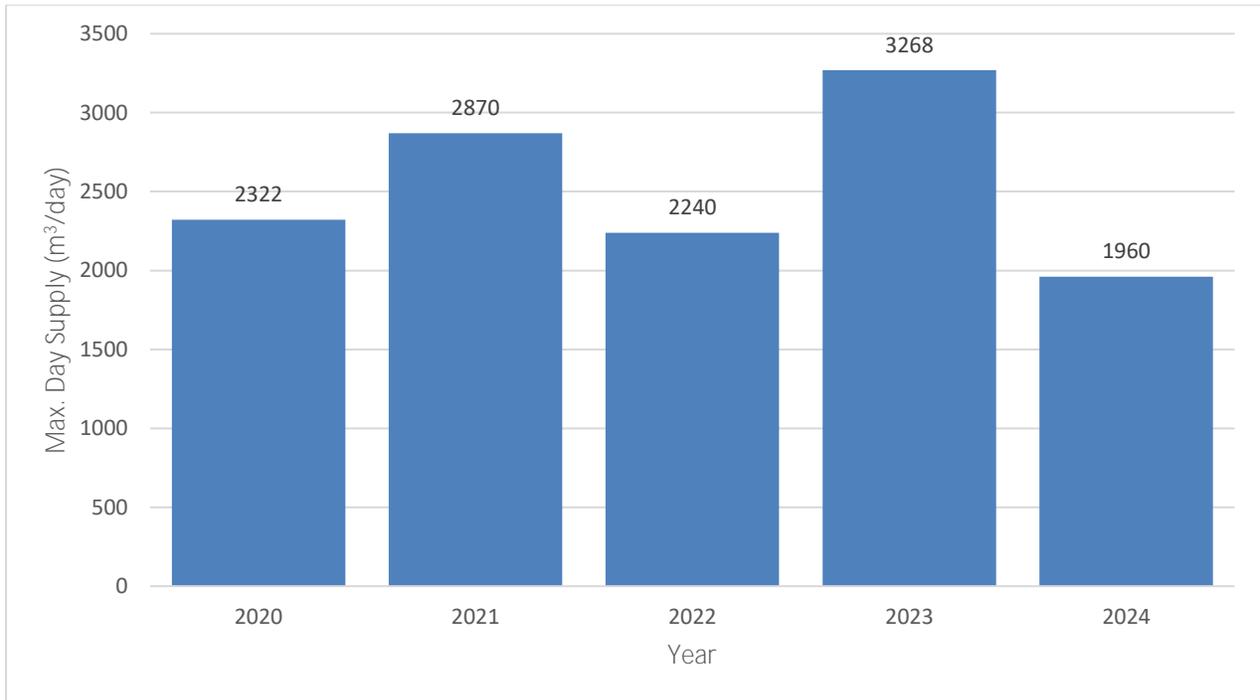
	2020	2021	2022	2023	2024	3-yr	5-yr
Avg. Day (m³/day)	1,376	1,432	1,391	1,498	1,432	1,440	1,426
Population	5133	5,300	5,462	5,628	5,800	5,630	5465
Per capita (Lpcd)	268	270	255	266	247	256	261

Therefore, based on the 3-year average water use and populations based on the Growth Plan, the current per capita average day water use is 256 L/capita/day (Lpcd). MECP design guidelines recommend a value of 270-450 Lpcd. Because not all of the community is serviced by the Township’s Municipal Drinking Water System (i.e. serviced population is less than the Growth Plan population, so the actual per capita water use rate would be higher than the above calculation), and to take into account MECP Guidelines, a design value of 275 Lpcd has been

selected for this study. It is noted that this value is based on all system uses, including the ICI sector. It is therefore inherently assumed the ICI water use will increase at the same proportion as residential growth in water demand.

The maximum day demand during the past five years is illustrated in the following Figure 4.1 bar chart.

Figure 4.1 - Maximum Day Demand (2020-2024)



**See Table 4.1 note ó the Yr. 2023 maximum day demands occurred due to the standpipe being out of service*

Therefore, the maximum day demand during the past five years, ignoring the 3,268 m³/day that occurred due to how the system was operated during a period when the standpipe was out of service for recoating work, was 2,870 m³/day. Based on the 1,498 m³/day average annual water use during this period, the maximum day factor is calculated to be 1.9. For the current population of Mount Forest, MECP Guidelines recommend using a maximum day demand factor of 2.0, and this is what has been used in this study for the water supply, water storage and water distribution design evaluations. It is noted that the calculated maximum day demand factor, based on this and the previous study, for the past ten years, excluding the 2023 result, ranged from 1.4 to 2.0 (i.e. maximum day demand of 1,797 to 2,870 m³).

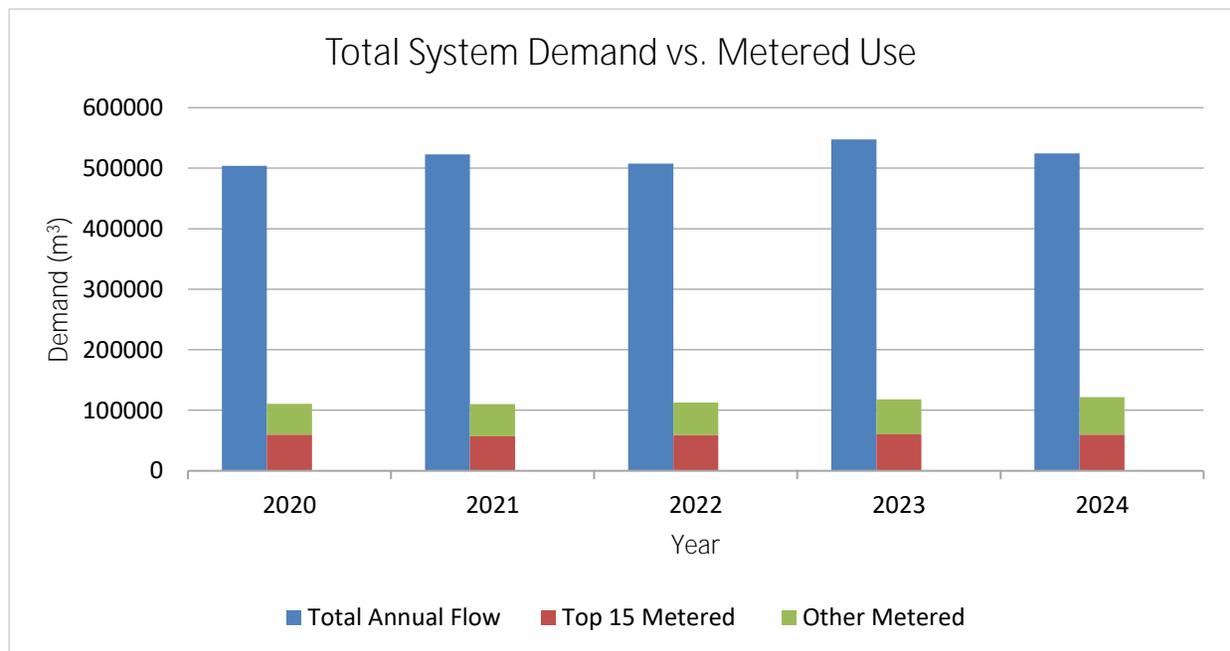
As part of the water use review, in order to confirm that there are no unusual trends in major metered water demands, metered water use records were obtained and reviewed for the past three years. The results of that review are summarized in the following Table 4.3 and Figure 4.2:

Table 4.3 - Annual Metered Water Use (2020-2024)

Metered Users	2020	2021	2022	2023	2024
Metered Use (m ³)	110,469	110,231	112,693	118,001	122,023
Total water use (m ³)	503,982	522,761	507,789	547,441	524,169
Percent of use that is metered	22%	21%	22%	22%	23%
Metered Use >250m ³ /yr* (m ³)	98,823	98,341	101,653	107,003	112,157
Percent of metered use	89%	89%	90%	91%	92%
Top 15 metered users (m ³)	59,884	56,909	59,167	60,374	59,627
Percent of metered use	54%	52%	53%	51%	49%

*Equivalent to approximately one household average annual water usage

Figure 4.2 - Metered Water Use (2020-2024)



The metered water use has generally been consistent during the past five years and there are no noticeable trends. It is therefore considered appropriate to assume the ICI sector water demand will increase at the same pace as residential water demands. Therefore, for purposes of this study, projected overall system water use demands are based on the 275 Lpcd value. Should wet industries arise, this assumption and water system requirements should be revisited.

In summary, based on a review of recent water demands, the following water use design values have been established for purposes of this Technical Update study:

- 275 Lpcd (all uses – i.e. residential & ICI, based on per capita residential population)
- Maximum day demand factor of 2.0, as per MECP Guidelines
- Peak rate (hour) demand factor of 3.0, as per MECP Guidelines

4.2 Water Supply

Mount Forest is currently serviced by four drilled bedrock well supplies. Their rated capacities are summarized in Table 4.4. The previous study report had a separate “operational capacity” column due to throttling of well supplies for various reasons. However, Township operational staff have indicated that the stations are now set up to operate based on VFDs and system pressures such that in their opinion the approved/permitted capacity is the actual pumping capacity that is achieved during larger demand periods including fire fighting events. Therefore, the “operational capacity” is no longer considered in this technical servicing study evaluation. This study did not include a detailed evaluation of well operations.

Table 4.4 - Mount Forest Municipal Well Capacities

Well No.	Rated Capacity ¹
3	18.95 L/s (1,637 m ³ /d)
4	22.73 L/s (1,964 m ³ /d)
5	45.46 L/s (3,928 m ³ /d)
6	45.46 L/s (3,928 m ³ /d)
Total	132.60 L/s (11,457 m ³ /d)
Firm Capacity ²	87.14 L/s (7,529 m ³ /d)

Notes:

1. As per the Municipal Drinking Water License.
2. Equal to total well supply capacity with the largest supply out of service.

Well supply capacity is typically designed to accommodate the design maximum day demand with the largest well supply out of service for any reason. The firm well supply capacity is 87.14 L/s (7,529 m³/d). The current maximum day demand is 3,268 m³/day, which is only 43.4% of the current operational firm supply capacity. There is significant surplus firm supply capacity available for growth in the community of Mount Forest.

Using the Growth Plan populations, an average demand of 275 Lpcd, and a maximum day factor of 2.0, the projected maximum day demand and, hence, the minimum required firm well supply capacity, has been calculated as summarized in the following Figure 4.3. Therefore, it is predicted that there is adequate firm supply capacity for greater than fifty years of growth.

The water supply calculations have assumed that all of the existing urban population and growth, as presented in the Growth Plan, are and will be serviced by the water system. This is a conservative assumption because, as previously noted, there are currently some unserved areas within the urban boundary.

Based on a May 1, 2025, Raw Water Assessment evaluation report, the existing water quality supplied by the production wells is acceptable, although the sodium concentrations at Wells 3 and 5 are greater than the reportable limit. That report concluded there are no observed raw water quality trends at this time. Sulphides have been noted in the past, by the Operator, as an aesthetic concern for at least Well No. 6.

Well 3 was rehabilitated earlier in 2025, with the installation of a stainless steel liner and completion of some air lifting. Additional rehabilitation work is currently being considered.

As an aside, the Township Operator indicates that, normally, only one or two duty well pumps operate in any given day to keep the standpipe at its normal operating levels. This is a further indication that there is significant surplus well capacity available to the community of Mount Forest.

A well supply reserve capacity calculation table is included in Appendix F.

It is noted that standby power is currently only provided at the Well 3 site which has a rated capacity of 18.95 L/s (1,637 m³/d). Based on the recommended 275 Lpcd average day demand, this well capacity is equivalent to a serviced population of approximately 5,952 which is less than the current estimated population of 6,234. While not all of the urban area is serviced by the municipal water system the majority is, and MECP Guidelines recommend that consideration be given to providing standby power to meet average day system demands. Therefore, the Township should consider establishing standby power at another of its existing well supplies. If ongoing rehabilitation work at Well 3 increases the long-term capacity of this well to its Permitted capacity of 22.73 L/s, then average day demand can be met during an extended power failure by this well supply until Yr. 2028.

Figure 4.3 - Required Well Supply Firm Capacity



4.3 Water Storage and Related Watermain

a) Design Water Storage Volume

Required water storage volume, as per MECP Guidelines, is characterized by fire, equalization, and emergency storage components, as follows:

$$\text{Storage volume} = A + B + C$$

Where;

A = fire storage (based on serviced population; see MECP tables – e.g., for a population of 6,234, storage is calculated assuming 160.75L/s fire protection for 3hrs);

B = equalization storage (to accommodate diurnal peak daily demands; 25% of maximum day demand);

C = emergency storage (25% of A + B).

The sizing of the equalization storage component is based on having well supply capacity equal to or greater than the water system’s maximum day demand. This is the circumstance for Mount Forest, which has available surplus firm supply capacity beyond the Growth Plan timeline (i.e. beyond Yr. 2051). It is noted that MECP Guidelines indicate that surplus water supply capacity could be credited to a reduction in storage volume.

The following Table 4.5 and Figure 4.4 present the calculated water storage capacities required for the planning period. These calculations have assumed that all of the urban population and growth, as presented in the Growth Plan, are and will be serviced by the water system. It is also assumed that a 50-year projection is a reasonable and practical timeframe for sizing the total storage volume required (e.g. due to uncertainties in actual growth during such a long timeframe). Elevated water storage facilities typically have a design lifespan of 80-100 years or greater.

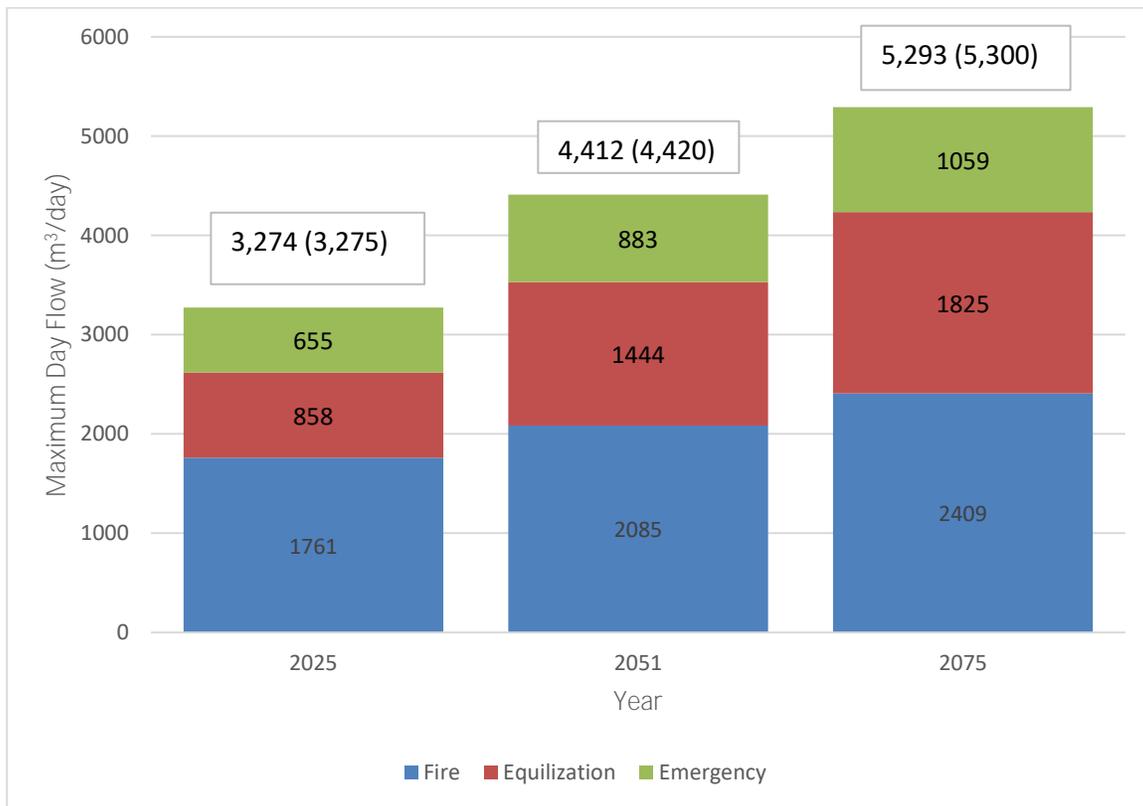
Table 4.5 - Calculated Design Water Storage Volumes (m³)

Year	Population	Fire	Equalization	Emergency	Total (rounded)
2025	6,234	1,739	858	650	3,250
2051	10,500	2,106	1,444	888	4,450
2075	13,271	2,409	1,825	1,059	5,300

Therefore, the minimum 50-year design water storage capacity required is 5,300 m³. The current effective storage capacity of the 40-year-old refurbished/recoated standpipe (Built in 1985; recoated in Yr. 2023) is 2,000 m³, based on the ability to utilize the entire storage contents through the use of a booster pumping station during higher demand periods such as a fire event. The previous study update evaluated several alternatives for increasing system storage, and the Township selected “Alternative No. 2” which was to retain the existing standpipe and construct a second new elevated tank at the north end of Mount Forest. Since then, a significant expenditure was made to refurbish the existing standpipe (recoating both the inside and outside). Table 4.6 indicates that a minimum additional 3,300 m³ of storage (i.e. 5,300 – 2,000m³ for the existing standpipe) is recommended to service the community for the next 50 years, based on MECP Guidelines. It is noted that, based on the previous technical study growth projections, the total recommended 50-year (Yr. 2070) storage capacity was calculated to be 4,420, which is

equivalent to the current calculated volume required by Yr. 2051 (26 years) rather than to Yr. 2075 (50 years). This difference is due to the much higher growth rate projections established by recent studies completed by others for the Township. Current cost estimates for the second elevated storage were based on the previous study recommendation for an additional 2,420 m³ of storage and not on the subsequent new 3,300 m³ calculated additional volume. It is recommended that, at the time of the next study update or planning for additional water storage, whichever comes first, that updated growth projections be reviewed to determine an appropriate size for additional system storage.

Figure 4.4 - Design Water Storage Volumes (m³)



As an aside, the Township Operator has indicated that, other than manually operating the booster pump monthly for testing, the booster pumping station has in the past only been activated during several large watermain breaks. Up to only two of the four well supplies are typically active at any given time based on current normal demands to keep the standpipe filled to normal operating levels.

b) Schedule for water storage expansion implementation

The expansion of water storage involves a significant capital expenditure and, since the time the previous study was completed, new growth projections indicate the size of a new second storage facility needs to be 35% larger, and the estimated cost for a new elevated tank has more than doubled (probably tripled when including the new larger projected size of storage required). As previously mentioned, consideration could be given to a reduction in storage volume based on available surplus water supply capacity. Currently, due to surplus well supply capacity and

based on actual operational experience, equalization storage is not required during periods when there are no power failures or other disruptions (mechanical or otherwise) to the existing well supplies. This can be supported by the calculated peak hour design demand of 60 L/s being below the 87.14 L/s firm supply capacity. By Yr. 2043, the estimated peak hour demand will start to exceed the rated firm supply capacity. Once the peak hour demand exceeds the firm rated capacity of the water supply, then there will be a need for some equalization storage or else reliance on the fourth well supply (i.e. reliance on the total well supply capacity and not the MECP recommendation of relying on firm water supply capacity).

If surplus well supply capacity is credited towards deficient water storage, the following is noted for two interim alternatives for delaying expansion of storage capacity:

If the existing standpipe provides all of the emergency storage and some of the fire storage, and surplus firm well supply capacity provides the equivalent of the remaining fire storage plus the equivalent of all of the equalization storage:

- Existing effective standpipe volume is 2,000 m³ (relying on a single booster pump).
- Currently, approximately 655m³ of emergency storage is required.
- This would leave 2,000 m³ (existing standpipe) – 655 m³ = 1,345m³ for fire storage.
- Current fire storage required is 1,739m³. This means 1,739 – 1,345 = 394m³ of fire storage would need to be compensated for by surplus water supply capacity (i.e. 36.5 L/s for a 3-hour fire event).
- Current firm supply capacity is 7,529 m³/d vs. current maximum day demand of 3,429m³, so there is currently a well supply capacity surplus of 7,529 – 3,429 = 4,100m³/d (i.e. 47.5L/s). For a 3-hr fire, that 47.5L/s is equal to a volume of 513m³, which is greater than the required 394m³, so there is sufficient credit available to compensate for current deficient storage if based on the firm well supply capacity. However, if taking into account an average of 20L/s needed to address current peak hour flow that is in excess of the maximum day flow, then the surplus will be as low as 47.5-20=27.5L/s, which is below the required 36.5L/s required. Therefore, available firm well supply capacity is insufficient to compensate for a lack of water storage if adhering to MECP recommendations for water supply and water storage.
- However, if the Township were to accept that the demand peaks and short-term growth increase in maximum day demands were accommodated by the largest well supply being in service (i.e. assume all wells in service during large system demands), then the surplus total well supply capacity that is available would be a minimum of 47.5-36.5=11.0L/s which, for a 3-hr fire event based on MECP Guidelines for fire flow rates, would be equivalent to approximately an additional 1,466 persons for a total serviced population of 6,234 + 1,466 = 7,700 (i.e. ≥Year 2031). This would apply if the Township were to base its evaluation on the total well supply capacity rather than firm supply capacity.

If the existing standpipe provides all of the fire storage and firm well supply capacity provides all of the equivalent emergency and equalization storage:

- If the existing standpipe were used only for fire storage and if the Township decided it could rely on its firm well supply capacity to provide the required equalization and emergency storage, 2000m³ fire storage for a 3hr fire is equivalent to 185L/s which is equivalent to a population, based on MECP Guidelines, of approximately 9,465 (**i.e. say Yr. 2043**), which is when the calculated peak hour demand (88.8L/s) is approximately equal to the firm well supply capacity (87.1 L/s). However, this would mean the Township is satisfied that it does not need any emergency storage.
- If the Township decided fire storage would all be from the existing standpipe and that the Township could rely on its firm well supply capacity (87.1 L/s) to supply the peak hour demand (i.e. so no need for equalization storage) and to supply an equivalent per hour emergency storage demand (i.e. if assuming emergency storage volume is a daily volume spread over 24 hours), then those demands would match the firm well supply capacity by **Yr. 2034**, and as above the fire demand can be accommodated by the existing standpipe. However, this would mean the Township is satisfied that it does not need any passive emergency storage.
- It is noted that there normally would be a 4th well supply available beyond the firm well supply capacity, with a rated capacity of 45.45L/s. However, it is not recommended by MECP Guidelines since it is not firm supply capacity.

Based on the foregoing assumptions, it is recommended that the Township assume that additional storage will be required to be online by **Yr. 2034 so long as the Township does not require emergency storage to be passive emergency storage** (i.e. accept well pumping capacity surplus to compensate for not having any actual online emergency storage in a tank). As per MECP Guidelines, the criteria used for municipal water supply and storage capacities is a municipal decision based on its considerations of the risks.

Due to the significantly escalated cost for a new second elevated tank, the Township should carefully re-evaluate the size, type and schedule for implementing storage expansion. Several years (i.e., 2-3 years) would be required to implement new storage works. It is therefore suggested that the Township decision for proceeding with water storage expansion can be deferred until at or before the next technical servicing update study is completed (Yr. 2030), if the Township decides to delay commencing with the work needed to implement storage expansion.

As previously noted, the Township should consider establishing standby power at another well supply in order to meet average day demands during a prolonged power outage but as well to reduce the risks associated with already having deficient storage.

c) Future study and design work

The alternative for a new second elevated water storage tank was decided at the time of the previous study. Based on recent (2023) MCEA changes, a Schedule B Class EA for the proposed new elevated tank is not required so long as the lands are owned by the Township, is not located on or adjacent to environmentally sensitive areas or on sensitive/residential land uses,

and if there are no archaeological/cultural heritage potential. It appears all of these criteria would be met, but an archaeological screening would be required to confirm.

Schedule B Class EA work is expected to be required for the watermain extensions (and sanitary sewer, new roadways) to the new water storage site (and to adjacent future vacant lands for industrial use) since the route of the watermain is anticipated to be in new or unopened road allowances.

The Township should budget for completing study work as well as the capital cost of new storage and associated works (\$9.1M; \$100,000 of this for Class EA). At this time, in case there are changes to the selected alternative and location, and since the connecting watermain (and sanitary sewer and roadways) is likely subject to the Class EA process, the cost for completing EA work is included in this amount even though the elevated tank itself is exempt.

The following should be considered at the time of detailed design for a new water storage facility if proceeding with the past selected alternative (not a comprehensive list):

- How to maintain water quality in the water storage facility(s), in particular during the initial decades of operation for a facility(s) designed to service a future higher population.
- Similarly, how to prevent icing problems during the winter.
- How to control properly the use of two different types of elevated storage to ensure proper turnover of water, etc.
- SCADA
- Size of property for the elevated tank would ideally be in the order of 1.0ha, with a minimum width in the order of 50m. The actual preferred dimension of the site depends on the final size of the elevated tank and should take into consideration construction access and maintenance (e.g. recoating) access.

Future evaluations of increasing treated water storage could include a comparative evaluation of an elevated tank option to ground level storage, including available sites that can accommodate ground level storage. Ground level storage can be staged (i.e. size the initial tank cell for a 20-year growth projection and then add another cell in the future when required based on actual growth). However, ground level storage relies on mechanical components (pumps) and electrical components (e.g. standby power necessary). Other advantages and disadvantages of the types and sizes of additional water storage would be part of a future study comparison.

d) Recommended risk mitigation

Within the next five years the Township should consider completing the following to mitigate the risks of deferring water storage expansion and to enable the Township to proceed as quickly as possible with implementation once it has been decided to proceed with water storage expansion:

- Establish automatic standby power at a second well supply.
- Complete a study to reconsider the type, size and location of water storage for expanding the total Mount Forest water storage capacity. Such study work should consider the anticipated lifespan of the existing recoated standpipe.
- Establish a reserve fund for financing future water storage expansion.

- Consider if there are funding sources available and apply when ready to proceed with the water storage expansion work.
- Consult with West Grey and the County of Grey to confirm there is no need for specialized studies for the proposed works, other than Schedule B Class EA for new watermain, sanitary sewer, and roadways or within corridors where there currently are no municipal services. Discuss also the possibility of proceeding with servicing and developing the vacant land for industrial use by following the Planning Act (e.g. Draft Plan of Subdivision) instead of the Class EA process.
- Consult with West Grey about the need for a building permit for the new water storage facility and other proposed works, and what will be required for submissions in support of that permit application.
- Consult with West Grey about the proposed watermain, sewer and SPS within or adjacent to their Watson Drive road allowance including easements and a possible site for a SPS.
- It is anticipated that any industries that locate within lands owned by Wellington North but that will be within West Grey will be subject to approvals, permits, property taxes, etc. from West Grey and the County of Grey. The Township may wish to consider and discuss this matter with its neighbouring municipality and county.

4.4 Water Distribution System

As part of past study work, a WaterCAD™ model was established and calibrated. It was updated as part of this study, incorporating the updated GIS database information, including watermains constructed since the previous study work was completed. Details are presented in Appendix B.

Normal system pressures for the existing distribution system ranges from 295kPa to 535kPa. MECP recommends normal system pressures be 350kPa to 480kPa, but no lower than 275kPa and no higher than 700kPa. System-wide pressures should remain at or above 140kPa during maximum day demand + fire flow conditions. System pressures are currently governed by the standpipe operating levels. The area adjacent to the standpipe, and to the east/northeast of the standpipe, have normal system pressures below 350kPa but above 275kPa.

The future development area south of the existing and unopened Oxford Street road allowance is at higher elevations and cannot be serviced at this time without the creation of a separate, higher pressure zone serviced by a booster pumping station. As such, this area has been excluded from the WaterCAD™ model.

For Mount Forest, the governing criteria for sizing of watermain is generally the maximum day + fire flow scenario. The Township in the past selected the following minimum target fire flow capabilities within the distribution network:

- 50 L/s, low density residential (e.g. single-family dwellings)
- 75 L/s, medium density residential (e.g. row townhouses)
- 150 L/s, for ICI (Note: it has been observed for many ICI buildings designed by others with sprinkler systems for fire protection that the required fire flow rate to service the building is in the order of 100 L/s. Therefore, in the evaluation completed for this study

this is typically assumed to be an acceptable level of fire service for existing built areas and system extensions where achieving 150 L/s is difficult)

- 225 L/s, for the downtown commercial business core

It is noted that recommended minimum fire flows are based on the type and density of land use and building construction, and varies both in terms of volume and duration. It is recommended that the fire protection level be reviewed by the Fire Department at the time of any new developments to confirm appropriate fire protection levels are being achieved.

It is noted that, for the fire flow evaluation, the available fire flow capacity is based on the capability of the distribution system to transmit those flows to the evaluated locations. Actual capabilities of utilizing that available capacity depends on the number and spacing of fire hydrants and the fire fighting equipment that is being utilized. This study did not include such an evaluation. This should be considered by the Fire Department when reviewing existing or new development for fire prevention servicing.

Modeling was used to size watermain extensions to future development areas and to determine the need for additional watermain looping to achieve the selected level of service. The results are summarized in Appendix B and in the following Recommended Drinking Water System Projects section.

Modeling identified locations throughout the existing distribution system where minimum 50L/s residential target fire protection levels are not achieved. This is a result of, or combination of, small diameter watermain (<150mm dia.), old watermain assumed to have deteriorated transmission capacity (i.e. cast iron), or longer dead-end watermain segments. The Township should continue with its long-term strategy of upgrading these watermains as part of road reconstruction projects or as development interests require. These include:

- Fergus Street midblock between Durham Street and Sligo Road (long block, old small dia. C.I.)
- Westerly end of Queen Street (long dead-end main)
- Peel Street and York Street (unlooped small dia. C.I.)
- South Water Street between the two river crossings (small dia. C.I.)
- Murphy Street (fed through a small dia. C.I.)
- 300mm dia. C.I. watermain on Grant Street

According to the Township's GIS database, there is approximately 3.7 km of old cast iron watermain that is still being used to service parts of the community of Mount Forest, as presented in Figure 4.5. The Township typically has been progressively replacing these types of watermain as part of its road reconstruction projects. These cast iron watermains typically experience higher breakage rates, are more susceptible to frost action (typically are shallower installations), and they can contribute to distribution system aesthetic water quality issues including reduced chlorine residuals. Figure 4.5 also shows the location of watermain breaks since 2004. Figure 4.5 also shows non-cast iron, small diameter watermain. Since the Township's distribution system is intended to provide fire protection for the community, MECP Guidelines recommend minimum 150mm dia. watermain, to provide minimum fire flows to residential areas. Larger watermain should be considered if servicing higher density or ICI uses, such as on Dublin Street (hospital; medical clinic, seniors/nursing home).

Cast Iron watermain				
STREET NAME	FROM	TO	SIZE (mm)	LENGTH (m)
BIRMINGHAM ST	Queen ST W	Weber ST	150	220
BIRMINGHAM ST	Weber ST	Normanby ST W	150	227
BIRMINGHAM ST	Normanby ST W	Elgin ST N	200	170
BIRMINGHAM ST	Elgin ST N	Main ST N	200	154
BIRMINGHAM ST	Main ST N	Fergus ST N	150	6
BYELAND DR	Sligo road E	Egremont ST N	150	487
DUBLIN ST	Martin St	Princess St	150	12
DURHAM ST	Main ST N	Fergus ST N	100	160
DURHAM ST	Fergus ST N	Egremont ST N	100	140
DURHAM ST	Egremont ST N	Church ST N	150	81
EGREMONT ST	BYELAND DR	Durham ST E	150	128
FERGUS ST	Sligo road E	Durham ST E	100	294
FERGUS ST	Durham ST E	Birmingham ST E	100	183
GRANT ST	Main ST S	Parkside DR	300	64
KING ST	Main ST S	Fergus ST S	100	161
KING ST	Fergus ST S	Egremont ST S	100	145
MURPHY ST	Main ST S	115m East from Main ST S	100	115
NORTH WATER ST	Peel ST	Main ST S	50	110
PEEL ST	Queen ST E	York ST	100	177
PEEL ST	York ST	North water ST	100	89
South Water ST	Main St S	Bristol ST (unopened)	100	275
WELLINGTON ST	Fergus ST S	Egremont ST S	150	141
YORK ST	Peel ST	Queen ST E	100	128
				3,668

Non-Cast Iron Watermain ≤ 100mm dia				
STREET NAME	FROM	TO	SIZE(mm)	LENGTH(m)
DUBLIN ST	Princess Anne St	Waterloo St	100	150
DUBLIN ST	Waterloo St	Queen St	100	188
PRINCE CHARLES ST	Dublin St	Arthur St	100	136
SLIGO RD	Church St	Byeland Dr	38	48
YORK ST	Queen St	Peel St	100	83
YORK ST	Queen St	Peel St	25	80
				686

Legend

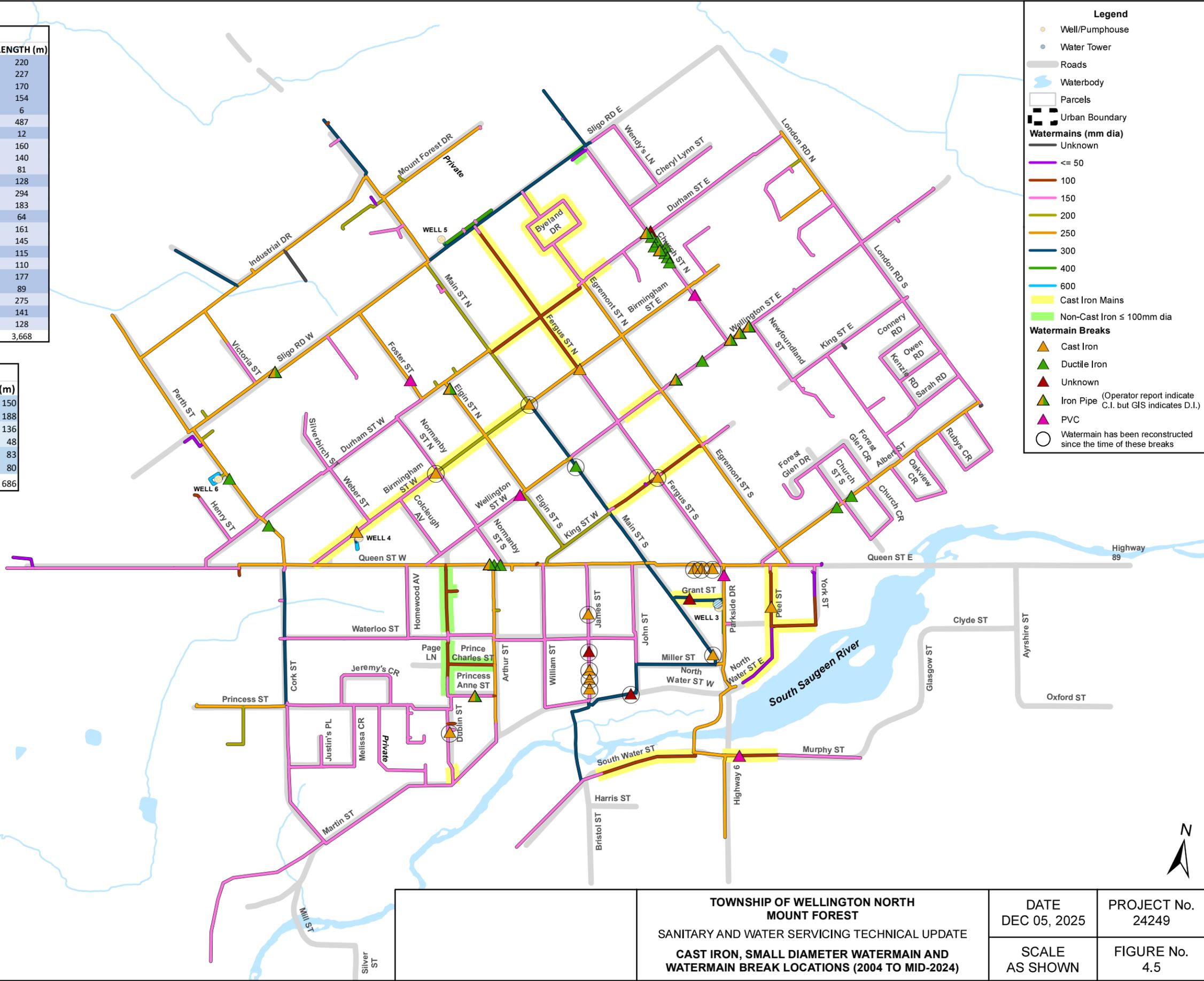
- Well/Pumphouse
- Water Tower
- Roads
- Waterbody
- Parcels
- Urban Boundary

Watermains (mm dia)

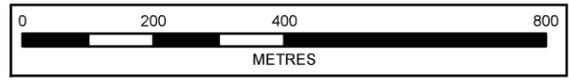
- Unknown
- ≤ 50
- 100
- 150
- 200
- 250
- 300
- 400
- 600
- Cast Iron Mains
- Non-Cast Iron ≤ 100mm dia

Watermain Breaks

- Cast Iron
- Ductile Iron
- Unknown
- Iron Pipe (Operator report indicate C.I. but GIS indicates D.I.)
- PVC
- Watermain has been reconstructed since the time of these breaks



NOTES:
 This is a schematic representation of the water distribution system (and roadways). While this drawing and its detail views are shown to a scale, symbols, roadway widths, and watermains are not plotted to scale. Exact locations of many works are not known (based on old non-GPS data). This mapping should be used for general information purposes only.



TOWNSHIP OF WELLINGTON NORTH MOUNT FOREST SANITARY AND WATER SERVICING TECHNICAL UPDATE CAST IRON, SMALL DIAMETER WATERMAIN AND WATERMAIN BREAK LOCATIONS (2004 TO MID-2024)	DATE DEC 05, 2025	PROJECT No. 24249
	SCALE AS SHOWN	FIGURE No. 4.5

The structural condition of the existing distribution system was not evaluated as part of this study. However, the past study update had noted that there were two significant watermain breaks reported by the Township on 250mm dia. ductile iron watermain on or near Queen Street West, and a more recent one occurred in the same area in 2022:

- One was a longitudinal crack down the length of the pipe
- One was an end cap blow off; appears the bolts holding the cap had corroded away
- One was a ring break

At this time, the Township is not aware that there is a system-wide issue with ductile iron watermain corrosion, but this should be monitored in the future and if the frequency of such incidents increases then consideration should be given to implementing measures to protect that infrastructure (e.g. add corrosion protection, if appropriate).

Below summarizes the water distribution servicing needs required for each of the future land development areas as outlined in the Township's Growth Plan report. Supplemental commentary is provided below based on the results of this current technical servicing study update.

FD Area #1: Northeast Mount Forest – Sligo Road and West of Side Road 41 Southgate

- † 300mm diameter extension on Sligo Road with the watermain looping into the existing watermain distribution system.

Evaluation completed as part of this study indicates a 250mm dia. dead-end watermain would be sufficient to service residential growth in this FD area and maybe even a 200mm dia., but this depends on the type and density of the residential developments. Further evaluation recommended at the time of development interests in FD Area #1.

It is noted that Sligo Road is a County Road (Wellington Road 6) such that any proposed works within their road allowance will require their approvals. It is also noted that the lands along the north side of Sligo Road that are east of London Road are within the Township of Southgate such that Township of Wellington North servicing east of London Road may need to be kept within the south side of this roadway.

FD Area #2: Northeast Mount Forest – London Road and South of Sligo Road

- † 300mm diameter extension on Sligo Road with the watermain looping into the existing watermain distribution system.

It is recommended that the London Road watermain, from Sligo Road to Durham Street, be 250mm dia. to allow opportunity for finishing a 250mm dia loop to and along Birmingham Street. Optional extension of the 250mm dia. Birmingham Street watermain, from east of Church Street to west of London Road, to complete looping. However, the need for this looping is dependent on how future development lands east of London Road are developed and serviced.

FD Area #3: Southeast Mount Forest – Highway 6 and South of Murphy Street

- † Most of the Future Development area (i.e., easterly two-thirds) is high in elevation and may require a separate high-pressure zone complete with a booster pumping station with standby power. It is important to note that Murphy Street is a dead-end watermain at present. The servicing strategy for these lands may require a second

Main Street connection for looping, but a higher pressure zone portion of this Future Development area would not end up being looped. A possible upgrade to the Murphy Street watermain would be needed to upsize to a 250 mm diameter, but this depends on the location of the booster pumping station. The need for a booster pumping station and the existing dead-end high-pressure zone may preclude the opportunity for high-density residential development in this area.

Assuming the booster pumping station (BPS) will be established at/near the easterly end of Murphy Street, the existing Murphy Street watermain should be replaced with 250mm dia. watermain to provide adequate capacity for feeding fire flows through the BPS to the high pressure zone.

FD Area #4: Southwest Mount Forest ó Nqxtgðu"Ncpg"cpf"Uqwj"qh"Swggp"Uvtggv"Yguv"

- ð Ycvt"ó 472" o o"fkc o gvt"gzvpgukqp"qp"Swggp"Uvtggv"cpf"Nqxtgðu"Ncpg"ku"tgsuktgf"ykvj" the watermain looping into the existing watermain distribution system. As a result, the servicing may not be able to accommodate higher-density residential due to limitations of practical looping options (this has not been evaluated to date).

Evaluation completed as part of this study indicates 200mm dia. watermain would be sufficient to service residential growth in this FD area and maybe even 150mm dia. where it is looped, but this depends on the type and density of the residential developments. Further evaluation recommended at the time of development interests in FD Area #4.

4.5 Recommended Drinking Water System Projects

Based on the scoped study evaluations completed, the following Drinking Water System (DWS) projects are anticipated during the next 20-year planning period:

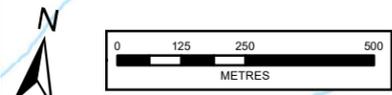
1. As part of Phase 1 for the Deer Ridge Heights subdivision, a 300mm dia. watermain is to be constructed on South Water Street from the proposed SWS-SPS site southwesterly past the westerly end of the existing street and into the subdivision lands. This work is to be completed by the Developer. This is anticipated within the next few years.
2. Consider establishing automatic standby power at a second well supply station (i.e. by **Yr. 2028**), in order to provide adequate water supply to the community during an extended power outage.
3. Complete study work within the next few years (i.e. by **Yr. 2028**) to evaluate the size, type and location of additional water storage in comparison to the previously selected alternative of a second elevated tank at the north end of the urban area, due to the new recommended larger total storage size (attributed to a revised much higher growth projection) and the significant escalated cost for an elevated tank. It is recommended to budget \$25,000 for this study.
4. If a revised evaluation of water storage expansion continues to conclude that the preferred alternative for a new second water storage facility is for it to be situated at the north end of town west of Highway No. 6 in the Municipality of West Grey on lands owned by the Township, then proceed with the planning work (Schedule B Class EA or,

if possible under the Planning Act; e.g. Draft Plan of Subdivision) for the watermain, sewer and roadway required to service such a facility and for servicing adjacent vacant future industrial lands. Consult with West Grey and the County of Grey about the proposed works. It is recommended to commence with this planning work by Yr. 2028 and finish it before the next technical servicing study update (i.e. **before Yr. 2030**). It is recommended to budget \$100,000 for this planning work. If proceeding with a Draft Plan of Subdivision, this budget would only include preliminary conceptual servicing design sufficient to support a Draft Plan application.

5. Consider proceeding with the 300mm dia. Sligo Road watermain extension, from Church Street to London Road, in order to provide servicing of FD Area #2 as well as for servicing vacant land that is at the southwest corner of the Sligo/London Road intersection. Consider if these works will be constructed through Development Charges.
6. At the time of completing road reconstruction projects, carefully review the size, material and condition of watermain within intersections to confirm they either were already replaced in the past or to include them in the replacement work (e.g. replace the existing 150mm dia. watermain road crossing at the Queen/Cork Street intersection with 300mm dia. watermain).
7. Continue replacing old cast iron and small diameter (<150mm) watermains, typically as part of progressively completing street reconstruction within the community, or in accordance with priorities due to increased breakage rates or other problems with specific sections of older watermain. As a minimum, match the existing watermain size except no smaller than 150mm dia. Consider replacing the Dublin Street watermain using 250mm dia. to improve fire flows to the institutional locations at/near Princess Street (hospital, seniors/nursing home, medical clinic).

Recommended works are presented on Figure 4.6, along with costs (see also Appendix A).

Other DWS works identified in this report and shown on Figure 4.6 should be completed as development interests dictate. At this time, they are not included in the foregoing key recommendations since there are no known current active development interests that require those works.



NOTES:
 This is a schematic representation of the water distribution system (and roadways). While this drawing and its detail views are shown to a scale, symbols, roadway widths, and watermains are not plotted to scale. Exact locations of many works are not known (based on old non-GPS data). This mapping should be used for general information purposes only.

WATER WORKS PROJECTS - CAPITAL					
Watermain (excludes cost of water services, except where noted)					
Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments
1	Fergus Street	Birmingham Street	150	\$413,000	175m. Includes water services.
2	Durham Street	Main Street	150	\$365,800	155m. Includes water services.
3	Fergus Street	Durham Street	150	\$767,000	325m. Includes water services.
4	King Street	Main Street	150	\$295,000	125m. Includes water services.
5	King Street	Fergus Street	150	\$649,000	275m. Includes water services.
6	Newfoundland St	King Street	150	\$472,000	200m. Includes water services.
7	Grant Street	east of Main Street	300	\$156,000	65m @ \$2,400/m
8	Dublin Street	Queen Street	250	\$1,182,300	420m @ \$2,815/m. Includes water services
9	Replace all other old cast iron and undersized (<150mm dia.) watermains		150	\$5,357,200	See Note 5. 2,270m @ \$2,360/lin.m incl. services, valves, etc. See Note 6.
Total watermain:				\$9,657,300	

- Notes:**
- Above are Class 5 present value opinions of probable cost generally based on limited information, and includes construction, engineering and net HST (1.76%)
 - Above excludes Yr. 2025 active construction projects
 - Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor sanitary or storm sewer.
 - Deleted
 - Excludes the 48m of 38mm dia. line on the South side of Sligo Road west of Church Street. This line would be removed/abandoned and any related services reconnected to the watermain that exists on the opposite side of the street. Unit price per lineal metres includes fittings, valves, hydrants, services, and road reinstatement.
 - 324m of this is 200mm on Birmingham Street from Normanby to Elgin but using 150mm pricing because it probably only needs to be 150mm dia.

WATER WORKS PROJECTS - GROWTH					
Water Storage					
E.T. (Alternative #2) - Supplemental 2,420m ³ storage at greenfield site north end of town				Cost (See Note 1)	Comments
				\$9,100,000	
Watermain (excludes cost of water services, except where noted)					
Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments
Stage 1 (2025-2031)					
1	South Water Street	Dead-end	300	\$525,300	255m @ \$2,060/m. Gravel road. Large lots so fewer new services. Cost sharing with Developer.
Stage 2 (2031-2041)					
2	Industrial Drive	Ex. Dead-end	300	\$145,000	120m @ \$1,450/m. No road restoration. No services. Needed to service new E.T. Alternative #2.
3	Coral Lea Drive	Industrial Drive	300	\$398,750	275m @ \$1,450/m. No road restoration. No services. Needed to service new E.T. Alternative #2.
4	Coral Lea Drive	New E.T. site	300	\$552,150	145m @ 1,630/m (gravel rd) + 170m @ \$1,740/m (paved rd) + allowance for directional drilling across highway. No services. Needed for New E.T. Alt.#2 looping.
5	Highway No. 6	Coral Lea Drive	300	\$94,250	65m @ \$1,450/m. No road restoration. No services. Needed for New E.T. Alternative #2 looping.
Stage 3 (2041-2051)					
6	Sligo Road	Church Street	300	\$931,000	475m @ \$1,960/m. To service vacant land on both sides of the street. Few existing lots on south side to also service. Includes full County road reinstatement.
7	London Road	Sligo Road	250	\$457,600	320m @ \$1,430/m. Gravel road. No services. To service vacant land on both sides of the street.
8	South Water Street	Bristol Street	150	\$467,350	45m @ \$1,470/m (paved portion) & 295m @ \$1,360 (gravel portion). Large lots so fewer existing services.
9	Murphy Street	Main Street	250	\$226,550	115m @ \$1,970/m. Large lots so fewer existings services. See Note 4.
Stage 4 (2051+)					
10	Birmingham Street	West of London Road	250	\$321,750	225m @ \$1,430. 3.0m access path/walkway and lawn restoration. To provide looping to service London Road and future developments east of London Road, depending on how those lands are phased and planned to be serviced.
11	Mount Forest Drive	355m east of Main Street	250	\$300,000	240m @ \$1,250. No road restoration. To service vacant industrial land.
12	Queen Street	West of Cork Street	250	\$1,335,900	610m @ \$2,190/m includes water services to existing lots; includes Connecting Link road reinstatement
Total watermain:				\$5,755,600	
Total watermain + water storage:				\$14,855,600	

- Notes:**
- Above are Class 5 present value opinions of probable cost generally based on limited information, and includes construction, engineering and net HST (1.76%)
 - Above excludes Yr. 2025 active construction projects
 - Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor sanitary or storm sewer.
 - The replacement size of this old 100mm dia. cast iron watermain depends on how servicing for future development east of Hwy. #6 proceeds. Per lineal metre price includes services, valves, fittings, hydrants, road reinstatement.

Legend

- Well/Pumphouse
- Water Tower
- Roads
- Waterbody
- Parcels
- Urban Boundary

Watermains (mm dia)

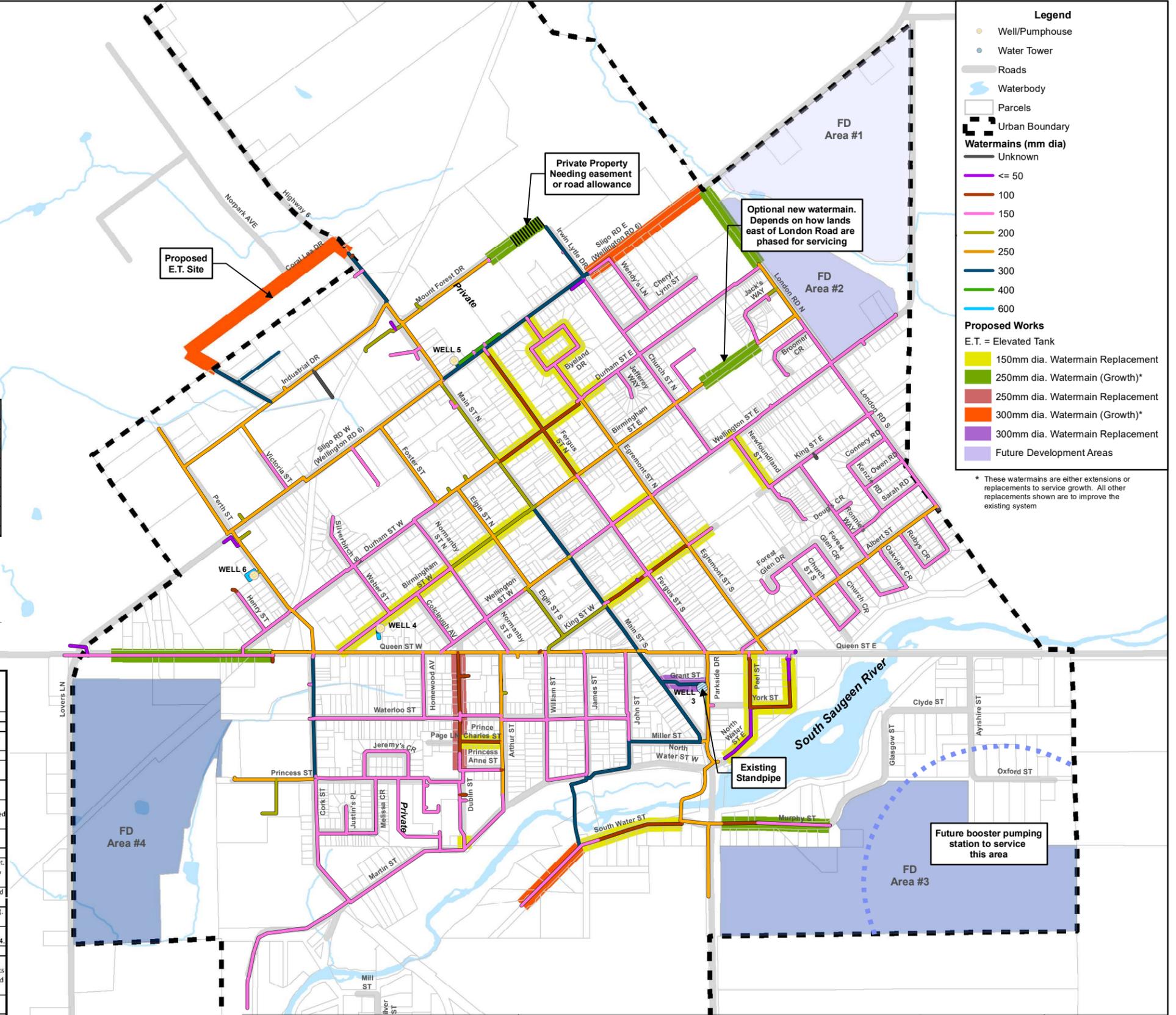
- Unknown
- <= 50
- 100
- 150
- 200
- 250
- 300
- 400
- 600

Proposed Works

E.T. = Elevated Tank

- 150mm dia. Watermain Replacement
- 250mm dia. Watermain (Growth)*
- 250mm dia. Watermain Replacement
- 300mm dia. Watermain (Growth)*
- 300mm dia. Watermain Replacement
- Future Development Areas

* These watermains are either extensions or replacements to service growth. All other replacements shown are to improve the existing system



**TOWNSHIP OF WELLINGTON NORTH
 MOUNT FOREST**
 SANITARY AND WATER SERVICING TECHNICAL UPDATE
 PROPOSED WATERWORKS

DATE Jan 16, 2026	PROJECT No. 24249
SCALE AS SHOWN	FIGURE No. 4.6

5.0 SANITARY

5.1 Sanitary Sewage Flows

The sanitary sewage serviced population is less than the community population, since not all areas within the urban boundary are serviced by the municipal system (e.g. built areas south of the South Saugeen River are serviced by private individual Class IV sewage disposal systems). A comparison of the assumed populations based on the Township’s annual reserve capacity calculations and the Growth Plan are summarized as follows:

Table 5.1 - Serviced vs. Total Population Estimates

Year	Reserve Capacity Calculations*		Growth Plan	
	Serviced Population	Growth rate	Total Population	Growth rate
2020	4,726**	-	5,133	-
2021	4,928**	4.27%	5,300	3.25%
2022	5136	4.22%	5,462	3.05%
2023	5342	4.01%	5,628	3.05%
2024	5510	3.14%	5,800	3.05%

*Source: Triton Engineering annual calculations

**Adjusted to use 2021 Census density of 2.24 persons/unit as per the Triton 2022-2024 calculations

The estimated reserve capacity population was 93.0 to 95.0% of the growth plan population estimates. This will be in part attributed to the reserve calculations being based on a lower household density of 2.24 persons and a lower number of households, whereas the Growth Plan assumed 2.33 persons per household and a higher number of households. However, it can mostly be attributed to there being some areas within the urban boundary that are serviced by private septic systems. To reflect the actual serviced area, sewage per capita flows for the period of 2020-2024 were evaluated based on the lower populations as used in the reserve capacity calculations. Wellington North Power does the monthly billing for sewer/water use for the Township and have also indicated that there are some homes that have an unused service connection but are not actually connected and still on septic.

Sanitary sewage flows for the past five years were reviewed for the following three SPSs:

- Cork Street SPS
- Durham Street SPS
- North Water Street SPS (NWS-SPS)

It is noted that all sanitary sewage flow from the serviced areas of the community ends up at the NWS-SPS, where it is pumped to the WWTP. The total sewage flow (i.e. NWS-SPS) is summarized in the following Figure 5.1 chart and Table 5.2.

Figure 5.1 - Annual Sewage Volume (m³)

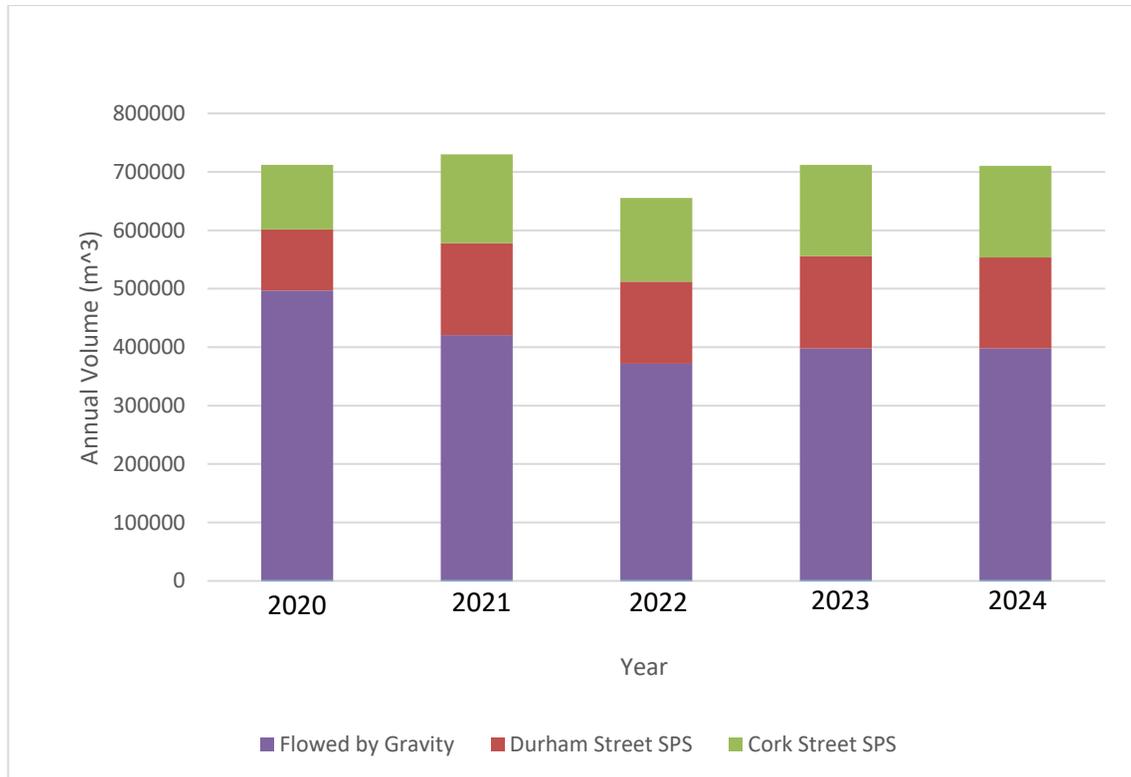
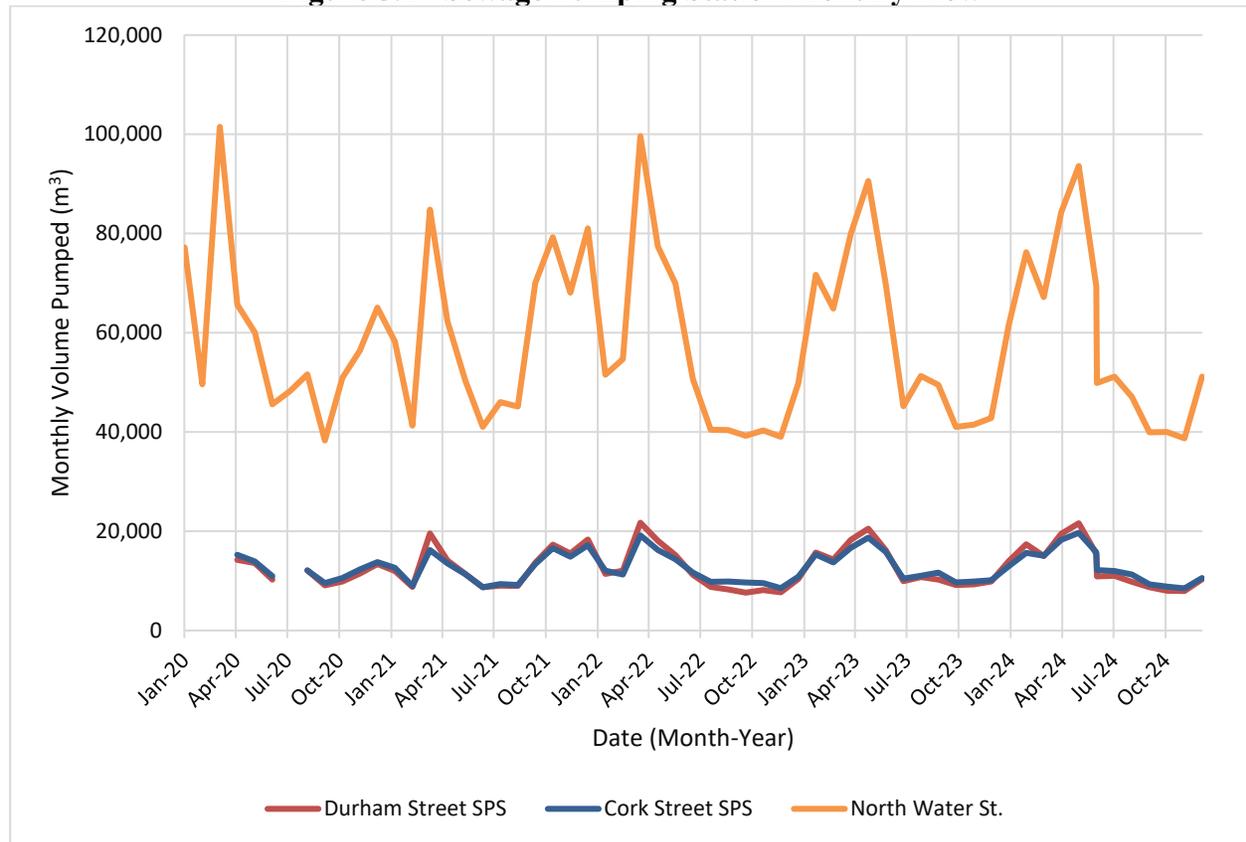


Table 5.2 - Annual Average Day Sewage Flow

Year	Population*	Avg. Flow (m ³ /d)	Per Capita (Lpcd)
2020	4,726	1,940	411
2021	4,928	1,994	405
2022	5,136	1,790	348
2023	5,342	1,944	364
2024	5,510	1,936	351
Average (2023-4)	5,353	1,921	358

*As per annual sewage reserve capacity calculations (adjusted for 2020 & 2021)

Figure 5.2 - Sewage Pumping Station Monthly Flow



Note: There are gaps in the data for Cork St. and Durham St. for three months in 2020.

Ignoring the 2022 lower total annual flow, the 2-year average per capita flow is calculated to be 358 Lpcd, which includes domestic sewage, ICI sewage, and extraneous flow contributions. The Township’s Municipal Servicing Standards (MSS) uses 350 Lpcd domestic daily sewage flow rate plus 0.15L/s/ha extraneous flow contribution. Therefore, in terms of annual average sewage flow, the MSS design criteria appears to reasonably reflect actual system flows. However, the design of the collection system (sewers and pumping stations) needs to consider peak instantaneous sewage flows, to avoid sewer backups into buildings and, as much as possible, raw sewage spills to the natural environment. All major SPS facilities are equipped with overflows.

The lowest month flow during each of the past few years has been in the order of 38,500 to 41,500 m³ which is equivalent to 222 to 258 Lpcd. Therefore, base sewage flows for the community could be assumed to be in the order of this amount, and the additional flows during other times of the year due to I&I or seasonal changes in water use. In comparison to the established 275 Lpcd design water use demand, the base sewage flow is in the order of 80-90% of municipal water use. The maximum day sewage flow was in the order of 5.3-6.8 times higher than the low monthly average day flow and typically occurs during significant wet weather events (e.g. snow melt and/or rainfall; high groundwater periods). This high peak flow rate is an indication of high I&I contributions to the sewage collection system. During the past 5 years, the daily sewage flow has ranged from approximately 1,145 to 8,705 m³/d (March 10, 2020), further support of high I&I contributions, and making it difficult to predict peak sewage flows for the pumping stations.

As noted in the previous study report, on June 23, 2017, there was a significant rainfall event that resulted in a recorded total daily pumped flow of 12,941 m³ and a maximum pumping rate of 208L/s, at the NWS-SPS, which is expected to be the actual peak pumping capacity of this station (based on how this station is currently configured and equipped) and, hence, it exceeded the 15,000 m³/d (173.6 L/s) design hydraulic capacity of the WWTP (although we are not aware of this resulting in any reported malfunctions at the WWTP). The peak sewage inflow to the NWS-SPS is unknown, but is >208L/s. The previous day flow was 1,875 m³, so there was a 690% increase in the daily flow because of that storm. A comparison of all three key SPSs is provided below in Table 5.3 (may indicate the Durham Street SPS catchment has a higher relative inflow issue than the other catchments, but all catchments have inflow issues). It is evident there are significant sources of inflow to the sanitary collection system during storm and snow melt events. This Technical Update study did not evaluate I&I issues, and the sizing of sewer extensions in this study are based on typical design values used by the Township for new sewers.

Table 5.3 - Wet Weather Event Flows (June 23, 2017)

Station	Daily Flow (m ³)		% Increase In Flow
	June 22, 2017	June 23, 2017	
Cork Street SPS	390	2,108	540%
Durham Street SPS	392	3,378	860%
Gravity (calculated)	1,093	7,455	680%
North Water Street SPS	1,875	12,941	690%

Sewage by-passing was reported during this June 2017 storm event, the first known by-pass since the new WWTP became operational in November 2008. By-passing occurred on January 11-12, 2020 (wet weather event; rapid snow melt and rain) that resulted in high peak sewage flows and overflow at the NWS-SPS.

The former aeration and clarifier tanks at the NWS-SPS site are available for emergency storage of excess wet weather event flows (not equalization storage: manual pump-outs after such events), although it is reported that the aeration tankage is typically always “half full” of clean water from groundwater infiltration.

For the current period under review, the following Table 5.4 summarizes the highest annual daily sewage flow and the peak sewage pumping rate recorded at the NWS-SPS.

Table 5.4 - Annual Maximum Day and Peak Sewage Pumping Rates (2020-2024)

Year	Max Day Flow (m ³)	Day	Peak Pumping Rate (L/s)	Day
2020	8,705*	March 10	156***	December 24
2021	7,228**	September 23	205**	June 21
2022	5,843	March 19	176	May 14
2023	6,750	April 2	166	May 4
2024	6,242	April 14	162	January 31

*attributed to snow melt and rainfall

**attributed to a significant wet weather event

***data unavailable for January 11, 2021, during the time of the bypass/overflow event. Therefore, the actual peak pumping rate in 2020 is expected to have been 205L/s on January 11th.

As discussed above regarding the June 2017 wet weather event, the June 21, 2021, peak sewage flow (and the likely January 11, 2021, peak pumping rate) is the capacity of the NWS-SPS pumps. Onsite NWS-SPS storage and overflow occurred on January 11, 2021, but none reported to have occurred on June 21, 2021, likely because of the short duration storm event vs. the longer rainfall/snowmelt event that occurred in January 2021.

5.2 Sanitary Sewer

a) General

The community of Mount Forest is serviced by a sanitary sewage collection pipe network, including a number of SPSs that are detailed in a following section.

There are two existing low-pressure sanitary sewers in the community:

- At the easterly end of Wellington Street East, beyond London Road, to service 5 single family residential lots;
- At the easterly end of Durham Street East, immediately west of London Road, to service two 5-unit townhouse buildings (10 total residential units).

The Township owns and operates the low-pressure collection sewers within the bounds of the road allowance while each private lot is responsible for the ownership and operation of the grinder pumps and discharge line within the bounds of the private lots. Normally, the Township will only approve new developments that are serviced by conventional gravity sewers (or a new SPS, if that is required), but in some circumstances may consider alternative methods of sanitary servicing.

As previously mentioned, there are some areas or lots within the urban boundary that are serviced by individual Class IV sewage disposal (septic) systems, including:

- All areas south/southeast of the South Saugeen River.
- Lots fronting on Queen Street east of Sligo Road and west of Cork Street.
- Residential lots fronting on Sligo Road near Queen Street

- Some William Street lots south of Waterloo Street (there is now a sanitary sewer there to allow for connections).
- Some Wellington Street East lots opposite the fairgrounds (there is a sanitary sewer there to allow for connections).
- Various random lots within the urban boundary.

Where practical, the Township should consider extending sanitary servicing to these areas and encourage connections including where there is already available municipal sanitary sewers.

There are also some lots that are serviced by private grinder pumps, some with discharge lines through private easements to a municipal sanitary sewer (e.g. North Water Street, east of John Street; Victoria Street commercial mall; OPP Station on Main Street).

This Technical Update study did not include a review of the physical condition of the existing sewer system.

There continues to be I&I issues within the collection system. This Technical Update study did not include an evaluation of those problems nor consider solutions to I&I issues.

b) SewerCAD™

As part of this servicing technical update study, a SewerCAD™ model was established for the existing gravity sanitary collection system. Details are included in Appendix D, including the following highlights:

- Known current development interests were included in the existing condition model run given the high probability they will be developed within the next few years, in order to help ensure the existing modelled system has sufficient capacity.
- An infiltration and inflow (I&I) allowance of 0.0175 L/mm pipe dia./km of pipe was included in the existing condition model run. This is equivalent to approximately 125L/s of extraneous flow. The total existing condition model run flow is approximately 213 L/s which approximately matches the NWS-SPS peak recorded pumping rate. Therefore, the model attempts to reflect actual peak flows experienced within the collection system during extreme wet weather flow conditions. However, the I&I flow was spread uniformly across the collection system and there may be “hot spots” that result in higher flows for certain sewer sections than modelled. Without sewer system flow monitoring (including during wet weather events), the model cannot be calibrated.
- The Growth Plan Future Development Areas #1, 2 & 4 were included in the model. FD Area #3 would discharge to a future SPS on South Water Street which will directly discharge to the NWS-SPS and, hence, not impact the modelled existing gravity sewer system.
- Generally all vacant areas within the urban boundaries (excluding areas south of the South Saugeen River) were included in the model such that it represents ultimate build-out conditions (i.e. beyond 2051), other than it excludes the Northeast Industrial Area (currently privately owned and used for agricultural purposes).

Based on the modeling work and its assumptions, the following is concluded:

- The existing gravity sanitary sewer collection system is capable of servicing the existing built serviced area and known active development interests.
- However, there are a number of sewer sections that appear to be at grades below the minimum grade recommended by MECP for self-cleansing. See a table included on Exhibit SAN-1 in Appendix D for their locations. The Township has a regular 3-year flushing cycle for its sanitary sewer system and indicates this appears to be adequate for maintaining these sewer sections.
- There are also old clay tile and AC cement sewers within Mount Forest, and these tend to be replaced as part of annual road reconstruction projects. It is likely that some of these old types of sewers have high I&I and may be structurally in poor condition and may be more susceptible to solids deposition and plugging or, due to higher roughness, subject to reduced capacity than modelled.
- **By Yr. 2034**, the available surplus capacity for some sections of the Wellington Street West sanitary sewer, between Main Street and Normanby Street, may be exhausted and require upsizing. Further evaluation of this can be completed at the time of the next servicing technical study update.
- All other existing sanitary sewers are anticipated to accommodate growth beyond Yr. 2051.
- The foregoing excludes consideration of the addition of a new SPS to service the Northeast Industrial Area and where that flow might discharge (currently privately owned and used for agricultural purposes).

It is recommended that flow monitoring be completed on Wellington Street West, east of Normanby Street, during a wet season, to help confirm peak flows in that sewer and determine if and when any upgrades should be made. Consider this matter further at the time of the next technical servicing study update.

c) Gravity sanitary sewer extensions to unserviced areas

Sanitary sewer extensions to undeveloped areas within the urban boundary were evaluated in previous studies and further reviewed as part of this study. A summary of key sanitary sewer extensions evaluated is provided in the following subsections.

Calculations for new trunk sanitary sewer extensions were generally completed in previous studies, and were based on the Township's servicing standards, MECP Guidelines, and a previous Official Plan greenfield residential density, as follows:

- 40 persons per ha (*Note: current Growth Plan uses minimum 32 persons per ha*)
- 450 Lpcd, for domestic flows (*Note: current sewage flow evaluation indicates 350 Lpcd*)
- 28m³/ha/d, for commercial and industrial flows (i.e. used equivalent of 62 persons/ha)
- 0.15 L/ha/s, for extraneous flow allowance (infiltration)
- Peaking factor: Harmon equation (max. 4.0); note this was used also for ICI areas
- Assume minimum sewer grade as per MECP Guidelines

This is expected to result in conservative sizing estimates for these sewers given actual recorded domestic sewage flows are much lower than 450 Lpcd, and past evaluations of metered ICI uses indicates daily flow rates significantly lower than 28 m³/ha/d. At the time of detailed design, the sizing of sewer extensions should be checked.

Below summarizes the sanitary servicing needs required for each of the future land development areas as outlined in the Township's Growth Plan report. Supplemental commentary is provided below based on the results of this current technical servicing study update.

FD Area #1: Northeast Mount Forest – Sligo Road and West of Side Road 41 Southgate

- *Sanitary ó Gzvypukqp"qh"gzkuvkpi"fggr"*707o+"ucpkvct{"ugygt"qp"Ukniq"Tqc f0ö*

The need for a SPS on the east side of the tributary to Fairbanks Creek is anticipated. The Sligo Road sanitary sewer extension from Church Street to London Road would provide the outlet for the forcemain. Survey of the tributary to Fairbanks Creek along with the terminal end of the existing Sligo Road sanitary sewer is recommended to confirm that gravity servicing to FD Area #1 is not viable. Preliminary design of a Sligo Road sanitary sewer should include preliminary design of the following London Road sanitary sewer.

FD Area #2: Northeast Mount Forest – London Road and South of Sligo Road

- *Sanitary ó Gzvypukqp"qh"gzkuvkpi"fggr"*707o+"ucpkvct{"ugygt"qp"Ukniq"Tqc f0ö*

The required size of the sanitary sewer extension on Sligo Road is anticipated to be a 300mm dia. at minimum grade, in order to allow gravity servicing to the maximum degree within FD Area #2 and for receiving pumped flow from a future FD Area #1 SPS. Survey of the tributary to Fairbanks Creek at the Sligo Road crossing should be completed at the time of detailed design of the Sligo Road sewer extension, in order to confirm that gravity servicing of FD Area #1 is not feasible.

A London Road sanitary sewer may only need to be a 250mm dia. sewer at minimum grade. Sanitary services to lots created on the east side of London Road may need to be shallower insulated services due to potential conflicts with the existing trunk storm sewer (i.e. gravity servicing of basements may not be possible if those lots are serviced off of a London Road sewer). Sizing and design elevations should be established prior to proceeding with detailed design of the London Road sanitary sewer, including checking if services will conflict with the trunk storm sewer. The Growth Plan has indicated FD Area #2, along with FD Area #3, are the preferred initial greenfield growth areas within the urban boundaries.

It is assumed that portions of FD Area #2 will be filled by up to 1.5m depth in order for the majority of this area to be serviced by a gravity connection to the future sewer extensions along Sligo-London. Servicing a portion of FD Area #2 alongside London Road from Broomer's Crescent to Wellington Street East may be possible using the existing 200 mm dia. sanitary sewer, but that may be limited due to its shallower depth and new servicing conflicts with the existing storm sewer.

Depending on how FD Area #2 development proceeds, it may be desirable to extend the 250mm dia. Birmingham Street sanitary sewer to London Road (i.e. to service an initial southerly phase of development). However, this Birmingham sewer may be unnecessary if the Sligo-London Road sanitary sewer is constructed first.

FD Area #3: Southeast Mount Forest – Highway 6 and South of Murphy Street

- *Sanitary ó This area requires a new sewage pumping station (S.P.S.) to be constructed on South Water Street, including a gravity sanitary sewer on South Water Street from the S.P.S. to Main Street, a sewer crossing of Main Street (Highway 6) by jack and boring, and extending this new sewer easterly along Murphy Street. The gravity sewer would be 7.0 m deep. Alternatively, as S.P.S. would be required to pump from Murphy Street to the*

On Murphy Street is a road crossing culvert with an invert at approximately 409.0m or lower (based on GIS information; not actually surveyed). The South Water Street and Murphy Street sanitary sewer would need to be designed deep enough to cross that culvert with adequate separation for frost protection or insulation between it and the culvert. The Growth Plan has indicated FD Area #3, along with FD Area #2, are the preferred initial greenfield growth areas within the urban boundaries. Survey of the Murphy Street culvert is recommended to help establish the future detailed design of a new sanitary sewer. Given the significant grade differential along the south development side of Murphy Street at this low point, it may be possible to raise Murphy Street and allow a new sanitary sewer to go over the culvert rather than under it, in order to allow for a decrease in the South Water Street and Murphy Street future sewer depths. This alternative should be investigated because it may significantly reduce the cost of the proposed sewer and jack & bore Main Street (Hwy. 6) crossing. The east Murphy Park entrance may need to be relocated to the east and an existing rural residential driveway raised and regraded beyond the road allowance.

FD Area #4: Southwest Mount Forest ó Nqxtgøu"Ncpj"cpf"Uqwj"qh"Swggp"Uvtggv"Yguv"

- *Sanitary ó An S.P.S. is required. The sanitary sewer on Queen Street would need to be gzygpfjg"htqo"Eqtm"Uvtggv"vq"Nqxtgøu"Ncpj"Vjg"gzkwpki"Eqtm"Uvtggv"ugygt"eqmgevqkq"cpf" Cork Street S.P.S. capacities would need to be elevated to ensure that no upgrades are tgswwktgf"vq"ugt.xkeg"vjkv"hwvwtg"ncpf"ctgcö*

A sanitary sewer cannot be extended along Queen Street all the way to Lover's Lane. Such a sewer could be extended to a north/northeasterly portion of FD Area #4 to service a small portion of FD Area #4 by gravity (see Figure 5.4), but the majority of FD Area #4 will require a SPS. It is noted that any proposed works on Sligo Road from Queen Street to approximately 425m northeast of Queen Street is a boundary road, so any proposed Township infrastructure may need to be installed within the Township side of that boundary road.

Industrial area expansion to the north into the Municipality of West Grey on lands owned by the Township of Wellington North

An extension of the existing Industrial Drive sanitary sewer to service additional lands owned by the Township but within West Grey is technically possible, except not for the most westerly portion of those lands. However, discussions would need to occur between the Township and

West Grey and the County of Grey to establish servicing outside of the Township of Wellington North and its Mount Forest urban boundary. Class EA work would be required for new sewers that would be required within unopened or new road allowances, or else consider the possibility of servicing the Township's vacant lands through the Planning Act (e.g. Draft Plan of Subdivision).

Mount Forest Drive/Irwin Lytle Drive industrial area servicing

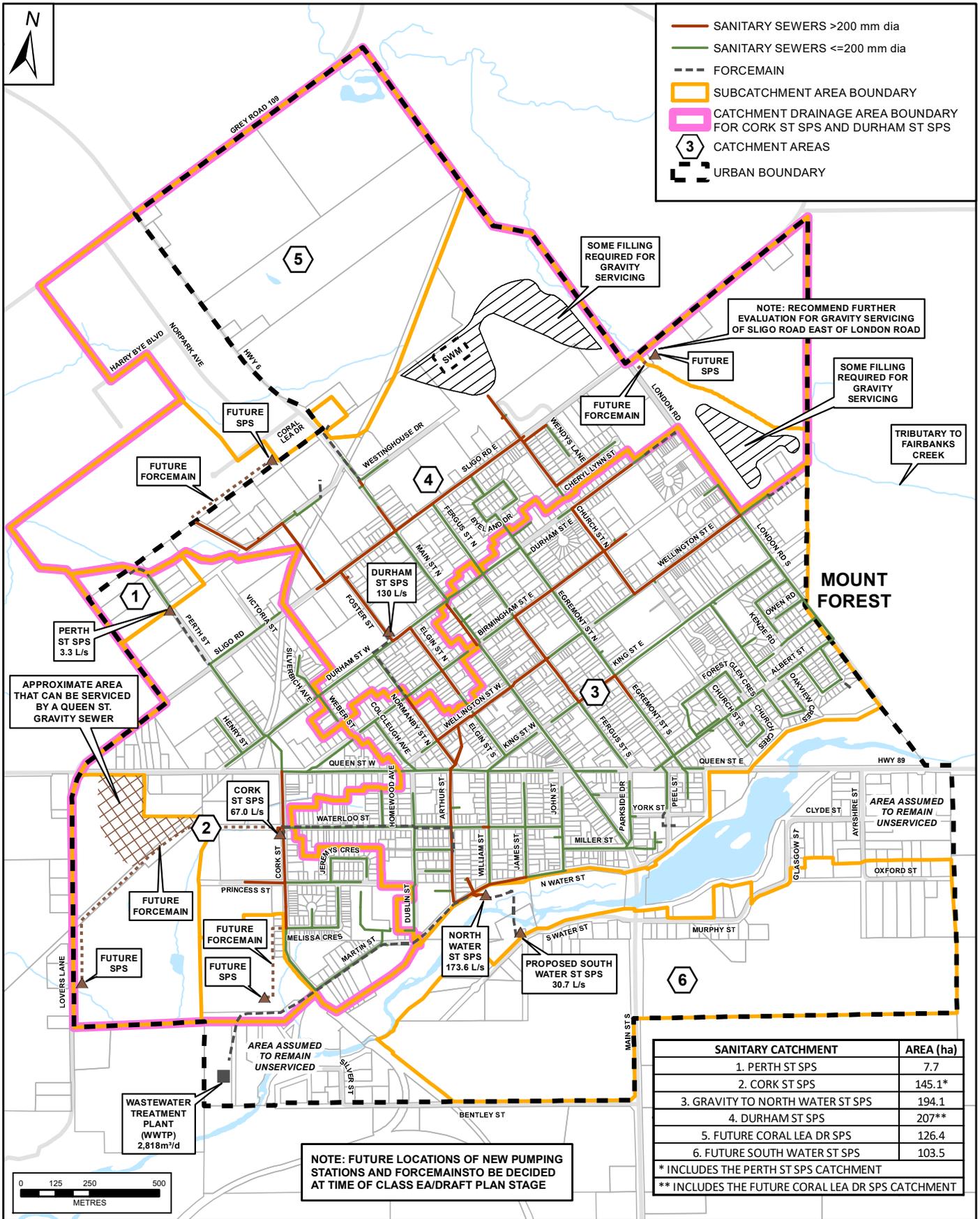
To service industrial areas along the undeveloped portion of Mount Forest Drive, an extension of the Irwin Lytle Drive sanitary sewer to the west along a future extension of Mount Forest Drive would be required (currently is private ownership), or else a sewer could be routed to the south from Mount Forest Drive to Sligo Road through undeveloped property. Portions of the industrial lands north of Wellington Heights Secondary School would require an extension of the existing trunk storm sewer to the north and filling within the unopened road allowance. As well, regrading/filling within this future development area would be required in some areas to maximize the area that can be serviced by gravity sewer.

Northeast Industrial Area (zoned for industrial use)

Servicing of this industrial area would require a SPS. Appendix E shows two profiles into this Northeast Industrial Area, one along an imaginary extension of Irwin Lytle Drive and the other along Highway No. 6. Both show that gravity servicing is not an option. The current concept for servicing the Northeast Industrial Area is a SPS located near the intersection of Watson Drive (formerly called Coral Lea Drive) and Nor-Park Drive. It is assumed that the forcemain for this new SPS would discharge to a future extension of the Industrial Drive sanitary sewer, assuming there is existing downstream sewer and SPS capacity for that. Given there are no active development interests and these lands are currently privately owned and used for agricultural purposes, a more detailed evaluation and costing was not completed as part of this study, including no SewerCAD modeling work to check impacts of such a new forcemain discharge into the exiting sewage collection system.

5.3 Sewage Pumping Stations (SPSs)

The community of Mount Forest is currently serviced by four municipal SPSs. A new SPS has been designed and will be built to service a subdivision on the west side of Cork Street south of Melissa Crescent (currently anticipated for Yr. 2026-2027 construction). A new SPS has been designed and approved on South Water Street opposite unopened Bristol Street, but its construction depends on a Developer's schedule (currently anticipated for Yr. 2026-2027 construction). The design capacity of the Mount Forest SPSs are based on design peak sanitary sewage flow rates. Figure 5.3 depicts the SPS catchment boundaries as well as additional future anticipated pumping station locations.



Perth Street Sewage Pumping Station (SPS)

The Perth Street submersible dual pump SPS was constructed as an interim solution to providing sanitary servicing for an extension of the Perth Street industrial area. It is a manhole located in the center of the street. It has a rated station capacity of 3.3L/s at 35m TDH. It discharges through a 50mm dia. forcemain to the Perth Street sanitary sewer, which conveys sewage to the Cork Street SPS. Because it is currently servicing only dry industries, the sewage flow rate to this station is anticipated to be very low and well below its rated capacity. This is confirmed by the consistent low pump hours, with the current annual average being 1.6 hrs/day for the past five years, with a maximum average day month pumping time of 2.7 hrs/day. In the absence of any reported operational concerns, there is no known requirement for upgrades to this pumping station within the foreseeable future.

Cork Street Sewage Pumping Station (SPS)

The Cork Street submersible VFD-controlled dual pump SPS was constructed in 2010 at the southwesterly corner of the Cork/Waterloo Street intersection. It has a rated capacity of 67L/s at 24.3m TDH. It discharges through a 200-250mm dia. forcemain along Waterloo Street to the Arthur Street sanitary sewer, where it is then conveyed by gravity to the NWS-SPS. This station was sized to accommodate pumps with an ultimate capacity of 97L/s. The facility is equipped with a 175 kW standby diesel generator set.

Based on a review of sewage flows for the period of 2020-2024, the following is noted (*Note: August 26/23 162.1L/s and August 14/24 100.55L/s recorded results were ignored and considered anomalous*):

- Minimum monthly flow of 8,487 m³ (equivalent to an average of 283 m³/day), in November 2024.
- Maximum day flow of 1,215 m³ (March 10, 2020).
- The annual maximum day flow for the period under review was 3.3 to 3.8 times higher than the minimum monthly “base” flow. In comparison to the Durham Street SPS and North Water Street SPS, this factor is significantly lower and may be an indication of less I&I problems in the Cork Street SPS catchment area.
- The annual 99th percentile peak instantaneous pumping rate was 77.5-79.1 (5-year average of 78.3) L/s. This consistent discharge rate is because the pumps, since 2019, have not been operated using the VFDs based on operational decision of removing the manual bar screen (attributed to operator H&S issues) and the resultant frequent clogging problems with the pumps (attributed to VFD operating at minimum speed due to low inlet flows). The pumps cycle on/off based on high and low wetwell levels.
- The 78.3L/s average pumping rate exceeds the 67L/s rated equipped capacity of the station but is below the approved capacity of 97L/s. This may be attributed to conservative design calculations (e.g. lower actual discharge head allowing a higher operating pump capacity) or, if the pumps were refurbished since 2010 and before 2020, they may now have a higher capacity than how they were originally built.

- The peak inlet sewage flow rate is not measured but can be theoretically calculated using the non-pumping periods, wet well dimensions and wetwell ultrasonic level information (recorded by SCADA every minute). Preliminary calculations indicate the annual peak inlet flow rate has ranged from 14.6 to 40.9L/s. The higher of the peak flows may be anomalous, but the data wasn't reviewed in detail to make that determination. However, if 40.9L/s is actually representative of the 2024 peak inlet sewage flow, it is significantly lower than the apparent equipped capacity of 78.3L/s.
- The apparent surplus capacity of this station is 37.4L/s (78.3-40.9).
- Based on 32 capita/ha (as per Growth Plan), 350 Lpcd daily sewage flow (as per MSS), a peaking factor of 4.0 (maximum to use, as per MSS), and an extraneous (I&I) flow allowance of 0.15 L/s/ha (as per MSS), the peak sewage flow from new residential developments can be expected to be approximately 0.67 L/s/ha. Therefore, a 37.4L/s surplus capacity yields 54ha of new development which exceeds the active and future development areas identified within the Cork Street SPS catchment.
- Therefore, growth within the Cork Street SPS catchment is not expected to exceed the reserve capacity of this station during at least the next 20 years and, therefore, no upgrades to the pumps are required for the anticipated operational life of the existing pumps and probably beyond Yr. 2051 unless there is higher density growth within the catchment than assumed by the Growth Plan.

Durham Street West Sewage Pumping Station (SPS)

The Durham Street West SPS was constructed in 2011 at the northeasterly corner of Durham/Foster Street. It continues to be known as the Durham Street SPS. It is equipped with three pumps, each with a rated capacity of 74L/s at 13m TDH. It discharges through a 300mm dia. forcemain to a 600mm dia. sanitary sewer on Normanby Street, where it is then conveyed by gravity to the NWS-SPS. The Durham Street SPS was designed for parallel pump operation, and the currently equipped dual pump operational rated capacity is approximately 130L/s. The station wetwell was sized to accommodate an ultimate total capacity of 251 L/s. The facility is equipped with a 60 kW standby diesel generator set.

Based on a review of sewage flows for the period of 2020-2024, the following is noted:

- Minimum monthly flow of 7,628 m³/day (equivalent to an average of 254 m³/day), in September 2022.
- Maximum day flow of 1,850 m³ (March 10, 2020).
- The annual 99th percentile peak instantaneous pumping rate was 68.2-94.5 L/s.
- The 94.5L/s peak pumping rate (occurred in Yr. 2022) is below the current equipped station capacity of 130 L/s.
- The apparent surplus capacity of this station is 35.5L/s (130-94.5).
- Based on 32 capita/ha (as per Growth Plan), 350 Lpcd daily sewage flow (as per MSS), a peaking factor of 4.0 (maximum to use, as per MSS), and an extraneous (I&I) flow allowance of 0.15 L/s/ha (as per MSS), the peak sewage flow from new residential developments can be expected to be approximately 0.67 L/s/ha. Therefore, a 35.5L/s

surplus capacity yields 53ha of new development which exceeds the future development areas identified by the Growth Plan within the Durham Street SPS catchment.

- Therefore, growth within the Durham Street SPS catchment is not expected to exceed the reserve capacity of this station during at least the next 20 years and, therefore, no upgrades to the pumps are required for the anticipated operational life of the existing pumps and probably beyond Yr. 2051 unless there is higher density growth within the catchment than assumed by the Growth Plan.

North Water Street Sewage Pumping Station (NWS-SPS)

All sanitary sewage flow from the serviced areas of the community ends up at the North Water Street SPS, including from all other SPSs, where it is then (re)pumped to the WWTP through a 300 mm diameter forcemain along North Water Street and Martin Street. This station is equipped with 2 variable speed pumps, each rated to handle a flow of 173.6 L/s at 44.2 m TDH and 1 pump rated for 57.2 L/s at 17.7 m TDH (e.g. “jockey” pump). Only 1 pump was designed to operate at any given time. The facility is equipped with a 450-kW standby diesel generator set. There is approximately 1,288 m³ of storage at the SPS (old STP tanks) which is used to store excess peak flows during wet weather events.

Based on a review of sewage flows for the period of 2020-2024, the following is noted:

- Minimum monthly flow of 38,293 m³/day (equivalent to an average of 1,276 m³/day = 14.8 L/s), in September 2020.
- Maximum day flow of 8,705 m³ (March 10, 2020). This maximum day flow is equal to approximately an average pumping rate of 101L/s. *Note: on June 23, 2017, coinciding with a significant rainfall event that caused significant flooding in areas in local municipalities, the maximum day flow was 12,941 m³.*
- The annual 99th percentile peak instantaneous pumping rate was 153.2-173.0L/s.
- The annual 95th percentile peak instantaneous pumping rate was 149.7-167.6L/s.
- However, these are instantaneous pumping rates (i.e. when the large duty pump kicks on) and is not necessarily (nor often) representative of the actual peak sewage inflow rate into the wetwell. Refer to the Appendix G select pumping rate charts for examples (those select dates were graphed since they represent available 2020-2023 SCADA results where annual maximum day and peak instantaneous pumping rates occurred; detailed SCADA 2024 results were not available for review). It appears that an observed sustained peak pumping rate of 160± L/s (September 22-23, 2021) is representative of the peak sewage inflow rate to the NWS-SPS wetwell during the period under review (data for the overflow event of June 21, 2021, is missing and/or suspect, so not available for review). However, this may even be too high of a value to use for evaluating the reserve pumping capacity of this station since this 160± L/s occurred during an extreme wet weather event (107mm of rainfall within a 24-hour period).
- Apparent current peak station pumping capacity is 204.1L/s (based on June 21, 2021, significant wet weather event; in the past, the peak pumping capacity was similar at 208.3 L/s based on a June 23, 2017 wet weather event; note that this station and the WWTP approved design hydraulic capacity is 173.6 L/s).

- The pumping capacity of the NWS-SPS is exceeded from time to time due to extreme wet weather events. On-site storage and/or overflow to the South Saugeen River will occur during some of these events.
- We are not aware of any reported WWTP plant upsets when accepting the high wet weather event pumping flows (i.e. of 204.1 L/s), but there was tertiary bypassing at the WWTP at the time of the June 23, 2017, wet weather event and at the time of a January 11, 2020, wet weather event (which also resulted in a NWS-SPS overflow event) to ensure no loss of biomass or other plant process problems during these high flow events.
- Based on the 99th percentile and the apparent station capacity as currently equipped, the surplus pumping capacity of this station is 31.1L/s (204.1-173.0). Based on the 95th percentile and the apparent station capacity as currently equipped, the surplus pumping capacity of this station is 36.5L/s (204.1-167.6). These peak instantaneous flows assume that excess flows from extreme wet weather events will continue to use the onsite storage and/or overflow to the South Saugeen River. However, these peak instantaneous flows are of short duration such that there were no wetwell overflows to onsite tankage and/or spills to the South Saugeen River (other than the June 21, 2021, event). A more detailed evaluation of the station's SCADA information would be required to calculate actual sewage inflow rates and to project the future frequency of overflows and manual pumpouts of onsite tanks to determine when upgrades at the NWS-SPS, if necessary, should be considered. Such an evaluation is beyond the scope of this current study.
- If using the 160± L/s observed sustained flow, the surplus capacity of this station is 44.1L/s (204.1-160).
- Based on 350 Lpcd daily sewage flow (as per MSS), a peaking factor of 4.0 (maximum to use, as per MSS), an extraneous (I&I) flow allowance of 0.15 L/s/ha (as per MSS) and 32 capita/ha (as per Growth Plan), a 44.1L/s surplus capacity is equivalent to an additional population of approximately 2,110 (i.e. Yr. 2024 population of 5,800 + growth of 2,110 = 7,910). Based on the Growth Plan, if basing the NWS-SPS capacity on 160 L/s wet weather peak flow, the capacity of the NWS-SPS will be exhausted by mid-2033. However, this capacity exceedance would be for infrequent large wet weather events and there is currently onsite emergency storage available, but increased frequency of spills to the South Saugeen River are possible though anticipated to be infrequent.

Based on the foregoing evaluation, it is established that upgrades to the NWS-SPS facility is unnecessary during, and probably beyond, the next seven years. Any consideration for upgrading would likely be limited to considering possible increased onsite emergency storage. At this time, it is recommended that a more detailed evaluation of the NWS-SPS (pumping rate and onsite storage) be evaluated at the time of the next technical servicing update study (i.e. Yr. 2030). That study should consider the following:

- The actual peak sewage inflow rate and projected future increased use of onsite overflow tanks should be calculated based on the detailed SCADA output (per minute basis of the metered pumping rate and the calculated flow attributed to the incremental change in the wetwell level).
- There is a flushing cycle to exercise the large pumps to help keep the forcemain clean. This information would need to be obtained and reviewed in order to refine the

evaluation of the sewage pumping data if wanting to better establish sewage peak inflow rates (into the wetwell) by excluding these cycles.

- The Cork Street SPS and Durham Street SPS discharges, upstream of the North Water Street SPS trunk inlet sewer, will impact the peak flows entering the NWS-SPS.
- The future South Water Street SPS discharges to the NWS-SPS will impact the peak flows entering the NWS-SPS.
- Increasing the pumping capacity of the NWS-SPS cannot happen without considering what needs to happen at the WWTP which, during extreme wet weather events, is already receiving peak flows from the NWS-SPS that are bypassing some of the WWTP treatment processes (i.e. the pumping capacity of the NWS-SPS cannot be increased unless the WWTP is expanded). Upgrading at the NWS-SPS apart from any upgrades to the WWTP capacity would need to entail onsite measures at the NWS-SPS (e.g. additional storage tank capacity, if that were possible) or otherwise it accepted that more frequent spills to the South Saugeen River may occur during extreme weather events.
- It is noted that, typically, the lower flow normal duty sewage pump would be upgraded but not the larger pumps (unless the WWTP capacity is also increased to handle additional peak hydraulic loading) which are designed for more severe conditions such as wet weather events.
- Any increased pumping rate needs to consider the existing forcemain capacity.
- Measures to reduce I&I flows could be considered. However, extreme wet weather event flows are difficult to manage, and occasional by-passing can be expected to continue to occur during extreme weather events. The Township continues to replace old clay tile and AC sanitary sewers as part of its annual road reconstruction projects.

South Water Street Sewage Pumping Station (SWS-SPS)

Works were constructed across the South Saugeen River in 2005, from the NWS-SPS to the future location of a SWS-SPS: forcemain; electrical conduits.

SWS-SPS design work has been completed and an ECA had been received from MECP (expired in November 2025, but the MECP advises that an administrative amendment application can be submitted to them under the Township's CLI ECA to extend the expiry date). These works could proceed to tendering and construction, upon completion of final electrical design and confirmation of MECP approvals status. At this time, it is anticipated that servicing for Phase 1 of a subdivision within the SWS-SPS catchment area may commence as early as 2027, and that the SWS-SPS would be constructed and commissioned by 2028.

Future pumping stations

The following are anticipated future SPSs that will be needed at the time of future development:

- Cork Street residential development north of the WWTP. This is currently being designed and may be constructed as early as 2026.
- Coral Lea Drive (now Watson Drive) SPS, to service the Northeast Industrial Area (currently privately owned and used for agricultural purposes). Due to limited capacity of the existing Industrial Drive sanitary sewer, and depending on the actual sewage

generation rates of industries within the Northeast Industrial Area, it may be necessary to route the forcemain from this future SPS to the Durham Street West SPS and/or a combination of forcemain and new gravity sanitary sewer to convey the sewage to the WWTP.

- Sligo Road East SPS, to service the vacant land area that is east of London Road and east of a tributary to Fairbanks Creek. It appears the capacity of a Sligo Road sanitary sewer extension could provide a suitable outlet for this future station. It is noted that there may be the possibility of gravity servicing (crossing of the tributary to Fairbanks Creek), but that would require completion of some survey and preliminary design work to confirm.
- Lover's Lane SPS, to service vacant land area in this southwesterly corner of the urban area including along Sligo Road in the vicinity of Queen Street East. Existing Cork Street sanitary sewer capacity, from Queen Street to the Cork Street SPS, is anticipated to be insufficient to service all of Lover's Lane catchment sewage flows. A forcemain from such a future SPS may need to be routed to and through the Cork Street Recreation Park to the Cork Street SPS for conveyance of those flows.
- Clyde Street SPS, if it is ever desired to service the low-density residential development in the Ayrshire-Clyde-Glasgow Street area. Where such sewage could be conveyed was not evaluated.
- Silver-Mill Street SPS, if it is ever desired to service the low-density residential development in this area that is northwest of Bentley Street. Where such sewage could be conveyed was not evaluated.

An evaluation of the locations of such future SPSs was not part of this study nor provision of costing.

It is assumed that the following areas will be regraded and filled to allow for gravity sanitary sewer servicing through extensions of the existing sanitary collection system:

- Industrial area north of Wellington Heights Secondary School. A portion of this area can be serviced by gravity sewer, but much of it would require some filling with some areas, in particular the north-easterly portion, needing more than 2m of fill. It is noted that sanitary sewer in an industrial area typically does not require basement servicing and therefore shallower sanitary sewers could be constructed, but this will not alter the need for some relatively extensive filling in some areas of this parcel of land. It may be that some portions of this industrial area will be serviced by private pumping stations.
- Vacant land area that is beyond and to the east of London Road and adjacent to and west of the tributary to Fairbanks Creek can be serviced by an extension of the Sligo Road sanitary sewer if up to approximately 1.5m of fill is utilized.

5.4 Mount Forest Wastewater Treatment Plant (WWTP)

The Mount Forest WWTP is located on Martin Street west of Cork Street. It has an approved annual average day treatment capacity of 2,818 m³/d and an approved hydraulic peak flow capacity of 15,000 m³/d. Upon completing a Receiver Impact Assessment to the satisfaction of MECP, the WWTP can be re-rated to an approved capacity of 3,500m³ without the need for a physical expansion.

Although not part of this Technical Update study, some comments on WWTP treatment capacity are provided based on the current approved WWTP treatment capacity and using the information presented by others in their 2025 reserve capacity calculations (see Appendix F), as follows:

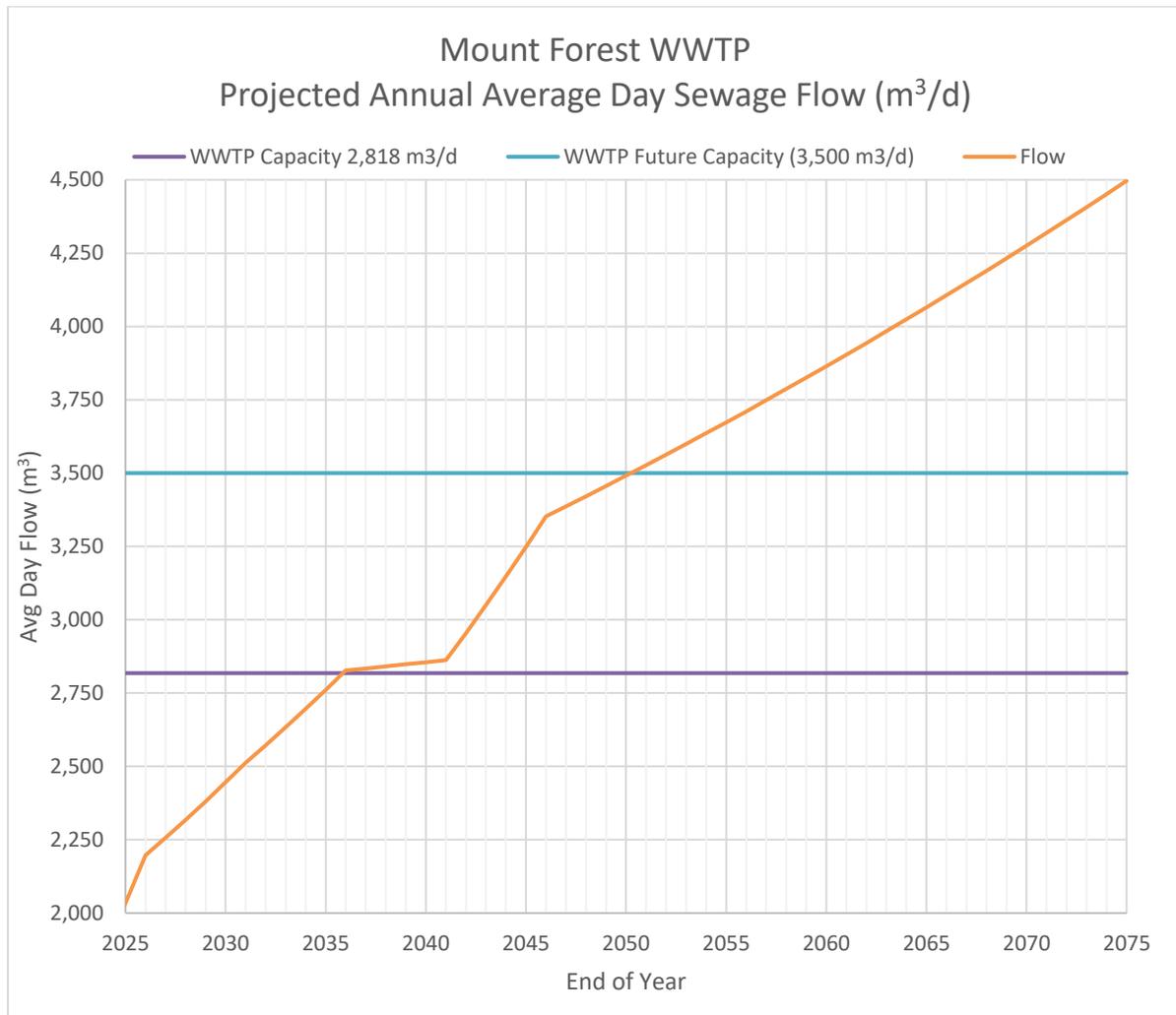
- 2,674 additional population can be serviced.
- Assume all growth will be serviced by the municipal sewage treatment works.
- Therefore, based on the Growth Plan and reserve capacity projections (Yr. 2024 population of $5,800 + 2,674 = 8,474$), the current $2,818 \text{ m}^3/\text{day}$ WWTP capacity will need to be increased **by Yr. 2036 or earlier**.
 - It is noted that some of the WWTP capacity may end up being utilized for the co-treatment of leachate from the Riverstown Waste Facility. Based on an ongoing leachate co-treatment study, this may advance the utilization of the remaining WWTP capacity by approximately a year (i.e. **by Yr. 2035**).
 - A new South Water Street SPS may be constructed as early as Yr. 2027, to service a new 400+ residential subdivision. That would result in the ability to service some existing residents along South Water Street, which may increase the utilization of the uncommitted reserve capacity and advance the date when the WWTP capacity will be fully utilized.
- It is estimated that the future $3,500 \text{ m}^3/\text{d}$ WWTP capacity (subject to obtaining all of the necessary approvals) will be exhausted **by early-2051**.

The projected annual average day sewage flow to the WWTP is illustrated in Figure 5.5, along with the current and future anticipated WWTP approved capacities.

It is recommended that the Township **by or preferably before Yr. 2030** complete the Receiver Impact Assessment and then obtain approval for the increased $3,500 \text{ m}^3/\text{day}$ WWTP capacity **by or before Yr. 2035**, along with the design and approvals of any necessary WWTP equipment upgrades or expansion. Refer to Appendix F Mount Forest WWTP Expansion Assessment Memo for an outline of the various recommended steps that should be taken.

The Township could consider stress testing the WWTP to help support an application to increase the rated capacity of the existing plant.

Figure 5.5 – WWTP Capacity vs. Projected Annual Average Day Flow



5.5 Recommended Sewage Works Projects

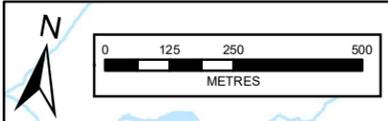
Based on the scoped study evaluations completed, the following Sewage Collection System projects are anticipated during the next 20-year planning period:

1. Construct the new South Water Street SPS (SWS-SPS), dependent on a Developer's schedules. This work is anticipated to be needed within the next few years and will be financed through Development Charges.
2. As part of Phase 1 for the Deer Ridge Heights subdivision, a 250mm dia. sanitary sewer is to be constructed on South Water Street from the proposed SWS-SPS site southwesterly past the southwesterly end of the existing street and into the subdivision lands, including sanitary services installed to existing South Water Street lots. This work is to be completed by the Developer. There may be cost allocations to the Township for servicing existing homes on South Water Street. This is anticipated within the next few years.

3. Complete the WWTP Receiver Impact Assessment (i.e. for the South Saugeen River) and obtain approvals for increasing the operational capacity of the WWTP plant to 3,500m³/day **within the next five years**. As well, given also the consideration that is currently being given to co-treatment of landfill leachate, existing plant equipment and processes should be reviewed to ensure optimum condition and adequate sizing. Refer to a January 12, 2026, Memo in Appendix F that outlines the proposed next steps.
4. At or before the time of the next technical servicing study (i.e. **by Yr. 2030**), include a detailed study of the existing and projected flows at the NWS-SPS coupled with the existing and possible expanded onsite overflow storage, to help minimize the potential and frequency of sewage spills to the South Saugeen River during wet weather events which may increase as growth adds additional sewage flows to the system. The cost for this evaluation is included in Section 8.0 Recommendation #3.
5. Prior to proceeding with any easterly extension of the Sligo Road sanitary sewer (e.g., to service FD Area #2 or the vacant land that is at the southwest corner of Sligo/London Road), complete survey to confirm whether or not gravity servicing to the east and under the tributary to Fairbanks Creek to FD Area #1 is feasible, since that will affect the size and depth of the Sligo Road sanitary sewer. Consider proceeding with this survey work at or before the time of the next servicing technical study update (**i.e. at or prior to Yr. 2030**). The cost for this survey and evaluation are included in Section 8.0 Recommendation #3. Consider if the future Sligo Road sewer extension will be constructed through Development Charges
6. Prior to proceeding with construction of a South Water Street sanitary sewer, from the proposed SWS-SPS easterly to Main Street, complete survey of a road crossing culvert and its surrounding area that is at a low point on Murphy Street approximately 200m east of Main Street. Consider if Murphy Street (and surrounding public and private lands) can be raised at that low point in order that the design elevation of the sanitary sewer can be raised to minimize its depth on South Water Street and at the Main Street crossing, to reduce the expense of the South Water Street and Murphy Street sewers while still servicing FD Area #3 and existing lots along these streets. The cost for this survey and evaluation are included in Section 8.0 Recommendation #3. Consider if the future South Water Street and Murphy Street sewers will be constructed through Development Charges
7. Continue replacing old sanitary sewers in conjunction with cast iron and small diameter (<150mm) watermain replacement activities, typically as part of progressively completing street reconstruction within the community, or in accordance with other priorities. At the time of road reconstruction projects, carefully review the size, material and condition of sanitary sewer within intersections to confirm they either were already replaced in the past or to include them in the replacement work.

Recommended works are presented on Figure 5.4, along with costs (see also Appendix A).

Other sanitary collection system works identified in this report should be completed as development interests dictate. At this time, they are not included in the foregoing key recommendations since there are no known current active development interests that require those works.



SANITARY WORKS PROJECTS - CAPITAL						
Sanitary Sewer						
Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments	
1	Fergus Street	Birmingham Street	Durham Street	200	\$402,500	175m. Includes sanitary services
2	Durham Street	Main Street	Fergus Street	200	\$356,500	155m. Includes sanitary services
3	Fergus Street	Durham Street	Sligo Road	200	\$747,500	325m. Includes sanitary services
4	King Street	Fergus Street	east of Egremont Street	250	\$671,000	275m @ \$2,440/m. Includes sanitary services
5	Newfoundland St	King Street	Wellington Street	200	\$310,500	135m. Includes sanitary services
6	Replace san sewer	where is old clay tile and AC pipe		200	\$8,303,000	See Note 4. 3,610m @ \$2,300/lin.m ind. services, MHS, etc.
				Total sanitary sewer	\$10,791,000	

Notes:

- Above are Class 5 present value opinions of probable cost generally based on limited information, and includes construction, engineering and net HST (1.76%)
- Above excludes Yr. 2025 active construction projects
- Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor watermain or storm sewer.
- These segments are: Birmingham Street, from Queen Street to east side of Main Street; Byeland Drive, Durham Street, from Fergus Street to 85m east of Egremont Street; Egremont Street, from Byeland Drive to Durham Street; Wellington Street, from Fergus Street to Egremont Street; Dublin Street, from Queen Street to Princess Street; Prince Charles Street; Peel Street; York Street; Main Street, from Birmingham Street to Durham Street; Waterloo Street, John Street to Arthur Street.

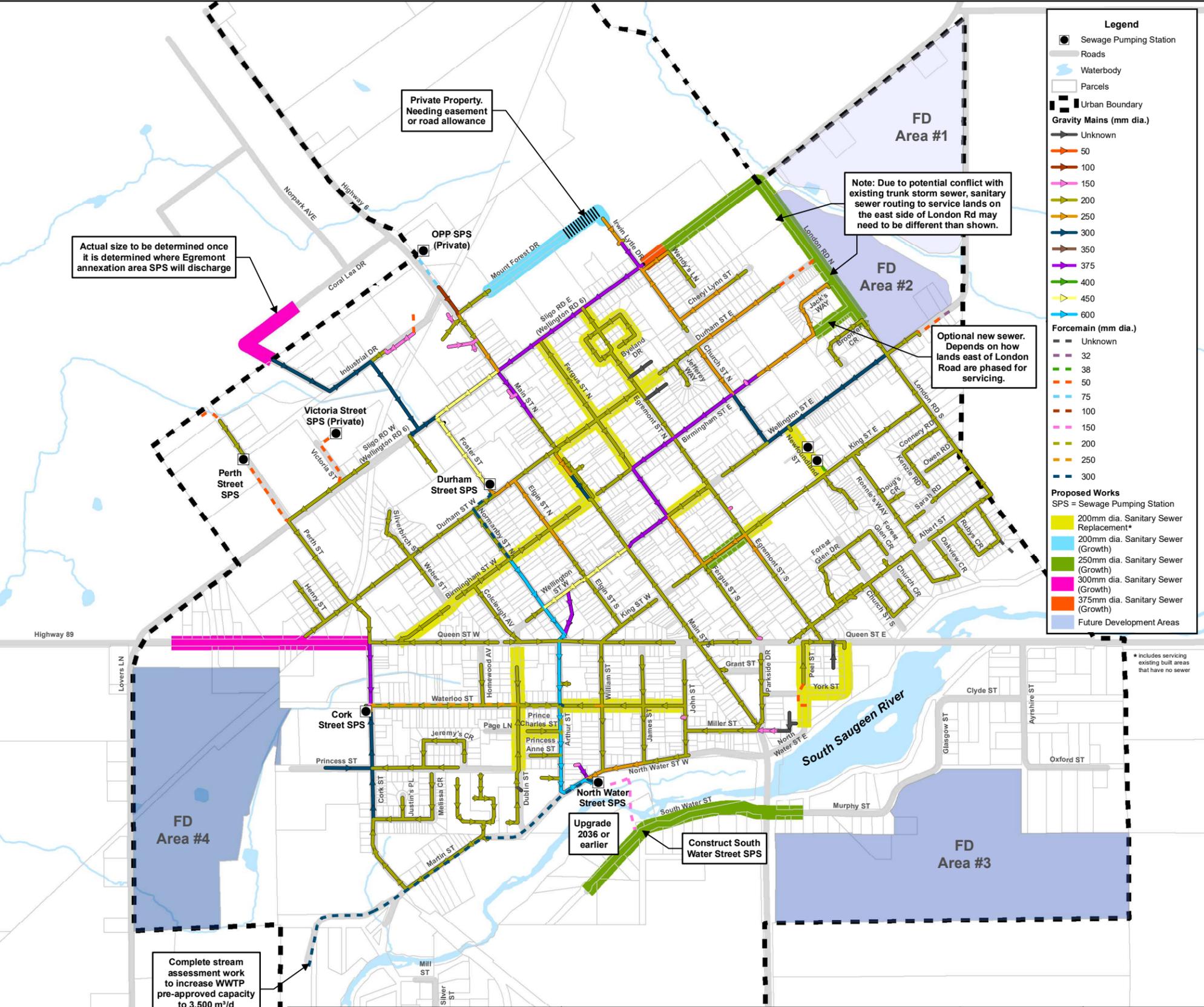
NOTE:
This is a schematic representation of the sanitary system (and roadways). While this drawing and its detail views are shown to a scale, symbols, roadway widths, and sanitary lines are not plotted to scale. Exact locations of many works are not known (based on old non-GPS data). This mapping should be used for general information purposes only.

NOTE:
See Figure 5.3 for conceptual information pertaining to areas of the urban boundary that will likely require a future SPS for sanitary servicing and for areas assumed to remain as individual Class IV sewage (septic) systems.

SANITARY WORKS PROJECTS - GROWTH						
WWTP						
WWTP upgrades (tied to the need for upgrading the NWS-SPS)						
SPS						
South Water Street SPS						
North Water Street SPS upgrades (this is part of the WWTP ECA)						
Sanitary Sewer (excludes cost of sanitary services, except where noted and then typically assuming 20m lot frontages)						
Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments	
Stage 1 (2025-2031)						
1	South Water Street	Dead-end	Bristol Street	250	\$499,800	255m @ \$1,960/m. Gravel road. Large lots so fewer new services. Cost sharing with Developer.
Stage 2 (2031-2041)						
2	Industrial Drive	Ex. Dead-end	Coral Lea Drive	300	\$168,000	120m @ \$1,400/m. No road restoration. Includes a few sanitary services to new industrial lots. Tied to new E.T. if wanting sanitary servicing to that site.
3	Coral Lea Drive	Industrial Drive	New E.T. site	300	\$385,000	275 @ \$1,400/m. No road restoration. Includes a few sanitary services to new industrial lots. Tied to new E.T. if wanting sanitary servicing to that site.
Stage 3 (2041-2051)						
4	Sligo Road	Church Street	London Road	375/250	\$1,607,500	To service vacant land on both sides of the street. Some existing lots on south side to also service. Deep sewer. 100m of 375mm dia. @ \$3,700 + 375m of 250mm dia. @ \$3,300. Includes full County road reinstatement.
5	London Road	Sligo Road	Durham Street	250	\$553,600	320m @ \$1,730/m. Gravel road. No services. To service vacant land on both sides of the street.
6	South Water Street	Bristol Street	Main Street	250	\$1,077,925	115m @ \$9,350/m (paved portion) & 295m @ \$2,465 (gravel portion). Inflated unit prices because of deep sewer and traffic control for dead-end narrow street. Large lots so fewer new services. Could consider alternative of a shallower gravity sewer but that would require a new SPS0 east of Main Street to service future development lands in that area.
Stage 4 (2051+)						
7	Murphy Street	Main Street	East of Main Street	250	\$430,000	115m @ \$2,000/m + allowance of \$200,000 for jack & bore across Hwy 6/Main St; includes sanitary services to a few existing lots
8	Birmingham Street	West of London Road	London Road	250	\$268,150	155m @ \$1,730/m. This sewer may be needed to service vacant land on the east side of London Road, depending on how those lands are phased and planned to be serviced.
9	London Road	Durham Street	Birmingham Street	250	\$328,700	190m @ \$1,730/m. Gravel road. No services. To service vacant land on east side of the street
10	London Road	Birmingham Street	Broomer Crescent	250	\$86,500	50m @ \$1,730/m. Gravel road. No services. To service vacant land on east side of the street
11	Mount Forest Drive	150m east of Main Street	Irwin Lytle Drive	200	\$675,750	To service vacant industrial land. Would need to purchase private property to extend road allowance to Irwin Lytle. A portion is paved road and rest is greenfield. 225m @ \$1,850 and 220m @ \$1,200/m
12	Queen Street	Cork Street	East of Sligo Road/Lovers Lane	300	\$2,340,000	640m @ \$3,500/m includes sanitary services to existing lots; includes Connecting Unk road reinstatement
				Total sanitary sewer + SPS	\$8,320,925	
				Total sanitary sewer + SPS	\$9,760,925	Excluding WWTP and NWS-SPS studies and upgrades required

Notes:

- Above are Class 5 present value opinions of probable cost generally based on limited information, and includes construction, engineering and net HST (1.76%)
- Above excludes Yr. 2025 active construction projects
- Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor watermain or storm sewer.



Legend

- Sewage Pumping Station
- Roads
- Waterbody
- Parcels
- Urban Boundary
- Gravity Mains (mm dia.)
 - Unknown
 - 50
 - 100
 - 150
 - 200
 - 250
 - 300
 - 350
 - 375
 - 400
 - 450
 - 600
- Forcemain (mm dia.)
 - Unknown
 - 32
 - 38
 - 50
 - 75
 - 100
 - 150
 - 200
 - 250
 - 300
- Proposed Works
 - SPS = Sewage Pumping Station
 - 200mm dia. Sanitary Sewer Replacement*
 - 200mm dia. Sanitary Sewer (Growth)
 - 250mm dia. Sanitary Sewer (Growth)
 - 300mm dia. Sanitary Sewer (Growth)
 - 375mm dia. Sanitary Sewer (Growth)
 - Future Development Areas

* includes servicing existing built areas that have no sewer

Complete stream assessment work to increase WWTP pre-approved capacity to 3,500 m³/d (By 2036 or earlier)

**TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST**

SANITARY AND WATER SERVICING TECHNICAL UPDATE

PROPOSED SANITARY WORKS

DATE Jan 16, 2026	PROJECT No. 24249
SCALE AS SHOWN	FIGURE No. 5.4

6.0 CAPITAL PROJECT LIST AND PROBABLE COSTS

The capital projects summarized in Section 4.5 and 5.5 of this report are anticipated to be completed within the next twenty-year period, and include recommendations for providing standby power at a second well pumphouse, future water storage expansion study, servicing for known existing active development interests, and servicing for FD Areas #2 & #3 as per the Growth Plan's recommended target growth areas. Cost estimates for these and other future servicing works are included on Figures 4.6 and 5.4.

7.0 APPROVALS

The following agency consultation or approvals activities are anticipated:

- Schedule B Class EA for new watermain and sanitary sewer within new or unopened road allowances (i.e. within future industrial lands adjacent to the north end of Mount Forest), or else consider the following:
- Consult with the Municipality of West Grey and the County of Grey for the proposed water storage facility and for servicing of Township-owned lands that are located within the Municipality of West Grey. Establish if the Township can proceed under the Planning Act (e.g. Draft Plan of Subdivision).
- MECP approvals (ECA) would be required for the new elevated water storage facility.
- Works that will occur within a Regulated Area or across streams will require a Permit from SVCA
- Most of the proposed Sewage Works (sanitary sewer; new SPS or SPS capacity changes) will probably be approved through the Township's CLI ECA but some may require individual ECA approvals from MECP or an amendment application to the CLI ECA.
- Most of the proposed watermain works will probably be approved through the Township's Drinking Water Works Permit (i.e. through a Form 1).
- Source Water Protection issues may need to be addressed for some of the recommended projects. The local Risk Advisor should be consulted.

8.0 RECOMMENDATIONS

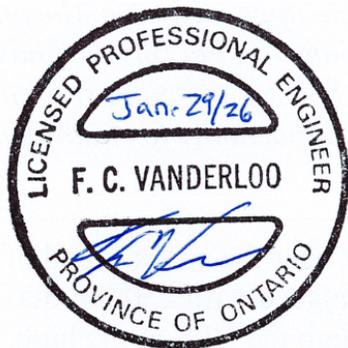
The following recommendations are made in relation to the results of this Mount Forest servicing technical update:

1. Complete water works capital upgrades as presented in Section 4.5 and as summarized in Figure 4.6.
2. Complete sewage works study and capital upgrade work as presented in Section 5.5 and as summarized in Figure 5.4.

3. Complete a Technical Servicing Update study in Yr. 2030 including study work for the North Water Street SPS, survey evaluation to check for a possible gravity sanitary sewer extension on Sligo Road east of London Road (to service FD Area #1), and survey to evaluate sanitary sewer design options on Murphy Street east of Main Street (which would impact the future receiving South Water Street sanitary sewer design depth). It is recommended to budget \$75,000 for this update study work.

It is noted that Regulatory changes can alter the conclusions and recommendations of this report. For example, if drinking water quality limits become more stringent (e.g. sodium levels in Well 5), it may become necessary to implement additional treatment processes or to establish a new well supply. This would also apply to regulations for wastewater treatment plant effluent limits.

All of which is respectfully submitted.



B. M. ROSS AND ASSOCIATES LIMITED

Per



Frank Vanderloo, P. Eng.

:hv

APPENDIX A
OPINION OF PROBABLE COSTS

TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST NEW COMPOSITE ELEVATED TANK (2,420m3)
OPINION OF PROBABLE COST

New water tower	\$8,175,000	See Note 1.
Maintenance bond (assume 2%)	\$163,500	
Contingency	\$100,000	
Engineering - Schedule B Class EA (probably not required)	\$100,000	
Geotechnical investigation	\$10,000	
Engineering design, contract administration, site review	\$300,000	
3rd party inspection (geotech; concrete; welding; coating)	\$67,500	
Hydro to site (allowance)	\$25,000	
Subtotal	\$8,941,000	
Net HST (1.76%)	\$157,362	
Total	\$9,098,362	
say	\$9,100,000	

NOTES:

- Budget inclusive of:
 - Site works
 - electrical/controls
 - paved access areas
 - fencing
 - HVAC/plumbing
 Exclusions:
 - Deep foundations
 - special tank coatings
 - special piping/mechanical including recirculation pumps and chemical metering system
 - special accessories (e.g. tank roof handrail)
 - 3rd party testing and inspection
 - contingencies
 - maintenance bond
- Coral Lea Drive (now called Watson Drive) road appears to already extend to the proposed site so is access already available?

WATER WORKS PROJECTS - CAPITAL						
Watermain (excludes cost of water services, except where noted)						
	Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments
1	Fergus Street	Birmingham Street	Durham Street	150	\$413,000	175m. Includes water services.
2	Durham Street	Main Street	Fergus Street	150	\$365,800	155m. Includes water services.
3	Fergus Street	Durham Street	Sligo Road	150	\$767,000	325m. Includes water services.
4	King Street	Main Street	Fergus Street	150	\$295,000	125m. Includes water services.
5	King Street	Fergus Street	east of Egremont Street	150	\$649,000	275m. Includes water services.
6	Newfoundland St	King Street	Wellington Street	150	\$472,000	200m. Includes water services.
7	Grant Street	east of Main Street	west of Parkside Drive	300	\$156,000	65m @\$2,400/m
8	Dublin Street	Queen Street	Princess Street	250	\$1,182,300	420m @\$2,815/m. Includes water services
9	Replace all other old cast iron and undersized (<150mm dia.) watermains			150	\$5,357,200	See Note 5. 2,270m @\$2,360/lin.m incl. services, valves, etc. See Note 6.
Total watermain:					\$9,657,300	

Notes:

- Above are Class 5 **present value** opinions of probable cost generally based on limited information, and includes construction, engineering and **net** HST (1.76%)
- Above excludes Yr. 2025 active construction projects
- Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor sanitary or storm sewer.
- Deleted
- Excludes the 48m of 38mm dia. line on the South side of Sligo Road west of Church Street.
This line would be removed/abandoned and any related services reconnected to the watermain that exists on the opposite side of the street. Unit price per lineal metres includes fittings, valves, hydrants, services, and road reinstatement.
- 324m of this is 200mm on Birmingham Street from Normanby to Elgin but using 150mm pricing because it probably only needs to be 150mm dia.

WATER WORKS PROJECTS - GROWTH					
Water Storage			Cost (See Note 1)		Comments
E.T. (Alternative #2) - Supplemental 2,420m ³ storage at greenfield site north end of town			\$9,100,000		
Watermain (excludes cost of water services, except where noted)					
Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments
Stage 1 (2025-2031)					
1 South Water Street	Dead-end	Bristol Street	300	\$525,300	255m @\$2,060/m. Gravel road. Large lots so fewer new services. Cost sharing with Developer.
Stage 2 (2031-2041)					
2 Industrial Drive	Ex. Dead-end	Coral Lea Drive	300	\$145,000	120m @\$1,450/m. No road restoration. No services. Needed to service new E.T. Alternative #2 .
3 Coral Lea Drive	Industrial Drive	New E.T. site	300	\$398,750	275m @\$1,450/m. No road restoration. No services. Needed to service new E.T. Alternative #2 .
4 Coral Lea Drive	New E.T. site	Highway No. 6	300	\$552,150	145m @1,630/m (gravel rd) + 170m @\$1,740/m (paved rd) + allowance for directional drilling across highway. No services. Needed for New E.T. Alt.#2 looping .
5 Highway No. 6	Coral Lea Drive	OPP Station	300	\$94,250	65m @\$1,450/m. No road restoration. No services. Needed for New E.T. Alternative #2 looping.
Stage 3 (2041-2051)					
6 Sligo Road	Church Street	London Road	300	\$931,000	475m @\$1,960/m. To service vacant land on both sides of the street. Few existing lots on south side to also service. Includes full County road reinstatement.
7 London Road	Sligo Road	Durham Street	250	\$457,600	320m @\$1,430/m. Gravel road. No services. To service vacant land on both sides of the street
8 South Water Street	Bristol Street	west of Main Street	150	\$467,350	45m @\$1,470/m (paved portion) & 295m @\$1,360 (gravel portion). Large lots so fewer existing services.
9 Murphy Street	Main Street	East of Main Street	250	\$226,550	115m @\$1,970/m. Large lots so fewer existings services. See Note 4.
Stage 4 (2051+)					
10 Birmingham Street	West of London Road	East of Church Street	250	\$321,750	225m @\$1,430. 3.0m access path/walkway and lawn restoration. To provide looping to service London Road and future developments east of London Road, depending on how those lands are phased and planned to be serviced.
11 Mount Forest Drive	355m east of Main Street	Irwin Lytle Drive	250	\$300,000	240m @\$1,250. No road restoration. To service vacant industrial land.
12 Queen Street	West of Cork Street	East of Sligo Road/Lovers Lane	250	\$1,335,900	610m @\$2,190/m includes water services to existing lots; includes Connecting Link road reinstatement
Total watermain:				\$5,755,600	
Total watermain + water storage:				\$14,855,600	

Notes:

- Above are Class 5 **present value** opinions of probable cost generally based on limited information, and includes construction, engineering and **net** HST (1.76%)
- Above excludes Yr. 2025 active construction projects
- Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor sanitary or storm sewer.
- The replacement size of this old 100mm dia. cast iron watermain depends on how servicing for future development east of Hwy. #6 proceeds. Per lineal metre price includes services, valves, fittings, hydrants, road reinstatement.

PRELIMINARY**SANITARY WORKS PROJECTS - CAPITAL****Sanitary Sewer**

	Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments
1	Fergus Street	Birmingham Street	Durham Street	200	\$402,500	175m. Includes sanitary services
2	Durham Street	Main Street	Fergus Street	200	\$356,500	155m. Includes sanitary services
3	Fergus Street	Durham Street	Sligo Road	200	\$747,500	325m. Includes sanitary services
4	King Street	Fergus Street	east of Egremont Street	250	\$671,000	275m@\$2,440/m. Includes sanitary services
5	Newfoundland St	King Street	Wellington Street	200	\$310,500	135m. Includes sanitary services
6	Replace san sewer where is old clay tile and AC pipe			200	\$8,303,000	See Note 4. 3,610m @\$2,300/lin.m incl. services, MHs, etc.
Total sanitary sewer					\$10,791,000	

Notes:

1. Above are Class 5 **present value** opinions of probable cost generally based on limited information, and includes construction, engineering and **net** HST (1.76%)
2. Above excludes Yr. 2025 active construction projects
3. Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor watermain or storm sewer.
4. These segments are: Birmingham Street, from Queen Street to east side of Main Street; Byeland Drive; Durham Street, from Fergus Street to 85m east of Egremont Street; Egremont Street, from Byeland Drive to Durham Street; Wellington Street, from Fergus Street to Egremont Street; Dublin Street, from Queen Street to Princess Street; Prince Charles Street; Peel Street; York Street; Main Street, from Birmingham Street to Durham Street; Waterloo Street, John Street to Arthur Street.

SANITARY WORKS PROJECTS - GROWTH					
WWTP					
WWTP upgrades (tied to the need for upgrading the NWS-SPS)				Cost (See Note 1)	Comments
				\$1,440,000	Not part of the scope of this current study
SPS					
South Water Street SPS					Comments
North Water Street SPS upgrades (this is part of the WWTP ECA)					May 16,2025, budget letter to Township
Sanitary Sewer (excludes cost of sanitary services, except where noted and then typically assuming 20m lot frontages)					Not part of the scope of this current study
Street	From	To	Dia. (mm)	Cost (See Note 1)	Comments
Stage 1 (2025-2031)					
1 South Water Street	Dead-end	Bristol Street	250	\$499,800	255m @\$1,960/m. Gravel road. Large lots so fewer new services. Cost sharing with Developer.
Stage 2 (2031-2041)					
2 Industrial Drive	Ex. Dead-end	Coral Lea Drive	300	\$168,000	120m @\$1,400/m. No road restoration. Includes a few sanitary services to new industrial lots. Tied to new E.T. if wanting sanitary servicing to that site.
3 Coral Lea Drive	Industrial Drive	New E.T. site	300	\$385,000	275 @1,400/m. No road restoration. Includes a few sanitary services to new industrial lots. Tied to new E.T. if wanting sanitary servicing to that site.
Stage 3 (2041-2051)					
4 Sligo Road	Church Street	London Road	375/250	\$1,607,500	To service vacant land on both sides of the street. Some existing lots on south side to also service. Deep sewer. 100m of 375mm dia. @3,700 + 375m of 250mm dia. @\$3,300. Includes full County road reinstatement.
5 London Road	Sligo Road	Durham Street	250	\$553,600	320m @\$1,730/m. Gravel road. No services. To service vacant land on both sides of the street
6 South Water Street	Bristol Street	Main Street	250	\$1,077,925	115m @\$3,050/m (paved portion) & 295m @\$2,465 (gravel portion). Inflated unit prices because of deep sewer and traffic control for dead-end narrow street. Large lots so fewer new services. Could consider alternative of a shallower gravity sewer but that would require a new SPSO east of Main Street to service future development lands in that area.
7 Murphy Street	Main Street	East of Main Street	250	\$430,000	115m @\$2,000/m + allowance of \$200,000 for jack & bore across Hwy 6/Main St.; includes sanitary services to a few existing lots
Stage 4 (2051+)					
8 Birmingham Street	West of London Road	London Road	250	\$268,150	155m @\$1,730/m. This sewer may be needed to service vacant land on the east side of London Road, depending on how those lands are phased and planned to be serviced.
9 London Road	Durham Street	Birmingham Street	250	\$328,700	190m @\$1,730/m. Gravel road. No services. To service vacant land on east side of the street
10 London Road	Birmingham Street	Broomer Crescent	250	\$86,500	50m @\$1,730/m. Gravel road. No services. To service vacant land on east side of the street
11 Mount Forest Drive	150m east of Main Street	Irwin Lytle Drive	200	\$675,750	To service vacant industrial land. Would need to purchase private property to extend road allowance to Irwin Lytle. A portion is paved road and rest is greenfield. 225m @\$1,830 and 220m @\$1,200/m
12 Queen Street	Cork Street	East of Sligo Road/Lovers Lane	300	\$2,240,000	640m @\$3,500/m includes sanitary services to existing lots; includes Connecting Link road reinstatement
Total sanitary sewer				\$8,320,925	
Total sanitary sewer + SPS				\$9,760,925	Excluding WWTP and NWS-SPS studies and upgrades required

Notes:

1. Above are Class 5 **present value** opinions of probable cost generally based on limited information, and includes construction, engineering and **net** HST (1.76%)
2. Above excludes Yr. 2025 active construction projects
3. Above costs only include trench restoration and does not include any new roads or upgrades to existing roads nor watermain or storm sewer.

APPENDIX B

WATERCAD™

**Township of Wellington North
WaterCAD Modelling for Servicing Update
Calculations and Notes for Mount Forest**

Job # :	24249
Date :	November 7, 2025
Revised :	

1.0 Background

The Township of Wellington North is completing a water and wastewater servicing update. The water supply component will include a review of servicing existing development and future development for peak hour and maximum day + fire flow demands. The purpose of these notes is to summarize data used to update the WaterCAD model, and the results of that modelling for the community of Mount Forest. The model was originally created as part of BMROSS project 08158, and has undergone numerous updates since that time for revised demands, and watermain replacements and additions.

2.0 Analysis & Model Data

2.1 Data

<u>Reference</u>	<u>Item</u>		
24249	Existing avg. day demand		19.8 L/s
		=	1715 m ³ /d
	Existing max. day demand		39.7 L/s
		=	3429 m ³ /d
	Existing peak demand		59.5 L/s
		=	5144 m ³ /d
	From above, max. day factor		2.00
	From above, peak factor		3.00
DWWP	Well pump ratings		
	Well No. 3		18.94 L/s
		@	90.0 m TDH
	Well No. 4		22.7 L/s
		@	83.2 m TDH
	Well No. 5		45.5 L/s
	@	81.8 m TDH	
	Well No. 6		45.5 L/s
		@	92.7 m TDH
	Standpipe volume		2083 m ³
08158, 24249	Standpipe TWL		461.4 mASL
	Standpipe model normal level		460.5 mASL
	Standpipe model fire level		455.0 mASL
MECP Guide	Pipe C-factors (these used for typical pipes; some known older pipes adjusted for lower C-factors)		
	<u>Pipe Dia. (mm)</u>		<u>C</u>
	150		100
	200-250		110
	300-600		120
	>600		130

MECP Guide	Normal operating pressure range target	350 to 480 kPa
	Normal operating pressure minimum	275 kPa
	Fire flow system pressure minimum	140 kPa
	Maximum allowable system pressure	700 kPa

2.2 Water Demands by Junction

(a) Existing Conditions

Water demands per junction were established in the original 08158 model. Current data demonstrates that usage is approximately 95% of the 08158 values for average day, maximum day, and peak demand. Therefore, the 08158 model is adjusted by setting junction demands to 95% of the previous value.

(b) Future Conditions

As part of 24249 calculations reported elsewhere, year 2051 demand is estimated to be 160% of current values. This demand is applied in the model by adjusting all existing junction demands to 160% of current values.

Model Junction	Elevation (mASL)	Existing			Year 2051		
		Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
J-10	410.8	0.006	0.012	0.019	0.006	0.012	0.019
J-20	412.1	0.057	0.114	0.171	0.057	0.114	0.171
J-30	417.5	0.066	0.132	0.198	0.066	0.132	0.198
J-35	416.0	0.008	0.016	0.024	0.008	0.016	0.024
J-40	415.8	0.445	0.889	1.334	0.445	0.889	1.334
J-50	414.0	0.053	0.106	0.159	0.053	0.106	0.159
J-60	410.7	0.013	0.025	0.038	0.013	0.025	0.038
J-70	415.0	0.081	0.161	0.242	0.081	0.161	0.242
J-75	415.0	0.043	0.086	0.129	0.043	0.086	0.129
J-80	416.0	0.028	0.055	0.083	0.028	0.055	0.083
J-90	415.3	0.047	0.093	0.140	0.047	0.093	0.140
J-91	416.1	0.000	0.000	0.000	0.000	0.000	0.000
J-95	415.2	0.114	0.002	0.003	0.114	0.002	0.003
J-100	414.7	0.386	0.771	1.157	0.386	0.771	1.157
J-105	415.5	0.151	0.303	0.454	0.151	0.303	0.454
J-110	411.1	0.196	0.392	0.588	0.196	0.392	0.588
J-120	414.1	0.206	0.412	0.618	0.206	0.412	0.618
J-125	414.3	0.147	0.295	0.442	0.147	0.295	0.442
J-130	414.8	0.035	0.071	0.106	0.035	0.071	0.106
J-135	419.0	0.131	0.263	0.394	0.131	0.263	0.394
J-140	415.1	0.038	0.077	0.115	0.038	0.077	0.115
J-150	415.9	0.066	0.131	0.197	0.066	0.131	0.197
J-160	415.8	0.141	0.282	0.422	0.141	0.282	0.422
J-170	415.0	0.056	0.111	0.167	0.056	0.111	0.167
J-180	415.4	0.053	0.107	0.160	0.053	0.107	0.160
J-190	415.8	0.112	0.224	0.336	0.112	0.224	0.336
J-200	418.0	0.335	0.669	1.004	0.335	0.669	1.004
J-210	420.4	0.123	0.245	0.368	0.123	0.245	0.368
J-220	412.1	0.012	0.024	0.036	0.012	0.024	0.036
J-230	414.9	0.197	0.394	0.591	0.197	0.394	0.591
J-240	422.9	0.109	0.218	0.327	0.109	0.218	0.327
J-250	416.1	0.061	0.122	0.184	0.061	0.122	0.184
J-260	421.4	0.070	0.139	0.209	0.070	0.139	0.209
J-270	416.1	0.109	0.218	0.327	0.109	0.218	0.327
J-280	416.4	0.119	0.239	0.358	0.119	0.239	0.358
J-290	416.7	0.063	0.126	0.189	0.063	0.126	0.189
J-300	415.3	0.033	0.067	0.100	0.033	0.067	0.100
J-310	417.9	0.124	0.249	0.373	0.124	0.249	0.373
J-315	418.0	0.066	0.133	0.199	0.066	0.133	0.199
J-320	413.0	0.156	0.312	0.468	0.156	0.312	0.468
J-330	417.6	0.110	0.220	0.330	0.110	0.220	0.330
J-340	417.9	0.033	0.065	0.098	0.033	0.065	0.098
J-350	413.0	0.030	0.059	0.089	0.030	0.059	0.089
J-360	414.1	0.257	0.513	0.770	0.257	0.513	0.770
J-370	412.2	0.151	0.301	0.452	0.151	0.301	0.452
J-380	418.4	0.033	0.065	0.098	0.033	0.065	0.098
J-390	412.9	0.099	0.198	0.297	0.099	0.198	0.297
J-400	419.7	0.086	0.171	0.257	0.086	0.171	0.257
J-410	421.2	0.080	0.160	0.240	0.080	0.160	0.240
J-420	418.0	0.105	0.211	0.316	0.105	0.211	0.316
J-430	412.2	0.098	0.196	0.293	0.098	0.196	0.293
J-440	416.3	0.171	0.342	0.513	0.171	0.342	0.513
J-450	415.0	0.099	0.198	0.296	0.099	0.198	0.296
J-460	416.2	0.454	0.907	1.361	0.454	0.907	1.361
J-470	416.6	0.145	0.290	0.435	0.145	0.290	0.435
J-480	415.5	0.087	0.175	0.262	0.087	0.175	0.262
J-490	417.0	0.024	0.047	0.071	0.024	0.047	0.071
J-500	418.4	0.026	0.053	0.079	0.026	0.053	0.079
J-510	415.4	0.084	0.169	0.253	0.084	0.169	0.253
J-520	412.3	0.152	0.304	0.456	0.152	0.304	0.456
J-530	413.6	0.680	1.359	2.039	0.680	1.359	2.039
J-540	415.6	0.058	0.115	0.173	0.058	0.115	0.173
J-550	420.1	0.103	0.206	0.310	0.103	0.206	0.310
J-560	420.5	0.066	0.133	0.199	0.066	0.133	0.199
J-570	420.0	0.100	0.200	0.300	0.100	0.200	0.300
J-580	420.0	0.015	0.030	0.045	0.015	0.030	0.045
J-590	419.5	0.218	0.435	0.653	0.218	0.435	0.653
J-600	420.0	0.009	0.018	0.027	0.009	0.018	0.027
J-601	418.3	0.000	0.000	0.000	0.000	0.000	0.000
J-610	417.0	0.031	0.061	0.092	0.031	0.061	0.092
J-620	412.4	0.050	0.100	0.150	0.050	0.100	0.150
J-630	412.2	0.027	0.055	0.082	0.027	0.055	0.082
J-640	415.0	0.056	0.112	0.168	0.056	0.112	0.168
J-650	416.3	0.046	0.092	0.138	0.046	0.092	0.138
J-660	417.9	0.168	0.336	0.504	0.168	0.336	0.504
J-670	417.0	0.131	0.261	0.392	0.131	0.261	0.392
J-680	418.5	0.110	0.220	0.329	0.110	0.220	0.329
J-690	419.8	0.015	0.030	0.044	0.015	0.030	0.044
J-700	421.8	0.297	0.595	0.892	0.297	0.595	0.892
J-701	423.8	0.000	0.000	0.000	0.000	0.000	0.000
J-710	421.0	0.221	0.442	0.663	0.221	0.442	0.663
J-720	422.3	0.075	0.150	0.225	0.075	0.150	0.225
J-730	419.6	0.063	0.127	0.190	0.063	0.127	0.190
J-740	423.7	0.149	0.299	0.448	0.149	0.299	0.448
J-750	423.7	0.144	0.288	0.431	0.144	0.288	0.431
J-760	429.3	0.111	0.221	0.332	0.111	0.221	0.332
J-770	429.0	0.036	0.072	0.107	0.036	0.072	0.107
J-780	416.0	0.137	0.274	0.411	0.137	0.274	0.411
J-790	425.8	0.138	0.277	0.415	0.138	0.277	0.415
J-800	427.7	0.041	0.083	0.124	0.041	0.083	0.124
J-810	428.3	0.051	0.101	0.152	0.051	0.101	0.152
J-820	428.7	0.075	0.150	0.225	0.075	0.150	0.225
J-830	424.0	0.122	0.245	0.367	0.122	0.245	0.367

Model Junction	Elevation (mASL)	Existing			Year 2051		
		Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
J-840	424.8	0.065	0.130	0.195	0.065	0.130	0.195
J-850	425.0	0.061	0.122	0.184	0.061	0.122	0.184
J-860	426.4	0.018	0.036	0.054	0.018	0.036	0.054
J-870	424.0	0.045	0.090	0.135	0.045	0.090	0.135
J-890	411.9	0.336	0.672	1.008	0.336	0.672	1.008
J-900	412.9	0.159	0.318	0.478	0.159	0.318	0.478
J-910	413.4	0.048	0.097	0.145	0.048	0.097	0.145
J-920	414.6	0.080	0.161	0.241	0.080	0.161	0.241
J-930	418.7	0.088	0.175	0.263	0.088	0.175	0.263
J-940	420.5	0.091	0.181	0.272	0.091	0.181	0.272
J-950	422.0	0.065	0.131	0.196	0.065	0.131	0.196
J-960	426.5	0.069	0.138	0.206	0.069	0.138	0.206
J-970	428.9	0.163	0.325	0.488	0.163	0.325	0.488
J-990	421.4	0.103	0.206	0.309	0.103	0.206	0.309
J-1000	420.0	0.017	0.033	0.050	0.017	0.033	0.050
J-1010	428.3	0.013	0.025	0.038	0.013	0.025	0.038
J-1020	429.3	0.055	0.111	0.166	0.055	0.111	0.166
J-1030	427.1	0.595	1.190	1.786	0.595	1.190	1.786
J-1040	427.5	0.070	0.140	0.211	0.070	0.140	0.211
J-1050	412.7	0.414	0.827	1.241	0.414	0.827	1.241
J-1060	411.6	0.013	0.025	0.038	0.013	0.025	0.038
J-1070	412.2	0.455	0.909	1.364	0.455	0.909	1.364
J-1080	415.0	0.027	0.053	0.080	0.027	0.053	0.080
J-1090	412.2	0.025	0.050	0.075	0.025	0.050	0.075
J-1100	414.2	0.035	0.071	0.106	0.035	0.071	0.106
J-1110	414.7	0.034	0.067	0.101	0.034	0.067	0.101
J-1120	413.9	0.014	0.027	0.041	0.014	0.027	0.041
J-1130	416.3	0.029	0.058	0.087	0.029	0.058	0.087
J-1140	417.5	0.033	0.066	0.098	0.033	0.066	0.098
J-1150	418.9	0.172	0.343	0.515	0.172	0.343	0.515
J-1160	420.4	0.315	0.631	0.946	0.315	0.631	0.946
J-1170	412.9	0.052	0.104	0.155	0.052	0.104	0.155
J-1180	420.8	0.157	0.314	0.471	0.157	0.314	0.471
J-1190	416.6	0.024	0.048	0.072	0.024	0.048	0.072
J-1200	416.9	0.036	0.073	0.109	0.036	0.073	0.109
J-1210	416.9	0.150	0.300	0.450	0.150	0.300	0.450
J-1220	419.0	0.049	0.099	0.148	0.049	0.099	0.148
J-1230	420.2	0.207	0.413	0.620	0.207	0.413	0.620
J-1240	415.4	0.062	0.123	0.185	0.062	0.123	0.185
J-1250	415.7	0.033	0.066	0.100	0.033	0.066	0.100
J-1260	415.9	0.020	0.040	0.061	0.020	0.040	0.061
J-1270	419.7	0.066	0.132	0.198	0.066	0.132	0.198
J-1280	408.0	0.021	0.042	0.064	0.021	0.042	0.064
J-1290	406.0	0.085	0.170	0.255	0.085	0.170	0.255
J-1300	410.0	0.253	0.505	0.758	0.253	0.505	0.758
J-1310	410.0	0.064	0.128	0.192	0.064	0.128	0.192
J-1315	416.0	0.107	0.214	0.321	0.107	0.214	0.321
J-1320	415.0	0.082	0.165	0.247	0.082	0.165	0.247
J-1330	420.5	0.116	0.231	0.347	7.916	15.831	23.747
J-1340	427.5	0.075	0.150	0.224	0.075	0.150	0.224
J-1790	411.5	0.114	0.228	0.342	0.114	0.228	0.342
J-1800	421.4	0.114	0.228	0.342	0.114	0.228	0.342
J-1810	410.0	0.114	0.228	0.342	0.114	0.228	0.342
J-1820	411.0	0.114	0.228	0.342	0.114	0.228	0.342
J-1830	411.3	0.286	0.572	0.858	0.286	0.572	0.858
J-1840	425.5	0.075	0.150	0.225	0.075	0.150	0.225
J-1850	423.0	0.075	0.150	0.225	0.075	0.150	0.225
J-1860	421.0	0.075	0.150	0.225	0.075	0.150	0.225
J-1870	426.0	0.075	0.150	0.225	0.075	0.150	0.225
J-1880	426.0	0.075	0.150	0.225	0.075	0.150	0.225
J-1890	424.0	0.075	0.150	0.225	0.075	0.150	0.225
J-1900	414.3	0.114	0.228	0.342	0.114	0.228	0.342
J-1910	410.8	0.114	0.228	0.342	0.114	0.228	0.342
J-1920	409.4	0.114	0.228	0.342	0.114	0.228	0.342
J-1930	416.2	0.114	0.228	0.342	0.114	0.228	0.342
J-1940	410.5	0.114	0.228	0.342	0.114	0.228	0.342
JN-67	423.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-68	432.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-69	436.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-200	417.8	0.475	0.950	1.425	0.475	0.950	1.425
JN-205	418.0	0.285	0.570	0.855	0.285	0.570	0.855
JN-210	417.3	0.114	0.228	0.342	0.114	0.228	0.342
JN-215	416.8	0.095	0.190	0.285	2.095	4.190	6.285
JN-220	416.8	0.114	0.228	0.342	0.114	0.228	0.342
JN-225	416.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-230	416.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-235	417.4	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-240	416.6	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-245	417.9	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-250	417.2	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-255	418.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-260	417.8	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-265	418.3	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-270	419.1	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-275	419.9	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-280	418.9	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-285	420.2	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-290	422.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
JN-295	423.9	0.114	0.228	0.342	0.114	0.228	0.342
JN-310	417.8	0.114	0.228	0.342	0.114	0.228	0.342
JN-325	417.4	0.114	0.228	0.342	0.114	0.228	0.342
JN-330	417.9	0.114	0.228	0.342	0.114	0.228	0.342
JN-335	428.6	0.114	0.228	0.342	0.114	0.228	0.342

Model Junction	Elevation (mASL)	Existing			Year 2051		
		Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
JN-340	427.3	0.114	0.228	0.342	0.114	0.228	0.342
JN-345	425.9	0.114	0.228	0.342	0.114	0.228	0.342
JN-350	426.0	0.114	0.228	0.342	0.114	0.228	0.342
JN-355	421.5	0.114	0.228	0.342	0.114	0.228	0.342
JN-360	427.5	0.114	0.228	0.342	0.114	0.228	0.342
JN-365	426.2	0.114	0.228	0.342	0.114	0.228	0.342
N-10	411.2	0.114	0.228	0.342	0.114	0.228	0.342
N-20	412.7	0.114	0.228	0.342	0.114	0.228	0.342
N-30	418.6	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-34	407.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-36	408.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-50	410.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-52	419.6	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-54	411.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-56	410.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-60	412.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-62	413.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-64	416.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-66	409.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-80	415.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-82	417.6	(N/A)	(N/A)	(N/A)	2.000	4.000	6.000
N-84	418.9	(N/A)	(N/A)	(N/A)	2.000	4.000	6.000
N-100	410.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-120	418.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-122	431.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-130	419.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-400	411.2	0.143	0.285	0.427	0.143	0.285	0.427
N-410	410.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-420	410.8	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-430	410.4	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-440	409.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-450	409.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-460	410.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-500	419.5	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-600	410.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-605	409.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
N-610	408.0	(N/A)	(N/A)	(N/A)	0.000	0.000	0.000
Minimum	406.0	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	436.0	0.680	1.359	2.039	7.916	15.831	23.747
Total		20.0	39.7	59.5	33.8	67.3	100.9

3.0 **Model Results - Existing Demands**

3.1 **Existing Conditions**

For average day and peak hour analysis, assume no pumps operating and standpipe water level at nominal operating level of 460.5 mASL. For fire flow analysis, use two scenarios: one with standpipe water level of 460.5 mASL with no pumps operating, and one with level of 455.0 mASL and all four well pumps operating.

Junction	P at Q _{PEAK-AVG} (kPa)	P at Q _{PEAK-HOUR} (kPa)	Available Fire Flow at 140 kPa (L/s)	
			Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
J-10	486	482	213	223
J-20	473	469	262	286
J-30	420	416	237	257
J-35	435	431	234	251
J-40	437	433	230	245
J-50	454	451	251	271
J-60	487	483	242	257
J-70	445	441	252	274
J-75	445	441	193	199
J-80	435	431	158	159
J-90	442	438	291	331
J-91	434	430	219	233
J-95	443	439	288	330
J-100	448	444	285	318
J-105	440	436	286	334
J-110	483	479	344	392
J-120	454	450	307	357
J-125	452	448	296	342
J-130	447	443	285	324
J-135	406	402	130	125
J-140	444	440	260	287
J-150	436	432	231	248
J-160	437	434	233	249
J-170	445	441	68	64
J-180	440	436	138	136
J-190	436	433	300	341
J-200	415	411	49	45
J-210	391	388	143	143
J-220	473	470	370	406
J-230	446	442	361	394
J-240	367	363	165	159
J-250	434	430	127	122
J-260	382	378	107	100
J-270	434	430	277	280
J-280	431	427	167	164
J-290	429	425	127	123
J-300	442	438	61	56
J-310	417	413	190	185
J-315	415	411	93	86
J-320	464	460	41	38
J-330	419	415	59	54
J-340	416	412	240	256
J-350	464	460	301	335
J-360	454	450	200	202
J-370	472	468	382	442
J-380	412	407	84	77
J-390	466	462	321	354
J-400	399	395	147	163
J-410	384	380	152	152
J-420	416	412	239	244
J-430	472	468	417	459
J-440	432	429	418	467
J-450	445	442	391	418
J-460	433	430	370	380
J-470	429	426	264	263
J-480	440	436	326	351
J-490	426	422	331	357
J-500	411	408	224	227
J-510	440	437	247	250
J-520	471	468	444	481
J-530	458	455	444	486
J-540	439	436	229	224
J-550	395	391	314	318
J-560	391	387	129	119
J-570	396	392	108	100
J-580	396	392	47	43
J-590	401	397	156	147
J-600	396	391	90	82
J-601	413	409	51	47
J-610	425	422	333	357
J-620	470	467	372	411
J-630	472	469	389	432
J-640	445	442	452	488
J-650	432	429	384	400
J-660	417	414	482	500
J-670	425	422	149	140
J-680	411	407	290	286
J-690	397	394	90	82

Junction	P at Q _{PEAK-AVG} (kPa)	P at Q _{PEAK-HOUR} (kPa)	Available Fire Flow at 140 kPa (L/s)	
			Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
J-700	378	374	94	85
J-701	359	355	52	46
J-710	386	382	121	111
J-720	374	370	116	106
J-730	400	397	413	423
J-740	360	358	454	466
J-750	360	358	500	500
J-760	305	303	429	415
J-770	308	305	298	279
J-780	435	432	275	259
J-790	339	336	180	162
J-800	321	317	169	151
J-810	315	311	157	140
J-820	311	307	148	131
J-830	357	354	51	45
J-840	349	345	103	92
J-850	347	344	104	92
J-860	333	330	286	267
J-870	357	354	76	67
J-890	475	471	303	329
J-900	465	462	176	173
J-910	461	457	185	183
J-920	449	446	305	322
J-930	409	406	232	223
J-940	391	389	233	220
J-950	376	374	203	188
J-960	332	330	500	500
J-970	309	308	500	500
J-990	382	381	500	500
J-1000	396	394	297	275
J-1010	315	312	272	252
J-1020	304	297	14	11
J-1030	326	316	10	9
J-1040	322	313	9	8
J-1050	468	464	274	291
J-1060	478	474	138	135
J-1070	472	468	95	90
J-1080	445	441	96	91
J-1090	473	468	116	111
J-1100	453	448	111	106
J-1110	448	444	155	152
J-1120	456	452	158	155
J-1130	432	428	118	113
J-1140	421	417	113	108
J-1150	406	402	139	134
J-1160	392	388	148	142
J-1170	465	461	80	75
J-1180	388	385	135	128
J-1190	429	426	272	279
J-1200	426	423	246	249
J-1210	426	422	212	211
J-1220	406	402	90	84
J-1230	394	390	150	144
J-1240	441	438	140	130
J-1250	439	437	373	361
J-1260	437	435	412	401
J-1270	399	397	417	404
J-1280	514	512	256	245
J-1290	533	531	316	305
J-1300	494	492	46	43
J-1310	494	492	177	159
J-1315	435	434	154	137
J-1320	445	443	25	22
J-1330	391	389	22	19
J-1340	323	322	500	500
J-1790	479	475	221	227
J-1800	382	378	199	206
J-1810	494	490	196	198
J-1820	484	480	156	154
J-1830	481	477	142	139
J-1840	342	338	141	127
J-1850	366	362	95	85
J-1860	386	382	119	108
J-1870	337	333	101	89
J-1880	337	333	111	99
J-1890	357	353	122	110
J-1900	452	449	193	187
J-1910	486	482	218	230
J-1920	500	496	233	245
J-1930	433	429	215	210
J-1940	489	484	38	35
JN-67	(N/A)	(N/A)	(N/A)	(N/A)
JN-68	(N/A)	(N/A)	(N/A)	(N/A)
JN-69	(N/A)	(N/A)	(N/A)	(N/A)
JN-200	418	413	86	79

Junction	P at Q _{PEAK-AVG} (kPa)	P at Q _{PEAK-HOUR} (kPa)	Available Fire Flow at 140 kPa (L/s)	
			Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
JN-205	415	411	77	70
JN-210	423	418	86	79
JN-215	427	423	87	80
JN-220	427	423	84	77
JN-225	(N/A)	(N/A)	(N/A)	(N/A)
JN-230	(N/A)	(N/A)	(N/A)	(N/A)
JN-235	(N/A)	(N/A)	(N/A)	(N/A)
JN-240	(N/A)	(N/A)	(N/A)	(N/A)
JN-245	(N/A)	(N/A)	(N/A)	(N/A)
JN-250	(N/A)	(N/A)	(N/A)	(N/A)
JN-255	(N/A)	(N/A)	(N/A)	(N/A)
JN-260	(N/A)	(N/A)	(N/A)	(N/A)
JN-265	(N/A)	(N/A)	(N/A)	(N/A)
JN-270	(N/A)	(N/A)	(N/A)	(N/A)
JN-275	(N/A)	(N/A)	(N/A)	(N/A)
JN-280	(N/A)	(N/A)	(N/A)	(N/A)
JN-285	(N/A)	(N/A)	(N/A)	(N/A)
JN-290	(N/A)	(N/A)	(N/A)	(N/A)
JN-295	358	357	121	107
JN-310	418	414	125	122
JN-325	422	417	145	141
JN-330	416	412	121	115
JN-335	312	308	152	134
JN-340	325	321	121	106
JN-345	339	335	96	85
JN-350	337	333	75	65
JN-355	381	377	109	100
JN-360	322	318	144	128
JN-365	335	332	142	128
N-10	482	478	177	181
N-20	467	463	208	218
N-30	(N/A)	(N/A)	(N/A)	(N/A)
N-34	(N/A)	(N/A)	(N/A)	(N/A)
N-36	(N/A)	(N/A)	(N/A)	(N/A)
N-50	(N/A)	(N/A)	(N/A)	(N/A)
N-52	(N/A)	(N/A)	(N/A)	(N/A)
N-54	(N/A)	(N/A)	(N/A)	(N/A)
N-56	(N/A)	(N/A)	(N/A)	(N/A)
N-60	(N/A)	(N/A)	(N/A)	(N/A)
N-62	(N/A)	(N/A)	(N/A)	(N/A)
N-64	(N/A)	(N/A)	(N/A)	(N/A)
N-66	(N/A)	(N/A)	(N/A)	(N/A)
N-80	(N/A)	(N/A)	(N/A)	(N/A)
N-82	(N/A)	(N/A)	(N/A)	(N/A)
N-84	(N/A)	(N/A)	(N/A)	(N/A)
N-100	(N/A)	(N/A)	(N/A)	(N/A)
N-120	(N/A)	(N/A)	(N/A)	(N/A)
N-122	(N/A)	(N/A)	(N/A)	(N/A)
N-130	(N/A)	(N/A)	(N/A)	(N/A)
N-400	482	478	108	103
N-410	(N/A)	(N/A)	(N/A)	(N/A)
N-420	(N/A)	(N/A)	(N/A)	(N/A)
N-430	(N/A)	(N/A)	(N/A)	(N/A)
N-440	(N/A)	(N/A)	(N/A)	(N/A)
N-450	(N/A)	(N/A)	(N/A)	(N/A)
N-460	(N/A)	(N/A)	(N/A)	(N/A)
N-500	(N/A)	(N/A)	(N/A)	(N/A)
Min	304	297	9	8
Max	533	531	500	500

Notes:

	denotes operating pressure less than 275 kPa
	denotes operating pressure above 275 kPa but less than 350 kPa
	denotes operating pressure greater than 480 kPa
	denotes fire flow of less than 50 L/s at 140 kPa minimum system pressure

3.2 **Future Conditions**

Run the same same maximum day + fire flow scenarios as described in 3.1. Refer to attached figures for a description of pipes and demands included within each sub-scenario below.

Junction	Available Fire Flow at 140 kPa (L/s)							
	1.a) Add PN-80, PN-88		2.a), as 1.a) + Add PN-82, PN-94		2.b), as 2.a) + Add PN-1932		3.a), as 2.b) + Add PN-68	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On						
J-10	212	223	210	221	211	222	213	224
J-20	262	285	259	283	261	284	265	288
J-30	237	256	234	254	236	255	242	261
J-35	234	250	231	248	233	249	240	257
J-40	230	245	227	242	229	244	239	255
J-50	252	271	249	268	252	270	280	304
J-60	243	257	240	255	242	256	264	282
J-70	254	274	250	271	254	274	299	329
J-75	193	199	191	197	192	198	269	290
J-80	158	159	156	158	157	158	259	278
J-90	291	330	287	327	289	328	292	331
J-91	219	232	216	230	218	231	221	235
J-95	288	328	284	325	286	326	289	329
J-100	286	317	282	313	284	315	287	318
J-105	285	332	281	329	283	330	285	332
J-110	353	393	347	388	352	391	353	393
J-120	324	374	315	364	332	382	324	374
J-125	314	360	305	350	323	369	320	369
J-130	303	343	294	334	312	352	317	363
J-135	130	125	128	124	129	124	129	124
J-140	280	308	271	300	290	320	306	347
J-150	253	271	245	263	264	284	289	321
J-160	257	276	249	268	269	291	295	327
J-170	68	64	67	64	67	64	67	64
J-180	137	136	136	136	136	136	137	136
J-190	298	338	295	335	296	336	297	337
J-200	49	45	49	45	49	45	49	45
J-210	141	142	140	142	140	142	141	142
J-220	368	403	363	399	365	400	366	400
J-230	359	391	354	386	355	387	356	387
J-240	163	158	161	157	161	157	161	157
J-250	127	122	126	121	126	122	126	122
J-260	106	99	105	99	105	99	106	99
J-270	274	279	270	276	272	279	273	281
J-280	165	163	163	161	166	163	168	166
J-290	127	122	125	121	127	122	128	124
J-300	60	56	60	56	60	56	60	56
J-310	191	189	188	187	189	187	191	190
J-315	106	100	104	99	106	100	107	101
J-320	40	38	40	38	40	38	40	38
J-330	58	54	58	54	58	54	58	54
J-340	238	253	235	252	236	252	236	252
J-350	298	331	294	329	295	329	296	329
J-360	199	201	197	200	197	200	197	200
J-370	379	439	371	432	374	434	374	434
J-380	120	114	118	113	124	119	125	120
J-390	318	351	314	348	315	348	316	349
J-400	146	162	145	162	145	162	145	162
J-410	150	151	149	151	149	151	149	151
J-420	237	242	234	241	235	241	235	241
J-430	410	448	401	440	403	440	403	440
J-440	409	450	401	442	401	442	401	442
J-450	381	412	374	408	374	411	374	412
J-460	365	385	360	381	360	377	365	381
J-470	262	265	259	262	300	311	303	316
J-480	322	347	319	344	319	345	320	345
J-490	327	353	324	350	324	350	325	350
J-500	222	225	220	224	220	224	220	224
J-510	245	248	243	246	243	246	243	246
J-520	435	447	426	439	426	439	426	439
J-530	434	448	426	440	426	440	426	440
J-540	226	222	225	221	225	221	225	222
J-550	312	318	307	314	310	318	312	320
J-560	133	124	132	124	132	124	132	124
J-570	130	123	129	122	132	125	133	125
J-580	49	44	49	44	49	44	49	45
J-590	158	150	156	149	156	149	157	150
J-600	126	119	124	117	133	126	133	126
J-601	56	51	56	51	57	52	57	52
J-610	329	354	326	351	326	351	327	351
J-620	366	405	361	401	362	401	362	401
J-630	383	426	377	421	378	421	379	422
J-640	444	438	438	430	438	430	439	430
J-650	379	395	375	392	375	392	375	392
J-660	465	445	456	438	456	438	456	438
J-670	148	140	148	139	148	139	148	139
J-680	288	287	285	284	285	285	286	287
J-690	90	82	89	82	89	82	89	82

Available Fire Flow at 140 kPa (L/s)

Junction	1.a) Add PN-80, PN-88		2.a), as 1.a) + Add PN-82, PN-94		2.b), as 2.a) + Add PN-1932		3.a), as 2.b) + Add PN-68	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On						
JN-200	175	173	171	169	248	253	252	259
JN-205	125	120	123	118	150	145	151	147
JN-210	182	181	178	177	251	256	256	263
JN-215	196	196	191	192	252	259	258	267
JN-220	161	158	158	155	254	260	258	265
JN-225	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-230	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-235	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-240	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-245	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-250	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-255	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-260	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-265	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-270	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-275	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-280	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-285	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-290	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-295	94	67	93	67	93	67	93	67
JN-310	124	122	124	121	124	121	124	121
JN-325	144	140	143	140	143	140	144	140
JN-330	120	114	119	114	119	114	119	114
JN-335	154	138	152	137	152	137	152	137
JN-340	122	109	121	109	121	109	122	109
JN-345	97	87	96	86	97	86	97	86
JN-350	75	66	75	66	75	66	75	66
JN-355	112	104	111	103	112	103	112	104
JN-360	145	131	144	130	144	130	144	130
JN-365	144	131	142	130	143	130	143	130
N-10	176	181	175	180	176	180	177	181
N-20	208	217	206	215	207	216	212	221
N-30	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-34	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-36	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-50	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-52	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-54	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-56	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-60	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-62	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-64	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-66	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-80	242	251	216	223	246	256	256	270
N-82	(N/A)	(N/A)	167	166	181	180	185	186
N-84	(N/A)	(N/A)	147	144	157	154	160	157
N-100	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-120	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-122	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-130	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-400	107	103	107	103	107	103	107	103
N-410	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-420	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-430	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-440	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-450	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-460	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-500	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-600	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-605	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-610	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Min	6	4	6	4	6	4	6	4
Max	500	500	500	500	500	500	500	500

Notes:

(N/A) denotes fire flow of less than 50 L/s at 140 kPa minimum system pressure

Model Results

Future Conditio

Run the same s
description of p

Available Fire Flow at 140 kPa (L/s)

Junction	4.a), as 3.a) + Add PN-32 & ET to N-30		4.b), as 4.a) + Add PN-32, 34, 40, 50, 52, 54, 56, 60, 62, 64, 66		5.a), as 4.b) + No New ET, Add All PN S of S Water Street & W of Hwy. 6		5.b), as 5.a) + Add PN-297	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
	J-10	257	252	266	255	219	229	219
J-20	361	362	384	374	276	300	276	300
J-30	399	394	434	413	261	284	261	284
J-35	500	499	500	500	269	293	269	293
J-40	376	366	440	411	247	264	247	264
J-50	374	373	500	500	264	290	264	290
J-60	331	327	500	500	249	270	249	270
J-70	398	402	500	500	290	324	290	324
J-75	329	327	393	375	272	295	272	295
J-80	310	306	353	336	261	281	261	281
J-90	395	413	428	434	299	340	299	340
J-91	306	297	322	304	232	248	233	248
J-95	379	399	407	417	295	337	295	337
J-100	378	382	408	401	292	323	292	323
J-105	353	382	374	396	288	336	289	336
J-110	463	473	500	500	353	393	353	393
J-120	460	478	500	500	327	378	327	378
J-125	450	467	500	500	323	373	323	373
J-130	437	450	500	500	320	367	320	367
J-135	135	125	138	126	129	124	129	124
J-140	406	414	495	488	308	349	309	349
J-150	369	370	439	419	291	324	291	324
J-160	370	368	423	404	297	329	297	329
J-170	69	64	69	64	68	64	67	64
J-180	143	137	145	137	137	136	137	136
J-190	357	376	377	387	300	339	300	339
J-200	49	45	50	45	49	45	49	45
J-210	148	143	151	143	141	142	141	142
J-220	454	458	497	487	366	400	366	401
J-230	437	438	480	466	356	387	356	387
J-240	173	159	178	160	161	157	161	157
J-250	132	123	134	123	126	122	126	122
J-260	110	99	112	100	106	99	106	99
J-270	306	295	322	302	274	282	274	282
J-280	179	168	184	170	168	166	168	166
J-290	134	125	137	125	128	124	128	124
J-300	61	56	62	56	60	56	60	56
J-310	205	193	212	196	191	190	191	190
J-315	110	101	112	101	107	101	107	101
J-320	41	38	41	38	40	38	40	38
J-330	59	54	60	54	58	54	58	54
J-340	265	265	274	268	237	253	237	253
J-350	351	362	369	372	297	331	298	331
J-360	212	204	217	205	197	200	197	200
J-370	498	500	500	500	374	434	374	434
J-380	130	120	133	121	125	120	125	120
J-390	369	378	386	388	318	350	318	350
J-400	153	163	155	164	145	162	145	162
J-410	158	152	160	152	149	151	149	151
J-420	259	249	267	252	235	241	235	241
J-430	500	500	500	500	403	440	403	434
J-440	500	500	500	500	401	442	401	436
J-450	464	461	500	487	374	412	375	412
J-460	447	442	489	469	365	381	365	381
J-470	347	337	370	349	303	316	304	316
J-480	369	372	386	380	321	345	321	345
J-490	377	379	396	389	325	351	326	351
J-500	239	230	245	231	220	224	220	224
J-510	264	254	271	256	243	246	243	246
J-520	500	500	500	500	426	439	427	433
J-530	500	500	500	500	426	440	426	435
J-540	239	225	245	227	225	222	225	222
J-550	355	340	377	351	312	321	312	321
J-560	137	124	139	124	132	124	132	124
J-570	138	125	140	126	133	125	133	125
J-580	50	44	50	44	49	45	49	45
J-590	164	151	167	151	157	150	157	150
J-600	139	127	141	127	133	126	133	126
J-601	57	52	58	52	57	52	57	52
J-610	378	380	397	389	327	351	328	352
J-620	445	454	478	474	363	402	364	402
J-630	471	482	500	500	379	422	380	420
J-640	500	500	500	500	439	430	440	418
J-650	433	423	456	434	375	392	375	392
J-660	500	500	500	500	456	438	456	434
J-670	152	139	153	139	148	139	148	139
J-680	315	297	329	303	286	287	286	287
J-690	91	82	92	82	89	82	89	82

Available Fire Flow at 140 kPa (L/s)

Junction	4.a), as 3.a) + Add PN-32 & ET to N-30		4.b), as 4.a) + Add PN-32, 34, 40, 50, 52, 54, 56, 60, 62, 64, 66		5.a), as 4.b) + No New ET, Add All PN S of S Water Street & W of Hwy. 6		5.b), as 5.a) + Add PN-297	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
	JN-200	282	270	298	278	253	259	253
JN-205	159	148	163	149	152	147	151	147
JN-210	287	276	304	284	256	264	256	264
JN-215	291	280	309	289	258	267	258	267
JN-220	288	277	304	285	259	265	259	265
JN-225	(N/A)	(N/A)	(N/A)	(N/A)	124	112	186	145
JN-230	(N/A)	(N/A)	(N/A)	(N/A)	117	105	180	140
JN-235	(N/A)	(N/A)	(N/A)	(N/A)	112	102	158	136
JN-240	(N/A)	(N/A)	(N/A)	(N/A)	115	104	162	138
JN-245	(N/A)	(N/A)	(N/A)	(N/A)	108	99	156	134
JN-250	(N/A)	(N/A)	(N/A)	(N/A)	109	99	159	134
JN-255	(N/A)	(N/A)	(N/A)	(N/A)	106	95	169	130
JN-260	(N/A)	(N/A)	(N/A)	(N/A)	103	93	166	128
JN-265	(N/A)	(N/A)	(N/A)	(N/A)	102	91	164	126
JN-270	(N/A)	(N/A)	(N/A)	(N/A)	96	87	145	124
JN-275	(N/A)	(N/A)	(N/A)	(N/A)	104	95	167	129
JN-280	(N/A)	(N/A)	(N/A)	(N/A)	100	89	161	124
JN-285	(N/A)	(N/A)	(N/A)	(N/A)	96	87	159	122
JN-290	(N/A)	(N/A)	(N/A)	(N/A)	95	85	155	118
JN-295	95	67	96	67	93	67	150	115
JN-310	129	122	131	122	124	122	124	122
JN-325	150	140	152	140	144	140	144	140
JN-330	123	114	125	114	119	114	119	114
JN-335	161	137	164	138	152	137	152	137
JN-340	126	109	128	109	122	109	122	109
JN-345	100	86	101	86	97	86	97	86
JN-350	76	66	77	66	75	66	75	66
JN-355	115	103	116	103	112	104	112	104
JN-360	151	130	154	130	144	130	144	130
JN-365	149	130	151	130	143	130	143	130
N-10	202	194	207	196	180	184	180	184
N-20	500	500	500	500	254	276	254	276
N-30	500	500	500	500	239	256	239	256
N-34	(N/A)	(N/A)	317	292	206	212	206	212
N-36	(N/A)	(N/A)	257	237	185	188	185	188
N-50	(N/A)	(N/A)	500	465	227	241	227	241
N-52	(N/A)	(N/A)	267	239	179	183	179	183
N-54	(N/A)	(N/A)	250	230	179	183	179	183
N-56	(N/A)	(N/A)	227	210	176	179	176	179
N-60	(N/A)	(N/A)	299	271	195	202	195	202
N-62	(N/A)	(N/A)	260	236	182	186	182	186
N-64	(N/A)	(N/A)	210	190	160	162	160	161
N-66	(N/A)	(N/A)	195	180	159	160	159	160
N-80	297	288	322	302	257	270	257	270
N-82	202	190	211	193	186	186	186	186
N-84	171	159	177	161	160	157	160	157
N-100	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-120	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-122	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-130	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-400	110	103	110	103	107	103	107	103
N-410	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-420	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-430	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-440	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-450	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-460	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-500	(N/A)	(N/A)	(N/A)	(N/A)	106	96	170	131
N-600	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-605	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-610	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Min	6	4	6	4	6	4	6	4
Max	500	500	500	500	500	500	500	500

Notes:



Model Results

Future Conditio

Run the same :
description of p

Available Fire Flow at 140 kPa (L/s)

Junction	6.a), as 5.b) + Add P-3030, PN-98, 120, 128, 132		7.a), as 6.a) + Add ET to N-30; P-312, 322, 332 to 250 mm dia.; PN-100, 105		7.b), as 7.a) + Add PN-110, 115		7.c), as 7.b) + Add P-118	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
	J-10	266	255	266	255	266	255	270
J-20	384	374	384	374	384	374	394	384
J-30	434	413	434	413	434	413	441	419
J-35	500	500	500	500	500	500	500	500
J-40	440	411	440	411	440	411	441	412
J-50	500	500	500	500	500	500	500	500
J-60	500	500	500	500	500	500	500	500
J-70	500	500	500	500	500	500	500	500
J-75	394	375	394	375	394	375	394	375
J-80	353	336	353	336	353	336	353	336
J-90	428	434	428	434	428	434	459	469
J-91	322	304	322	304	322	304	326	307
J-95	407	417	407	417	407	417	421	434
J-100	408	401	408	401	408	401	418	410
J-105	374	396	375	397	375	397	375	397
J-110	500	500	500	500	500	500	500	500
J-120	500	500	500	500	500	500	500	500
J-125	500	500	500	500	500	500	500	500
J-130	500	500	500	500	500	500	500	500
J-135	138	126	138	126	138	126	138	126
J-140	496	488	496	488	496	488	496	488
J-150	439	420	439	420	439	420	439	420
J-160	424	405	424	405	424	405	424	405
J-170	69	64	71	65	71	65	72	66
J-180	145	137	164	156	164	156	170	161
J-190	377	387	378	389	378	389	391	403
J-200	50	45	50	45	50	45	50	45
J-210	151	143	151	143	151	143	151	143
J-220	497	487	497	487	497	487	497	487
J-230	481	466	481	466	481	466	481	466
J-240	178	160	178	160	178	160	178	160
J-250	134	123	134	123	134	123	134	123
J-260	111	100	111	100	111	100	111	100
J-270	322	303	322	303	322	303	322	303
J-280	184	170	184	170	184	170	184	170
J-290	137	125	137	125	137	125	137	125
J-300	62	56	62	56	62	56	62	56
J-310	213	196	213	196	213	196	213	196
J-315	112	101	112	101	112	101	112	101
J-320	41	38	145	137	165	157	282	276
J-330	60	54	178	168	178	168	270	263
J-340	274	268	278	273	278	273	333	330
J-350	369	372	371	374	371	374	420	428
J-360	217	205	217	205	217	205	217	205
J-370	500	500	500	500	500	500	500	500
J-380	133	120	133	120	133	120	133	120
J-390	386	388	386	389	386	389	411	414
J-400	155	164	155	164	155	164	156	164
J-410	160	152	160	152	160	152	161	153
J-420	267	252	267	252	267	252	267	253
J-430	500	500	500	500	500	500	500	500
J-440	500	500	500	500	500	500	500	500
J-450	500	488	500	488	500	488	500	489
J-460	493	472	493	472	493	472	493	472
J-470	371	350	371	350	371	350	371	350
J-480	386	380	386	381	386	381	400	394
J-490	396	389	396	390	396	390	409	402
J-500	245	231	245	232	245	232	247	233
J-510	271	256	271	256	271	256	272	257
J-520	500	500	500	500	500	500	500	500
J-530	500	500	500	500	500	500	500	500
J-540	245	227	245	227	245	227	245	227
J-550	380	353	380	353	380	353	380	354
J-560	139	124	139	124	139	124	139	124
J-570	140	126	140	126	140	126	140	126
J-580	50	44	50	44	50	44	50	44
J-590	167	151	167	151	167	151	167	151
J-600	141	127	141	127	141	127	141	127
J-601	58	52	58	52	58	52	58	52
J-610	397	389	397	390	398	390	410	401
J-620	478	474	479	475	479	475	500	496
J-630	500	500	500	500	500	500	500	500
J-640	500	500	500	500	500	500	500	500
J-650	456	434	456	434	456	434	458	436
J-660	500	500	500	500	500	500	500	500
J-670	153	139	153	139	153	139	153	139
J-680	332	306	332	306	332	306	333	306
J-690	92	82	92	82	92	82	92	82

Available Fire Flow at 140 kPa (L/s)

Junction	6.a), as 5.b) + Add P-3030, PN-98, 120, 128, 132		7.a), as 6.a) + Add ET to N-30; P-312, 322, 332 to 250 mm dia.; PN-100, 105		7.b), as 7.a) + Add PN-110, 115		7.c), as 7.b) + Add P-118	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
JN-200	299	278	299	278	299	278	299	278
JN-205	163	149	163	149	163	149	163	149
JN-210	305	285	305	285	305	285	305	285
JN-215	309	290	309	290	309	290	309	290
JN-220	305	285	305	285	305	285	305	285
JN-225	238	217	238	217	238	217	238	217
JN-230	225	204	225	204	225	204	225	204
JN-235	167	151	167	151	167	151	167	151
JN-240	170	154	170	154	170	154	170	154
JN-245	165	148	165	148	165	148	165	149
JN-250	168	151	168	151	168	151	168	152
JN-255	213	192	213	192	213	192	213	192
JN-260	219	198	219	198	219	198	220	199
JN-265	219	198	219	198	219	198	219	198
JN-270	154	138	154	138	154	138	154	138
JN-275	181	161	181	161	181	161	181	161
JN-280	218	197	218	197	218	197	218	197
JN-285	172	154	172	154	172	154	172	154
JN-290	211	187	211	187	211	187	211	187
JN-295	207	180	207	180	207	180	207	180
JN-310	131	122	234	227	234	227	307	302
JN-325	152	140	152	140	152	140	153	142
JN-330	125	114	125	114	125	114	125	115
JN-335	165	139	165	139	165	139	165	139
JN-340	129	109	129	109	129	109	129	109
JN-345	101	86	101	86	101	86	101	86
JN-350	77	66	77	66	77	66	77	66
JN-355	117	103	117	103	117	103	117	103
JN-360	154	131	154	131	154	131	154	131
JN-365	152	131	152	131	152	131	152	131
N-10	207	196	207	196	207	196	208	197
N-20	500	500	500	500	500	500	500	500
N-30	500	500	500	500	500	500	500	500
N-34	317	292	317	292	317	292	317	292
N-36	257	237	257	237	257	237	257	237
N-50	500	465	500	465	500	465	500	466
N-52	267	239	267	239	267	239	267	239
N-54	250	230	250	230	250	230	250	230
N-56	227	210	227	210	227	210	227	210
N-60	299	271	299	271	299	271	299	271
N-62	260	236	260	236	260	236	260	236
N-64	210	190	210	190	210	190	210	190
N-66	195	180	195	180	195	180	195	180
N-80	322	302	322	302	322	302	322	302
N-82	211	193	211	193	211	193	211	193
N-84	177	161	177	161	177	161	177	161
N-100	119	106	119	106	119	106	119	106
N-120	109	97	109	97	109	97	109	97
N-122	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-130	113	100	113	100	113	100	113	100
N-400	110	103	110	103	110	103	111	103
N-410	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-420	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-430	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-440	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-450	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-460	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-500	208	187	208	187	208	187	208	187
N-600	(N/A)	(N/A)	140	133	169	162	232	225
N-605	(N/A)	(N/A)	121	115	167	160	235	228
N-610	(N/A)	(N/A)	(N/A)	(N/A)	131	125	158	151
Min	25	20	25	20	25	20	25	20
Max	500	500	500	500	500	500	500	500

Notes:



Model Results

Future Condi

Run the same s
description of p

Junction	Available Fire Flow at 140 kPa (L/s)					
	2.c), as 2.a) but PN-82, 84 at 250 mm dia.		2.d), as 2.c but PN-88 closed		7.d), as 7.b) but PN-100, 105, 110, 115 at 200 mm dia.	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
J-10	210	221	208	221	270	258
J-20	259	283	256	281	394	384
J-30	234	254	231	252	441	419
J-35	231	248	228	246	500	500
J-40	227	242	224	241	441	412
J-50	249	268	245	265	500	500
J-60	240	255	236	253	500	500
J-70	251	271	245	268	500	500
J-75	191	197	188	196	394	375
J-80	156	158	155	157	353	336
J-90	287	327	283	325	458	469
J-91	216	230	214	229	326	307
J-95	285	326	281	324	421	434
J-100	282	314	278	311	418	410
J-105	282	329	279	328	375	397
J-110	347	388	327	383	500	500
J-120	315	364	292	342	500	500
J-125	305	350	282	328	500	500
J-130	294	334	271	310	500	500
J-135	128	124	128	124	138	126
J-140	271	300	248	275	496	488
J-150	245	263	220	237	439	420
J-160	249	268	219	234	424	405
J-170	69	66	69	66	72	66
J-180	153	154	152	154	170	161
J-190	296	336	294	335	391	403
J-200	49	45	49	45	50	45
J-210	140	142	140	142	151	143
J-220	363	399	359	396	497	487
J-230	354	386	348	384	481	466
J-240	161	157	161	157	178	160
J-250	126	121	125	121	134	123
J-260	105	99	105	99	111	100
J-270	270	276	270	275	322	303
J-280	163	161	163	161	184	170
J-290	125	121	124	121	137	125
J-300	60	56	60	56	62	56
J-310	188	187	184	181	213	196
J-315	104	99	90	83	112	101
J-320	42	39	42	39	277	271
J-330	64	59	63	60	268	260
J-340	238	256	237	255	332	329
J-350	295	330	293	329	419	427
J-360	197	200	197	200	217	205
J-370	371	432	365	427	500	500
J-380	118	113	79	73	133	120
J-390	315	348	313	348	411	413
J-400	145	162	145	162	156	164
J-410	149	151	149	151	161	153
J-420	234	241	234	241	267	253
J-430	401	440	398	440	500	500
J-440	401	442	400	442	500	500
J-450	374	408	374	407	500	489
J-460	360	381	356	364	493	472
J-470	259	262	257	258	371	350
J-480	319	345	318	344	400	394
J-490	324	350	323	350	409	402
J-500	220	224	219	224	247	233
J-510	243	246	242	246	272	257
J-520	426	439	424	439	500	500
J-530	426	440	425	440	500	500
J-540	225	221	225	221	245	227
J-550	307	314	305	310	380	354
J-560	132	124	126	117	139	124
J-570	129	122	104	96	140	126
J-580	49	44	46	42	50	44
J-590	156	149	153	145	167	151
J-600	124	117	86	78	141	127
J-601	56	51	50	45	58	52
J-610	326	351	325	351	410	401
J-620	361	401	360	401	500	496
J-630	378	421	376	421	500	500
J-640	438	430	436	430	500	500
J-650	375	392	374	392	458	436
J-660	456	438	458	438	500	500
J-670	148	139	148	139	153	139
J-680	285	284	282	280	333	306
J-690	89	82	89	82	92	82

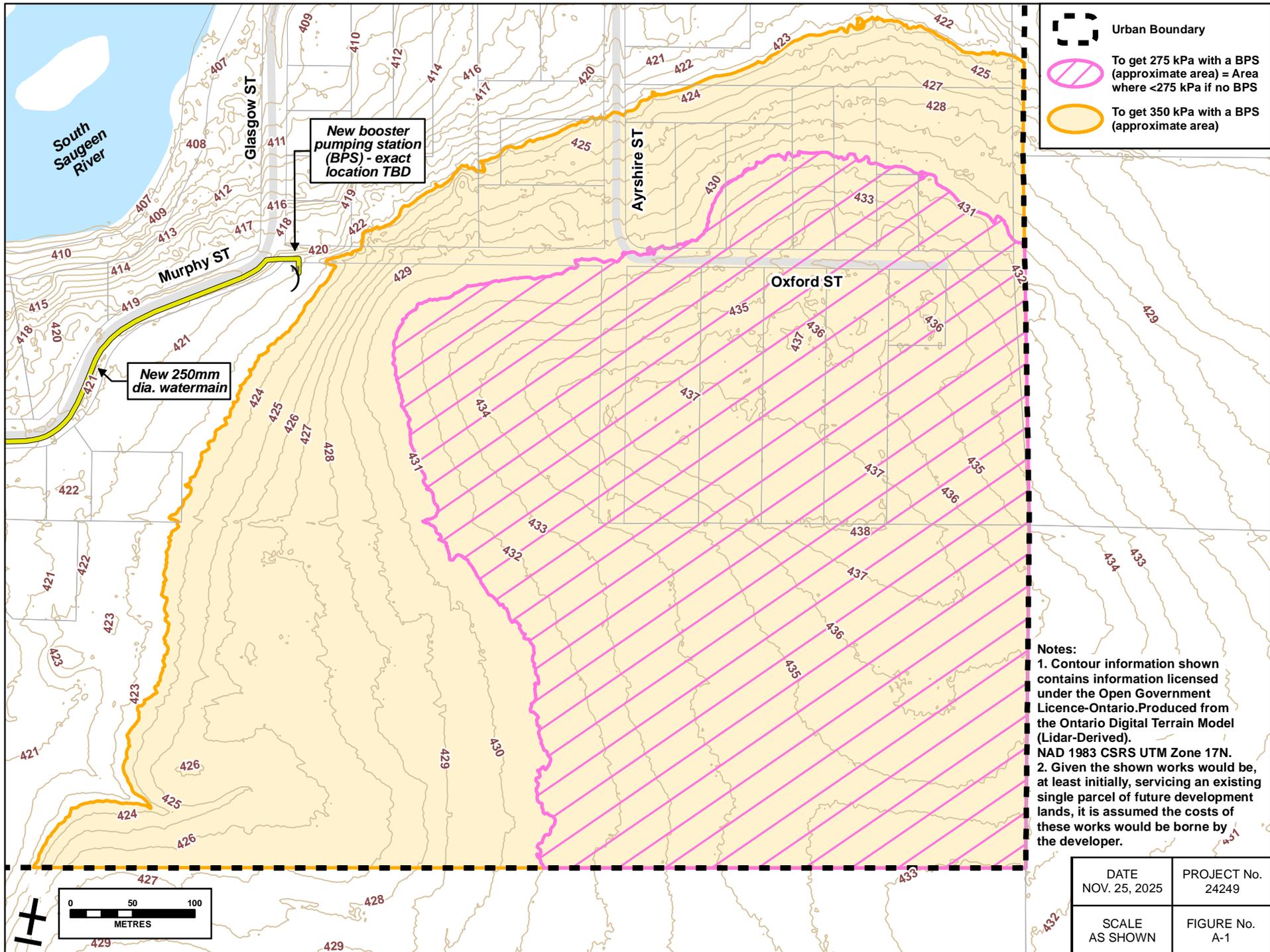
Junction	Available Fire Flow at 140 kPa (L/s)					
	2.c), as 2.a) but PN-82, 84 at 250 mm dia.		2.d), as 2.c but PN-88 closed		7.d), as 7.b) but PN-100, 105, 110, 115 at 200 mm dia.	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
J-700	96	88	92	84	99	88
J-701	51	46	51	45	53	46
J-710	126	118	118	109	133	119
J-720	118	108	114	104	123	109
J-730	402	414	401	414	488	459
J-740	440	431	439	431	500	500
J-750	462	433	462	433	500	500
J-760	414	404	413	402	500	453
J-770	293	278	290	274	356	307
J-780	270	259	264	251	333	287
J-790	179	164	174	158	199	168
J-800	169	154	164	148	186	156
J-810	157	142	153	137	172	144
J-820	148	133	144	128	161	135
J-830	50	44	50	44	51	44
J-840	102	92	101	91	106	92
J-850	103	92	102	91	107	92
J-860	269	254	266	249	346	296
J-870	81	70	81	70	117	98
J-890	298	325	297	324	381	380
J-900	173	172	173	172	186	175
J-910	183	181	183	181	197	185
J-920	298	316	297	316	367	353
J-930	228	220	228	220	245	224
J-940	229	217	229	217	244	221
J-950	200	186	200	186	210	187
J-960	451	430	451	430	500	500
J-970	500	500	500	500	500	500
J-990	342	297	342	297	500	500
J-1000	191	150	191	150	393	358
J-1010	269	254	267	250	335	285
J-1020	25	21	25	21	25	20
J-1030	26	22	26	22	27	22
J-1040	32	27	32	27	33	27
J-1050	269	288	269	288	327	322
J-1060	137	134	137	134	144	135
J-1070	94	90	94	90	97	90
J-1080	95	91	95	91	99	91
J-1090	115	111	115	111	120	111
J-1100	110	106	110	106	115	106
J-1110	153	151	153	151	164	153
J-1120	156	154	156	154	168	156
J-1130	117	112	117	112	122	113
J-1140	112	107	112	107	117	108
J-1150	137	133	137	133	146	134
J-1160	146	141	146	141	156	143
J-1170	79	75	79	75	81	75
J-1180	133	127	133	127	141	128
J-1190	267	275	266	275	308	294
J-1200	241	246	241	246	273	259
J-1210	208	209	208	209	230	216
J-1220	89	83	89	83	92	83
J-1230	147	142	147	143	158	144
J-1240	139	130	139	130	143	130
J-1250	365	320	365	320	444	413
J-1260	362	317	362	317	478	446
J-1270	360	315	360	315	479	440
J-1280	197	188	197	188	282	258
J-1290	311	301	311	302	402	370
J-1300	46	42	46	42	46	42
J-1310	108	79	108	79	292	257
J-1315	93	67	93	67	264	231
J-1320	7	4	7	4	186	164
J-1330	6	4	6	4	119	104
J-1340	500	500	500	500	500	500
J-1790	218	225	217	225	247	238
J-1800	206	213	190	199	359	338
J-1810	193	197	193	197	213	204
J-1820	154	153	154	154	165	157
J-1830	140	138	140	139	149	141
J-1840	142	130	138	125	151	130
J-1850	96	87	93	84	99	87
J-1860	122	112	117	106	127	112
J-1870	102	91	98	88	106	91
J-1880	112	101	109	97	118	101
J-1890	123	113	119	109	129	113
J-1900	189	185	189	185	203	189
J-1910	216	228	214	227	500	500
J-1920	231	243	228	242	500	500
J-1930	212	209	210	207	330	310
J-1940	38	35	38	35	38	35
JN-67	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-68	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
JN-69	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Available Fire Flow at 140 kPa (L/s)

Junction	2.c), as 2.a) but PN-82, 84 at 250 mm dia.		2.d), as 2.c but PN-88 closed		7.d), as 7.b) but PN-100, 105, 110, 115 at 200 mm dia.	
	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On	Standpipe 460.5 mASL, Wells Off	Standpipe 455.0 mASL, Four Wells On
JN-200	171	169	81	75	299	278
JN-205	123	118	73	67	163	149
JN-210	178	177	81	75	305	285
JN-215	191	192	82	75	309	290
JN-220	158	155	79	73	305	285
JN-225	(N/A)	(N/A)	(N/A)	(N/A)	238	217
JN-230	(N/A)	(N/A)	(N/A)	(N/A)	225	204
JN-235	(N/A)	(N/A)	(N/A)	(N/A)	167	151
JN-240	(N/A)	(N/A)	(N/A)	(N/A)	170	154
JN-245	(N/A)	(N/A)	(N/A)	(N/A)	165	149
JN-250	(N/A)	(N/A)	(N/A)	(N/A)	168	152
JN-255	(N/A)	(N/A)	(N/A)	(N/A)	213	192
JN-260	(N/A)	(N/A)	(N/A)	(N/A)	220	199
JN-265	(N/A)	(N/A)	(N/A)	(N/A)	219	198
JN-270	(N/A)	(N/A)	(N/A)	(N/A)	154	138
JN-275	(N/A)	(N/A)	(N/A)	(N/A)	181	161
JN-280	(N/A)	(N/A)	(N/A)	(N/A)	218	197
JN-285	(N/A)	(N/A)	(N/A)	(N/A)	172	154
JN-290	(N/A)	(N/A)	(N/A)	(N/A)	211	187
JN-295	93	67	93	67	207	180
JN-310	207	217	207	217	305	300
JN-325	143	140	143	140	153	142
JN-330	119	114	119	114	125	115
JN-335	152	137	147	132	165	139
JN-340	121	109	117	104	129	109
JN-345	96	86	94	83	101	86
JN-350	75	66	73	64	77	66
JN-355	111	103	107	98	117	103
JN-360	144	130	140	125	154	131
JN-365	142	130	139	125	152	131
N-10	175	180	174	180	208	197
N-20	206	215	204	215	500	500
N-30	(N/A)	(N/A)	(N/A)	(N/A)	500	500
N-34	(N/A)	(N/A)	(N/A)	(N/A)	317	292
N-36	(N/A)	(N/A)	(N/A)	(N/A)	257	237
N-50	(N/A)	(N/A)	(N/A)	(N/A)	500	466
N-52	(N/A)	(N/A)	(N/A)	(N/A)	267	239
N-54	(N/A)	(N/A)	(N/A)	(N/A)	250	230
N-56	(N/A)	(N/A)	(N/A)	(N/A)	227	210
N-60	(N/A)	(N/A)	(N/A)	(N/A)	299	271
N-62	(N/A)	(N/A)	(N/A)	(N/A)	260	236
N-64	(N/A)	(N/A)	(N/A)	(N/A)	210	190
N-66	(N/A)	(N/A)	(N/A)	(N/A)	195	180
N-80	216	222	175	180	322	302
N-82	124	120	114	111	211	193
N-84	102	97	96	92	177	161
N-100	(N/A)	(N/A)	(N/A)	(N/A)	119	106
N-120	(N/A)	(N/A)	(N/A)	(N/A)	109	97
N-122	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-130	(N/A)	(N/A)	(N/A)	(N/A)	113	100
N-400	107	103	107	103	111	103
N-410	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-420	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-430	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-440	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-450	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-460	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
N-500	(N/A)	(N/A)	(N/A)	(N/A)	208	187
N-600	(N/A)	(N/A)	(N/A)	(N/A)	165	158
N-605	(N/A)	(N/A)	(N/A)	(N/A)	167	160
N-610	(N/A)	(N/A)	(N/A)	(N/A)	97	92
Min	6	4	6	4	25	20
Max	500	500	500	500	500	500

Notes:





DATE NOV. 25, 2025	PROJECT No. 24249
SCALE AS SHOWN	FIGURE No. A-1

APPENDIX C

WATERMAIN BREAKAGE SUMMARY

Street	From	To	Size(mm Dia)	Size (inches)	Material	Date of break	Depth of main (m)	Depth of main(Inches)	Type of break	Exterior condition	Interior condition	Cause (As per operator)	Repair made	Other comments
James St.	Queen St.	Waterloo St.	100.0	4		18-Nov-04	1.676		66 Ring			Deterioration	100mm repair clamp on ring break, back filled with new material	
Elgin St.		Corner of Durham St.	250.0	10	CI	28-Dec-04	1.676		66 Ring				Put 250mm Sleeve on fractured main, superchlorinated parts. Backfilled with crushed stone and gravel	
Grant St.	Parkside Dr.	Main St. S	250.0	10		16-Dec-04	1.829		72 Joint			Deterioration	3' pipe cut out + replaced with new 250mm watermain connected with 2 250mm Maxi fit couplings, superchlorinated main.	
North water St.	John St.	James St.	150.0	6		2-Sep-04	1.829		72 Ring			Stress	Chlorinated 150mm repair clamp and water main installey clamp and changed line	
Fergus St.	Birmingham St.	Wellington St.	100.0	4	CI	22-Apr-05	1.829		72 Ring			Deterioration	100mm was installed after main was cleaned. Backfill with crush + gravel.	
Main St.	Grant St.	Miller St.	100.0	4	CI	18-Feb-05	0.991		39 Blowout			Deterioration	100mm reappear clamp installed, vales turned back on.	
James St.	Waterloo St.	North Water St.	150.0	6	CI	22-Jan-05	1.600		63 Ring			Stress	Dug out and installed 150mm repair clamp	
Wellington St.	Egremont St.	Church St.	150.0	6	CI	8-Jan-08	1.524		60 Ring			Deterioration	150mm stainless steel clamp was installed around break	
Sligo Rd.	Perth St.	Foster St.	250.0	10	CI	19-Mar-08	1.829		72 Ring			Stress	250mm repair clamp was installed	
Birmingham St.		NW corner of Normanby St	150.0	6	CI	20-May-08	1.295		51 Boring by Pikards			Contractor	150mm stainless steel clamp was installed around break	
Church St.		church and Durham intersection	150.0	6		8-Dec-08	1.981		78 Ring			Stress	150mm repair clamp was installed around break	
Wellington St.		Wellington and Elgin intersection	250.0	10	PVC	30-Sep-08	1.829		72 Accidental			Contractor	250mm Maxifit coupler, 300mm mechanical joint + accessories	
Main St.	Wellington St.	King St.	200.0	8	DI	16-Apr-09			Ring			Deterioration	200mm stainless steel repair clamp was installed	
Wellington St.	Church St.	London St.	150.0	6	CI	12-Mar-09	1.676		66 Ring			Deterioration	150mm repair clamp was installed	
Wellington St.	Church St.	London St.	150.0	6	CI	12-Mar-09	0.000		Ring				150mm stainless steel repair clamp	
James St.	Waterloo St.	North Water St.	100.0	4	CI	17-Jan-09	1.524		60 Ring			Frost pressure	100mm repair clamp installed	
Main St.		Birmingham and Main intersection	200.0	8	CI	27-Apr-09			Ring				200mm stainless steel repair clamp	
Church St.	Durham St.	Birmingham St.	150.0	6	DI	24-Sep-11	1.829		72 Ring			Deterioration	150mm stainless steel repair clamp	
Foster St.	Sligo Rd.	Durham St.	250.0	10	PVC	27-Apr-11	1.676		66 Main hit by construction			Xterra	Cut out 2m length in pipe and installed new PVC pipe and Maxifit + Hymax couplings	
Queen St.		Queen and Arthur intersection	250.0	10	CI	22-Feb-12	1.676		66 Ring			Deterioration	300mm stainless steel repair clamp was used along with rubber taken from a 250mm stainless repair clamp	250mm stainless steel repair clamp wasnt holding so used a 300mm stainless repair clamp and the rubber from the 250mm repair clamp
Albert St.	Egremont St.	Church St.	250.0	10	DI	28-Jun-13	2.896		114 Blowout			Unknown	Repaired Blowout with 250mm Repair clamp	First 250mm repair clamp didn't tighten up to seal the blowout. Picked up a 250mm repair clamp from Minto township
Durham St.		Durham and Church intersection	150.0	6	CI	24-Dec-13	1.829		72 Ring & Longitudinal			Stress	150mm repair clamp was installed	
Dublin St.	Princess St.	Martin St.	150.0	6	CI	1-Nov-13	1.524		60 Ring			Deterioration	Fixed under pressure using a 150mm stainless steel repair clamp	
James St.	Waterloo St.	North Water St.	150.0	6	CI	28-Oct-13	1.676		66 Ring			Deterioration	150mm stainless steel repair clamp was installed	
Princess ann St.	Dublin St.	Arthur St.	150.0	6	CI	31-Dec-13	1.219		48 Ring			Deterioration	150mm Stainless steel repair clamp was installed	
Wellington St.	Church St.	London St.	150.0	6	CI	20-Nov-13	1.524		60 Ring			Unknown	150mm Srainless steel repair clamp was installed	
James St.	Queen St.	Waterloo St.	100.0	4	CI	12-Mar-15	1.829		72 Ring			Age	100mm Repair clamp was installed	
Church St.	Durham St.	Birmingham St.	150.0	6	CI	6-Jan-15	1.524		60 Ring			Deterioration	150mm stainless steel repair clamp was installed	
Murphy St.	Main St.	Glasgow St.	250.0	10	PVC	3-Mar-15	1.829		72 Gasket blown out at joint			Deterioration	"T" removed + replaced with 32" of blue brute, used existing 250mm to 150mm reducer	Upon arrival potable water running down bank into Saugeen River, placed dechlorination pucks in stream of water going into river. Minimized flow, took CL2 residue at river bank at approx 0900. Free CL2 0.05 mg/l was highest DPD value. Melissa reported as a spill to MoECC. Due to watermain being dewatered for repair a precautionary BWA was issued by the MOH for Murphy St.
Perth St.		Across from Well #6	250.0	10	DI	24-Sep-16	2.591		102 Ring				250mm repair clamp was installed	Due to the amount of water + soil conditions Well 6 valve was closed + pump shutoff. Perth St. Was closed at both valves, MOH MoECC advised boil water notice.
Wellington St.	Egremont St.	Church St.	150.0	6	DI	3-Nov-17	1.321		52 Ring	Good	N/A		Stainless steel repair clamp	
Birmingham St.	Queen St.	Weber St.	150.0	6	CI	21-Jan-17	1.321		52 Ring	Ok	N/A		Stainless steel repair clamp	
Peel St.	Queen St.	York St.	100.0	4	CI	27-Mar-18	1.524		60 Ring	Good	N/A		Stainless steel repair clamp	
Durham St.		Durham and Perth intersection	250.0	10	DI	2-Feb-19	2.032		80 Split pipe	Good	Good		Removed 8' of 250mm Ductile iron watermain and installed 8' of 250mm PVC watermain using 250mm Hymax couplings.	CAD welded tracer wire on both Ductile watermain ends
Wellington St.	Dublin St.	Normanby St.	150.0	6	CI	10-Nov-19	1.524		60 Ring	Good	Unknown		Stainless steel repair clamp	
Arthur St.		Arthur and Queen intersection	250.0	10	DI	28-Aug-19	1.676		66 Joint Failure	Good	Good	250mm end cap rusted off "Y" connection	250mm end plug + rubber gasket bolts	Excavation was 12' x 12'. Asphalt was lifted in entire intersection and will have to be removed + repaved
King St.		King and Fergus intersection	100.0	4	CI	15-Nov-19	1.549		61 Ring	Good	N/A		Stainless steel repair clamp	slow seep and entering a catch basin talked to cory. Decided to repair Sat nov 16/19 in Daylight, to be on the safe side . Placed dechlorination pucks in catch basin
Queen St.	Main St.	Parkside Dr.	100.0	4	CI	31-Mar-20	1.499		59 Ring	Good	Good		Stainless steel repair clamp	
North water St.			50.0	2	PVC	26-Apr-21	1.300		51.18 Hole	Good	Good		2" Tee, 3/4 Bushing and two 2" Barb Fitting	
Church St.	Durham St.	Birmingham St.	150.0	6	DI	4-Jan-21	1.829		72 Ring	Good	N/A		Stainless Steel Repair Clamp	
Church St.	Birmingham St.	Durham St.	150.0	6	DI	13-Jun-21	1.829		72 Ring	Good	N/A		Stainless steel repair clamp	
Durham St.		Durham and Church intersection	150.0	6	DI	20-Jul-21	1.829		72 Ring	Good	N/A		Stainless steel repair clamp	Ring break occurred in construction area. Operators replaced a 6" main valve in Durham St. East and Church St. North intersection with JT Excavating assisting in excavating and back filling. When packing site, a ring break occurred approx 10ft. From construction area (south). Found large rocks on watermain.
Queen St.	Main St.	Parkside Dr.	100.0	4	CI	26-May-22	1.524		60 Ring	Ok	N/A		Stainless steel repair clamp	
Parkside Dr.		Parkside and Queen intersection	250.0	10	PVC & HDPE	29-Jul-22	2.134		84 Joint Failure	Good	Good		Pipe and 10" End cap	Short section of watermain became dislodged. Bell cut off and cap with 1" blowoff installed for flushing and sampling. When bell was cut, flushed into excavation using V-197
Queen St.		Normanby and Queen intersection	250.0	10	DI	4-Apr-22	2.134		84 Ring	Good	Unknown		Stainless Steel repair clamp	Ring break on 10" ductile iron watermain at the exact location of old saddle and main stop for an abandon 1 1/4" water service. Previous leaks on abandon service on Sept 13, 2017 and June 1, 2018. Removed abandon saddle and main stop and installed a 10" stainless steel repair clamp over ring break.
Queen St.	Main St.	Parkside Dr.	100.0	4		30-May-22	1.219		48 Ring	Ok			Stainless steel repair clamp	
Church St.	Durham St.	Birmingham St.	150.0	6	DI	10-Feb-23	1.900		74.8 Ring	Good	Good		Stainless steel repair clamp	
Church St.		Durham and Church intersection	150.0	6	DI	15-Feb-23	1.670		65.75 Ring	Good	Good		Stainless steel repair clamp	
Church St.		Church and Albert intersection	250.0	10	DI	6-Feb-24	2.400		94.49 Hole	Scaling at Blow Hole	N/A		Stainless steel repair clamp	
Church St.	Durham St.	Birmingham St.	150.0	6	DI	26-Jan-24	1.900		74.8 Ring	Good	Good		Stainless steel repair clamp	
Church St.		Church and Birmingham intersection	150.0	6	PVC	14-Aug-24	0.000		Joint Failure				MJ sleeve couplings, MJ tess, Restraints, Valve, Hydrant and Pipe	Break occurred during planned excavation to replace water main valve 151 and Hydrant 86 on Church St. at the intersection of Birmingham St. E. Hydrant 86 lead from the water main pulled out of the hydrant secondary valve when dirt/cover was removed from around the pipe. Replacement was completed as planned.

APPENDIX D
SEWERCAD™

ULTIMATE CONDITIONS SEWER CAPACITY EXCEEDANCES SUMMARY										
SEWER ID	STREET	FROM	TO	PIPE DIA. (mm)	SEWER SLOPE (%)	FULL FLOW CAPACITY (L/s)	EXISTING PEAK FLOW (L/s)	"ULTIMATE" CONDITIONS PEAK FLOW (L/s)	ADDITIONAL EQUIVALENT POPULATION GROWTH TO FULL FLOW SEWER CAPACITY	PREDICTED YEAR SEWER REACHES FULL FLOW CAPACITY*
295	Wellington	e. Elgin	Elgin	450	0.12	98.8	80.4	107.6	1133	2034
298	Wellington	e. Normanby	Normanby	450	0.12	99.8	82.4	110.3	1074	2034
81	Normanby	Wellington	Queen	600	0.08	177.9	117.0	211.7	3755	>2051
241	Arthur	Queen	s. of Queen	600	0.11	200.3	124.8	221.9	4656	>2051
242	Arthur	s. of Queen	Waterloo	600	0.11	203.4	125.8	223.0	4788	>2051
244	Arthur	Waterloo	Prince Charles	600	0.11	200.4	131.8	231.4	4233	>2051
229	Arthur	n. of North Water	North Water	600	0.20	273.1	199.7	319.8	4529	>2051
227	North Water	Arthur	NWS-SPS	600	0.24	301.1	200.6	320.9	6202	>2051

FLAT SEWER SUMMARY TABLE					
SEWER ID	PEAK FLOW (L/S) (SEE NOTE 5)	SEWER DIA. (mm)	SEWER SLOPE (%)	ACTUAL CAPACITY (L/S)	MODELED CAPACITY (L/S)
SAN 14	0.1	200	0.17	13.5	20.7
SAN 47	9.8	200	0.18	13.9	20.7
SAN 50	5.5	200	0.20	14.7	20.7
SAN 51	2.9	200	0.21	15.0	20.7
SAN 52	2.5	200	0.27	17.0	20.7
SAN 57	1.8	200	0.24	16.1	20.7
SAN 128	0.3	200	0.14	12.3	20.7
SAN 146	24.5	375	0.11	58.2	67.9
SAN 205	5.0	300	0.05	21.6	45.4
SAN 206	4.6	300	0.15	37.5	45.4
SAN 216	0.4	250	0.13	21.4	31.5
SAN 248	0.3	200	0.20	14.7	20.7
SAN 285	7.5	200	0.16	13.1	20.7
SAN 288	11.7	200	0.17	13.5	20.7
SAN 295	107.6	450	0.05	63.8	98.8
SAN 303	13.5	250	0.06	14.6	31.5
SAN 320	8.7	375	0.10	55.4	67.9
SAN 358	1.5	200	0.26	16.7	20.7
SAN 498	0.3	200	0.08	9.3	20.7
SAN 499	6.5	200	0.15	12.7	20.7

- FLAT SEWERS FOR THE PURPOSE OF THIS TABLE ARE SEWERS WITH FULL-FLOW VELOCITY < 0.6 M/S AS CALCULATED USING EXISTING SEWER SLOPE FROM AVAILABLE RECORD MAPS AND DRAWINGS.
- "ACTUAL" CAPACITY IS BASED ON GRAVITY FULL-FLOW CAPACITY USING THE EXISTING SEWER SLOPE AS NOTED IN THE TABLE.
- MODELED CAPACITY IS AS PER SEWERCAD NOTE 12 ON THIS DRAWING USING MINIMUM GRADE SEWER. FLAT SEWER WITH ADEQUATE PIPE DIAMETER MAY SURCHARGE DUE TO REDUCED GRAVITY FLOW CAPACITY.
- FIELD SURVEY INVERTS AND LIDS TO VERIFY EXISTING SLOPE PRIOR TO ADDING A FLAT SEWER TO A MUNICIPAL PROJECT LIST. TOLERANCES OF AS-RECORDED INFORMATION COULD BE A FACTOR FOR CALCULATED REDUCED GRAVITY FLOW CAPACITY OF FLATTER SEWERS.
- THE ABOVE PEAK FLOW IS THE MODEL ULTIMATE BUILT-OUT CONDITIONS AND ANTICIPATED GENERALLY TO OCCUR BEYOND YEAR 2051.

LEGEND

- SEWER ID: <25% FLOW CAPACITY UTILIZED (EX. SAN. SEWER)
- SEWER ID: 25 - 50% FLOW CAPACITY UTILIZED (EX. SAN. SEWER)
- SEWER ID: 50 - 75% FLOW CAPACITY UTILIZED (EX. SAN. SEWER)
- SEWER ID: 75 - 100% FLOW CAPACITY UTILIZED (EX. SAN. SEWER)
- SEWER ID: GRAVITY FLOW CAPACITY EXCEEDED (EX. SAN. SEWER)
- PARCEL ACCOUNTED FOR IN THE SEWERCAD MODEL
- PARCEL EXCLUDED FROM THE SEWERCAD MODEL
- DURHAM STREET SPS CATCHMENT AREA
- CORN STREET SPS CATCHMENT AREA
- PERTH STREET SPS CATCHMENT AREA
- SOUTH WATER STREET SPS CATCHMENT AREA

1:6000

Design By: J.A.V. Checked By: F.C.V.

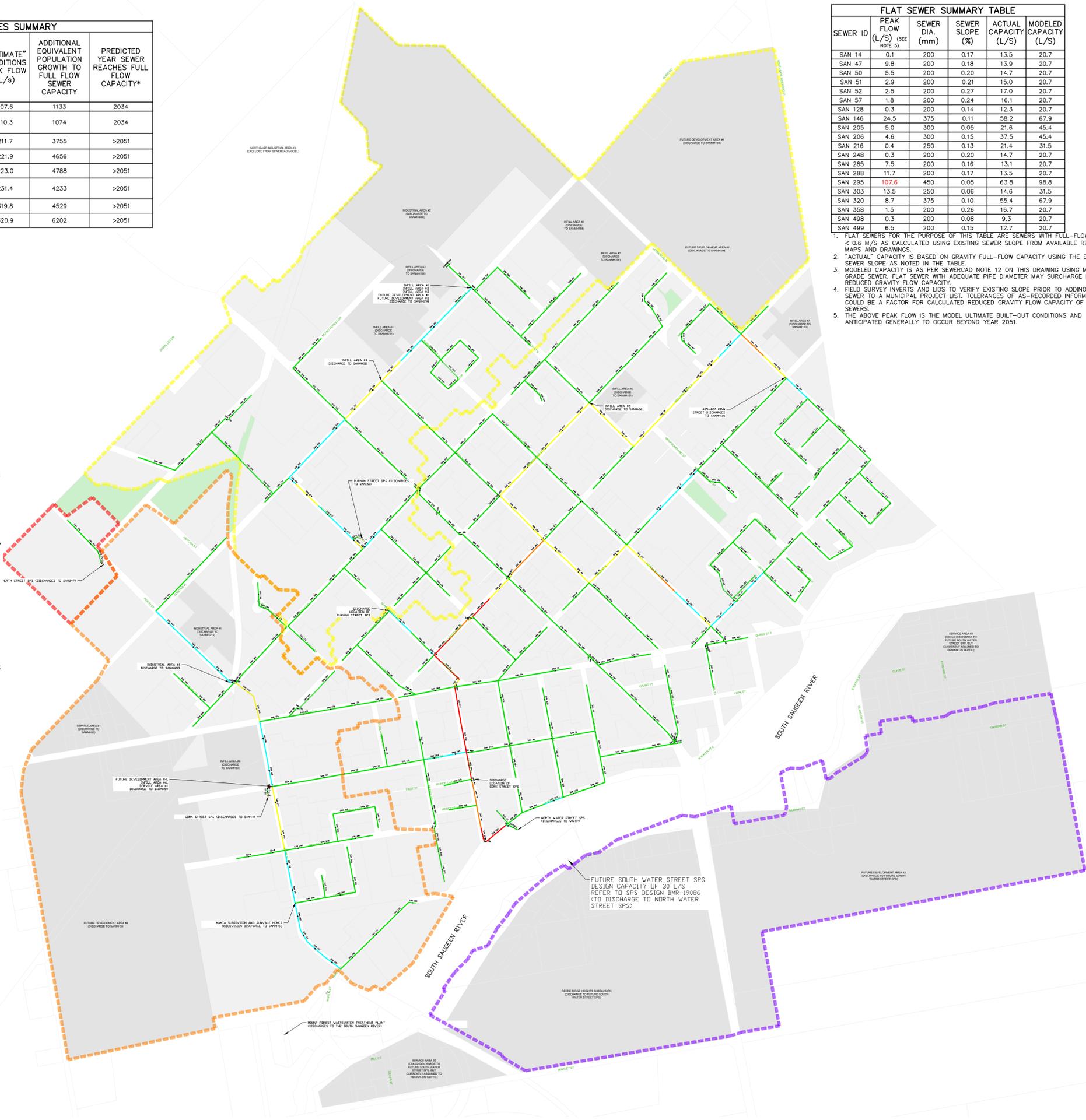
PROPOSED CONDITIONS SEWERCAD MODEL KEY ASSUMPTIONS AND NOTES

- LOTS WHICH WERE INCLUDED IN THE MODEL ARE INDICATED ON THE PLAN. SANITARY SEWAGE FLOWS FROM EXISTING SERVICED LOTS, INFILL LOTS, KNOWN DEVELOPMENT INTERESTS, AND FUTURE DEVELOPMENT AREAS WERE INCLUDED IN THE PROPOSED CONDITIONS MODEL. THE LARGE NORTHEASTERLY INDUSTRIAL ZONED AREA WAS EXCLUDED FROM THE SEWERCAD MODEL SINCE IT WOULD POTENTIALLY REQUIRE SUBSTANTIAL SEWER UPGRADES AND DURHAM STREET SPS UPGRADE TO FULLY SERVE OR A FUTURE SPS FOREMAIN WOULD BE ROUTED AROUND MOUNT FOREST TO DISCHARGE TO FUTURE UPGRADED WWTP HEADER WORKS.
- THE NUMBER OF RESIDENTIAL UNITS PER RESIDENTIAL LOT WAS BASED ON THE GREATER OF THE EXISTING NUMBER OF UNITS ON THE LOT, THE PROPOSED NUMBER OF UNITS OF A KNOWN DEVELOPMENT OR 40 CAPITA/HECTARE AS PER COUNTY GROWTH PLAN.
- USED 2.44 CAPITA/UNIT FOR RESIDENTIAL UNITS AS PER THE GROWTH PLAN.
- USED 350 LPD FOR RESIDENTIAL SEWAGE FLOW AS PER THE MUNICIPAL SERVICING STANDARD.
- EQUIVALENT POPULATION WAS CALCULATED FOR ICI LOTS USING ICI WATER METER DATA, WHERE AVAILABLE, OR 0.2 L/s/ha BASED ON TYPICAL OBSERVED WATER USAGE AS PER WATER METER DATA, AND THE EQUIVALENT POPULATION PER LOT WAS BACK-CALCULATED USING 450 LPD AVERAGE DAY SEWAGE FLOW FOR THE EQUIVALENT PERSON.
- EQUIVALENT POPULATION WAS BACK-CALCULATED FOR SCHOOLS (140 L/D/STUDENT), THE HOSPITAL (1800 L/D/BED), AND THE MOTEL (200 L/D/BED) BASED ON CURRENT UNIT COUNTS USING AN AVERAGE DAY SEWAGE FLOW OF 450 LPD FOR THE EQUIVALENT PERSON.
- PARCS, AS SHOWN ON PLAN VIEW, WERE ASSUMED TO PRODUCE NO SANITARY SEWAGE IN THE MODEL.
- AVERAGE DAY SEWAGE FLOWS AS REPRESENTED BY THE EQUIVALENT POPULATION WAS INSERTED INTO THE DOWNSIDE MAINTENANCE HOLE TO MODEL SEWAGE FLOWS BASED ON EXISTING SPATIAL DISTRIBUTION OF RESIDENTIAL UNITS AND ICI PROPERTIES. KNOWN DEVELOPMENTS AND FUTURE DEVELOPMENT AREAS THAT COULD INFLUENCE LONGER-TERM PLANNING HORIZON DECISIONS WERE MODELLED. REFER TO PLAN VIEW FOR FUTURE OUTLET LOCATION AS MODELLED FOR LARGER FUTURE DEVELOPMENTS THAT WERE INCLUDED IN THE SEWERCAD MODEL.
- THE HARMON PEAKING FACTOR WAS CALCULATED IN SEWERCAD FOR EACH SEWER SECTION USING A MAXIMUM PEAK FACTOR OF 4.0. A MINIMUM PEAK FACTOR OF APPROXIMATELY 2.7 OCCURS AT THE NORTH WATER STREET SPS FOR AN EQUIVALENT POPULATION, EXCLUDING THE FUTURE SOUTH WATER STREET SPS SERVICE AREA, OF ~16400 PERSONS, ALTHOUGH THE PEAK FACTOR IS NOT REDUCED FOR PUMPED FLOW. THE MAXIMUM DAY INFILTRATION AND INFLOW RECENTLY OBSERVED AT THE MOUNT FOREST WASTEWATER TREATMENT PLANT WAS APPROXIMATELY 11 MEGALITRES DURING WET WEATHER EVENTS. THIS CORRESPONDS TO AN INFILTRATION RATE APPROXIMATELY EQUAL TO A RATE OF 0.0175 L/W/M PIPE DIAMETER/KM PIPE WHICH WAS USED TO DISTRIBUTE THE EXISTING OBSERVED I&I THROUGH THE EXISTING SANITARY SEWER SYSTEM. THIS CORRESPONDS TO AN I&I RATE OF APPROXIMATELY 0.4 L/s/ha FOR THE EXISTING SERVICE AREA WHICH IS GREATER THAN THE I&I ALLOWANCE OF 0.15 L/s/ha IN THE MUNICIPAL SERVICING STANDARD FOR NEW DEVELOPMENTS. IT WAS ASSUMED THAT THE TOTAL PEAK I&I FLOW RATE TO THE WWTP WOULD NOT INCREASE SINCE NEW SANITARY SEWER IS TO BE WATER-TIGHT AND THE DETERIORATION OF NEW SEWER WILL BE OFFSET BY MAINTENANCE AND REPLACEMENT OF EXISTING DEFICIENT SEWERS.
- OUTFLOW FROM PUMPING STATIONS WAS SET TO EQUAL THE MODELED PEAK INFLOW RATE.
- A MINIMUM SEWER SLOPE AS PER THE MECOP GUIDELINES WAS USED TO MODEL THE EXISTING SEWER, OR THE EXISTING SLOPE, WHICHEVER IS GREATER. FLAT SEWERS MAY BE MORE SUSCEPTIBLE TO BACKWATER EFFECTS FROM THE BUILD-UP OF DEBRIS DUE TO A FULL FLOW VELOCITY THAT IS LESS THAN THE MINIMUM RECOMMENDED SELF-CLEANSING VELOCITY OF 0.6 M/S. REFER TO FLAT SEWER SUMMARY TABLE ON THIS DRAWING FOR SEWERS WITH EXISTING FULL-FLOW VELOCITY < 0.6 M/S AS PER SEWER SLOPES FROM AVAILABLE RECORD MAPS AND DRAWINGS.
- CLAY AND A.C. PIPES MAY HAVE A MANNING'S ROUGHNESS > n = 0.013 DUE TO DETERIORATION OF THE PIPE. THIS WAS NOT ACCOUNTED FOR IN THE MODEL.
- SEWERCAD ALLOWS ONE OUTLET SEWER AND ONE OVERFLOW SEWER CONNECTION TO EACH MAINTENANCE HOLE. SECONDARY OVERFLOW SEWER SECTIONS WERE NOT MODELLED WHERE THERE ARE MORE THAN TWO OUTLET SEWERS FROM A MANHOLE.

DEVELOPMENT PARCEL SUMMARY

PARCEL ID	AREA (HA.)	EQUIVALENT POPULATION (SEE NOTE 1)	PEAK FLOW (L/S) (SEE NOTE 2)
INFILL AREA #1	2.63	105	2.1
INFILL AREA #2	2.62	105	2.1
INFILL AREA #3	2.78	111	2.2
INFILL AREA #4	3.11	124	2.5
INFILL AREA #5	1.29	51	1.0
INFILL AREA #6	4.03	161	3.2
INFILL AREA #7	1.99	80	1.6
FUTURE DEVELOPMENT AREA #1	22.35	894	17.8
FUTURE DEVELOPMENT AREA #2	13.13	525	10.5
FUTURE DEVELOPMENT AREA #3	---	SEE BMR-19086	---
FUTURE DEVELOPMENT AREA #4	43.55	1741	34.7
SERVICE AREA #1	3.96	158	3.1
INDUSTRIAL AREA #1	2.48	95	1.9
INDUSTRIAL AREA #2	28.53	1095	22.0
NORTHEAST INDUSTRIAL AREA #3 (SEE NOTE 3)	93.30	3583	72.1

- EQUIVALENT POPULATION AS MODELLED IN THE PROPOSED CONDITIONS SEWERCAD. REFER TO THE PLAN VIEW FOR DISCHARGE LOCATION, AND ALSO REFER TO THE SEWERCAD NOTES ON THIS DRAWING.
- PEAK FLOW CALCULATED USING H.F.F. OF 4.0, WITH AN I&I ALLOWANCE OF 0.15 L/S/HA. AS PER MUNICIPAL SERVICING STANDARDS FOR SEWER EXTENSIONS TO SERVICE NEW DEVELOPMENTS.
- NORTHEAST INDUSTRIAL AREA #3 WAS EXCLUDED FROM THE SEWERCAD MODEL. HOW THIS AREA WILL BE PROVIDED WITH SANITARY SERVICING MAY SIGNIFICANTLY AFFECT THE EXISTING SEWER COLLECTION SYSTEM. IT MAY REQUIRE A SEPARATE FOREMAIN TO THE WWTP OR SIGNIFICANT UPGRADES TO THE EXISTING SYSTEM.



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Goderich Kincardine Mount Forest Sarnia

Township of Wellington North
Mount Forest Sanitary Sewer System
SewerCADTM Model Summary

Project No. 24249

Scale (24x36) **1:6000**

Exhibit SAN-1

Z:\24249-Wellington-North-Sanitary-SewerCAD\SewerCAD\Results\24249-2025-12-05-ProposedConditionsSummary.dwg

APPENDIX E

**CONCEPTUAL SANITARY SEWER
EXTENSION PROFILES**

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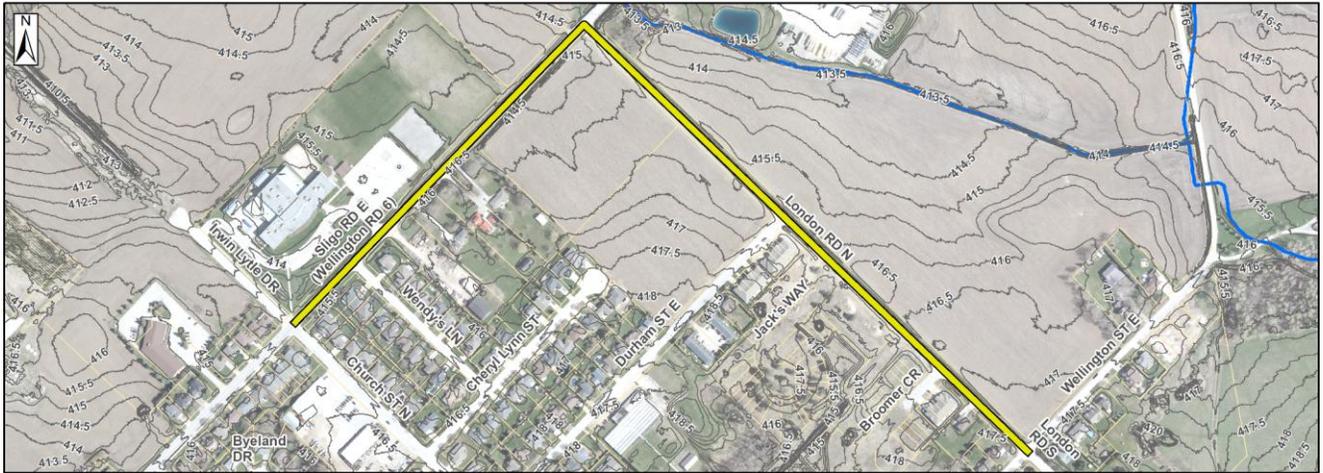
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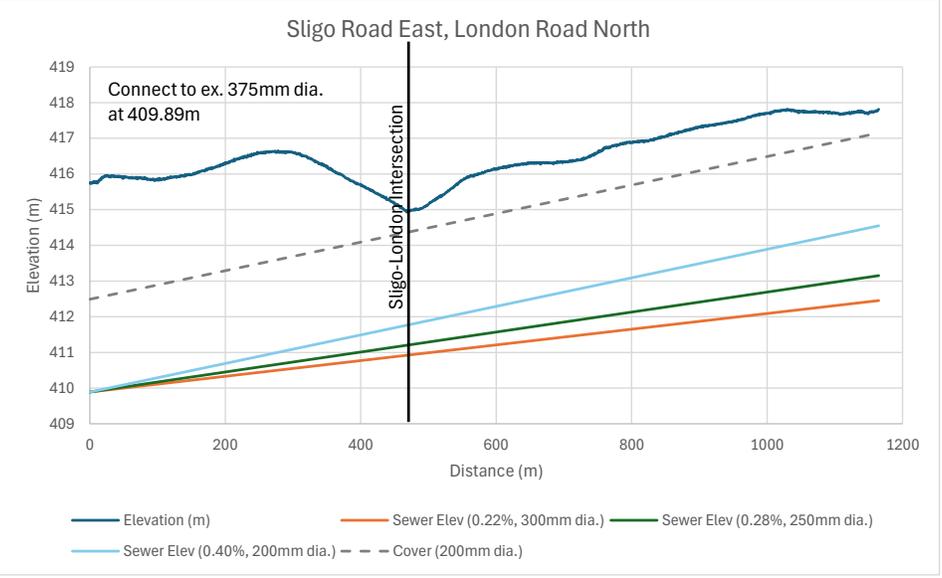
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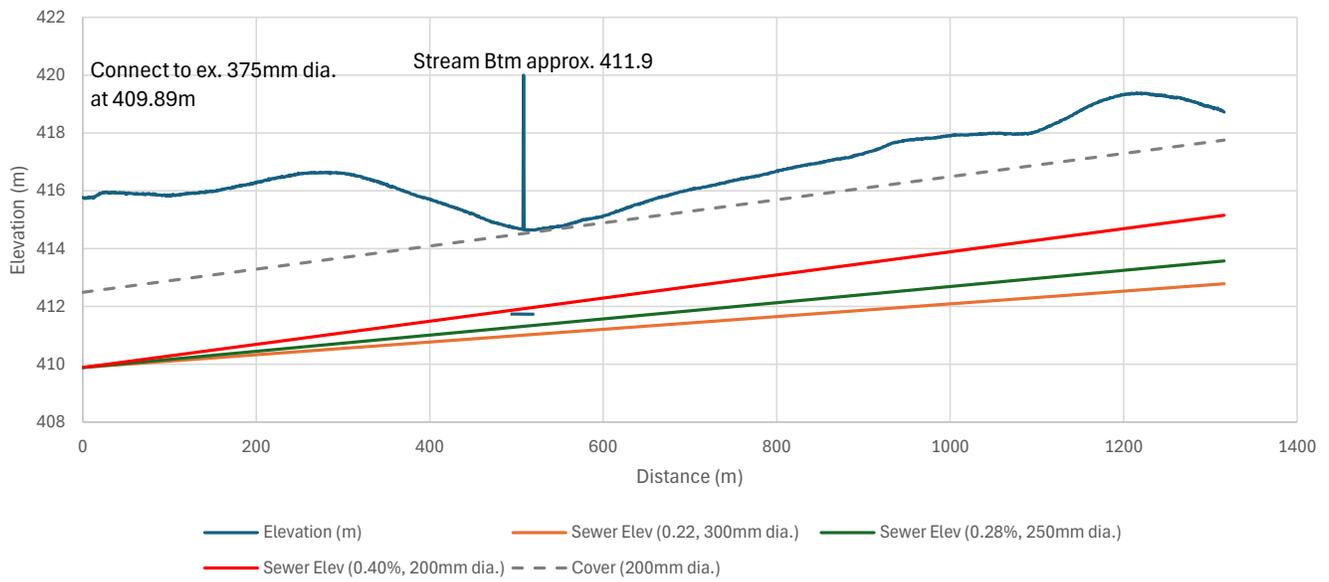


Sligo Road East, London Road North

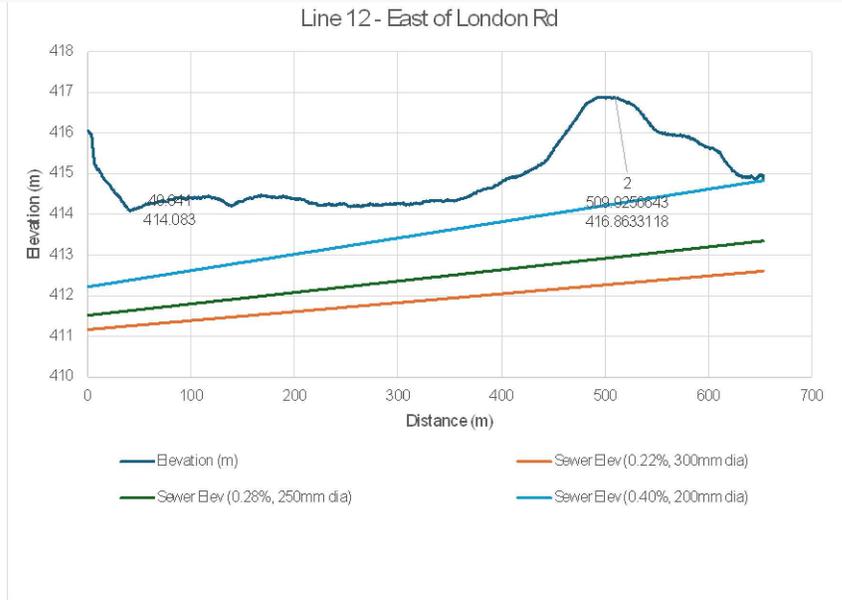
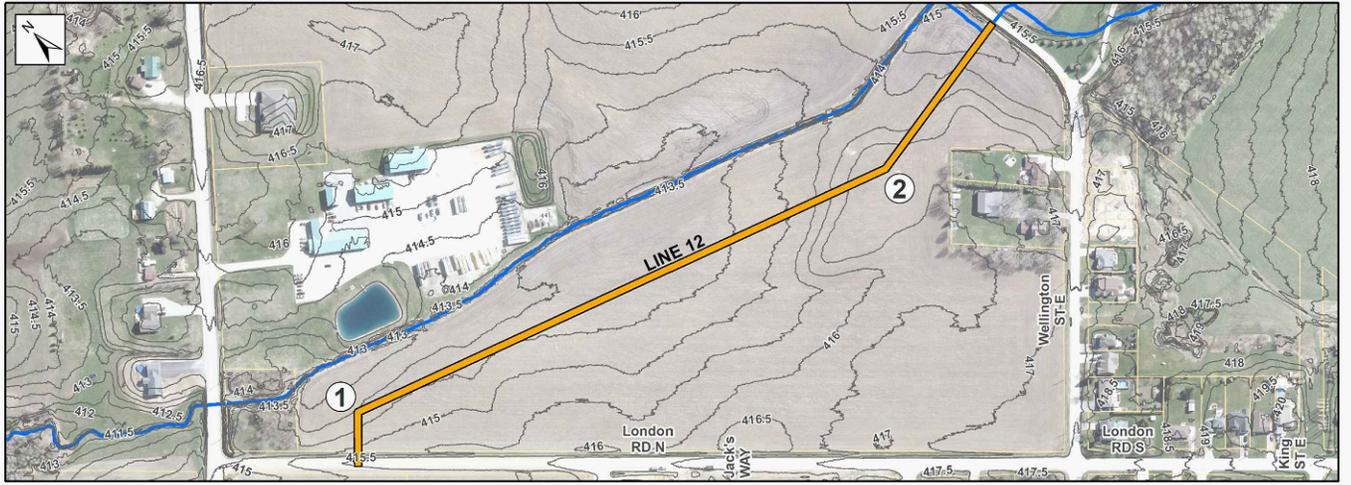




Sligo Road East



THE ABOVE IS MISSING SHOWING THE ACTUAL STREAM, BECAUSE THE PROFILE IS ALONG CENTRELINE OF THE ROAD



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Township of
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 East of London Road
 Line - 12

June 18
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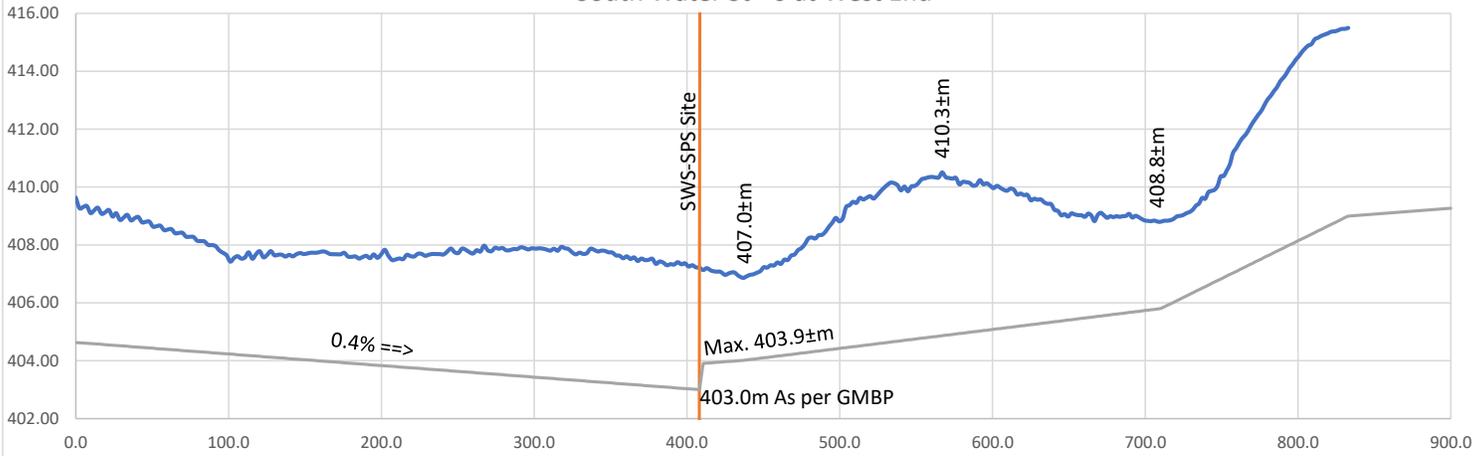
PROJECT No.
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FIGURE No.
 12

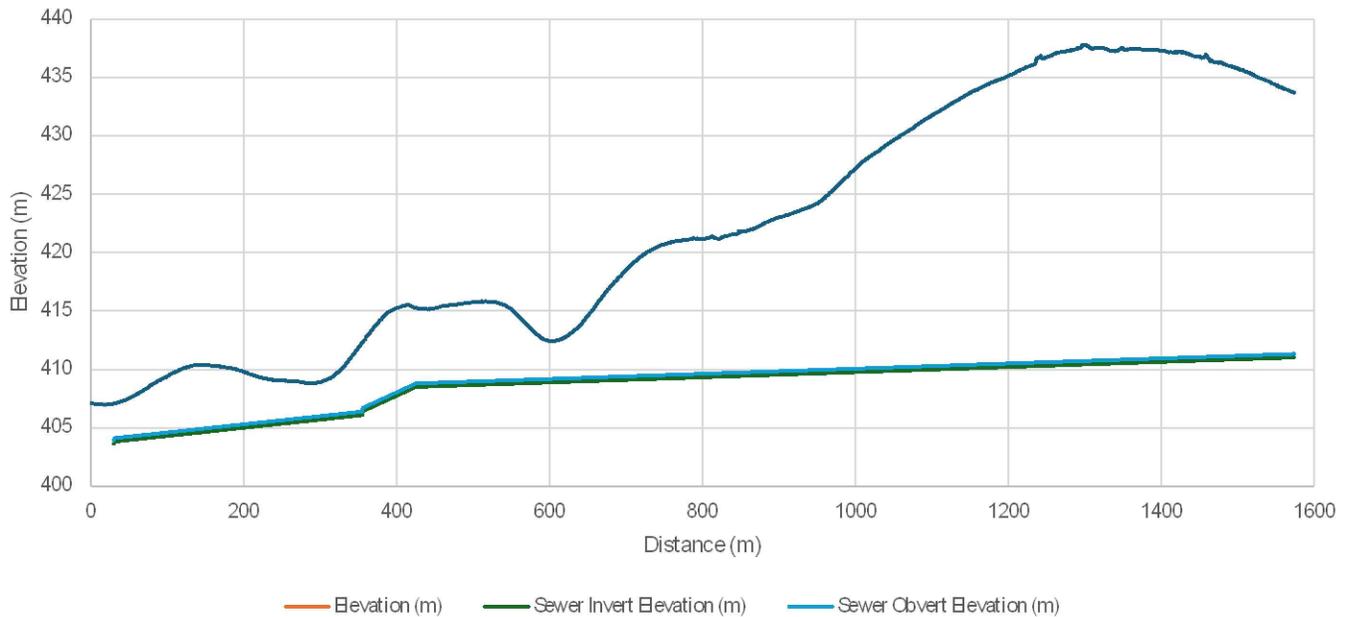
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South Water St - 0 at West End





Line 5 - South Water Street and Murphy Street (300mm dia)



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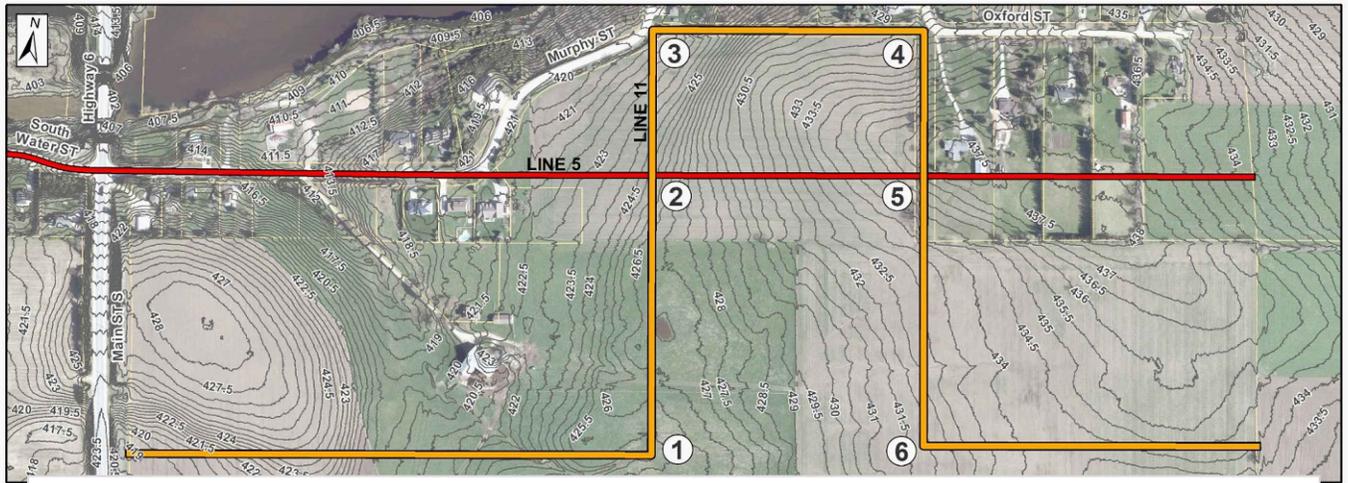
**Township of
 Wellington North
 Tech Updates**
 South Water St and Murphy St
 Line - 5

June 19
 2025

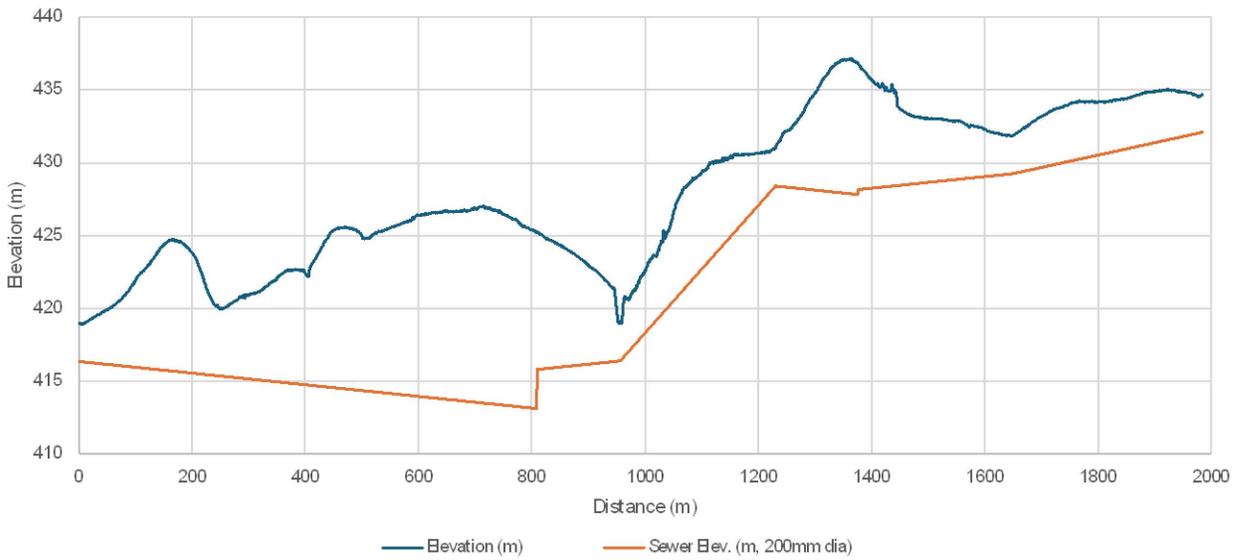
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FIGURE No.
 5



Line 11 - Murphy St Area (200mm dia)



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Murphy St Area
 Line - 11

June 18
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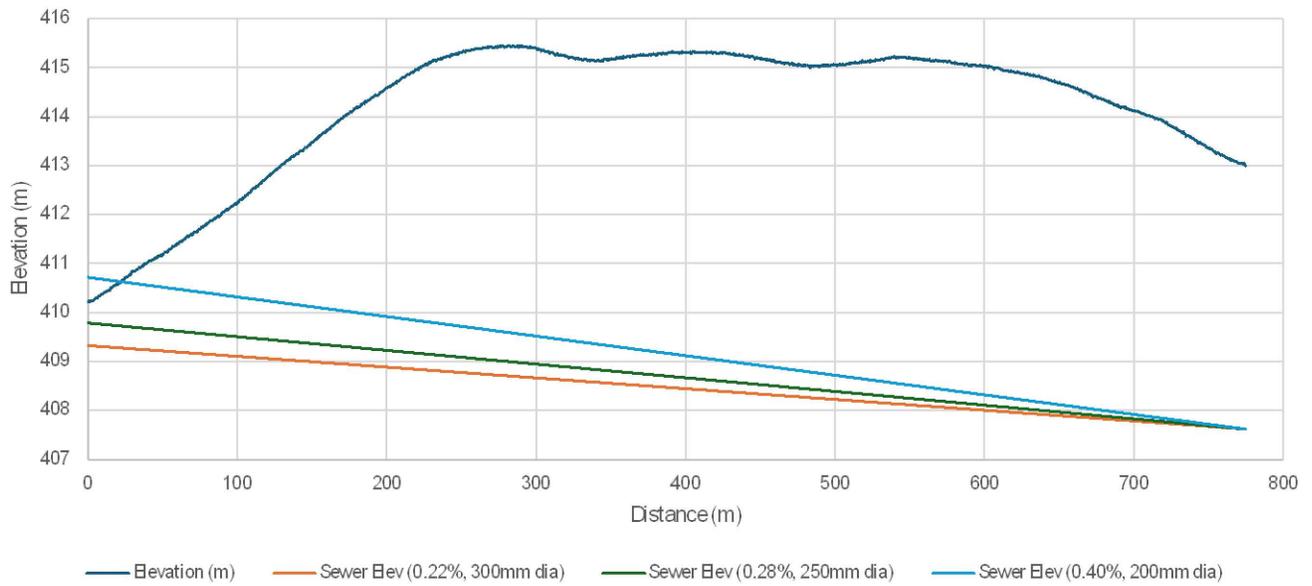
FIGURE No.
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Line 1 - Queen Street West - Lovers Lane to Cork Street



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Queen St W - Lovers Lane to Cork St
 Line - 1

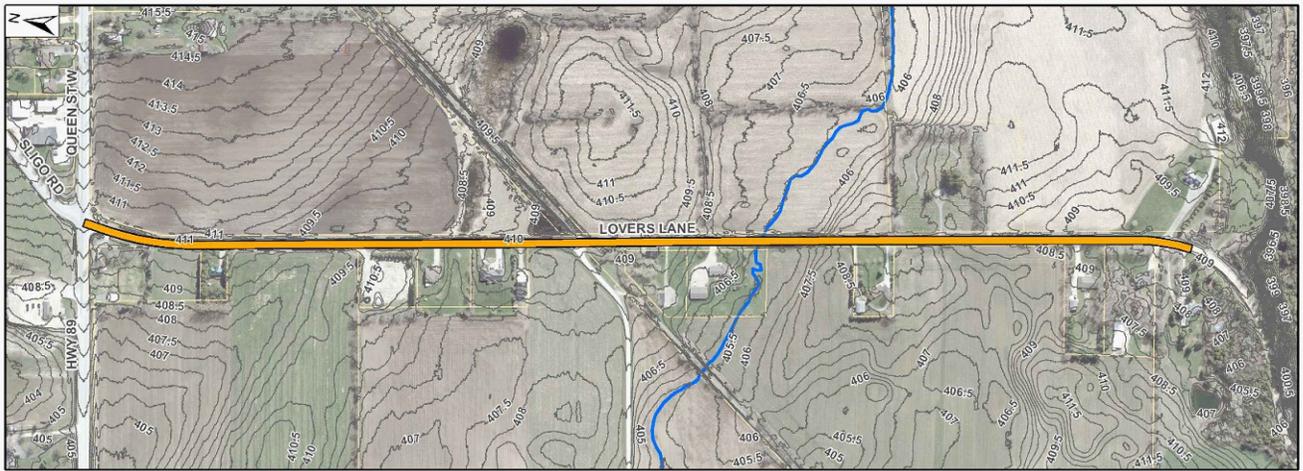
June 19
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PROJECT No.
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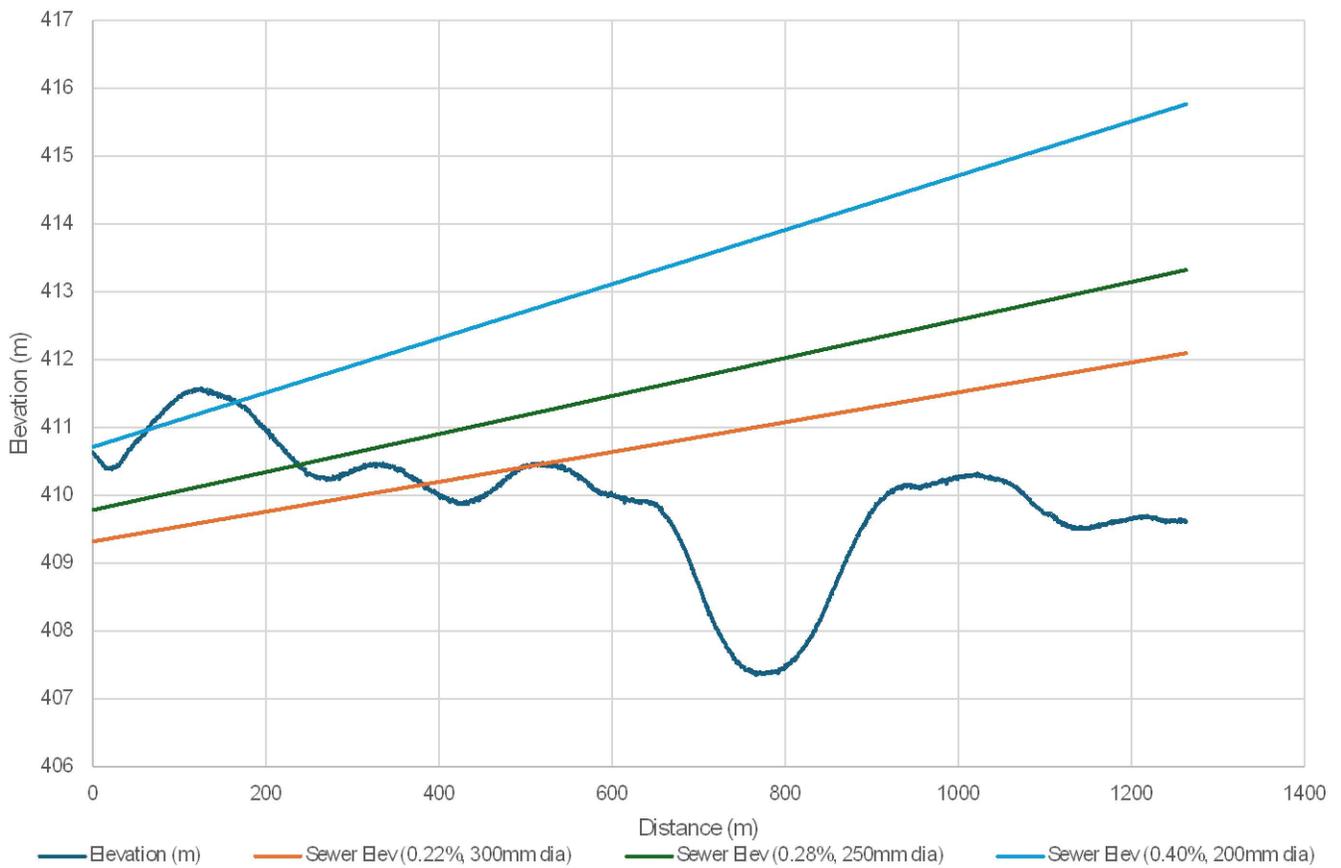
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FIGURE No.
 1

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Line 2 - Lovers Lane - Queen Street West to Curve



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 Lovers Lane - Queen St W to Curve
 Line - 2

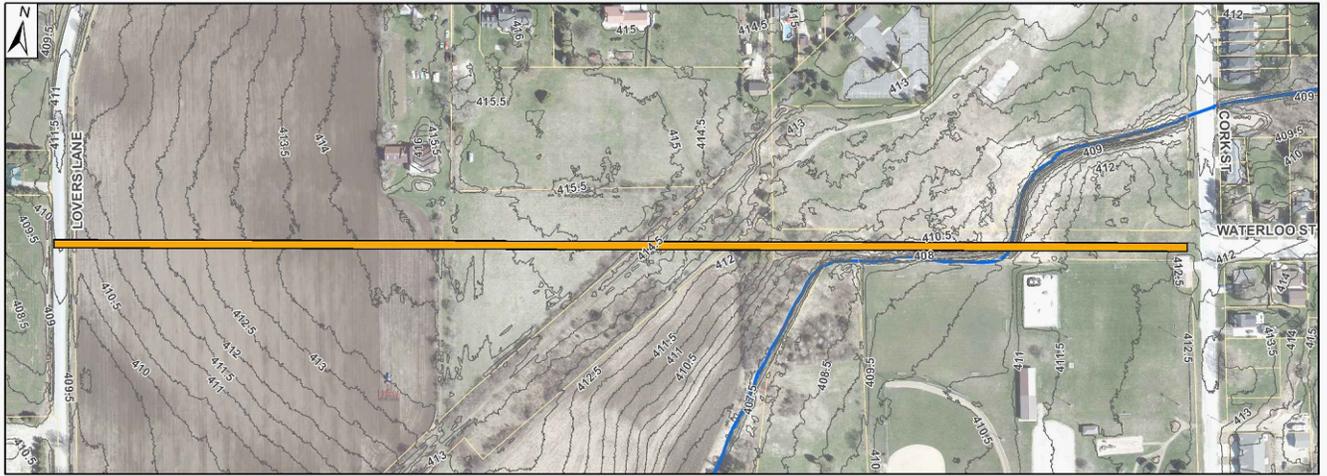
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PROJECT No.
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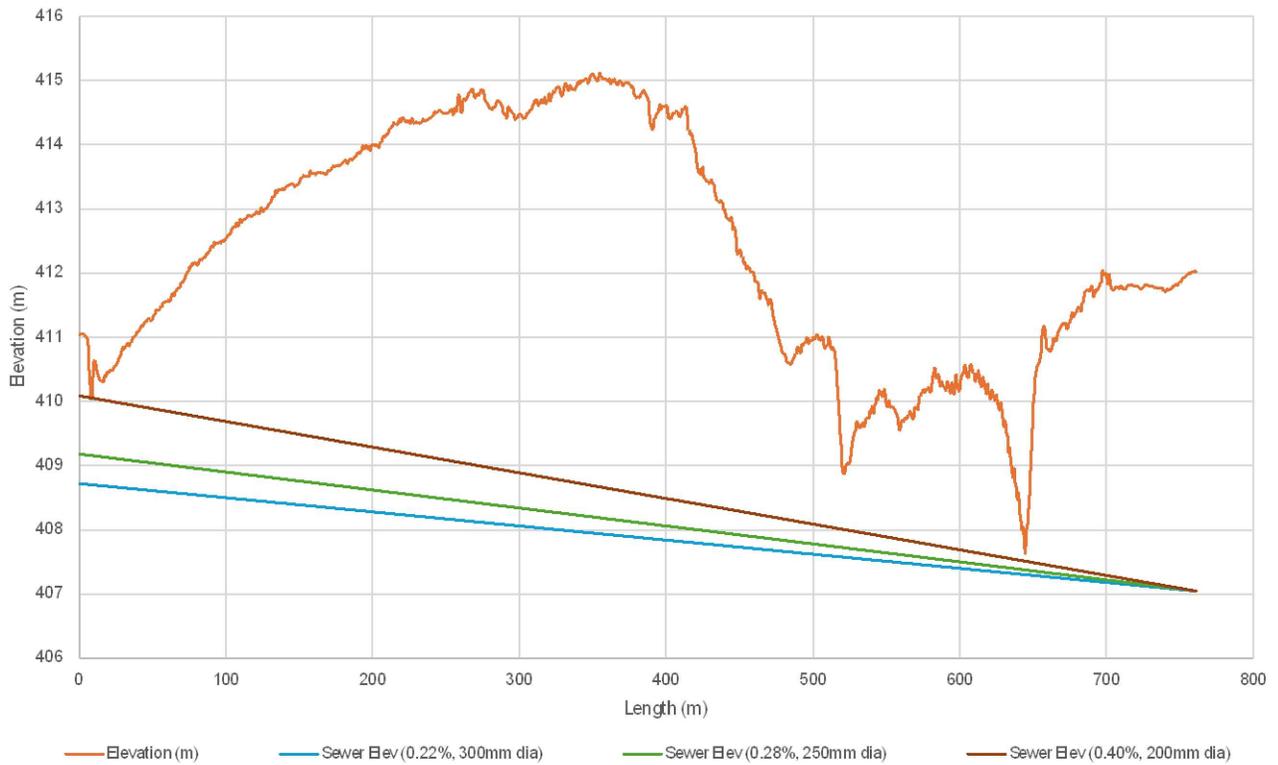
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FIGURE No.
 2

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Line 3 - Waterloo Street Easement - Lovers Lane to Cork Street



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Waterloo St Easement - Lovers Lane to Cork St
 Line - 3

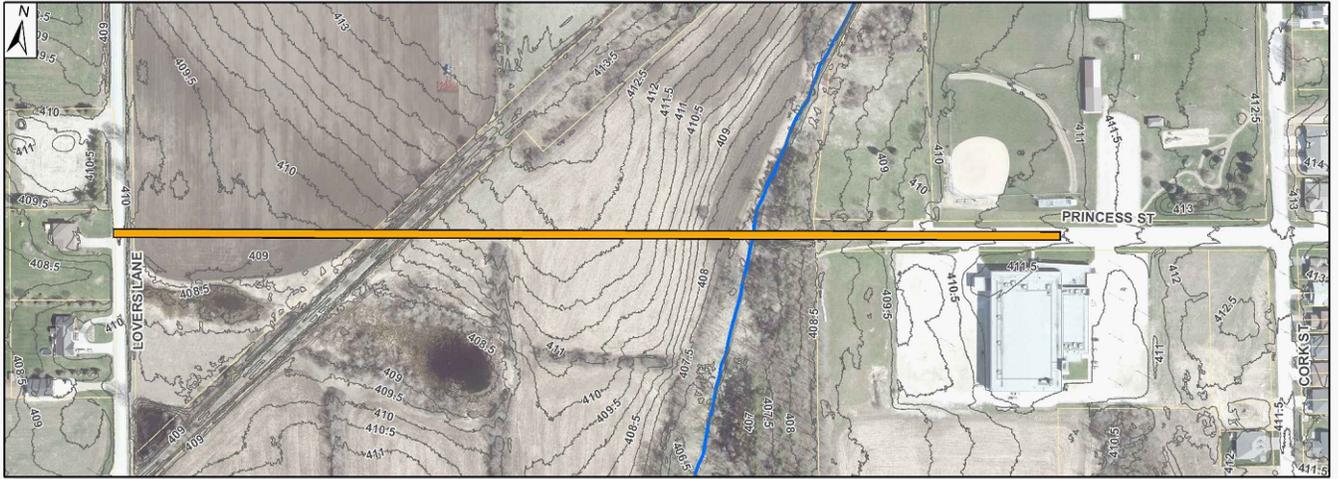
June 19
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PROJECT No.
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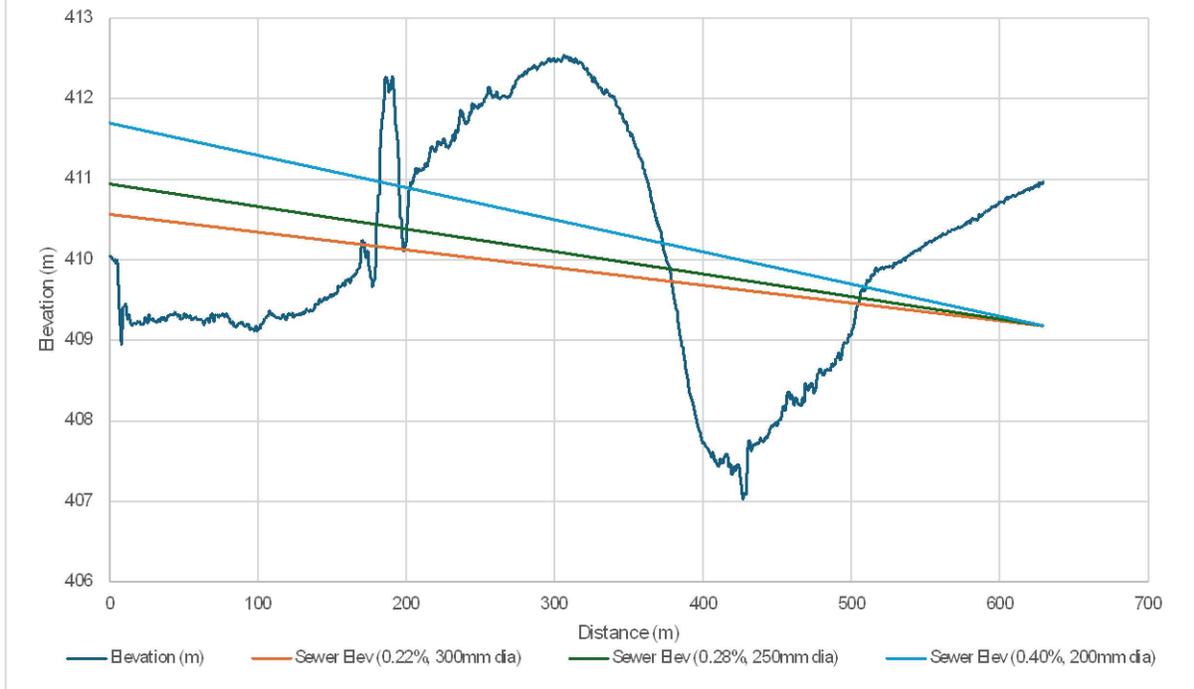
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FIGURE No.
 3

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Line 4 - Princess Street - Lovers Lane to Sports Complex



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 Tech Updates**
 Princess St - Lovers Lane to Sports Complex
 Line - 4

June 19
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PROJECT No.
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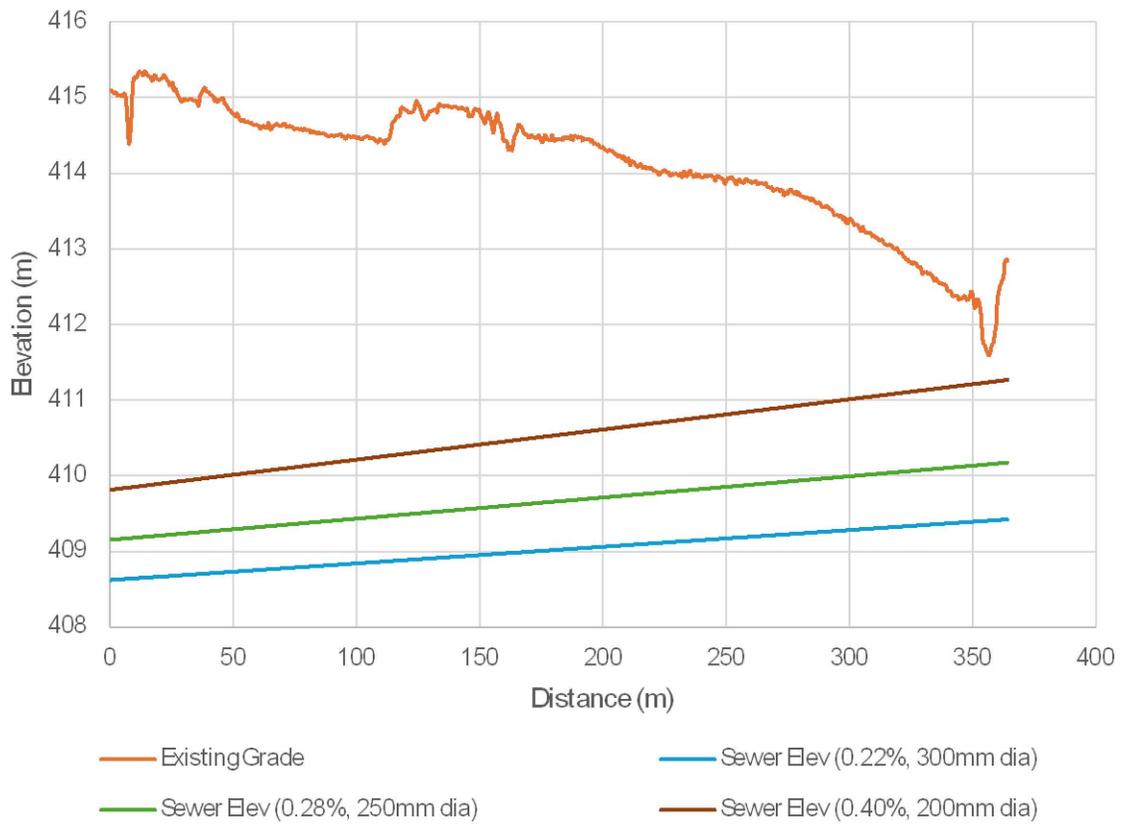
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FIGURE No.
 4

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Line 9 (1A) - South of Queen St



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South of Queen St
Line - 9

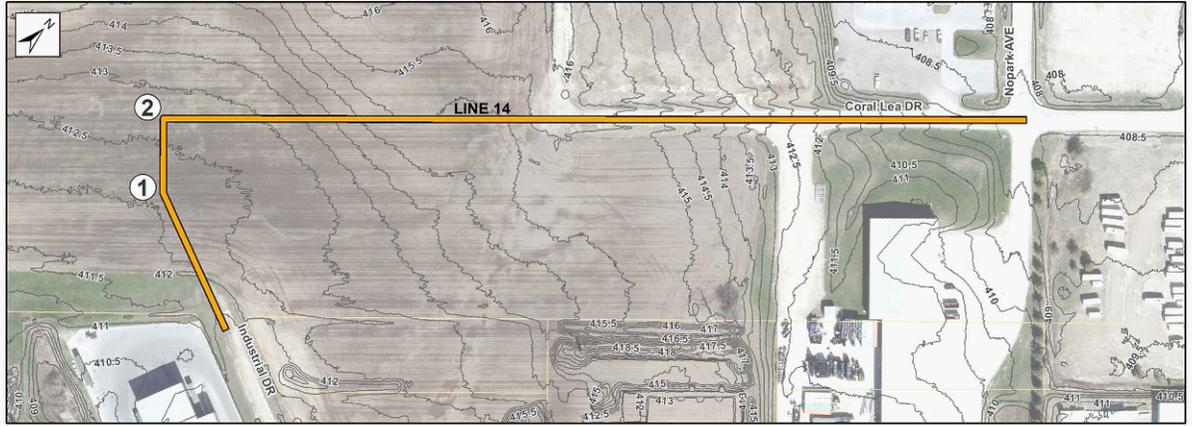
June 18
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PROJECT No.
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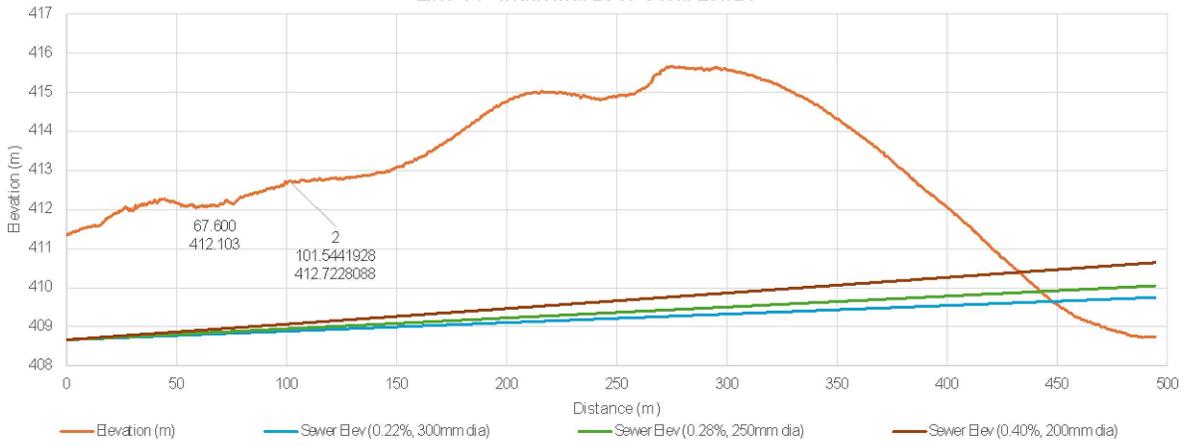
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FIGURE No.
9

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Line 14 - Industrial Dr to Coral Lea Dr



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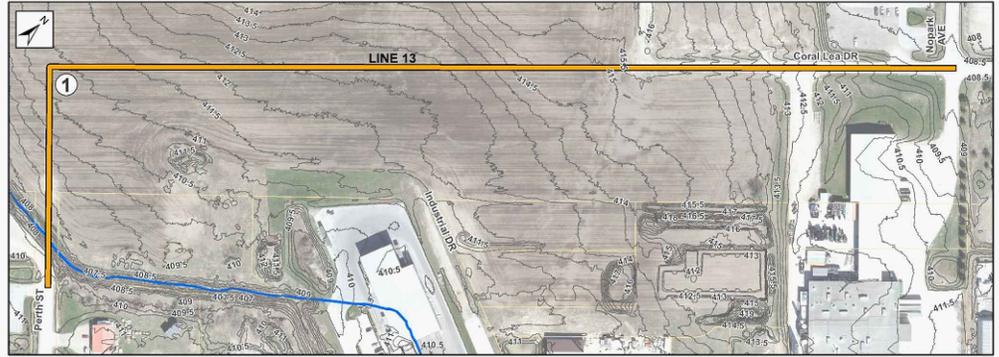
Township of
 Wellington North
 Tech Updates
 Industrial Dr to Coral Lea Dr
 Line - 14

June 18
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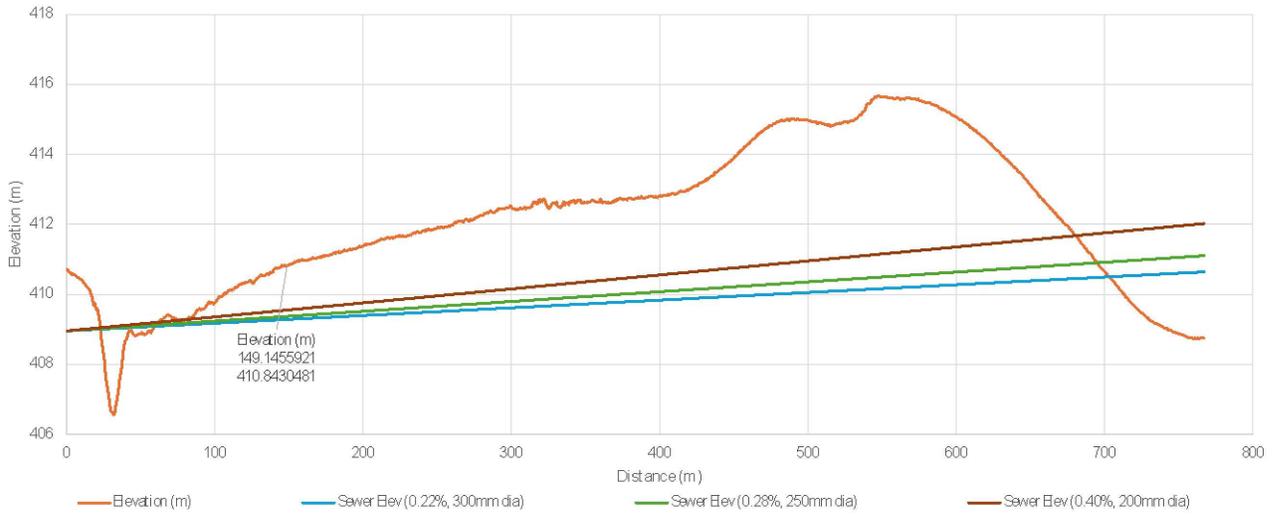
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FIGURE No.
 14



Line 13 - Perth St to Coral Lea Dr



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Perth St to Coral Lea Dr
Line - 13

June 18
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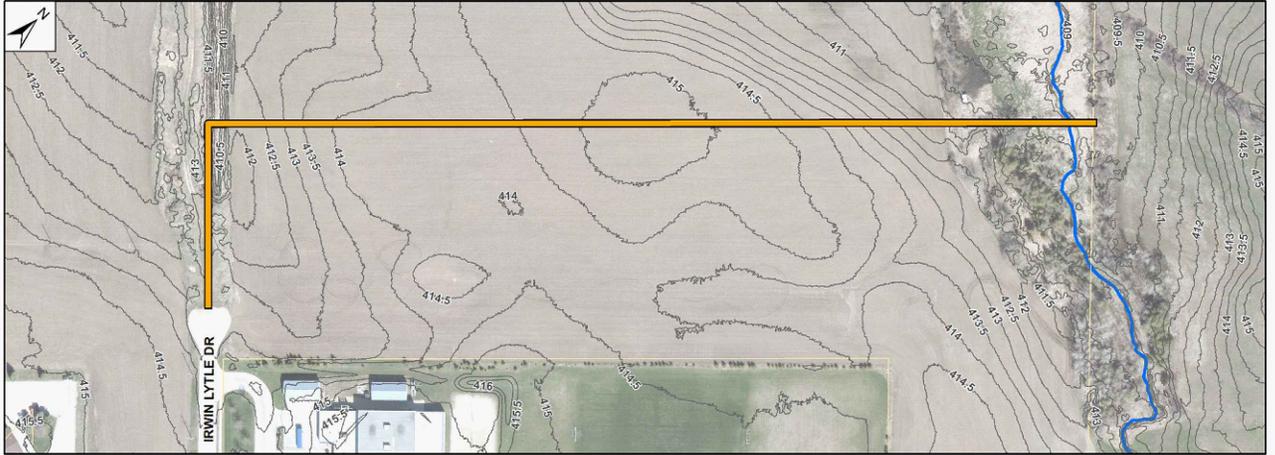
PROJECT No.
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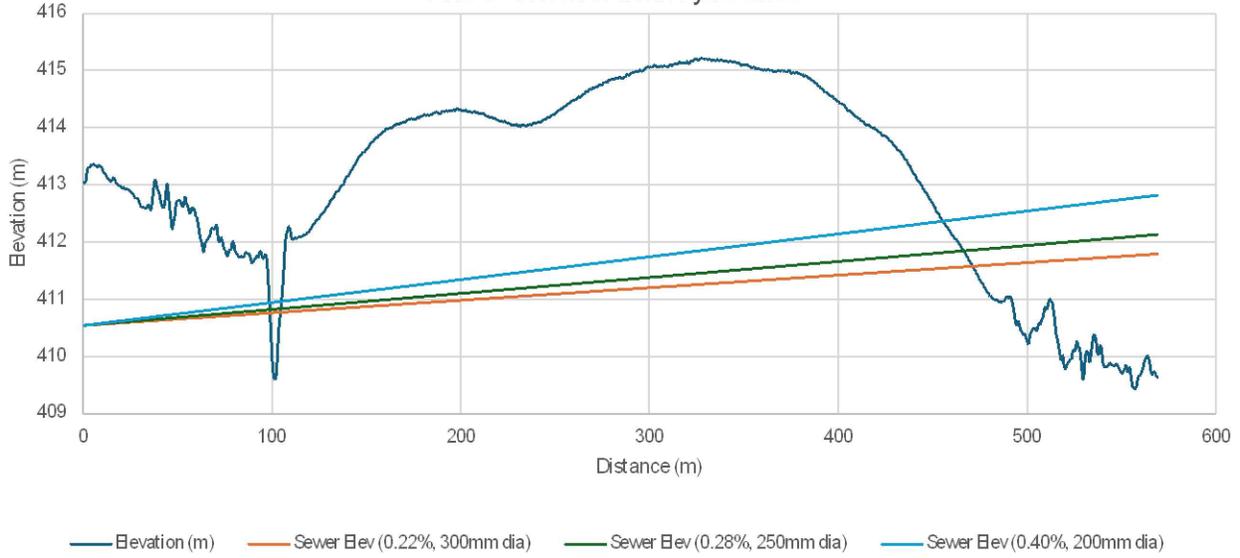
FIGURE No.
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Line 6 - North of Irwin Lytle Drive



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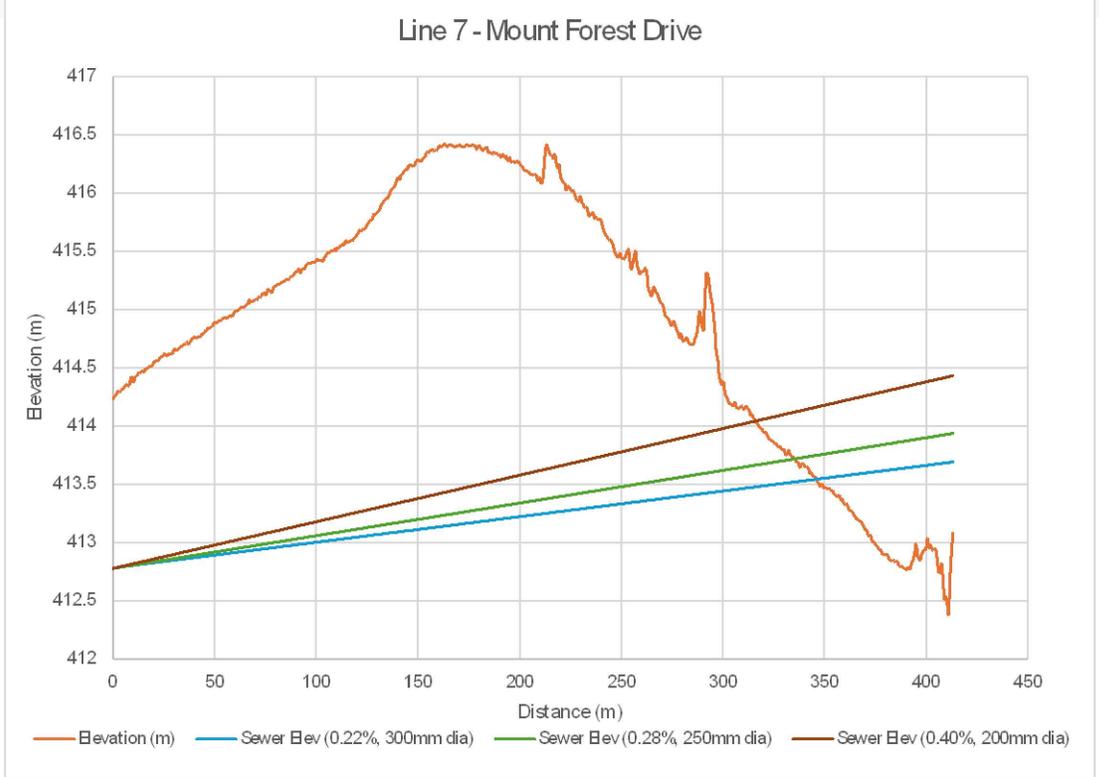
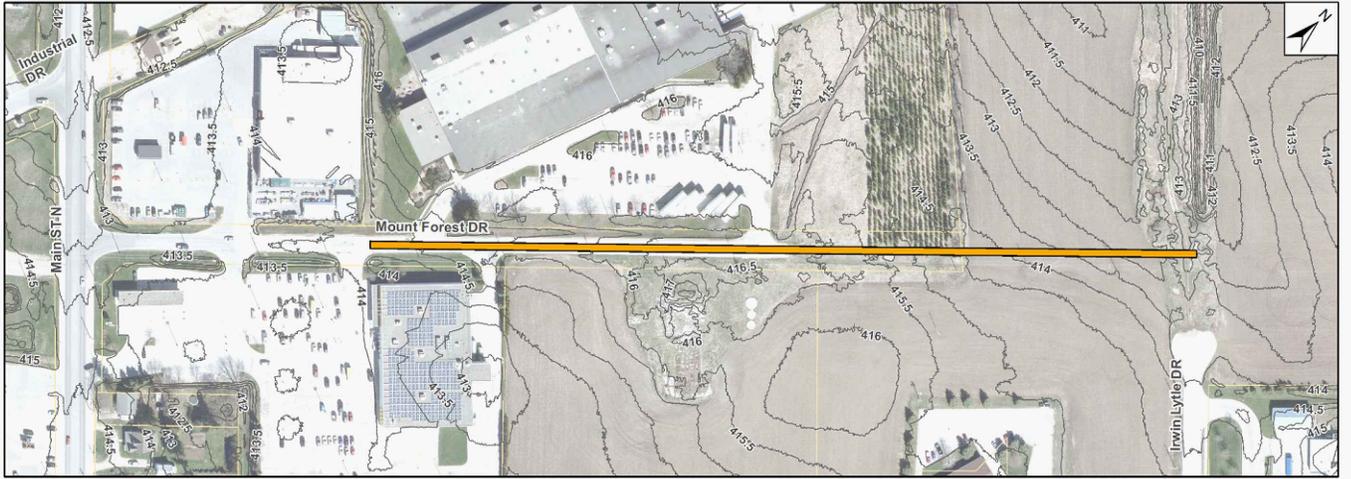
**Township of
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 Tech Updates**
 North of Irwin Lytle Dr
 Line - 6

June 18
 2025

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FIGURE No.
 6



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Wellington North
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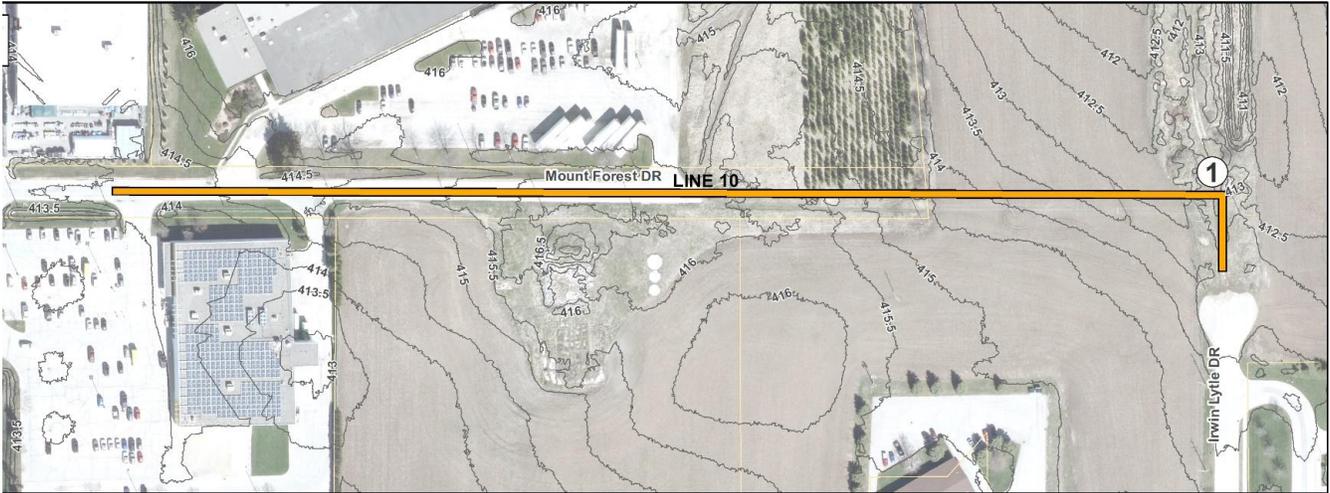
Mount Forest Drive
Line - 7

June 18
2025

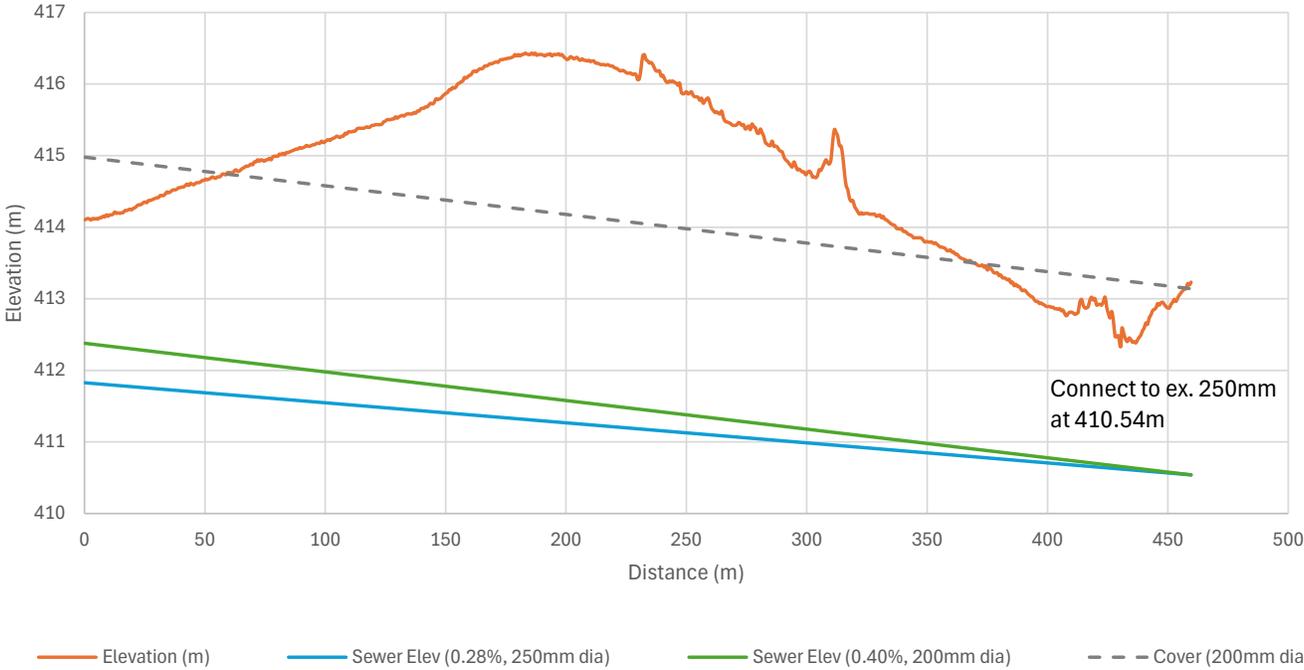
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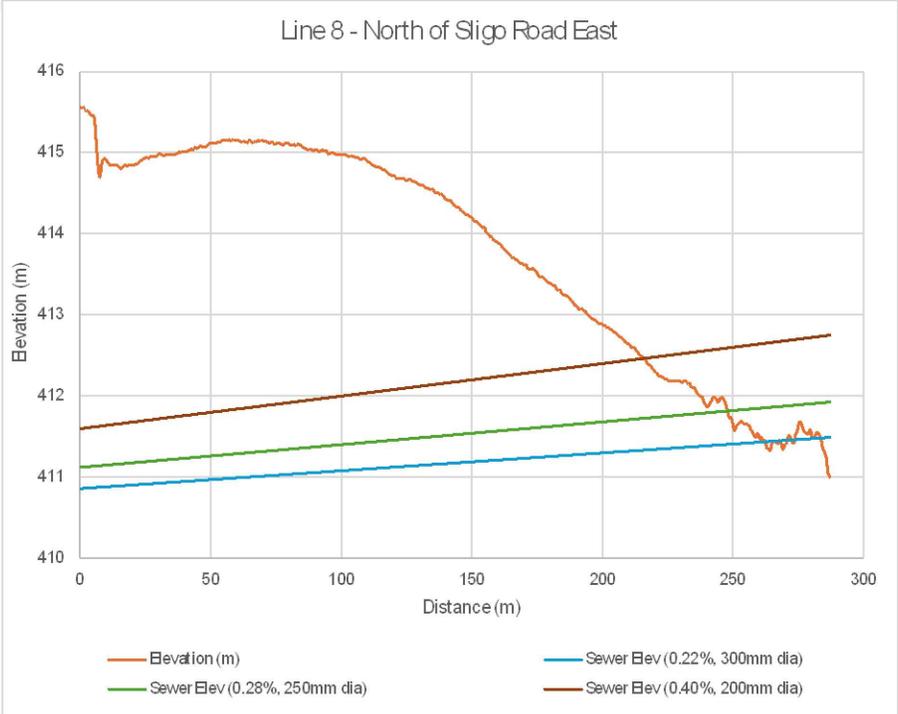
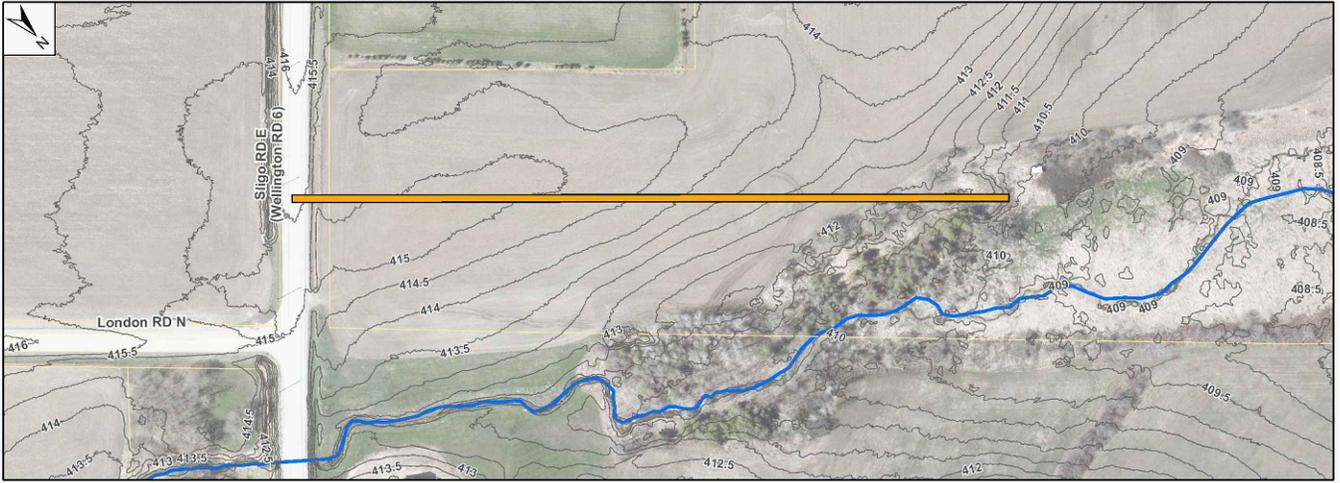
FIGURE No.
7



Line 10 - Mount Forest Dr to Irwin Lytle Dr



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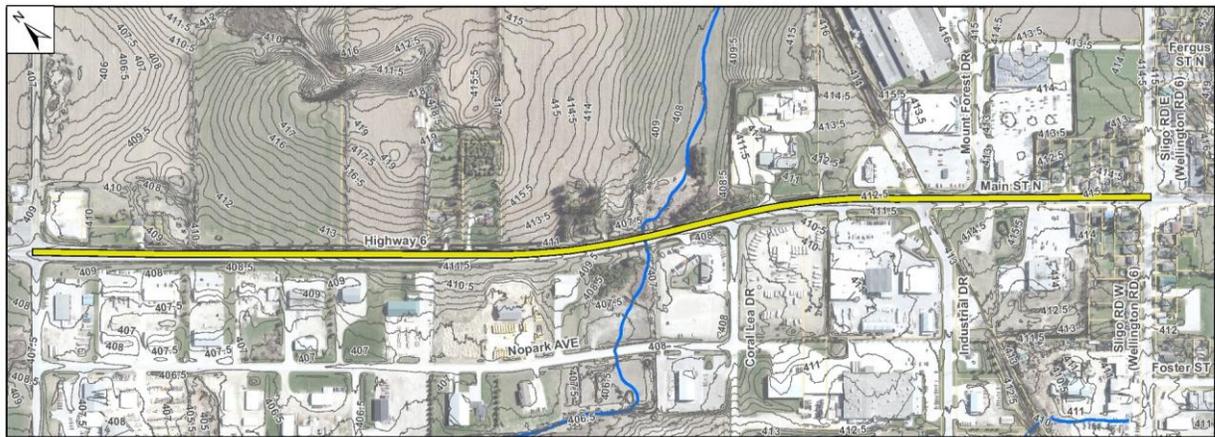
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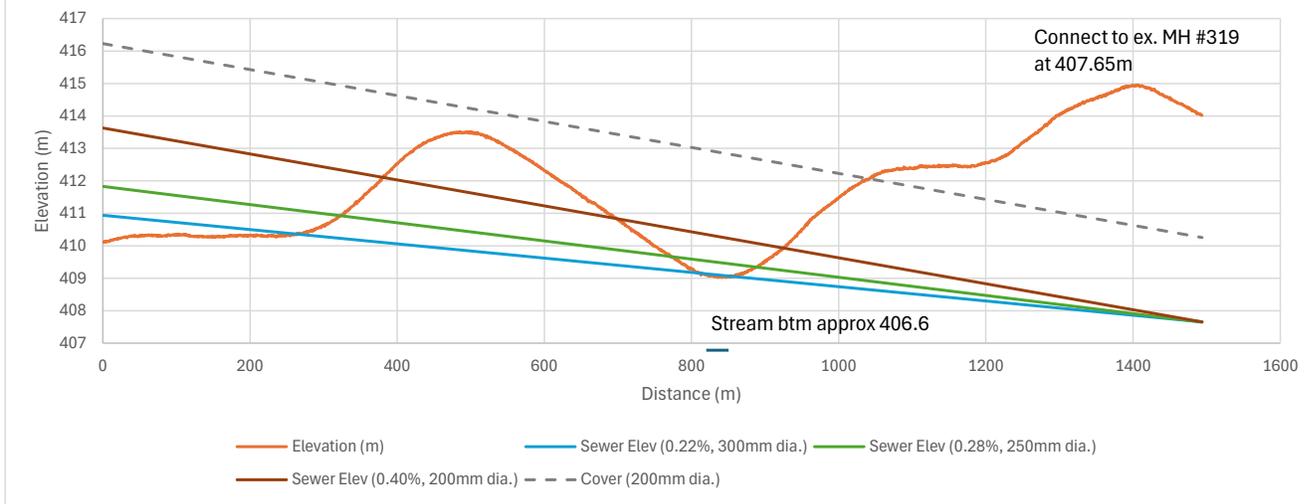
Township of
 Wellington North
 Tech Updates
 North of Sligo Rd East
 Line - 8

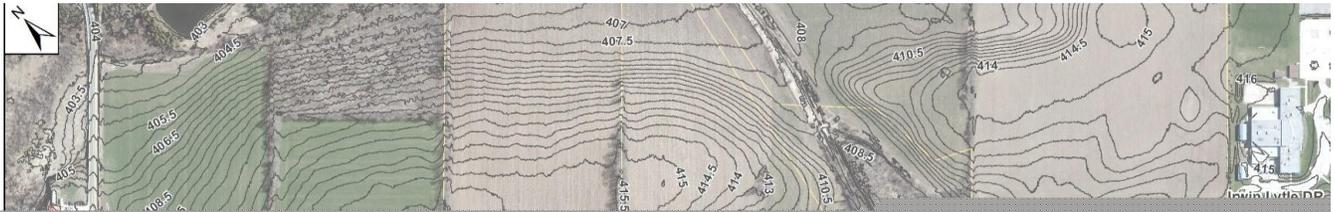
June 18 2025	PROJECT No. 24249
N.T.S	FIGURE No. 8

NORTHEAST INDUSTRIAL AREA

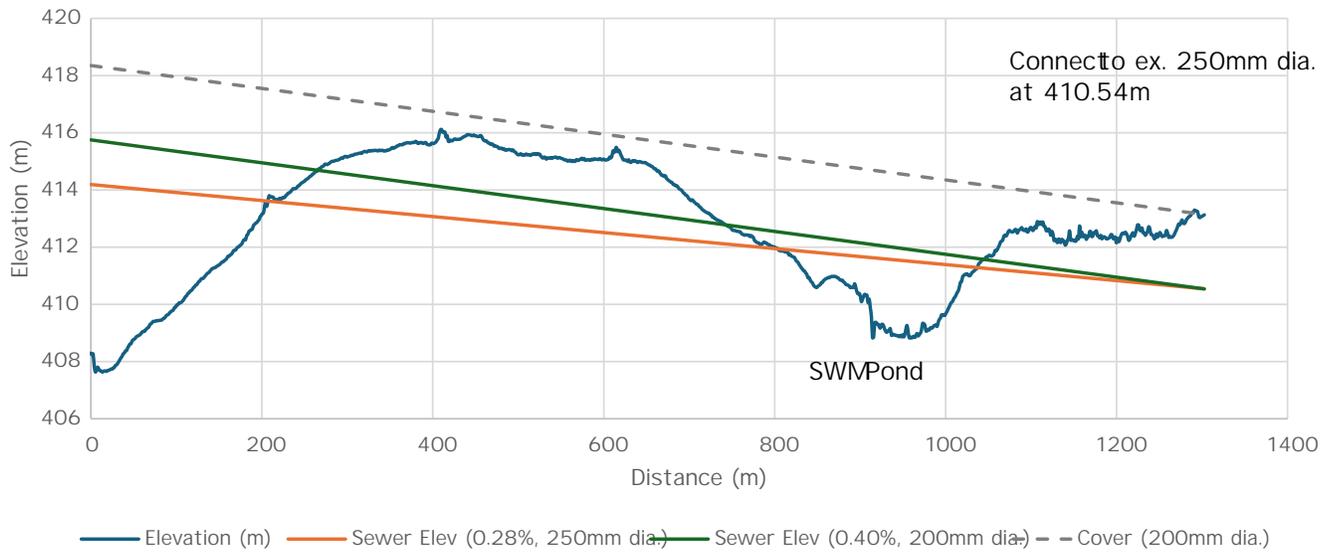


Highway 6 (North of Sligo)





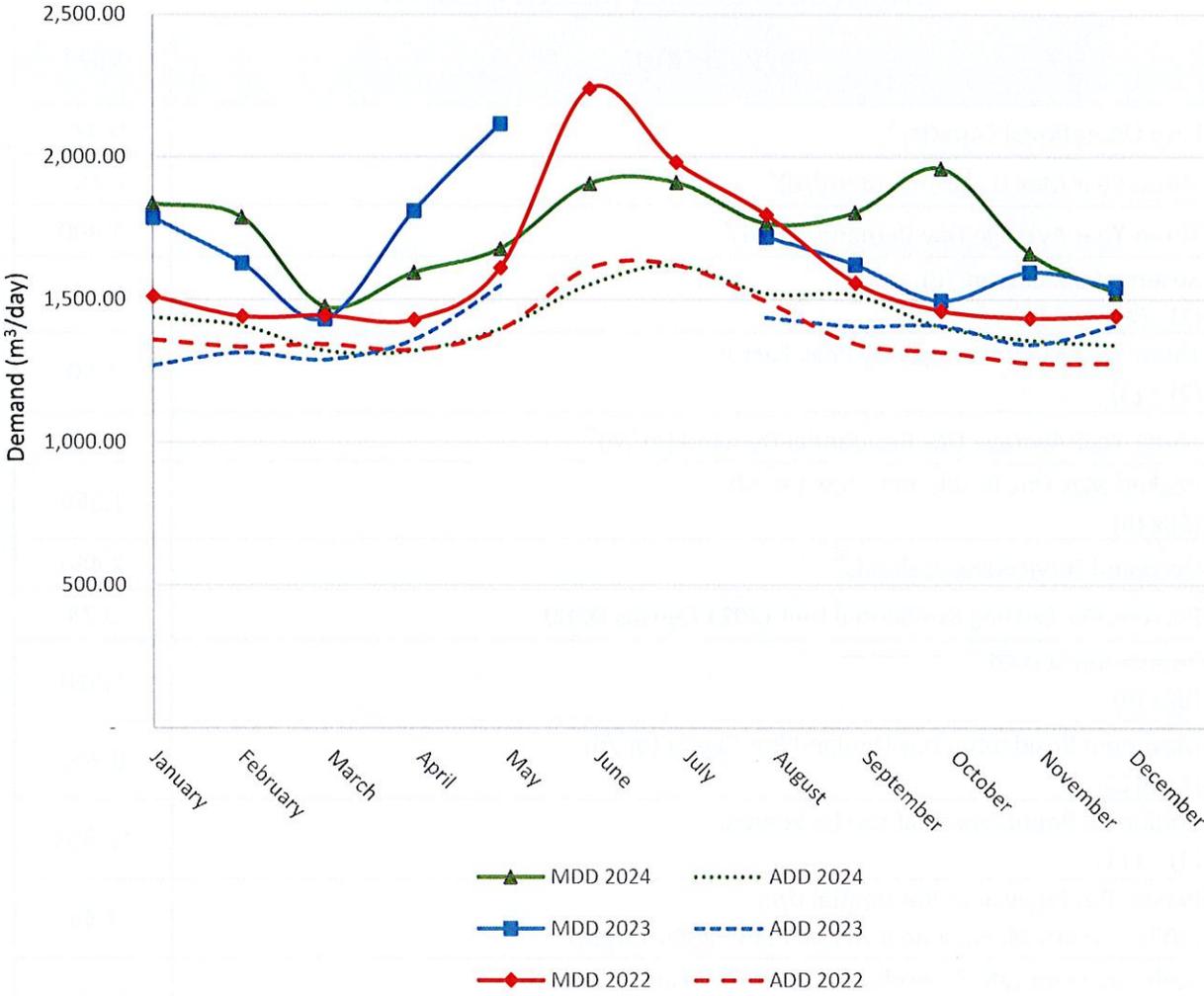
North of Irwin Lytle Drive



**TABLE 1.0
TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST
WATER SUPPLY 2025 RESERVE CAPACITY**

DESCRIPTION	2024
1 Firm Operational Capacity ¹	5,976
2 Three-Year Max Day Demand (m ³ /d) ²	2,105
3 Three-Year Average Day Demand (m ³ /d) ³	1,400
4 Reserve Capacity (m ³ /d) (1) - (2)	3,871
5 Three-Year Max/Average Day Peak Factor (2) ÷ (3)	1.50
6 Three-Year Average Day Residential Demand (m ³ /d) ⁴	1,103
7 Peaked Max Day Residential Flow (m ³ /d) (5) x (6)	1,659
8 Occupied Serviced Households ⁵	2,460
9 Persons Per Existing Residential Unit (2021 Census Data)	2.24
10 Population Served (8) x (9)	5,510
11 Maximum Residential Day Demand Per Capita (m ³ /d) (7) ÷ (10)	0.301
12 Additional Population that can be Served (4) ÷ (11)	12,853
13 Person Per Equivalent Residential Unit (2024 Growth Management Action Plan - 2026 Target)	2.44
14 Additional Equivalent Residential Units that can be served. (12) ÷ (13)	5,268
15 Committed Equivalent Residential Units (Table 3)	219
16 Uncommitted Reserve Capacity Equivalent Residential Units (14) - (15)	5,049
¹ Operational Capacity is as per the 2020 Technical Study Update.	
² Max day demand is the average of the maximum day demand of 2022, 2023 (adjusted) and 2024 (2,340 m ³ /d, 2,116 m ³ /d & 1,960 m ³ /d respectively).	
³ Average day demand is the average daily demand of 2022, 2023 & 2024 (1,391 m ³ /d, 1,377 m ³ /d and 1,432 m ³ /d* respectively).	
⁴ Average residential demand is the average daily demand with the ICI users discounted from 2022, 2023 and 2024 (1,127 m ³ /d, 1,082 m ³ /d and 1,102 m ³ /d respectively)	
⁵ 2,385 (2023) + 75 units connected in 2024.	
Note: The values presented have been rounded.	

MOUNT FOREST WATER HISTORIC TRENDS



**TABLE 1.1
TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST
WATER STORAGE 2025 ASSESSMENT**

DESCRIPTION	2024
1 Existing System Storage (m ³) ¹	2,000
2 Three-Year Max Day Demand (m ³ /d) (Table 1)	2,105
3 Existing Storage Required (m ³) (as per MECP Guidelines)	2,705
4 Existing Storage Deficit (m³) (1) - (3)	-705
5 Committed Equivalent Residential Units (Table 3)	219
6 Storage Required to Service Committed Developments (m ³)	2,805
7 Additional Storage Deficit (m³) (1) - (6)	-805
¹ Existing System Storage provided by Stand Pipe constructed in 1985.	
Note: The values presented have been rounded.	

**TABLE 2.0
TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST
WASTEWATER 2025 RESERVE CAPACITY**

DESCRIPTION	2024
1 Design Capacity of Sewage Treatment Facility (m ³ /d)	2,818
2 Average Day Flow ¹ (m ³ /d) (Average of 2022, 2023 and 2024 Average Day Flows)	1,882
3 Reserve Capacity (m ³ /d) (1) - (2)	936
4 Expected New Development Per Capita Flow ² (m ³ /d)	0.350
5 Additional Equivalent Population that can be Served (3) ÷ (4)	2,674
6 Person Per Equivalent Residential Unit (2024 Growth Management Action Plan - 2026 Target)	2.44
7 Estimated New Equivalent Residential Unit Flow Rate (4) x (6)	0.854
8 Additional New Equivalent Residential Units that can be Served (5) ÷ (6)	1,096
9 Committed Development Residential Units (Table 3)	219
10 Uncommitted Reserve Capacity New Development Equivalent Residential Units (8) - (9)	877
¹ Average day flow is the average daily flow from 2022, 2023 and 2024 (1,790 m ³ /d, 1,920 m ³ /d and 1,936 m ³ /d respectively)	
² Adjusted per person flow rate based on MOE recommended values and supported by current water usage rates.	
Note: The values presented have been rounded.	

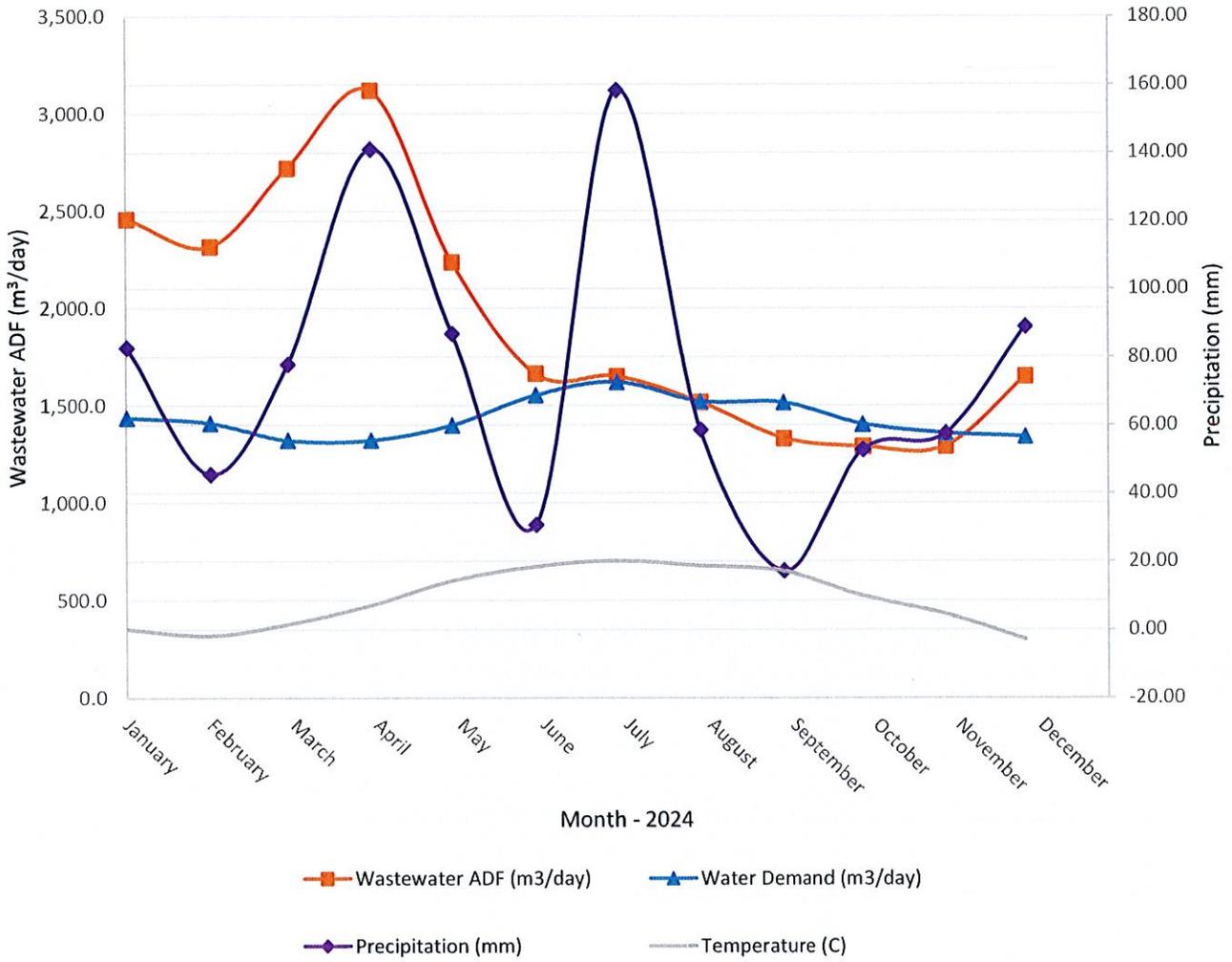
**TABLE 3.0
TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST
SUMMARY OF COMMITTED & BUILT DEVELOPMENTS 2024**

COMMITTED DEVELOPMENTS	ALLOCATED	UNITS ALLOCATED IN 2024	REMAINING (END OF 2024)
Lucas Subdivision (Reeves)	34	0	1
Martin Street (Betty Dee Ltd.)	3	0	1
London Road Subdivision (Bye)	30	0	22
Marlanna Homes - Newfoundland Subdivision (400 King St East)	24	2	16
Archcon Group Ltd (773 Princess St)	32	32	0
John Welton Custom Home Building - Sunvale Home Subdivision (Cork & Martin St)	141	0	141
Farhan Mahood (425-427 King Street East)	18	0	18
Wilson Developments Inc (440 Wellington Street East)	28	28	0
INFILL LOTS ¹	20	13	20
SUB-TOTAL	330	75	219
TOTAL COMMITTED UNITS			219
¹ 20 infill lots to be allocated each year.			

**TABLE 4.0
TOWNSHIP OF WELLINGTON NORTH
MOUNT FOREST
EXTRANEOUS FLOWS 2024**

MONTH	PRECIPITATION¹ (mm)	AMBIENT TEMP. (C°)	WASTEWATER ADF (m³/day)	WATER ADD (m³/day)	EXTRANEOUS FLOW (m³/day)
January-2024	82.70	0.11	2,458.4	1,436.4	1,022.0
February-2024	45.50	-1.85	2,316.7	1,408.6	908.1
March-2024	77.80	1.55	2,720.4	1,319.6	1,400.9
April-2024	141.00	7.10	3,119.7	1,319.7	1,800.0
May-2024	86.80	14.30	2,237.5	1,396.9	840.6
June-2024	30.70	18.40	1,663.1	1,551.1	112.0
July-2024	158.30	20.10	1,650.7	1,619.1	31.5
August-2024	58.50	18.70	1,517.3	1,520.7	0.0
September-2024	17.20	17.10	1,331.3	1,513.7	0.0
October-2024	52.70	9.90	1,289.8	1,403.1	0.0
November-2024	57.50	4.50	1,290.2	1,356.4	0.0
December-2024	88.90	-2.90	1,649.7	1,339.4	310.3
AVERAGE	897.4 (TOTAL)	8.92	1,937	1,432	535.5
REASONABLE EXTRANEOUS FLOW BASED ON POPULATION - TABLE 1.0 (m³/day)²					330.6
EXTRANEOUS FLOW OVER AND ABOVE REASONABLE AMOUNT(m³/day)					204.8
EQUIVALENT RESIDENTIAL UNITS USED BY EXTRANEOUS FLOWS (ERU)³					239.8
¹ Environment Canada - Daily Data Report for Mount Forest					
² Expected infiltration based on 60 Litres per person per day allowable infiltration (modified historic MOE Standard).					
³ Based on Future Development Unit Sanitary Flow Rate					

MOUNT FOREST EXTRANEANEOUS FLOWS 2024 TRENDS



protection without necessitating a full ACS. The limited occurrence of bypass events further supports the re-rating of this facility, with increasing development pressures in Mount Forest, it is important to secure this additional treatment capacity in a timely manner which will require MECP support of the proposed RIA approach.

Additionally, as part of the re-rating process a detailed review of key equipment (bar screens, grit chamber, flow meters, sludge and chemical dosing pumps) should be completed to verify they meet design specifications and can support the proposed capacity increase. The travelling bridge filter media was replaced in 2025 and both aeration cells cleaned out with the necessary diffusers replaced in 2023 and 2024, which will help ensure the system is operating at optimal performance.

Leachate Considerations:

The Mount Forest WWTP may be considered for leachate acceptance, which is highly concentrated and consumes significantly more treatment capacity than sewage. The impact will depend on the volume received (10m³/day annually), also needs review, as operational issues have been reported. Both leachate and septage handling should be assessed to confirm capacity and identify any required improvements. If this rate is not sufficient for the expected discharge rate during unloading, additional storage tanks may be required. This may also be warranted if the leachate is expected to have a negative impact on the treatment system; storage tanks would allow the leachate to be introduced at consistent and controlled rate. Expected quality (i.e., contaminants type/concentrations) of the leachate and septage should be considered as this may have a significant effect of the WWTP ability to assimilate these additional flow streams and will determine design requirements for any required modifications.

Additionally, it should be noted that if acceptance of the leachate is advanced, it is expected to require amendment to the existing ECA Permit and allocation of Reserve Capacity on an annual basis to ensure this capacity remains available for the leachate.

Recommendations:

Based on the forgoing, the WWTP currently has sufficient capacity to manage flows from the SPS, provided that all necessary maintenance is completed and the SPS does not exceed its designed maximum conveyance capacity. When evaluating the feasibility of leachate receiving/treatment, both the volume and quality of leachate along with the treatment capacity should be assessed prior to adding leachate treatment to the WWTP process. Further biological and hydraulic assessments should also be undertaken to confirm feasibility.

Therefore, to increase the rated capacity and potentially accept Leachate from the County landfill sites, the following is recommended:

Engage MECP (pre consult): Confirm that an RIA approach is acceptable for re rating; present monitoring evidence and growth context.

- **Proceed with RIA (conditional):** If MECP agrees, prepare and submit the RIA using existing monthly data and performance history.
- **Scope ACS (only if required):** If MECP insists on ACS, obtain and agree a focused scope, schedule, and data needs.

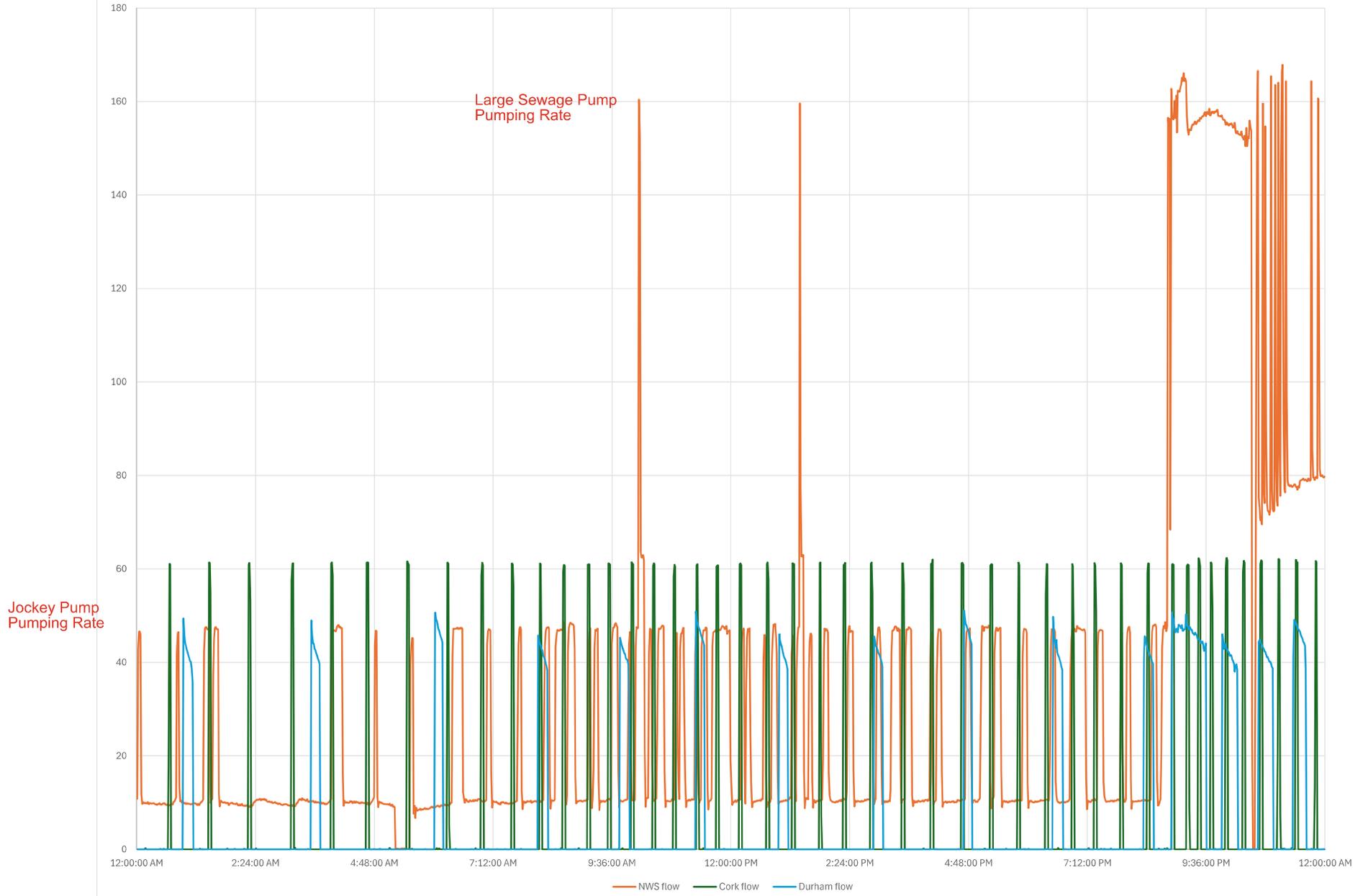
Engage Saugeen Valley Conservation Authority (pre-consult): Confirm other issues and/or potential environmental concerns.

Review key WWTP equipment: Complete a Condition Assessment of the existing critical components to verify that they meet design specifications and support the proposed increased capacity.

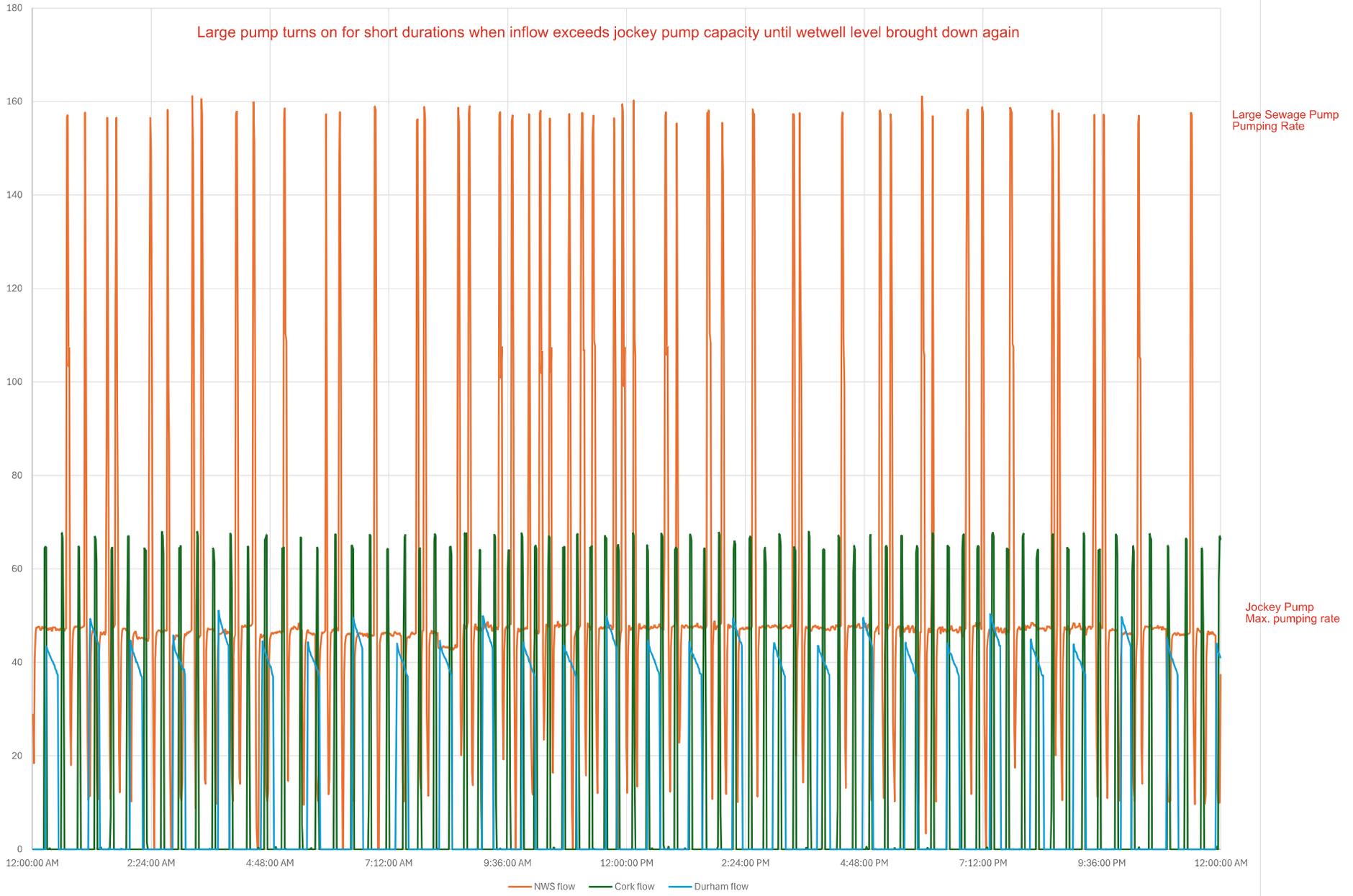
Evaluate septage receiving system: Confirm capacity and address operational issues relative to septage/leachate handling and evaluate the receiving location.

Analyse leachate feasibility: Assess expected leachate volume/quality and define any process

NWS-SPS Pumping Rate (L/s), May 14, 2022
(Maximum pumping rate in 2022, of 176.23 L/s)



NWS-SPS Pumping Rate (L/s), April 2, 2023
(This is day of maximum day flow in 2023 of 6,750 m3)



NWS-SPS Pumping Rate (L/s), May 4, 2023
(Maximum pumping rate in 2023 of 165.77 L/s)

