

Prepared By:



Region Of Peel

# Settlement Area Boundary Expansion (SABE) Water & Wastewater Servicing Analysis

**GMBP File: 721016**

**August 12, 2021**





REVISIONS LOG

Revision #	Date	Issue / Revision Description
1	April, 2021	Draft Version 1
2	May, 2021	Draft Version 2
3	July, 2021	Draft Version 3
4	August, 2021	FINAL

GM BluePlan Signatures

Report Prepared By:

Steve Jobson, P.Eng.

---

Sandy Naime, P.Eng.

---

Report Reviewed By:

Mark Zamojc, P.Eng.

---

## TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 Objective and Methodology .....	1
1.2 Study Area .....	1
<b>2. GROWTH AREA REVIEW AND SUMMARY .....</b>	<b>3</b>
2.1 Planning Context .....	3
2.2 Analysis Scenarios .....	4
2.3 Planning Notes and Observations .....	4
<b>3. DESIGN CRITERIA .....</b>	<b>5</b>
<b>4. WATER SYSTEM .....</b>	<b>6</b>
4.1 Water System Demands .....	6
4.1.1 SABE Scenario 0 .....	6
4.1.2 SABE Scenarios 1 to 4 .....	8
4.2 Water System Infrastructure Needs .....	13
4.2.1 West Transmission System (Pressure Zone 7W, 6W and Lower Pressure Zones) .....	13
4.2.2 Central Transmission System (Pressure Zone 7C, 6C and Lower Pressure Zones) .....	14
4.2.3 East Transmission System (Pressure Zone 7E, 6E, 7B, 6B and Lower Pressure Zones) .....	14
4.2.4 Water System Sensitivity Analysis (SABE Scenarios 1 to 4) .....	16
4.3 Water System Cost Analysis .....	18
<b>5. WASTEWATER SYSTEM .....</b>	<b>24</b>
5.1 Wastewater Flows Calculation .....	24
5.2 Trunk Infrastructure Needs – SABE Scenarios 0-4 .....	25
5.2.1 Area 1 - Winston Churchill Boulevard to McLaughlin Road .....	26
5.2.2 Area 2 - McLaughlin Road to Airport Road .....	27
5.2.3 Area 3 - Airport Road to The Gore Road .....	28
5.2.4 Area 4 - The Gore Road to Albion-Vaughan Road .....	29
5.3 Wastewater System Cost Analysis .....	30
<b>6. CONCLUSIONS .....</b>	<b>36</b>

### APPENDICES

Appendix A – Heat Maps

---

**SETTLEMENT AREA BOUNDARY EXPANSION (SABE)  
WATER & WASTEWATER SERVICING ANALYSIS****REGION OF PEEL****AUGUST 12, 2021****GMBP FILE: 721016**

---

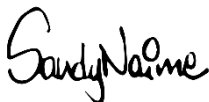
**1. INTRODUCTION**

The Region of Peel (the Region) has retained GM BluePlan Engineering to complete the water and wastewater servicing analysis for the Peel Settlement Area Boundary Expansion (SABE). This undertaking is a follow up analysis to the 2020 Water and Wastewater Master Plan for the Lake-Based System (Master Plan) to review the servicing needs in the Caledon area, including future growth areas north of Mayfield Road beyond the planned “2041 servicing boundary”.

**1.1 Objective and Methodology**

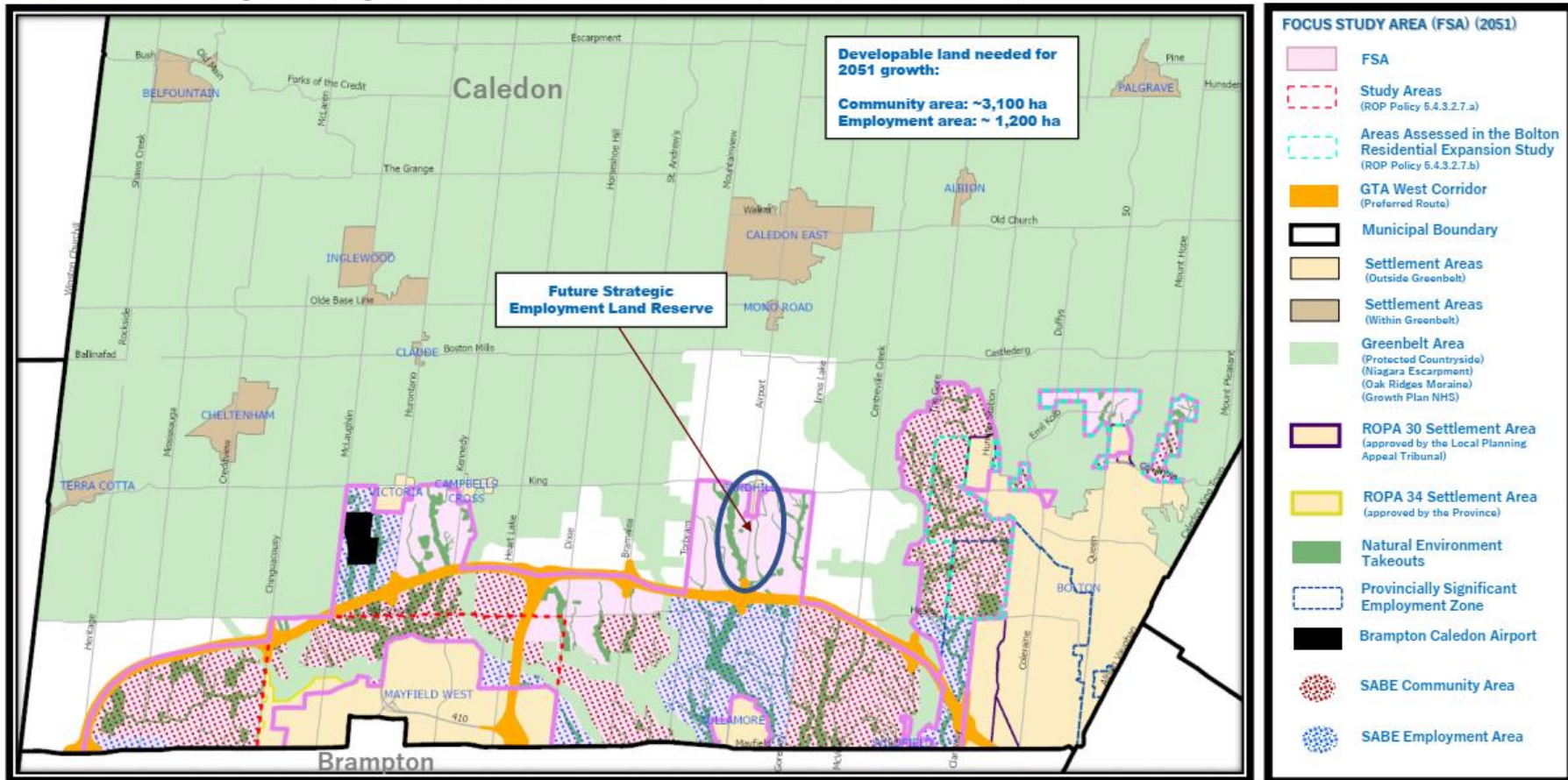
Prior to finalizing the exact locations and scale of 2041 to 2051 growth within the areas beyond the 2041 servicing boundary, the Region has requested completion of a high-level water and wastewater servicing analysis. This analysis consisted of the following steps:

1. Undertake a background review of the preliminary planning projections (SABE Baseline Scenario 0 and Scenarios 1-4) within the Small Geographic Units (SGUs) provided by the Region.
2. Calculate the water demands and wastewater flow estimates for the SABE focus study area subdivided by pressure zone and drainage area.
3. Determine high level, localized water and wastewater servicing needs along with associated costs to service the SABE focus study area. Desktop analysis of the servicing needs was undertaken (i.e. no hydraulic modelling was completed). The servicing needs reviewed the following:
  - o Water Pumping and Storage
  - o Trunk Water Transmission and Sub-Trunk Water Distribution
  - o Wastewater Pumping
  - o Trunk and Sub-Trunk Wastewater Conveyance
  - o *Note: Water or Wastewater Treatment needs as well as Operating and Maintenance Costs were not reviewed as part of this analysis; these costs were considered to be approximately equivalent across all scenarios*

**1.2****Study Area**

The Study Area (Figure 1) is located in the northern portion of the lake-based service areas of the Region of Peel, generally in South Caledon (including Mayfield West and Bolton). The SABE focus study area identified for growth are generally between Mayfield Rd and the proposed GTA West Corridor, along with expansion areas in West Bolton (west of Coleraine Dr) and northwest Bolton (north of King St). North Bolton (north of Columbia Way) consists of portions of the Bolton Residential Expansion Study (BRES) area. Servicing requirements specifically for these lands are currently being refined by the Region and are subject to change. Some of the growth areas noted above were forecasted to have growth to 2041 within the 2020 Water and Wastewater Master Plan, however, the SABE planning forecasts to 2051 have identified further growth within these areas as well as in areas shown to have no growth in the Master Plan.

# SABE Concept Map (December 2020 version updated with ROPA 30 LPAT Settlement & Approved ROPA 34)



**WARNING TO USERS:** This map represents a conceptual area for the Settlement Area Boundary Expansion and is being provided for information purposes only. Users are advised that this mapping is currently in draft and may change. The Region of Peel does not certify the accuracy of the information provided nor does it provide any assurance that the mapping will remain unchanged. Any reliance placed by the user on the information provided herein is strictly at the risk of the user, and the Region of Peel does not assume responsibility for any loss or damages resulting to the user or any third party by reliance on this information.

**Notes:**

- Other natural environmental constraints not identified on this map, including potential restoration lands, will be identified through further analysis and may further limit development.
- The ~4,300 ha SABE is based on a draft land needs assessment which is under review.

**DISCLAIMER**  
 Mapping is DRAFT  
 only for further study  
 and discussion.

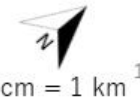


Figure 1 - Study Area

## 2. GROWTH AREA REVIEW AND SUMMARY

### 2.1 Planning Context

The Region of Peel has provided five planning scenarios which contain population and employment forecasts for the Region to 2051. Table 1 below provides a summary of the five scenarios as well as the planning forecasts to 2041 as per Scenario 16 of the 2020 Water and Wastewater Master Plan for the Lake-Based System. Table 2 provides a summary of the five scenarios and planning estimates to 2051.

*Table 1 – Planning Forecasts to 2041*

Population 2041						
Scenario	Master Plan	0 – LNA Base	1-Updated LNA Base	2-Higher DGA Density	3-Lower DGA Density	4-Min Intensification
Brampton	890,000	930,000	931,000	931,000	931,000	920,000
Caledon	160,000	203,000	203,000	203,000	203,000	237,000
Mississauga	920,000	916,000	917,000	917,000	917,000	893,000
<b>Total</b>	<b>1,970,000</b>	<b>2,049,000</b>	<b>2,051,000</b>	<b>2,051,000</b>	<b>2,051,000</b>	<b>2,050,000</b>
Employment 2041						
Scenario	Master Plan	0 – LNA Base	1-Updated LNA Base	2-Higher DGA Density	3-Lower DGA Density	4-Min Intensification
Brampton	325,000	314,000	315,000	315,000	315,000	313,000
Caledon	80,000	81,000	83,000	83,000	83,000	86,000
Mississauga	565,000	563,000	562,000	562,000	562,000	560,000
<b>Total</b>	<b>970,000</b>	<b>958,000</b>	<b>960,000</b>	<b>960,000</b>	<b>960,000</b>	<b>959,000</b>

*Note: Planning estimates rounded to the closest 1,000.*

*Table 2 – Planning Forecasts to 2051*

Population 2051					
Scenario	0 – LNA Base	1-Updated LNA Base	2-Higher DGA Density	3-Lower DGA Density	4-Min Intensification
Brampton	984,000	985,000	985,000	985,000	960,000
Caledon	300,000	300,000	300,000	300,000	360,000
Mississauga	995,000	995,000	995,000	995,000	960,000
<b>Total</b>	<b>2,279,000</b>	<b>2,280,000</b>	<b>2,280,000</b>	<b>2,280,000</b>	<b>2,280,000</b>
Employment 2051					
Scenario	0 – LNA Base	1-Updated LNA Base	2-Higher DGA Density	3-Lower DGA Density	4-Min Intensification
Brampton	353,000	356,000	356,000	356,000	355,000
Caledon	125,000	126,000	125,000	126,000	131,000
Mississauga	590,000	590,000	590,000	590,000	586,000
<b>Total</b>	<b>1,068,000</b>	<b>1,072,000</b>	<b>1,071,000</b>	<b>1,072,000</b>	<b>1,072,000</b>

*Note: Planning estimates rounded to the closest 1,000.*



## 2.2 Analysis Scenarios

For the purposes of comparing future servicing requirements and infrastructure costs, we have categorized the planning and analysis scenarios as follows:

### **Master Plan (Scenario 16) 2041**

2041 population and employment projections as per the 2020 Water and Wastewater Master Plan for the Lake-Based System. This is the starting point for the analysis. Any future servicing and infrastructure requirements identify as part of this analysis are above and beyond of those identify in the 2020 Master Plan Water and Wastewater Capital Programs.

### **SABE Baseline 2051 – Scenario 0**

2051 population and employment projections including growth in new areas beyond the 2041 servicing boundary for the lake-based systems. This is the baseline scenario for analysis of the SABE study area and is based on 55% Intensification Rate and DGA Density of 65 ppj (people and jobs per hectare)

### **SABE 2051 – Scenarios 1 - 4**

2051 population and employment projections including growth in new areas beyond the 2041 servicing boundary for the lake-based systems with modifications in planning density and location of growth. These scenarios represent high-level modifications of the Scenario 0. As shown in Table 2, the total population and employment within these scenarios for 2051 is consistent across the scenarios. However, there are significant shifts in the location of growth for each scenario.

- Scenario 1 (Updated LNA Base) is based on a 55% Intensification Rate, Density Target of 65 ppj/ha
- Scenario 2 (Higher DGA Density) is based on a 55% Intensification Rate, Density Target of 75 ppj/ha
- Scenario 3 (Lower DGA Density) is based on a 55% Intensification Rate and a Density Target of 55 ppj/ha
- Scenario 4 (Minimum Intensification) is based on a 50% Intensification Rate and a Density Target of 65 ppj/ha

Heat maps displaying geographical allocation of the population and employment growth from 2041 to 2051 for each scenario are presented in **Appendix A**.

## 2.3 Planning Notes and Observations

From the review of the planning and analysis scenarios the following observations were noted:

- 2041 population projections are significantly higher (~70K) that those included in the 2020 Water and Wastewater Master Plan for 2041.
  - A key area to note is Caledon, which projected **160,000** people in **2041** within the Master Plan, increased to **203,000-237,000** in the SABE **2041** Scenarios, followed by **300,000-360,000** in the SABE **2051** Scenarios. *Caledon's population is predicted to be about double what was planned in 2041 in the Master Plan*
- 2041 employment projections are lower (~10K) that those included in the 2020 Water and Wastewater Master Plan for 2041.
  - This analysis included servicing requirements above and beyond the 2020 Water and Wastewater Master Plan 2041 projections; therefore, any growth identified as part of this analysis refers to:

**Total Growth (2041-2051) = 2051 population and employment - 2041 Master Plan population and employment**

- Total population and employment projections for 2051 are consistent across the five planning scenarios. However, there are significant shifts in the location of growth for each scenario with scenarios 3 and 4 having allocated growth to areas north of the proposed GTA West Highway.
- Scenario 4 is the scenario with the highest growth allocated to the SABE study area of all scenarios. The additional growth in the Town of Caledon has been re-allocated from the City of Mississauga.

- Impacts to the water and wastewater systems due to the reduced projected growth in Mississauga are not part of the scope of this analysis.
- Specific to the water system pressure zones, Pressure Zone 6E has noticeably higher population throughout the 2016 to 2051 timeframe. It is expected that the differences are caused by slight variations in the boundary splits between West, Central and East. Since this exercise was more focused on being a comparison between the five SABE scenarios, the discrepancy does not impact the overall analysis.
- Throughout Pressure Zone 7, there is a dramatic increase in growth compared to the Master Plan, even within the 2041 timeframe. This means that it would not only impact additional projects that would be required post-2041 but would also impact the timing of various projects included in the current 2020 Master Plan Capital Program. Impacts to the timing of other projects within the 2020 Master Plan have not been identified as part of this project since the project was generally focused on the ultimate servicing for the various 2051 scenarios and the relative difference in infrastructure & cost between these scenarios.

### 3. DESIGN CRITERIA

Water demands and wastewater flows for this analysis were calculated using the Region’s latest design criteria for the distribution and collection systems, which was revised as part of the 2020 Water and Wastewater Master Plan for the Lake-Based System. The design criteria are summarized as follows:

#### ***Water and Wastewater Design Criteria***

*Table 3 – Water and Wastewater Design Criteria*

Water	Type of Development	Average Dry Weather Flow	Maximum Day Peaking Factor	Peak Hour Peaking Factor
	Residential	270 L/cap/day	1.8	3.0
	Employment	250 L/cap/day	1.4	3.0
Wastewater	Wastewater Design Criteria for Treatment Plants			
	Type of Development		Average Daily Flow	
	Residential & Employment		315 L/cap/day	
	Wastewater Design Criteria for Collection System Components			
	Type of Development	Average Dry Weather Flow	Peaking Factor	I/I Allowance
	Residential	290 L/cap/day	Harmon (min 2, max 4)	0.26 L/s/ha
Employment	270 L/cap/day			

#### ***Water Storage Needs Criteria***

Storage needs were estimated by the Ministry of Environment, Conservation, and Parks (MECP) approach as outlined below:

$$\text{Total Treated Water Storage Requirement} = A + B + C$$

Where: A = Fire Storage;

B = Equalization Storage (25% of maximum day demand); and

C = Emergency Storage (25% of A + B).



## 4. WATER SYSTEM

### 4.1 Water System Demands

To facilitate the determination of servicing needs and impacts to existing and planned infrastructure, the growth projections were separated into the various pressure districts and also sub-divided into the West, Central, East and Bolton areas within each pressure district. This is in line with the 2020 Master Plan analysis and helps to provide a clearer comparison of how each of the SABE scenarios compare with the prior Master Plan.

The SABE growth area covers Pressure Districts 6 and 7 (West, Central, East, & Bolton) for a total of eight service areas. These service areas are the focus of the water system analysis and can be seen in Figure 2.

Table 4 below provides a brief summary and comparison of the five SABE scenarios considered in this study and the additional demands beyond what the Master Plan 2041 scenario considered.

*Table 4 – Projected Additional 2041-2051 Water Demands (2051 SABE Scenario 0 minus 2041 Master Plan)*

Scenario	Additional Population	Additional Employment	Additional ADD (MLD)	Additional MDD (MLD)	Additional PHD (MLD)
Scenario 0	140,000	42,000	48.3	82.7	144.9
Scenario 1	140,000	43,000	48.6	83.1	145.7
Scenario 2	140,000	43,000	48.6	83.1	145.7
Scenario 3	140,000	44,000	48.8	83.4	146.4
Scenario 4	200,000	50,000	66.5	114.7	199.5

#### 4.1.1 SABE Scenario 0

SABE Scenario 0 is the baseline scenario for analysis of the SABE focus study area. It includes population and employment projections up to 2051 including growth in new areas beyond the 2041 Master Plan boundary.

Table 5 provides a summary of the additional population and additional water demands projected in the 2051 SABE Scenario 0 compared to the 2041 total population from the Master Plan. This table focuses on the differences in population and demand for the eight water service areas within the SABE focus study area.

*Table 5 – Projected Additional Water Demands (2051 SABE Scenario 0 minus 2041 Master Plan)*

Service Area	Additional Population & Employment	Additional ADD (MLD)	Additional MDD (MLD)	Additional PHD (MLD)
6W	7,844	2.2	4.4	6.6
6C	15,356	3.9	5.6	11.6
6E	105,000	27.8	47.2	83.4
6B	2,277	0.6	0.8	1.7
7W	40,677	10.9	19.1	32.6
7C	51,105	13.5	23.0	40.6
7E	19,560	5.3	9.5	15.8
7B	7,100	1.9	3.3	5.7
<b>Total</b>	<b>248,919</b>	<b>66.0</b>	<b>112.9</b>	<b>198.1</b>

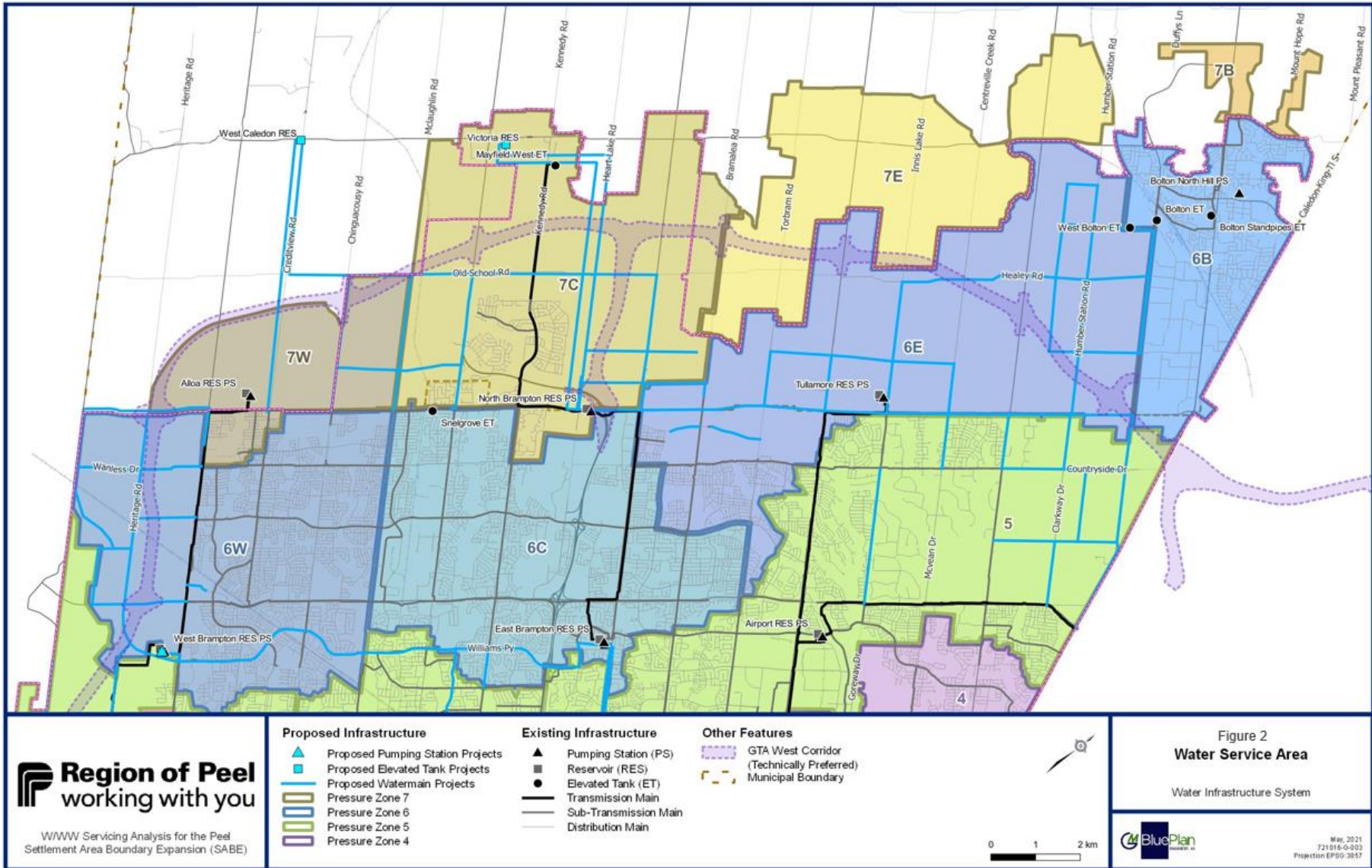


Figure 2 - SABA Water Service Areas and Pressure Zones

### 4.1.2 SABE Scenarios 1 to 4

Four additional scenarios were also provided in order to conduct a sensitivity analysis of servicing needs and associated costs. The location of growth does vary moderately across each of these scenarios, which has an impact on the water infrastructure needs across Zone 6 and Zone 7. In order to demonstrate the differences between each scenario, Figure 3 through Figure 10 compares the growth between the Master Plan and each of the five SABE Scenarios for each service area.



Figure 3 – Zone 6W – Growth Comparison by Scenario

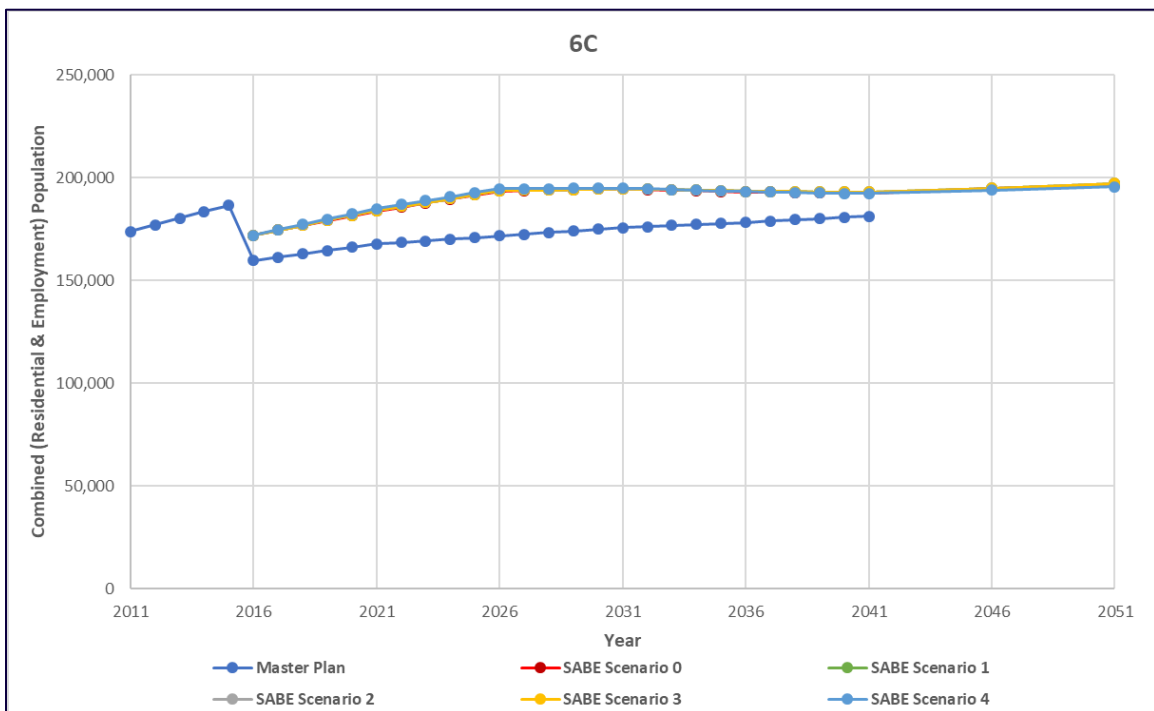


Figure 4 – Zone 6C – Growth Comparison by Scenario

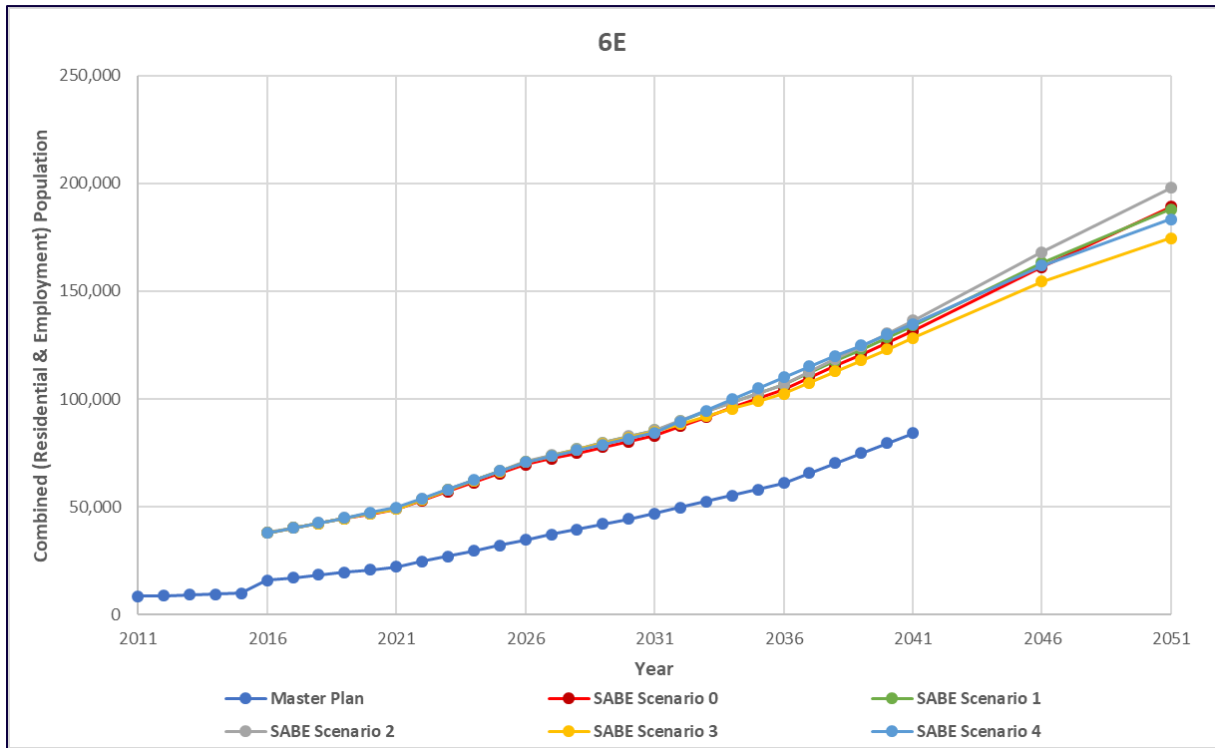


Figure 5 – Zone 6E – Growth Comparison by Scenario

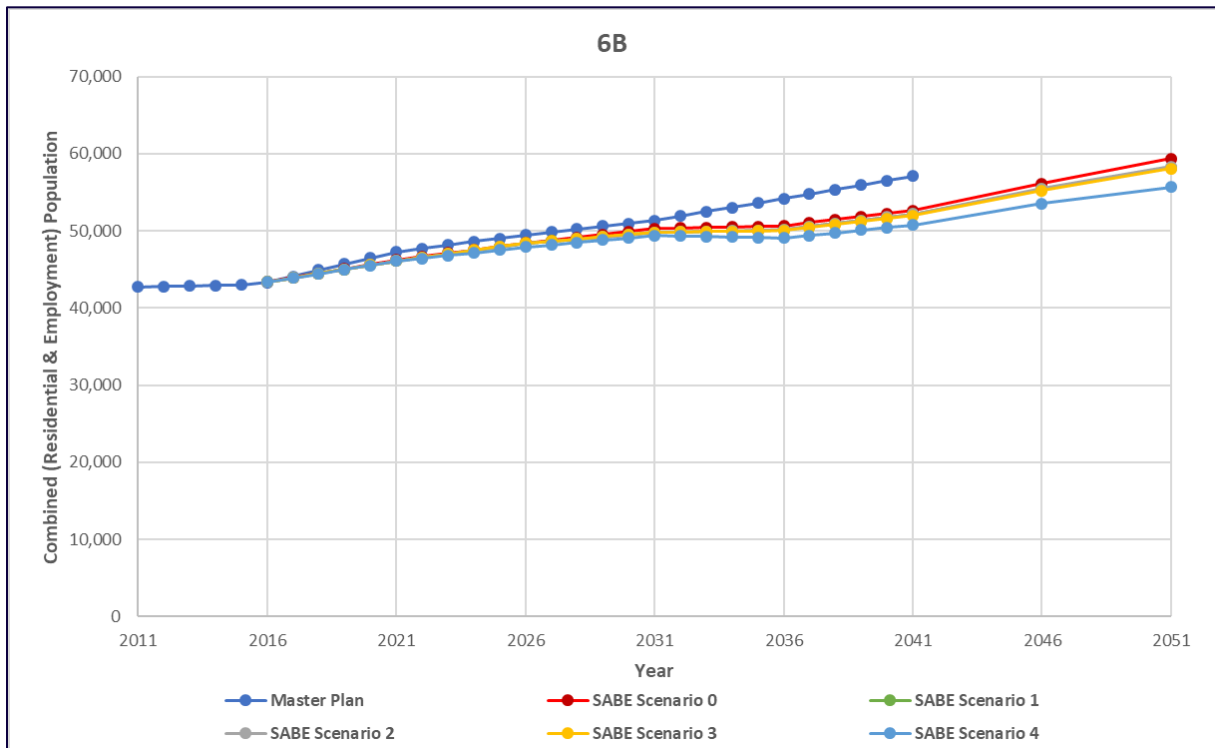


Figure 6 – Zone 6B – Growth Comparison by Scenario

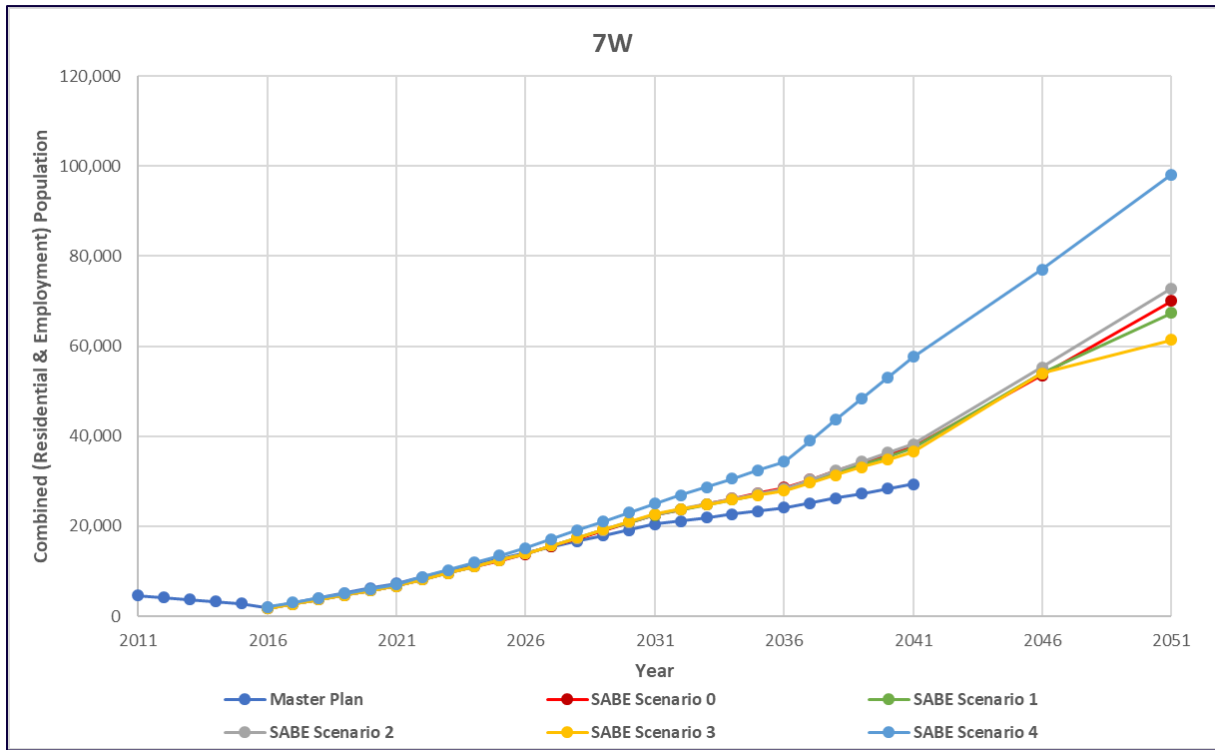


Figure 7 – Zone 7W – Growth Comparison by Scenario

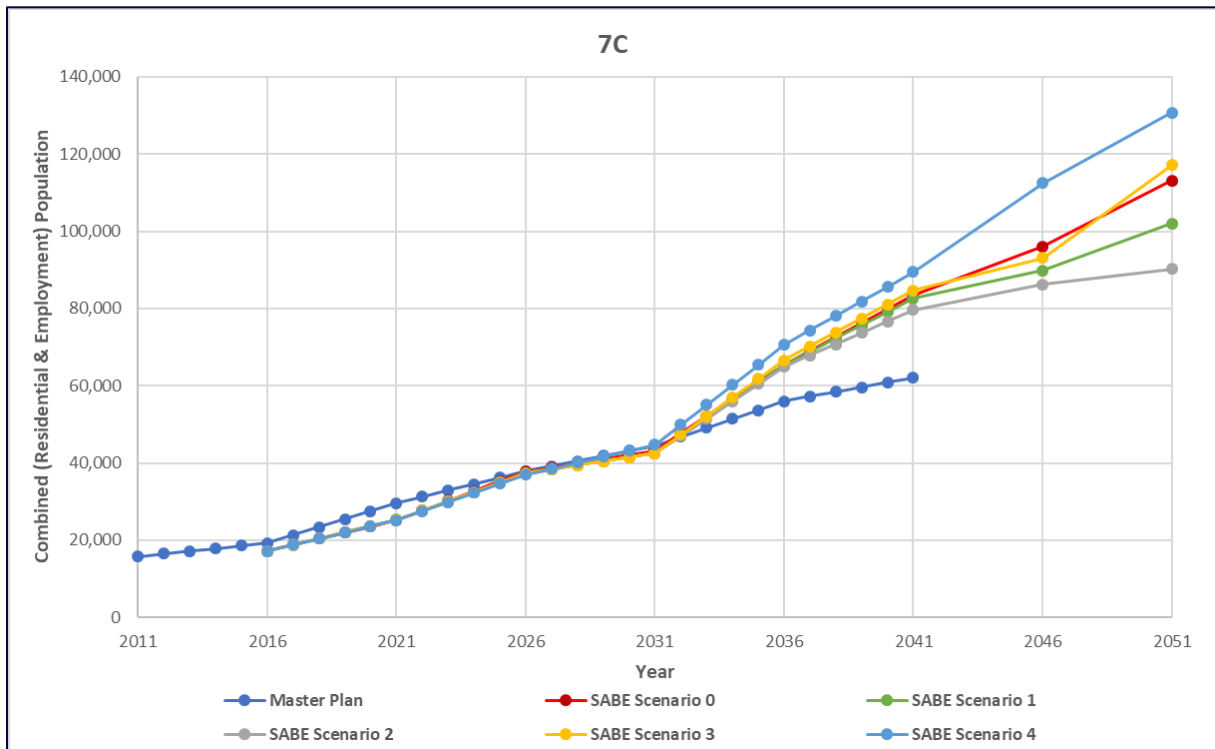


Figure 8 – Zone 7C – Growth Comparison by Scenario

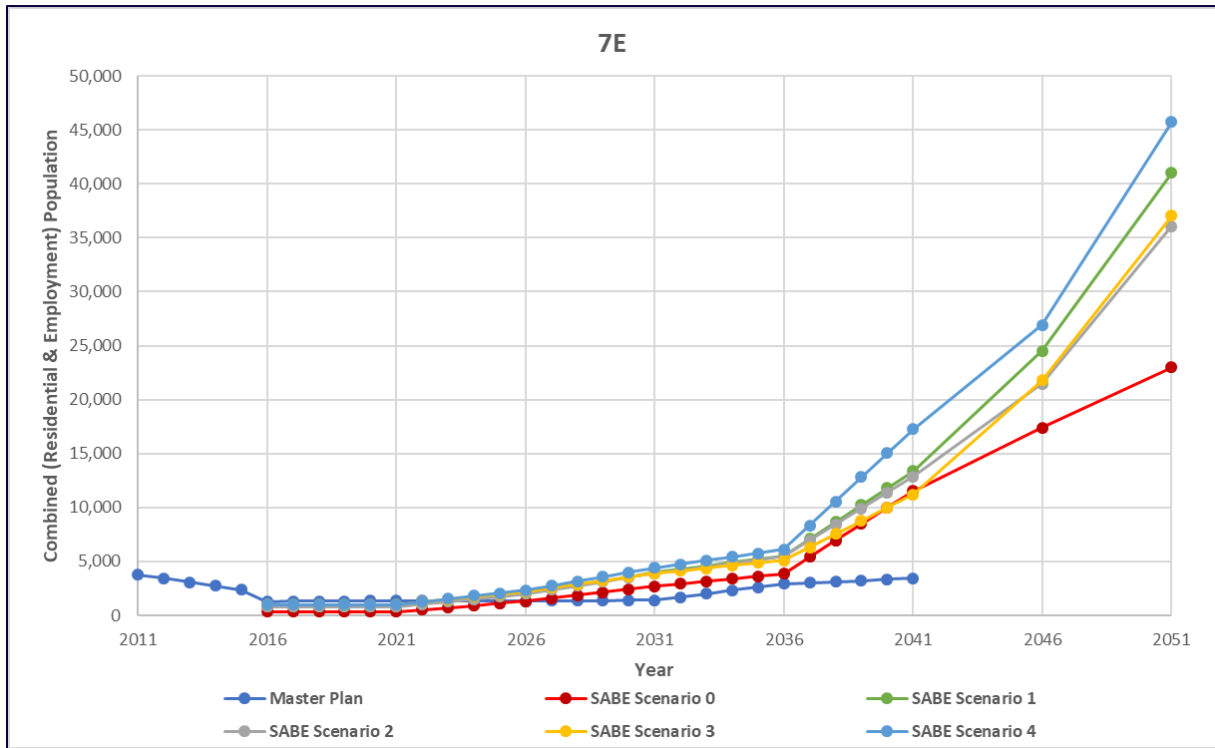


Figure 9 – Zone 7E – Growth Comparison by Scenario

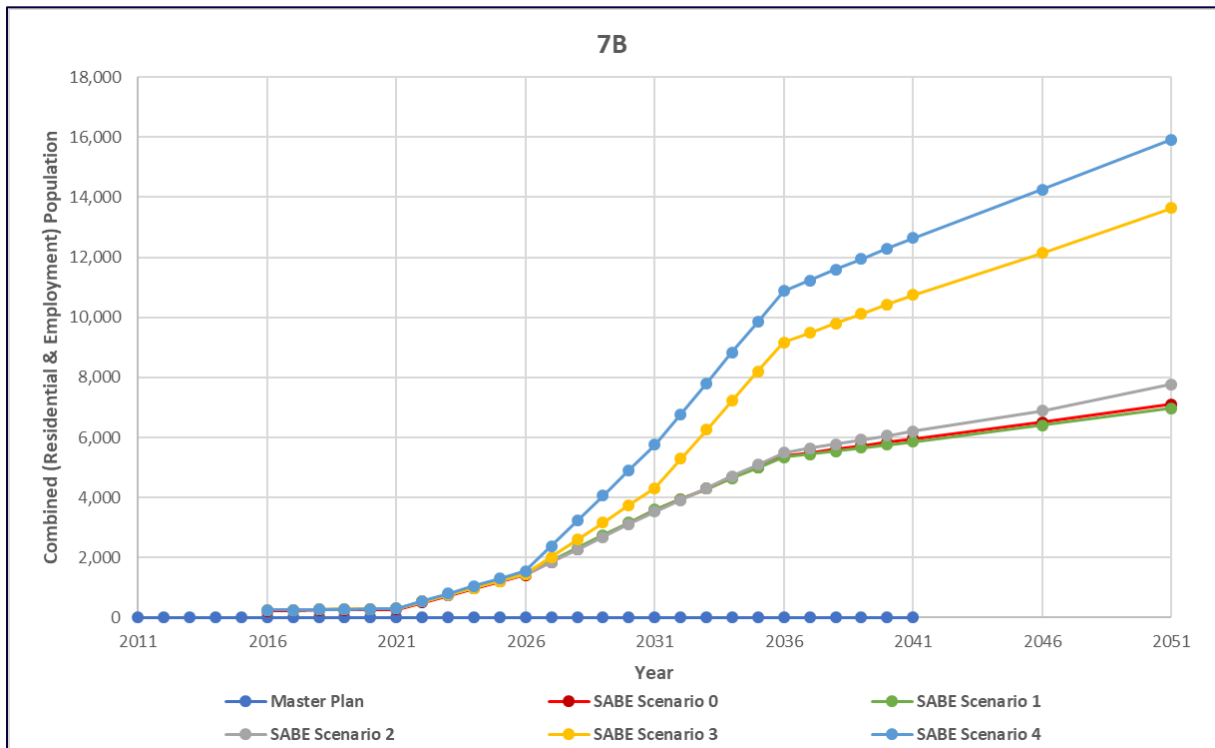


Figure 10 – Zone 7B – Growth Comparison by Scenario



Based on a review of the information in Figures 3 through 10, the following high-level conclusions can be made:

#### **Zone 6W**

- Minimal difference exists between the five SABE scenarios.
- Each of the five SABE scenarios align closely with what was previously assessed as part of the Master Plan, so no impact to water infrastructure needs are expected in this area.

#### **Zone 6C**

- Minimal difference exists between the five SABE scenarios.
- Each of the five SABE scenarios align closely with what was previously assessed as part of the Master Plan, so no impact to water infrastructure needs are expected in this area.
- Slight differences between the SABE and Master Plan scenarios are likely caused by slight variations in the boundaries considered between West/Central/East.

#### **Zone 6E**

- Noticeably more growth is anticipated in the SABE scenarios when compared to the Master Plan, so it is anticipated that this will impact the infrastructure needs in Zone 6E (Tullamore; Sandhill; etc.).
- Slight differences exist between the five SABE scenarios, where Scenario 2 has slightly higher growth and Scenario 3 has slightly lower growth. However, overall, the magnitude of these differences is quite small and are expected to have minimal impact.
- Some of the differences between the SABE and Master Plan scenarios are likely caused by slight variations in the boundaries considered between West/Central/East or the boundary between 5E and 6E.

#### **Zone 6B**

- Minimal difference exists between the five SABE scenarios.
- Each of the five SABE scenarios align closely with what was previously assessed as part of the Master Plan, so no impact to water infrastructure needs are expected in this area.

#### **Zone 7W**

- The Master Plan and SABE scenarios 0,1,2 & 3 are reasonably similar up to 2041. However, each of the SABE scenarios have noticeable growth beyond 2041 which was not included in the Master Plan. This suggests that there could be increased infrastructure needs in Zone 7W across all of the SABE scenarios.
- Furthermore, SABE Scenario 4 has a particularly high projection for Zone 7W compared to the other scenarios. This would further impact the infrastructure needs and will be considered in the later sections.

#### **Zone 7C**

- Beyond 2031, growth in Zone 7C starts to exceed the Master Plan projection in all of the SABE scenarios.
- Ultimately, the growth in 7C is significantly higher than the MP in all SABE scenarios and infrastructure upgrades are expected. Again, Scenario 4 has the highest projection of all SABE scenarios.

#### **Zone 7E**

- Beyond 2036, growth in Zone 7E starts to exceed the Master Plan projection in all of the SABE scenarios.
- Ultimately, the growth in 7E is significantly higher than the MP in all SABE scenarios and infrastructure upgrades are expected. Scenario 4 has the highest projection of all SABE scenarios and Scenario 0 has the lowest of the SABE scenarios.

#### **Zone 7B**

- The Master Plan did not consider growth in Zone 7B. In contrast, after 2026, the SABE scenarios start to show signs of moderate growth occurring.
- Ultimately, the growth in 7B is significantly higher than the MP in all SABE scenarios and infrastructure upgrades are expected. Scenario 4 (closely followed by Scenario 3) has the highest projection of all SABE scenarios in Zone 7B.

## 4.2 Water System Infrastructure Needs

In order to determine high level water servicing needs to service the SABE focus study area. Desktop analysis of the servicing needs was undertaken (no hydraulic modelling was completed). The desktop analysis involved a review of:

- Water Pumping Capacity;
- Water Storage Capacity;
- Trunk Water Transmission Capacity; and
- Sub-Trunk Water Distribution Needs

Pumping, storage and transmission capacity were assessed by updating the Master Plan Water Schematics with the population and employment projections from the SABE scenario (2051 year) and then reviewing the immediate storage, pumping and transmission needs in Zones 6 & 7, as well as reviewing the knock-on effects to downstream pumping stations, storage facilities and transmission. The following sections summarize the results of the analysis and the infrastructure needs for the baseline SABE Scenario (Scenario 0).

### 4.2.1 West Transmission System (Pressure Zone 7W, 6W and Lower Pressure Zones)

#### **Storage Needs**

- As part of the Master Plan, storage capacity in Zone 7W is already intended to be provided with the addition of the West Caledon Elevated Tank (10ML). With increased growth in SABE Scenario 0, this storage facility is confirmed to be critical.
- Ultimately, the 10ML capacity is suitable to provide the majority (~90%) of fire storage needs and the emergency storage needs in Z7W, but not the equalization storage. Rather than adding an additional storage facility, it is assumed that the remaining storage needs would be “pumped” storage from Alloa Reservoir and Z7 PS.
- Despite the growth, Alloa Reservoir (WS5) storage needs are within the existing capacity of 35 ML under 2051 SABE demands. **Therefore, no additional storage is required on the west transmission system based on the SABE growth.**
- It is noted that the storage needs of Alloa Reservoir are approaching the capacity limit, so further growth beyond 2051 will likely trigger a storage expansion.

#### **Pumping Needs**

- As part of the Master Plan, pumping capacity at Alloa Pumping Station (HLP7W) is already intended to reach a firm capacity of 30ML/D and total capacity of 45ML/D (three 15ML/D pumps).
- For SABE Scenario 0, increased growth in Zone 7W necessitates that the fourth high lift pump be added at Alloa Z7 PS while also switching out an existing pump for a larger one. **This means Alloa Z7 PS is increased to a firm capacity of 55ML/D.** This would allow the station to provide PHD up to Zone 7W.

#### **Transmission Needs**

- The proposed 750mm transmission main (WT7) from Alloa Pumping Station to West Caledon Elevated Tank, as per the Master Plan, is sufficient. **No further transmission is identified for SABE Scenario 0.**

#### **Sub-Transmission and Distribution Needs**

- The Master Plan proposed 600mm sub-transmission main from the future West Caledon Elevated Tank to future east-west road in Mayfield West Phase 2 is maintained.
- Various new distribution watermains are considered to service the SABE growth lands bounded by the GTA West Corridor to the north and Mayfield to the south. **Overall, this is estimated to be an additional 10km of 400mm watermains in the Z7W area.**

## 4.2.2 Central Transmission System (Pressure Zone 7C, 6C and Lower Pressure Zones)

### Storage Needs

- Storage capacity in Zone 7C already exists (Mayfield West Elevated Tank). Ultimately, the capacity of this storage is suitable to provide the majority (~90%) of fire storage needs and the emergency storage needs in Z7C, but not the equalization storage. Rather than adding an additional storage facility, it is assumed that the remaining storage needs would be “pumped” storage from North Brampton PS & Reservoir and from the future Victoria Z7 PS & Reservoir. This requires additional pumping capacity that will be described below.
- Despite the growth to 2051, the planned Victoria Reservoir (CS6) storage needs are within the proposed capacity (40 ML). Similarly, the other downstream storage facilities (North Brampton, East Brampton, etc.) are also suitable to meet the projected 2051 growth. **Therefore, no additional storage is required on the central transmission system, other than those already planned.**

### Pumping Needs

- Increased demands in Zone 7C require additional pumping capacity at both North Brampton Z7 PS and at a new Pumping Station to be located at the Victoria Reservoir site.
- As part of the Master Plan, pumping capacity at North Brampton Pumping Station (HLP7W) is already intended to be increased to a firm capacity of 35ML/D (by replacing 8ML/D pumps with 15ML/D pumps). **In order to meet the projected SABE growth, this North Brampton firm capacity would have to further increase to 45ML/D.** Therefore, costs are also considered to replace the two 10ML/D pumps with 15ML/D pumps.
- **For this scenario, the proposed Victoria PS would be sized for a firm capacity of 45ML/D.** This would allow the combined capacity of North Brampton and Victoria to provide PHD to Zone 7C.
- Due to the increased flow transfers north to Zone 7, the Zone 5 pumping capacity from East Brampton Pumping Station (LLP5C) will need to increase. Currently, there is an installed capacity of 177 MLD and firm capacity of 117 MLD. **Capacity will need to increase to by the replacement of Pump 3 with a larger 45ML/D pump.**

### Transmission Needs

- The existing transmission mains (towards North Brampton, Victoria Reservoir and Mayfield West) are maintained within their limits. **No further transmission is identified for SABE Scenario 0.**
- The transmission mains towards North Brampton and the proposed transmission main (CT6) from North Brampton Pumping Station to Victoria Reservoir are both nearing their theoretical capacity and will need to be assessed in more detail at a later date.

### Sub-Transmission and Distribution Needs

- Various new distribution water mains are considered to service the SABE growth lands previously not considered in the Master Plan. This primarily includes lands southwest of the Victoria Reservoir and lands around Bramalea and Torbram in Zone 7. **Overall, this is estimated to be an additional 13km of 400mm water mains in the Z7C area.**

## 4.2.3 East Transmission System (Pressure Zone 7E, 6E, 7B, 6B and Lower Pressure Zones)

### Storage Needs

- New storage is required to support the growth along the east transmission system (particularly in 7E and 6E). For the purposes of this assignment, it has been considered that this storage need is satisfied by the addition of Zone 5E storage (Sandhill Reservoir), the addition of East Caledon ET (6ML Z7E) and the addition of pumping capacity from Sandhill to Z7E and to Z6E. **The proposed Sandhill Reservoir would require two 15ML cells for a total capacity of 30ML.**
- Other storage facilities (Airport, Tullamore, Bolton) are still maintained within their planned capacities, so no further storage upgrades are identified here.

- It is noted that for the 7B service area, since the growth is still relatively low to 2051, it is again preferred to operate pumped storage capacity from a future North Bolton PS than adding a new storage tank. The existing 6B storage is able to incorporate this additional storage capacity.

### **Pumping Needs**

- Due to the significant increases in demands in the east transmission system, numerous pumping upgrades are required along the east transmission facilities, including:
  - **Addition of a new Sandhill Pumping Station to Z7E and Z6E (LLP6E and HLP7E)**
  - **Expansion of Tullamore Pumping Station to Z5E (LLP5E)**
  - **Expansion of Airport Road Pumping Station to Z4E (LLP4E)**
  - **Expansion of Beckett Sproule Transfer Pumping Station (to Airport)**
  - **Addition of a new North Bolton Pumping Station to support growth in Z7B**
- The Sandhill Pumping Station for Pressure Zone 7E (HLP7E) is proposed with a firm capacity of 25 MLD to ensure that sufficient capacity exists to support PHD and MDD + Fire.
- The Sandhill Pumping Station for Pressure Zone 6E (LLP6E) is proposed with a firm capacity of 65 MLD to ensure that, along with Tullamore PS, the two facilities have sufficient capacity to support PHD in Z6E.
- Tullamore PS to Z5E requires a significant expansion to meet the growth in transfers towards Sandhill and North Brampton. Tullamore PS is flagged as requiring an increase from the current 60ML/D firm capacity to 140ML/D firm capacity, which would require a significant upgrade beyond simple pump upgrades. This upgrade would also have to align with a new Z5 transmission main from Tullamore to Sandhill.
- The existing Airport Road Pumping Station (LLP4E) has an installed firm capacity of 126 MLD but will require a significant increase in capacity to transfer further flow to Tullamore Reservoir. The increase is expected to involve the installation of the additional high-lift pumping capacity beyond what the facilities four pumps can accomplish. Therefore, one or two of the York pumps would likely need to be reconfigured to transfer flow to 4E instead, along with upsizing of the existing pumps. These pump upgrades along with an additional Z4 transmission main are required to sufficiently increase flow from Airport to Tullamore.
- The existing Beckett Sproule Transfer Pumps include four pumps, with an additional pump identified already as part of the Master Plan Upgrades. The increased SABE growth would necessitate that two additional 105ML/D pumps be added at the spare pump bays at Beckett Sproule PS.
- The North Bolton Pumping Station for Pressure Zone 7B would be required to meet demands for the small proposed service area in 7B. Despite Scenario 0 only identifying a maximum day demand of 3.3ML/D in Z7B, it is important for the facility to be capable of pumping up to 15ML/D to provide some fire flow capacity on top of the maximum day demands. In other words, the facility would require both duty pumps and fire pumps because no storage would be added at this stage due to limited growth.

### **Transmission Needs**

- **A new 1200mm transmission main (ET5) from Tullamore Pumping Station to Sandhill Reservoir would be required** to meet the growth identified in 2051 (Scenario 0).
- The increased flow transfer from **Airport Road to Tullamore would require a second transmission main** (1200mm) to be added.
- It is also noted that the existing 2100mm transmission main (ET3A) from Beckett Sproule Pumping Station to Airport Road Reservoir has adequate capacity, but is nearing its capacity limit in this SABE scenario

### **Sub-Transmission and Distribution Needs**

- A sub-transmission main is identified from the proposed North Bolton PS towards the two growth areas ("fingers") in Zone 7B. This 600mm watermain has been identified and costed along with various 400mm distribution mains to meet the growth here.
- Various new distribution water mains are also considered to service the SABE growth lands previously not considered in the Master Plan. **Overall, this is estimated to be an additional 15km of 400mm distribution water mains in the Z6E and Z7E areas.**

#### 4.2.4 Water System Sensitivity Analysis (SABE Scenarios 1 to 4)

The following section summarizes the key infrastructure differences between Scenario 0 and the other four SABE scenarios considered as part of this project. Differences between the various infrastructure needs for each scenario can also be seen graphically from Figure 11 to Figure 15.

Table 6 - Water Infrastructure Needs – Sensitivity Impact Compared to SABE Scenario 0

System	Upgrade	Scenario 1	Scenario 2	Scenario 3	Scenario 4
West	Storage	- No impact (same as Scenario 0)	- No impact (same as Scenario 0)	- No impact (same as Scenario 0)	- No impact (same as Scenario 0)
	Pumping	- No impact	- No impact	- No impact	- Increased capacity needed at Alloa Z7W; requiring all pumps to be upsized or additional pump bays to be added - PS Capacity increased to 75ML/D from 55ML/D in Scenario 0
	Transmission	- No impact	- No impact	- No impact	- No impact
	Distribution	- No impact	- No impact	- No impact	- Increased sub-transmission and distribution needs due to larger Z7W service area (beyond the GTA West Highway Corridor) - Added 6km 600mm and 8km 400mm
Central	Storage	- No impact	- No impact	- No impact	- No impact
	Pumping	- No impact	- North Brampton PS Z7 expansion not needed in this Scenario - Victoria PD7 PS can be smaller in this Scenario (35ML/D vs 45ML/D)	- No impact	- Slightly larger expansion need at new North Brampton PS to PD7C
	Transmission	- No impact	- No impact	- No impact	- No impact
	Distribution	- Increased sub-transmission to connect PD7C and PD7E (600mm; ~7km)	- Reduced distribution main needs due to less areas in Z7C being developed in this Scenario	- Increased sub-transmission to connect PD7C and PD7E (600mm; ~7km) and increased distribution needs for new areas	- Increased sub-transmission to connect PD7C and PD7E (600mm; ~7km) and increased distribution needs for new areas

System	Upgrade	Scenario 1	Scenario 2	Scenario 3	Scenario 4
East	Storage	- East Caledon Elevated Tank increased storage to 10ML due to growth above Sc. 0	- East Caledon Elevated Tank increased storage to 10ML due to growth above Sc. 0	- East Caledon Elevated Tank increased storage to 10ML due to growth above Sc. 0	- East Caledon Elevated Tank increased storage to 10ML due to growth above Sc. 0
	Pumping	- No impact	- No impact	- No impact	- Increased capacity at new Sandhill PS to PD7E
	Transmission	- Transmission main added from Sandhill to East Caledon (750mm; 3km)	- Transmission main added from Sandhill to East Caledon (750mm; 3km)	- Transmission main added from Sandhill to East Caledon (750mm; 3km)	- Transmission main added from Sandhill to East Caledon (750mm; 3km)
	Distribution	-Increased distribution main needs due to new areas in Z7E being developed	-Increased distribution main needs due to new areas in Z7E being developed	-Increased distribution main needs due to new areas in Z7E being developed	-Increased distribution main needs due to new areas in Z7E being developed
East-Bolton	Storage	- No impact	- No impact	- No impact	- No impact
	Pumping	- No impact	- No impact	- Slight increase to North Bolton PS capacity	- Moderate increase to North Bolton PS capacity
	Transmission	- No impact	- No impact	- No impact	- No impact
	Distribution	- No impact	- No impact	-Increased distribution main needs due to new areas in Z7B being developed	-Increased distribution main needs due to new areas in Z7B being developed



### 4.3 Water System Cost Analysis

For each of the five growth scenarios, a high-level analysis was performed to determine the cost range of the potential water and wastewater infrastructure requirements to service growth to 2051. The cost analysis included a compilation of Class 5 cost estimates for vertical and linear water and wastewater infrastructure consistent with high-level planning cost estimating approaches. Class 5 estimates or “Order of Magnitude” estimates include high-level cost estimates with a long-term project horizon. This is consistent for desktop level analysis based on previous similar projects and engineer’s informed approximation formed on limited available information with respect to project scope (e.g. diameter, depth, alignment, construction methodology, subsurface conditions, etc.). The expected accuracy range for this analysis presents a typical variation of -40% (low complexity) and +70% (high complexity) consistent with Class 5 cost estimates as per the Association for the Advancement of Cost Engineering (AACE) Cost Estimate Classification System.

The following section presents a cost range for the potential water capital improvements given the characteristics of each of the five growth scenarios. Table 7 summarizes the high-level cost analysis for water infrastructure to service growth in the SABE study area to 2051. These are additional costs over and above the 2041 Master Plan Scenario to satisfy the 2051 SABE growth.

*Table 7 – Summary of High-Level Cost Analysis for Water Infrastructure*

System	Upgrade	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4
<b>West</b>	Storage	-	-	-	-	-
	Pumping	+\$1M	+\$1M	+\$1M	+\$1M	+\$10M
	Transmission	-	-	-	-	-
	Sub-Trans. & Distribution	+\$18M	+\$18M	+\$18M	+\$18M	+\$53M
<b>Central</b>	Storage	-	-	-	-	-
	Pumping	+\$13M	+\$13M	+\$10M	+\$13M	+\$16M
	Transmission	-	-	-	-	-
	Sub-Trans. & Distribution	+\$26M	+\$46M	+\$13M	+\$59M	+\$59M
<b>East &amp; Bolton</b>	Storage	+\$58M	+\$64M	+\$64M	+\$64M	+\$64M
	Pumping	+\$67M	+\$67M	+\$67M	+\$68M	+\$71M
	Transmission	+\$81M	+\$81M	+\$81M	+\$81M	+\$81M
	Sub-Trans. & Distribution	+\$58M	+\$65M	+\$65M	+\$75M	+\$75M
<b>Total</b>		<b>+\$321M</b>	<b>+\$355M</b>	<b>+\$319M</b>	<b>+\$379M</b>	<b>+\$429M</b>

The high-level cost analysis shows a range of cost for water infrastructure between \$319 and \$429 million.

Scenario 0 and Scenario 2 generally require the lowest capital investment mainly because there is less growth in the northmost areas (Zone 7), which would require significant new infrastructure to service. In contrast, Scenario 4 requires the greatest capital investment due to higher growth, not only in Zone 7C and 7E, but also in 7W.

Figure 11 to Figure 15 present water infrastructure requirements and associated high-level cost for each of the five planning scenarios for the SABE study area.

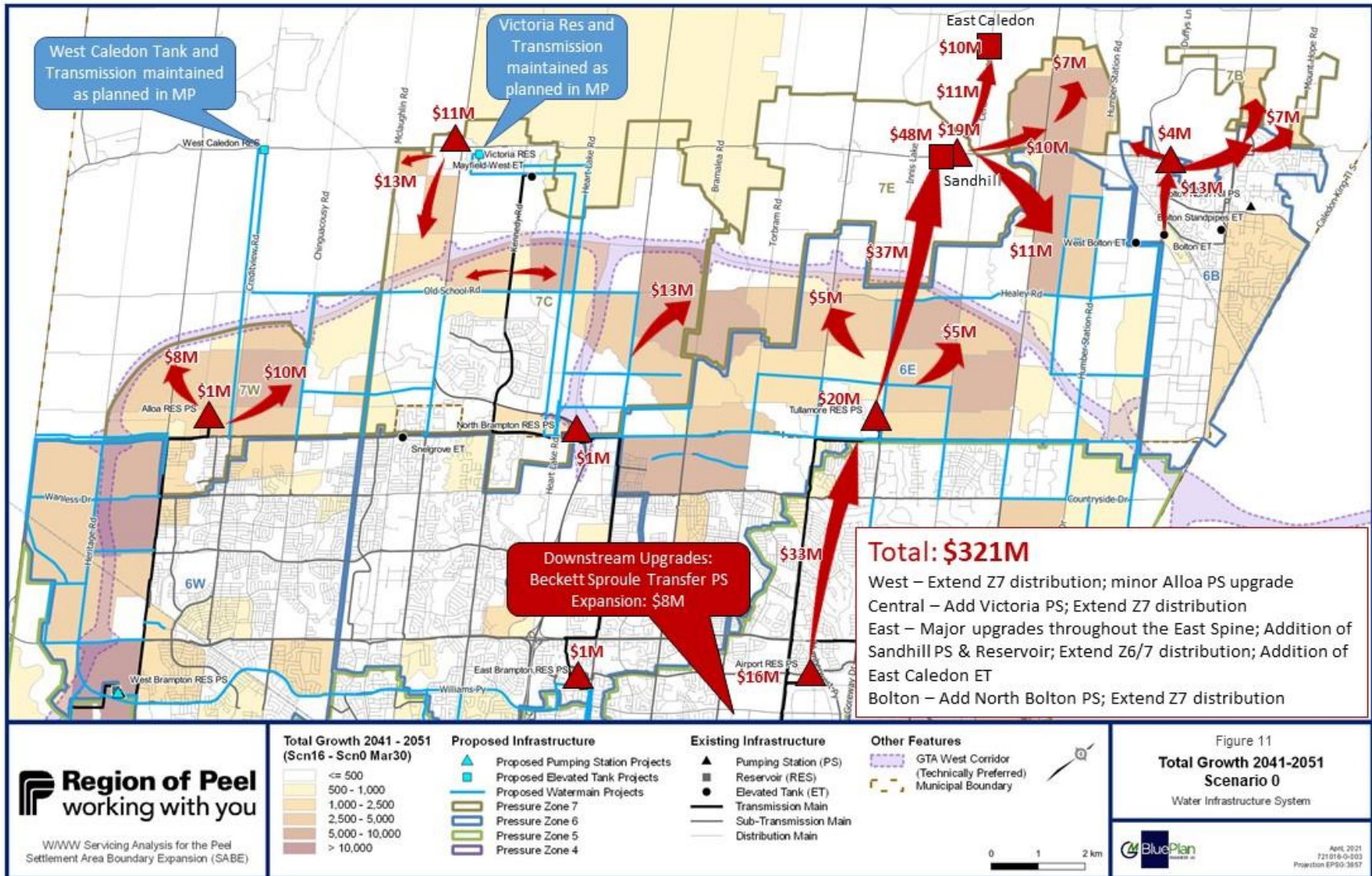


Figure 11 – Scenario 0 Water Infrastructure Requirements



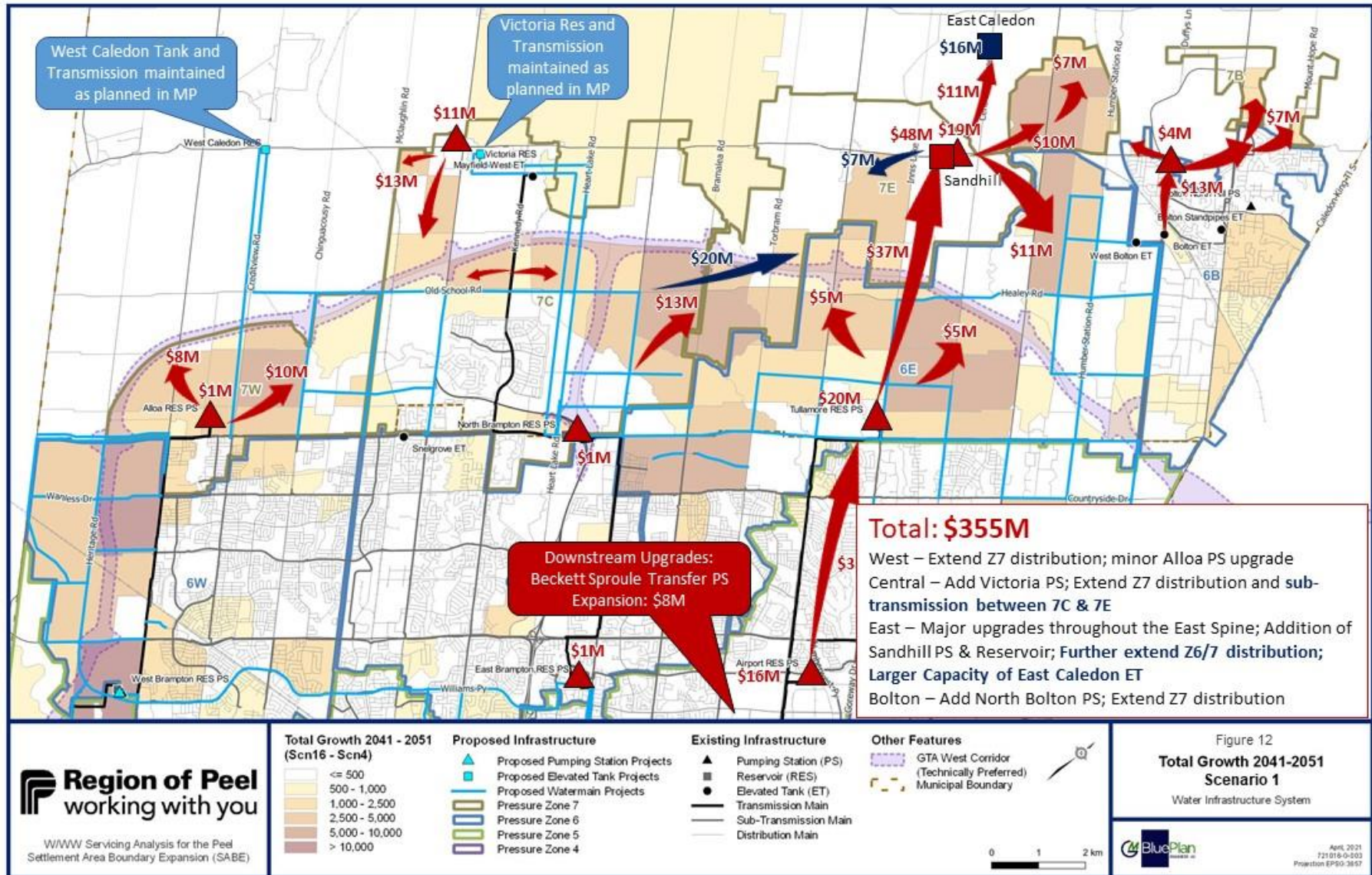


Figure 12 – Scenario 1 Water Infrastructure Requirements



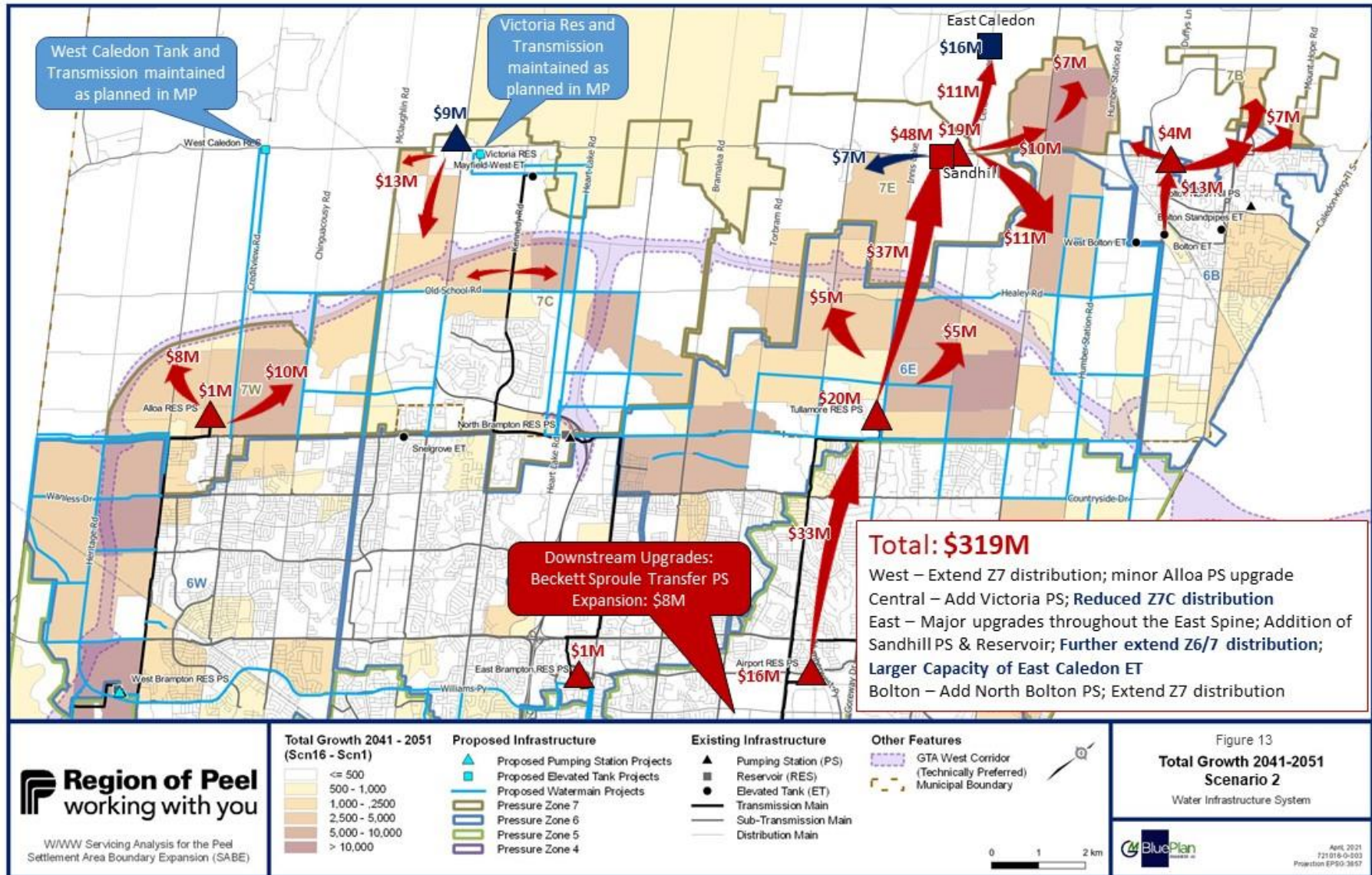


Figure 13– Scenario 2 Water Infrastructure Requirements



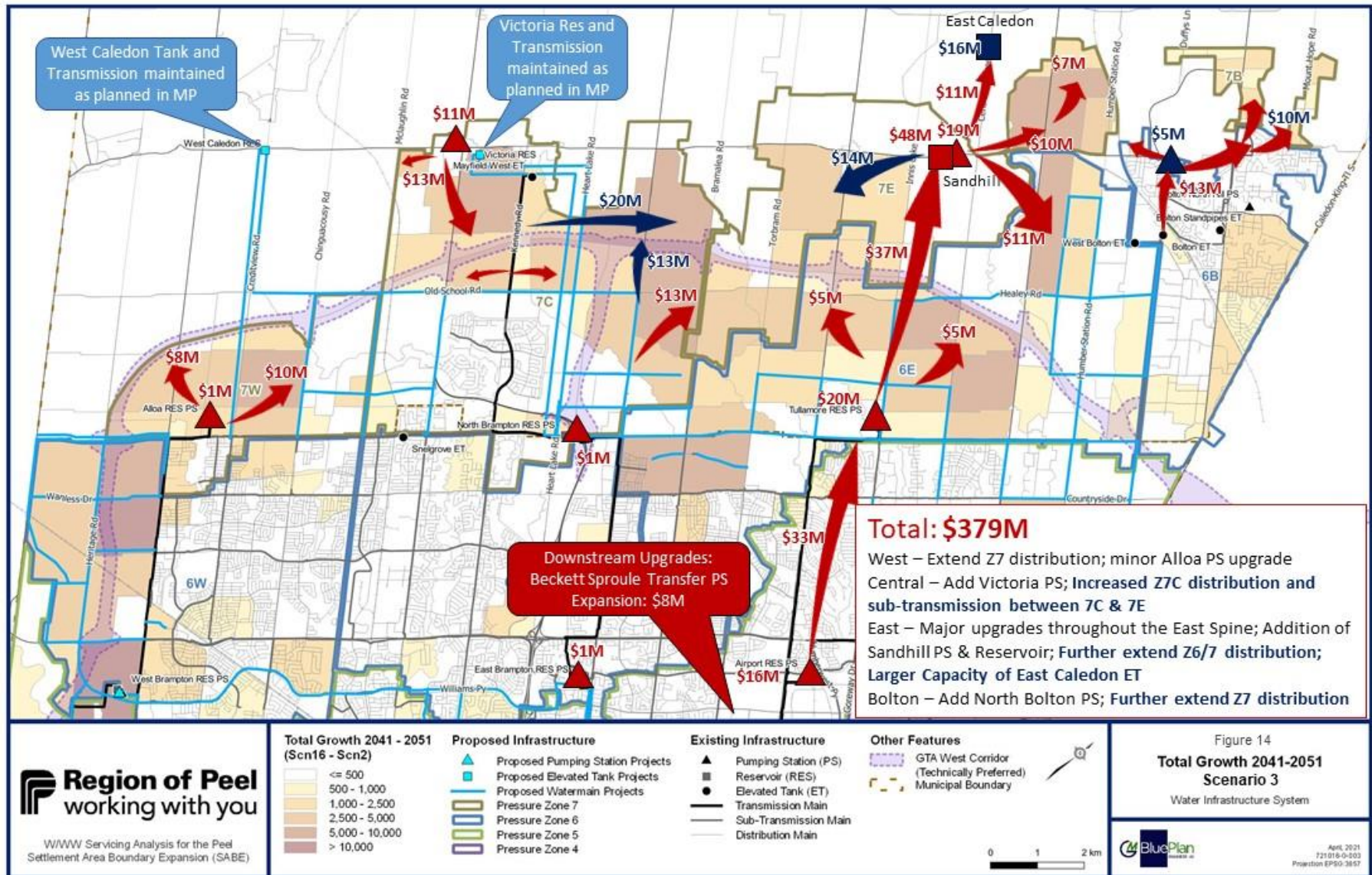


Figure 14 – Scenario 3 Water Infrastructure Requirements



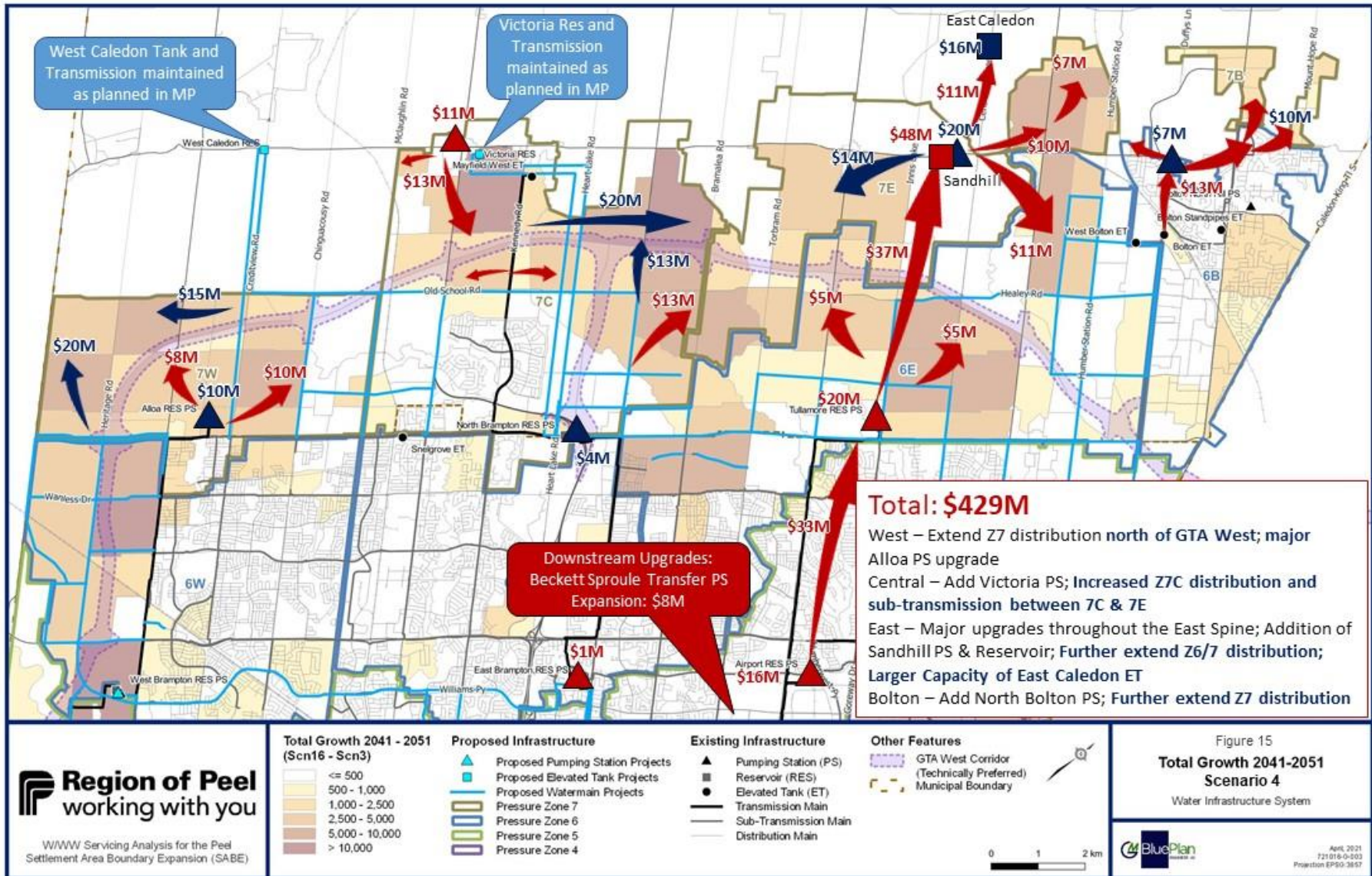


Figure 15– Scenario 4 Water Infrastructure Requirement



## 5. WASTEWATER SYSTEM

### 5.1 Wastewater Flows Calculation

Table 8 summarizes the additional population and employment for each scenario in the SABE study area compared to the 2041 total population employment from Scenario 16 utilized in the 2020 Water and Wastewater Master Plan. This table also summarizes the additional projected inflow and infiltration and wastewater flows associated with the new growth areas north of Mayfield Road for each of the five planning scenarios.

*Table 8 – Projected Additional 2041-2051 Wastewater Flows (2051 SABE Scenario 0 minus 2041 Master Plan)*

Scenario	Additional Population	Additional Employment	Additional Inflow and Infiltration (L/s)	Additional Average Dry Weather Flow (L/s)	Additional Peak Wet Weather Flow (L/s)
Scenario 0	140,000	42,000	880	1,090	1,970
Scenario 1	140,000	43,000	1,010	1,090	2,100
Scenario 2	140,000	43,000	870	1,090	1,960
Scenario 3	140,000	44,000	1,260	1,090	2,350
Scenario 4	200,000	50,000	1,450	1,420	2,870

*Notes: Planning estimates rounded to the closest 1,000.  
 Includes growth areas north of Mayfield Road.*

It should be noted that Table 8 is provided for reference only since the desktop analysis of the wastewater system was carried out by trunk/subtrunk catchment areas to more accurately determine future wastewater infrastructure requirements.

## 5.2 Trunk Infrastructure Needs – SABE Scenarios 0-4

A desktop wastewater analysis was undertaken to determine at a high-level new trunk and subtrunk linear and vertical infrastructure required to service growth to 2051. The infrastructure requirements determined as part of this analysis are beyond what was previously identified to service growth to 2041 in the 2020 Water and Wastewater Master Plan for the Lake-Based System. The analysis was performed for the five scenarios (Sc0, Sc1, Sc2, Sc3, Sc4 ) described in section 2 of this report.

For this analysis the following considerations and assumptions were taken:

- At desktop level analysis was carried out (i.e. no hydraulic modelling required) to calculate wastewater flows by trunk/subtrunk catchment area and determine new linear and vertical infrastructure requirements.
- The analysis was performed initially to service growth in Scenario 0, followed by sensitivity analysis for Scenarios 1-4.
- The analysis identified high-level impacts to existing or planned infrastructure and determined new trunk and subtrunk (≥450mm) linear infrastructure and/or facilities required in north Peel beyond the 2041 servicing boundary.
- Sizing of new infrastructure did not consider growth beyond the 2051 forecast, with the exception of major trunk infrastructure such as the extension of the Airport Road trunk sewer from the proposed Castlemore bypass to the north.
- Additional inflow and infiltration flows were calculated for areas outside of the 2041 servicing boundary assuming an 80% developable area.

The following sections describe the wastewater analysis and infrastructure needs divided in four areas:



Figure 16 – Wastewater Analysis – Areas 1 to 4

### 5.2.1 Area 1 - Winston Churchill Boulevard to McLaughlin Road

Area 1 is generally bounded by Winston Churchill Boulevard to the west and McLaughlin Road to the East. The future servicing strategy and infrastructure requirements for this area are as follows:

#### Scenario 0

- The Mississauga Rd trunk sewer will be the main trunk servicing new growth areas, including extension of infrastructure north of Mayfield Rd to service areas south of the proposed GTA West Highway.
- The area south of the creek between Creditview Rd and Chinguacousy Rd will be serviced by extending to the north the existing sewer on Brisdale Dr which ultimately drains to the Fletcher’s Creek trunk sewer.

#### Additional Considerations

#### Scenario 4

- The Mississauga Rd trunk sewer will also service areas northwest of the proposed GTA West Highway including extension of the planned trunk and subtrunk sewers west of Mississauga Rd.
- There will be a crossing of the proposed GTA West Highway required to convey flows from north of the Highway between Mississauga Rd and Chinguacousy Rd south to the Mississauga Rd trunk sewer.

Figure 17 schematically demonstrates the servicing strategy for Scenario 0 (Opaque Arrows) and Scenario 4 (Transparent Arrows). Areas shaded in yellow/orange/brown depict 2041-2051 “Heat Map” style growth for Scenario 0.

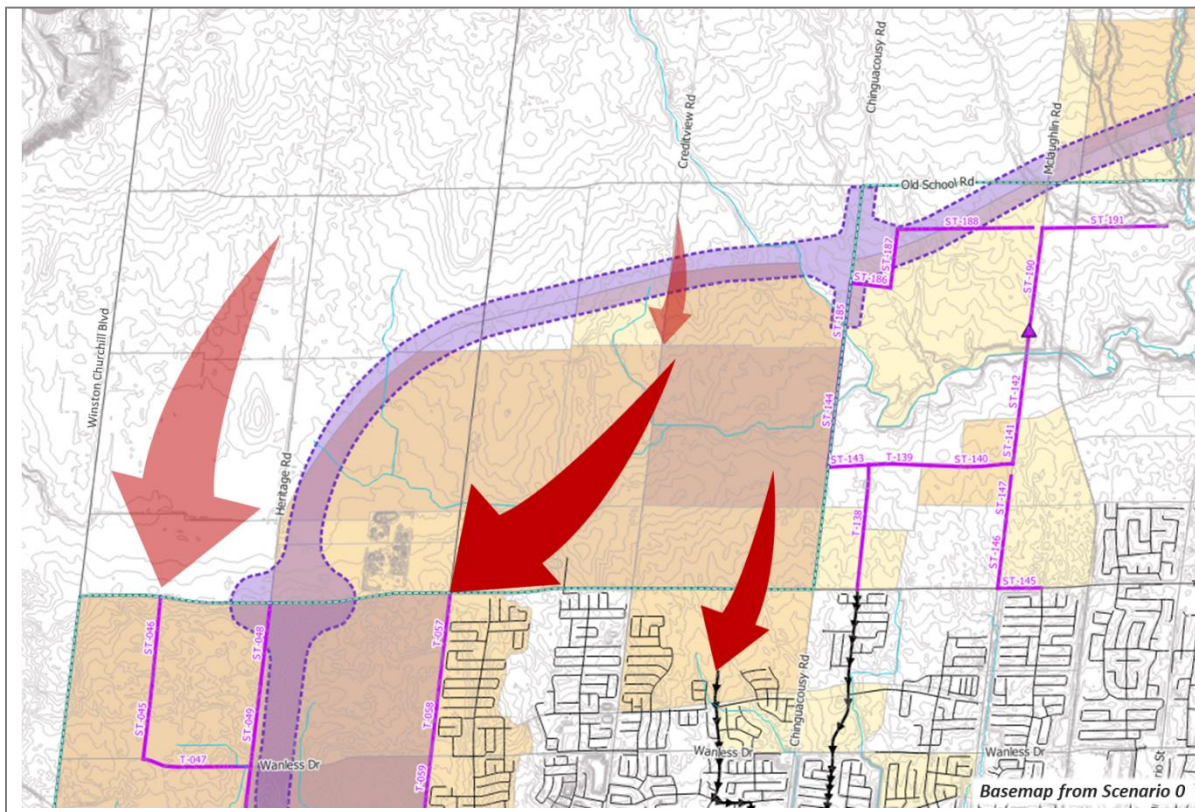


Figure 17 – Area 1 Wastewater Servicing



### 5.2.2 Area 2 - McLaughlin Road to Airport Road

Area 2 is generally bounded by McLaughlin Road to the West and Torbram Rd/Airport Road to the East. The future servicing strategy and infrastructure requirements for this area are as follows:

#### Scenario 0

- Areas immediate north and south of the proposed GTA West Highway and west of the Etobicoke Creek will require a combination of gravity and pumping solutions to drain to the proposed subtrunk sewer along McLaughlin Rd which ultimately drains to the Fletcher’s Creek trunk sewer.
- Areas north and immediately south of Old School Rd between McLaughlin Rd and Heart Lake Rd will require a combination of gravity and pumping solutions to drain to a proposed new trunk sewer on Hurontario St which ultimately drains to the Etobicoke Creek trunk sewer.
  - For the purpose of this analysis, a new trunk sewer along Hurontario St has been assumed to connect to the Etobicoke Creek trunk sewer at Williams Parkway.
- Areas immediately east and west of Dixie Rd will require an extension of the Spring Creek subtrunk sewer along Dixie Rd north of Mayfield Rd which ultimately drains to the East trunk sewers.
- New growth north of the creeks between Dixie Rd and Torbram Rd will be serviced by splitting the flows between new subtrunk sewers along Dixie Rd towards the Spring Creek trunk sewer and new subtrunk sewers along Bramalea Rd towards the Airport Rd trunk sewer.

#### Additional Considerations

##### Scenarios 3 & 4

- Multiple crossings of the proposed GTA West Highway will be required between Hurontario St and Bramalea Rd to convey flows to proposed sewer extensions along Hurontario St, Dixie Rd and Bramalea Rd.

Figure 18 schematically demonstrates the servicing strategy for Scenario 0 (Opaque Arrows) and Scenario 3 & 4 (Transparent Arrows). Areas shaded in yellow/orange/brown depict 2041-2051 “Heat Map” style growth for Scenario 0.

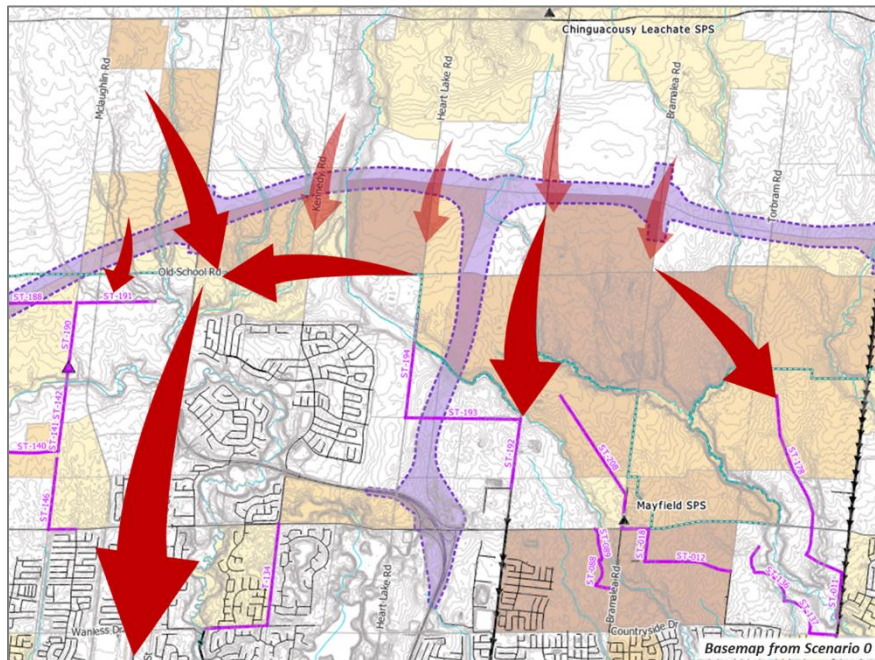


Figure 18 – Area 2 Wastewater Servicing

### 5.2.3 Area 3 - Airport Road to The Gore Road

Area 3 is generally bounded by Torbram Rd/Airport Road to the West and The Gore Rd to the East. The future servicing strategy and infrastructure requirements for this area are as follows:

#### Scenario 0

- Flows from the new subtrunk sewers along Bramalea Rd will be conveyed to the planned subtrunk sewer northwest of Mayfield Rd (ST-178) discharging to the Airport Rd trunk sewer.
- Areas west of Airport Rd and south of the proposed GTA West Highway will be conveyed to Airport Rd via new subtrunk sewers southwest of Salt Creek.
- Extension of the Airport Rd trunk sewer from the proposed Castlemore bypass to the north will be required to accommodate the additional flows in the Airport Rd catchment area.
- Extension of the planned subtrunk and trunk sewers along Innis Lake Rd, Centreville Creek Rd and The Gore Rd will be required to service growth east of Airport Rd and south of the proposed GTA West Highway.

#### Additional Considerations

#### Scenarios 1 - 2 - 3 - 4

- Longer extension of the new Airport Rd trunk sewer from the proposed Castlemore bypass to north of the proposed GTA West Highway will be required to accommodate the additional flows in the Airport Rd catchment area.

Figure 19 schematically demonstrates the servicing strategy for Scenario 0 (Opaque Arrows) and Scenario 1-4 (Transparent Arrows). Areas shaded in yellow/orange/brown depict 2041-2051 “Heat Map” style growth for Scenario 0.

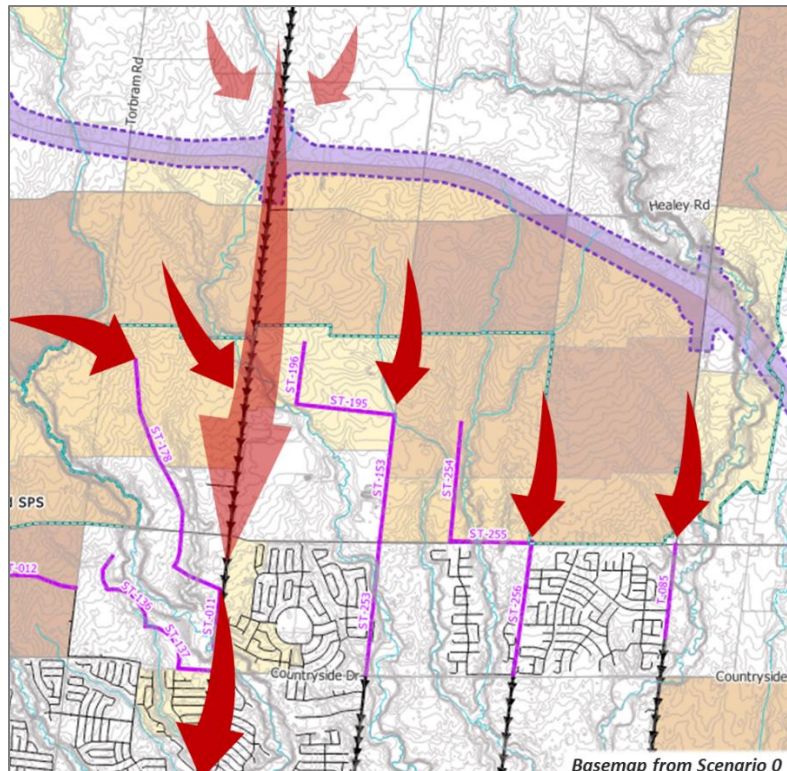


Figure 19 – Area 3 Wastewater Servicing



### 5.2.4 Area 4 - The Gore Road to Albion-Vaughan Road

Area 4 is generally bounded by The Gore Road to the West and Albion-Vaughan Road to the East. The future servicing strategy and infrastructure requirements for this area are as follows:

#### Scenario 0

- The Humber Station Rd trunk sewer will be the main trunk servicing new growth areas north of King St and West of Humber Station Rd.
  - This should include a flow split structure that will convey some flows East (ST-200) to Coleraine Dr and some flows south (ST-204) to Humber Station Rd.
- Areas north of Columbia Way will require twining of existing infrastructure to the Bolton SPS consistent with Option 2 strategy of the Bolton Residential Expansion Study (BRES).

#### Additional Considerations

#### Scenarios 3 & 4

- Additional population and service area north of Columbia Way will require an expansion of the Bolton sewage pumping station to accommodate the increase of flows.

Figure 20 schematically demonstrates the servicing strategy for Scenario 0 (Opaque Arrows) and Scenario 1-4 (Transparent Arrows). Areas shaded in yellow/orange/brown depict 2041-2051 “Heat Map” style growth for Scenario 0.

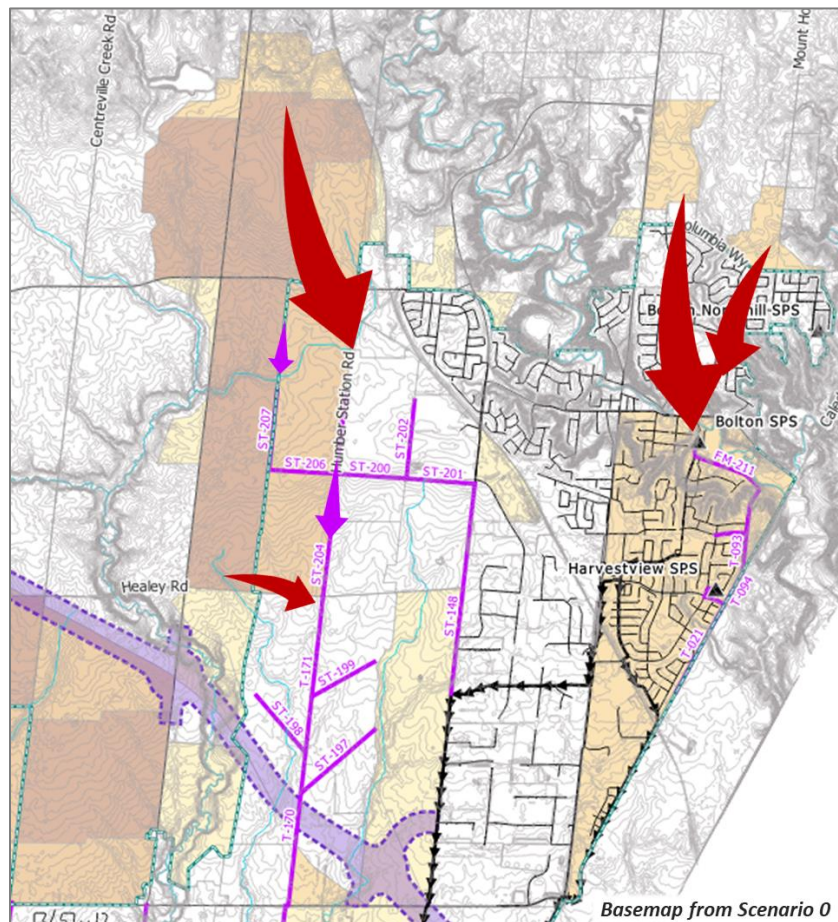


Figure 20 – Area 4 Wastewater Servicing



### 5.3 Wastewater System Cost Analysis

For each of the five growth scenarios, a high-level analysis was performed to determine the cost range of the potential water and wastewater infrastructure requirements to service growth to 2051. The cost analysis included a compilation of Class 5 cost estimates for vertical and linear water and wastewater infrastructure consistent with high-level planning cost estimating approaches. Class 5 estimates or “Order of Magnitude” estimates include high-level cost estimates with a long-term project horizon. This is consistent for desktop level analysis based on previous similar projects and engineer’s informed approximation formed on limited available information with respect to project scope (e.g. diameter, depth, alignment, construction methodology, subsurface conditions, etc.). The expected accuracy range for this analysis presents a typical variation of -40% (low complexity) and +70% (high complexity) consistent with Class 5 cost estimates as per the Association for the Advancement of Cost Engineering (AACE) Cost Estimate Classification System.

For high-level costing analysis the following assumptions were made:

- Cost estimates were developed mainly for trunk and subtrunk linear infrastructure (sewers ≥450mm) with some exceptions.
- All new trunk and sub-trunk sewers were assumed >5m deep with minimum slopes ranging from 0.25% to 0.40%.
- Sewers larger than 1200mm were assumed to be tunnelled.
- Cost estimates for sewage pumping stations were based on projected flows rounded to the closest 10L/s.
- Cost estimates for forcemains were based on a minimum size of 400mm.
- Estimates for impacted master plan projects were based on the difference between the Master Plan cost estimate and a new cost estimate based on change in scope (e.g. size, length, depth, etc.).

Table 9 summarizes the high-level cost analysis for wastewater infrastructure to service growth in the SABE study area to 2051. These are additional costs over and above the 2041 Master Plan Scenario to satisfy the 2051 SABE growth.

*Table 9 – Summary of High-Level Cost Analysis for Wastewater Infrastructure*

Area	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Area 1	+\$40 M	+\$40 M	+\$40 M	+\$40 M	+\$68 M
Area 2	+\$199 M	+\$206 M	+\$175 M	+\$235 M	+\$235 M
Area 3	+\$104 M	+\$213 M	+\$213 M	+\$213 M	+\$213 M
Area 4	+\$55 M	+\$55 M	+\$55 M	+\$58 M	+\$60 M
<b>Total</b>	<b>+\$398M</b>	<b>+\$514M</b>	<b>+\$483M</b>	<b>+\$546M</b>	<b>+\$576M</b>

The high-level cost analysis shows a range of cost for wastewater infrastructure between \$398 and \$576 million.

Scenario 0 would require the lowest capital investment mainly because there are no new growth areas north of the proposed GTA West Highway and requires a shorter length of the extension of the Airport Rd trunk sewer north of the proposed Castlemore Bypass.

In contrast, Scenarios 3 and 4 would require greater capital investment due to higher amount of growth allocated to growth areas north of the proposed GTA West Highway and requiring a longer extension of the Airport Rd trunk sewer.

Figure 21 to Figure 25 present wastewater infrastructure requirements and associated high-level cost for each of the five planning scenarios for the SABE study area.

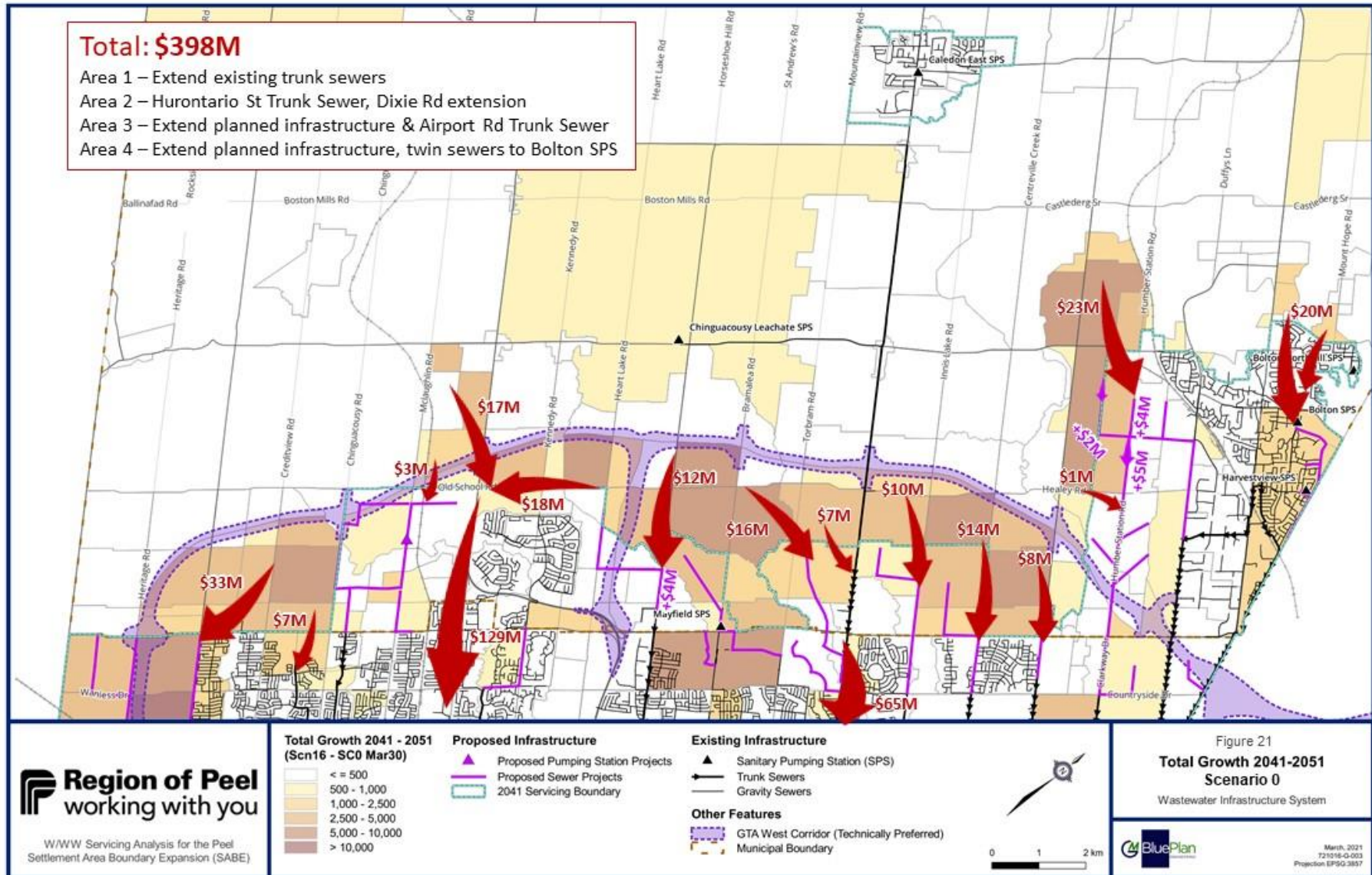


Figure 21 – Scenario 0 Wastewater Infrastructure Requirements



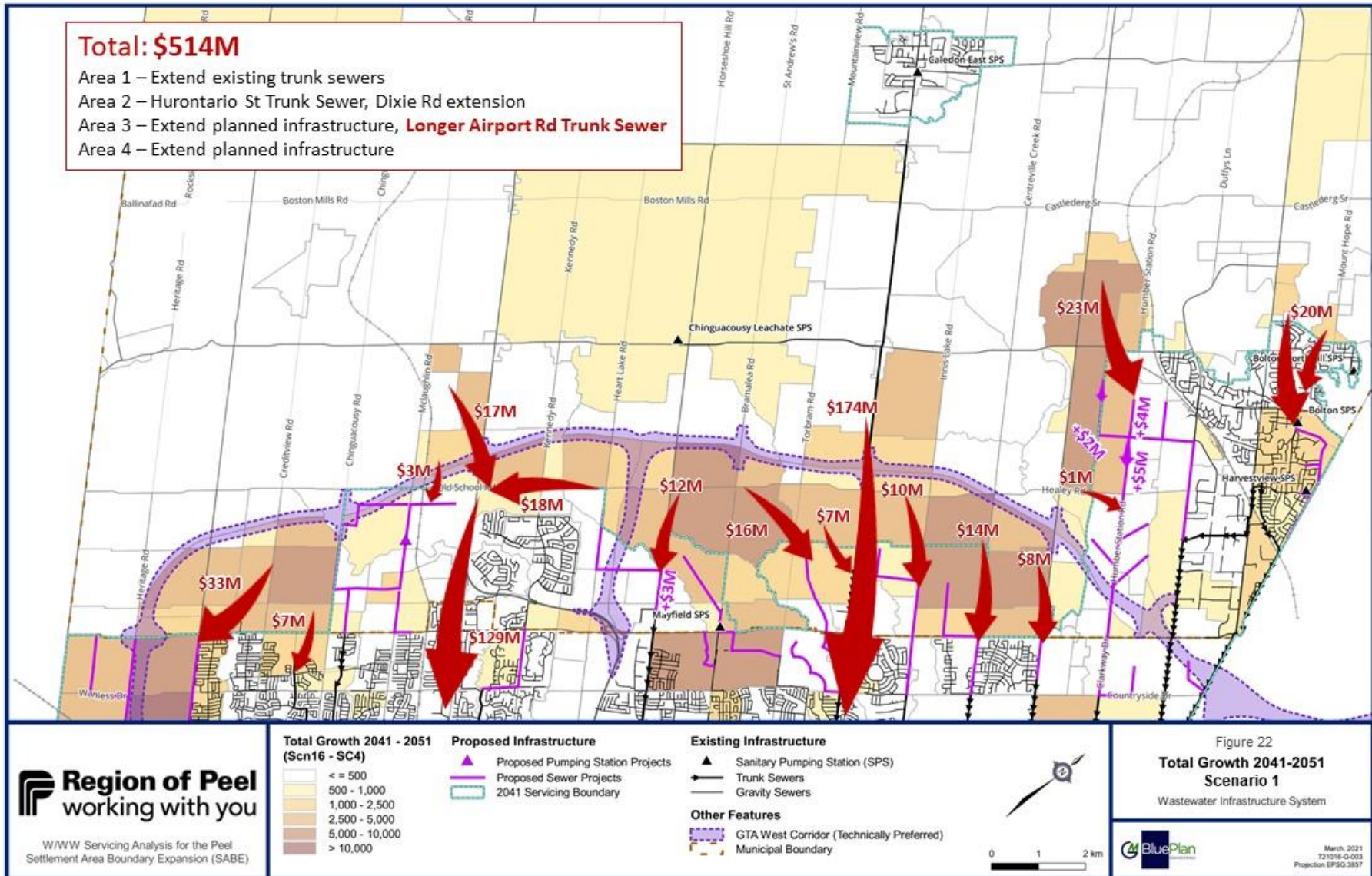


Figure 22 – Scenario 1 Wastewater Infrastructure Requirements

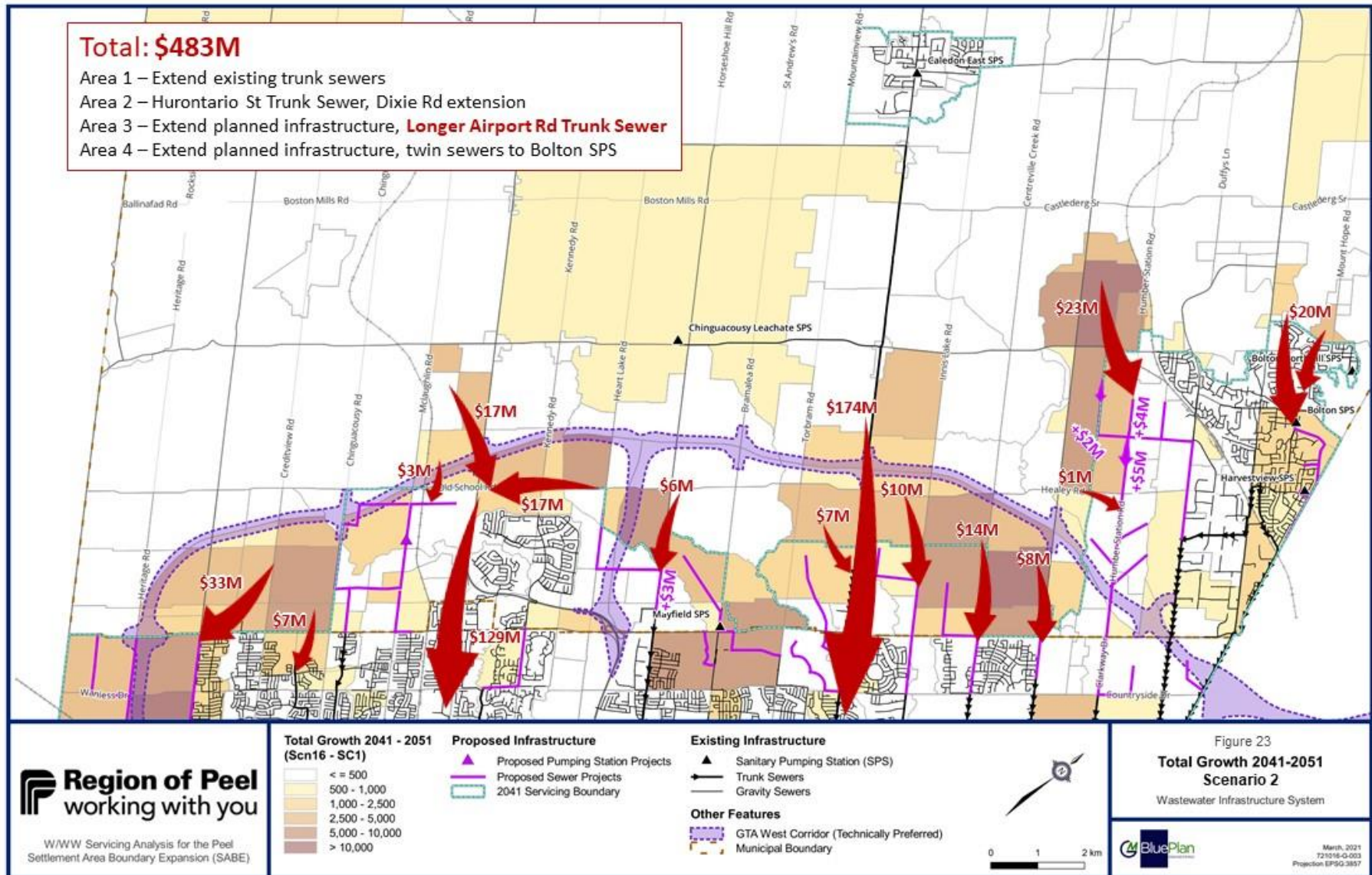


Figure 23 – Scenario 2 Wastewater Infrastructure Requirements



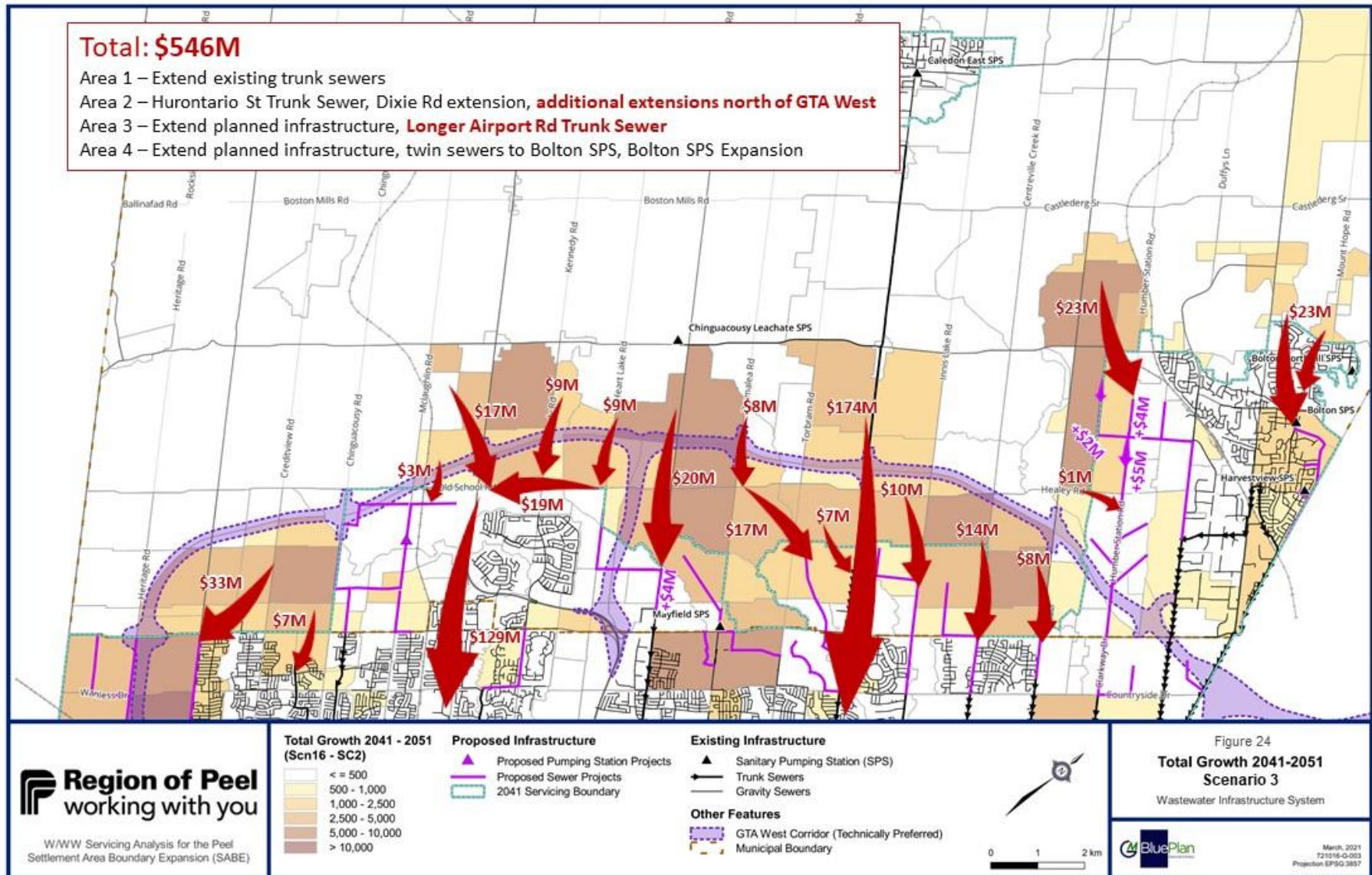


Figure 24 – Scenario 3 Wastewater Infrastructure Requirements

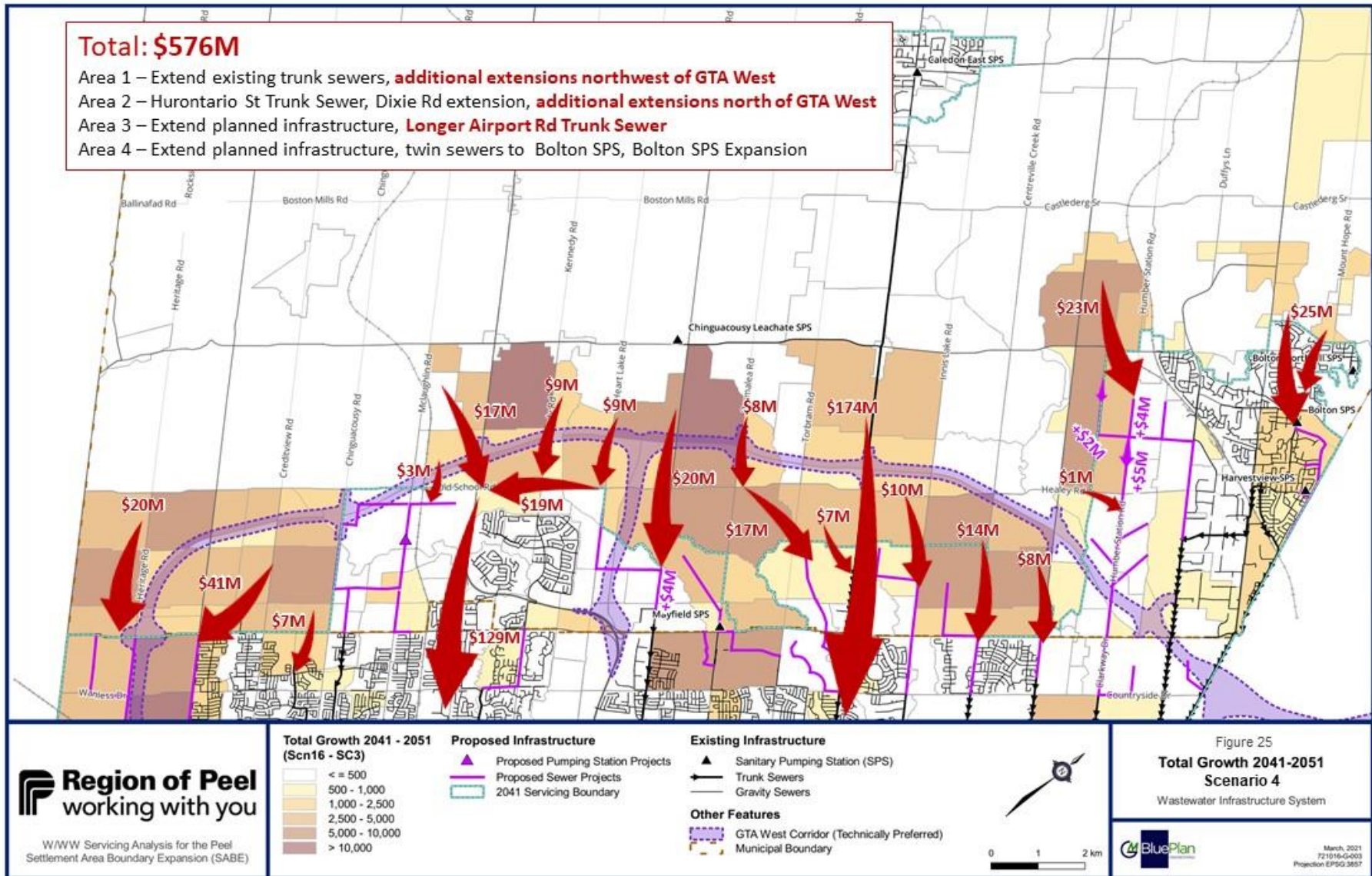


Figure 25 – Scenario 4 Wastewater Infrastructure Requirements



## 6. CONCLUSIONS

The following summarizes the key conclusions identified as part of this analysis:

### Planning

- The Region of Peel has provided five planning scenarios which contain population and employment forecast for the Region to 2051.
- Total population and employment projections for 2051 are consistent across the five planning scenarios. However, there are significant shifts in the location of growth in the SABE study area for each scenario with scenarios 3 and 4 having allocated growth to areas north of the proposed GTA West Highway.
- Of all the scenarios, Scenario 4 has the highest growth allocated to the SABE study area. The additional growth in the Town of Caledon seems to have been re-allocated from the City of Mississauga.
- Overall, the population increase within Caledon from the Master Plan 2041 to SABE 2051 is approximately double (160,000 in MP 2041 to 300,000 in SABE 2051)

### Water Infrastructure

- The additional growth seen in the various SABE scenarios primarily impacts Pressure Zone 7 (7W, 7C, 7E & 7B) and Pressure Zone 6E. For each of these five areas, the increase in population projections impacts the extent of proposed water infrastructure from the 2041 Master Plan.
- Although these population increases are largely focused in Z6 and Z7, there are knock-on effects that cause upgrades to be required further downstream as well.
- West Transmission System
  - Key upgrades include the extension of Z7W distribution mains and a minor Alloa PS upgrade.
  - These upgrades are significantly higher for Scenario 4 than the other 4 scenarios.
- Central Transmission System
  - Key upgrades include the extension of Z7C distribution/sub-transmission mains and the addition of the Victoria Pumping Station.
  - These upgrades are most significant for Scenarios 3 & 4, but all Scenarios require moderate upgrades due to growth.
- East Transmission System
  - The East Transmission System is the biggest driver of additional costs for the water system
  - Key upgrades include the addition of Sandhill PS & Reservoir; new transmission mains from Airport to Tullamore and to Sandhill; the addition of East Caledon Elevated Tank; various downstream PS upgrades (Tullamore, Airport, Beckett-Sproule) and the extension of Z7E distribution mains.
  - These upgrades are most significant for Scenarios 3 & 4, but all Scenarios require significant upgrades due to growth.
- East (Bolton) Transmission System
  - Key upgrades include the extension of Z7B distribution/sub-transmission mains and the addition of the North Bolton Pumping Station.
  - These upgrades are most significant for Scenarios 3 & 4, but all Scenarios require moderate upgrades due to growth.

### Wastewater Infrastructure

- The additional growth seen in the various SABE scenarios is spread out across the entire upstream north service area of the Regional wastewater lake-based system.
- A desktop wastewater analysis was undertaken to determine at a high-level new trunk and subtrunk linear and vertical infrastructure required to service growth to 2051 in the study area. Impacts and improvements downstream of the study area were not look in great level of detail as part of this analysis.

The wastewater analysis was divided into four areas:

- Area 1 - Winston Churchill Boulevard to McLaughlin Road
  - The Mississauga Rd trunk sewer will be the main trunk servicing new growth areas

- Key infrastructure requirements include extension of the existing and planned system on Mississauga Rd and Brisdale Drive to service areas north of Mayfield Rd.
- Scenario 4 will require further extension of the system north of the proposed GTA West Highway.
- Area 2 - McLaughlin Road to Airport Road
  - Etobicoke Creek, Spring Creek and Airport Rd will be the main trunk sewers servicing new growth areas.
  - Key infrastructure requirements include extension of the existing and planned trunk and sub-trunk sewers such as Spring Creek and Bramalea Rd towards Airport Rd, and a new proposed trunk sewer along Hurontario St.
  - Scenario 3 and 4 will require further extension of the system north of the proposed GTA West Highway.
- Area 3 - Airport Road to The Gore Road
  - Airport Rd, Goreway Dr, McVean Dr and The Gore Rd will be the main trunk sewers servicing new growth areas.
  - Extension of the Airport Rd trunk sewer from the proposed Castlemore bypass to the north will be required.
  - Scenarios 1 to 4 will require longer extension of the Airport Rd trunk sewer to north of the proposed GTA West Highway.
- Area 4 - The Gore Road to Albion-Vaughan Road
  - The Humber Station Rd trunk sewer will be the main trunk servicing new growth areas north of King St and West of Humber Station Rd and will require a flow split to divert flows from the Coleraine Dr sewers.
  - Areas north of Columbia Way will require twining of existing infrastructure to the Bolton SPS.
  - Scenarios 3 and 4 will require an expansion of the Bolton sewage pumping station to accommodate projected higher flows.

### **No GTA West Scenario**

All Scenarios that were reviewed for this analysis included the assumption that a GTA West Highway corridor was to be constructed, as shown in the Figures. This corridor generally acted as a boundary for growth in Scenario 0, however all Scenarios show a range of growth pushing north of the highway.

The Region has requested high level comment on the potential infrastructure cost impacts if the GTA West Highway was not constructed (“No GTA West Scenario”), assuming all growth remains the same for each given Scenario.

For all SABE growth Scenarios (Scenarios 0 through 4), the cost estimates for required infrastructure to service the 2041 to 2051 growth were largely driven by geographical distribution of growth and the need for large trunk infrastructure. That is, as growth is more spread out and shifts further north, more linear infrastructure as well as facilities are required for servicing. Included within the linear cost estimates is the cost for watermain and sewer crossings of the proposed highway (assuming the highway is constructed first, and infrastructure afterwards). While these ‘highway crossing’ costs do increase the overall cost of the infrastructure program, the estimated crossing costs amount to approximately 2-5% of the overall program cost.

Detailed costing of the “No GTA West” Scenario has not been completed at this time, however, in general, it is anticipated that there would be negligible infrastructure cost savings for the No GTA West Scenario.



**Cost Summary**

The following table summarizes the estimated costs for the water and wastewater infrastructure required to service growth in the SABE study area to 2051. These are additional costs over and above the 2041 Master Plan Scenario.

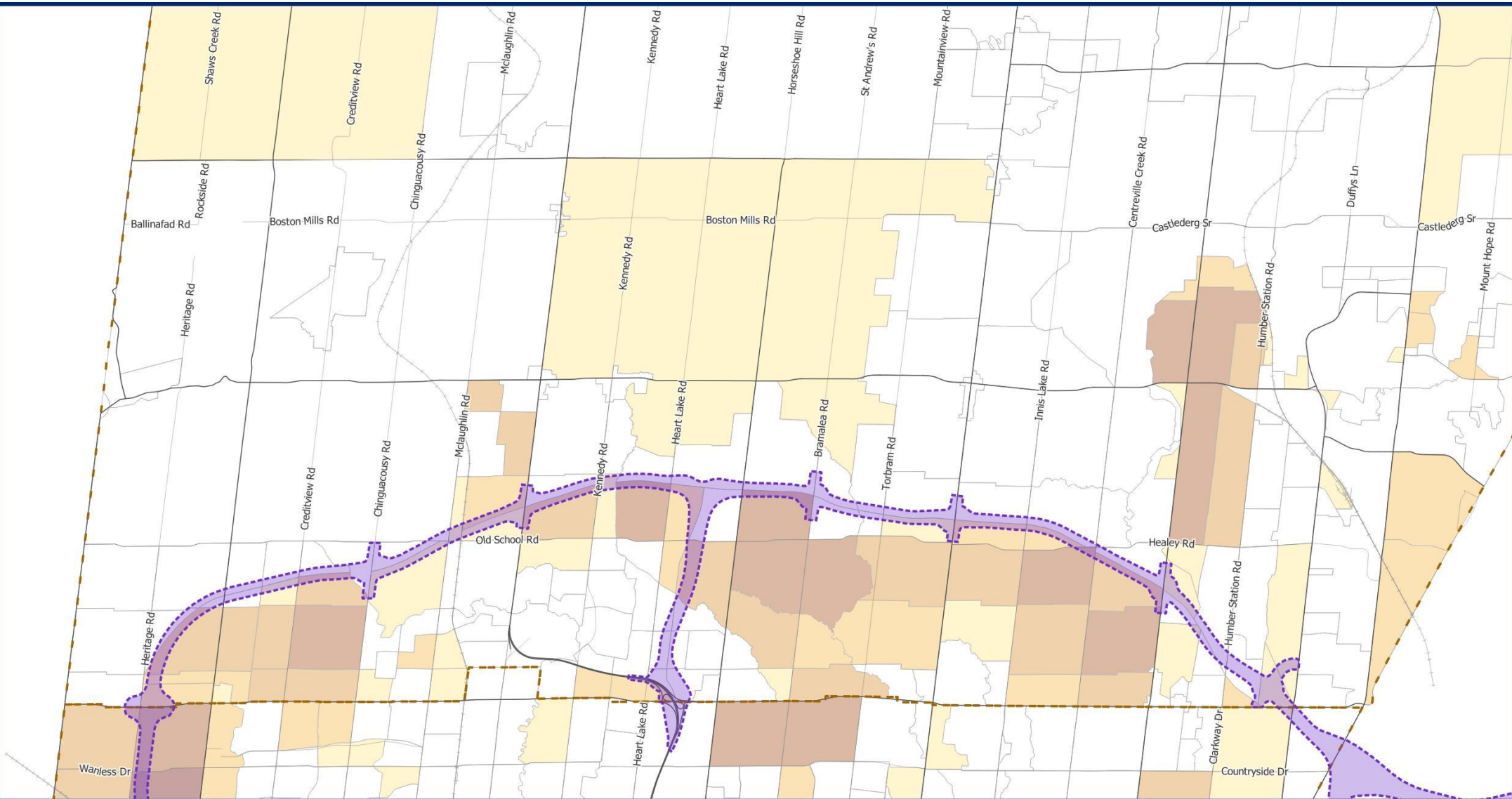
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Water	+\$321M	+\$355M	+\$319M	+\$379M	+\$429M
Wastewater	+\$398M	+\$514M	+\$483M	+\$546M	+\$576M
<b>Total</b>	<b>+\$719M</b>	<b>+\$869M</b>	<b>+\$802M</b>	<b>+\$925M</b>	<b>+\$1,005M</b>

- Scenario 0 is the least expensive option. This is primarily because most of the growth is focused in areas south of the GTA West Highway Corridor.
- Scenario 1 is the third least expensive overall. This is more expensive than Scenario 0 primarily because of the longer Airport Rd trunk sewer associated with growth north of the GTA West Highway Corridor.
- Scenario 2 is the second least expensive overall. This scenario is similar to Scenario 0, but with additional water and wastewater costs associated with further growth in the central areas north of the GTA West Highway Corridor.
- Scenario 3 is the second most expensive overall. This scenario is more expensive than Scenario 1 due to additional extensions north of the GTA West Highway Corridor in central areas.
- Scenario 4 is significantly more expensive than all other alternatives, due to higher allocation of growth and expansions north of the GTA West Highway Corridor in the West, Central and East parts of Caledon.



## **Appendix A – Heat Maps**





WWW Servicing Analysis for the Peel Settlement Area Boundary Expansion (SABE)

**Total Growth 2041 - 2051 (Scn16 - SC0 Mar30)**

- <= 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 10,000
- > 10,000

**Other Features**

- GTA West Corridor (Technically Preferred)
- Municipal Boundary

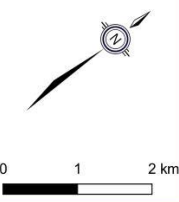
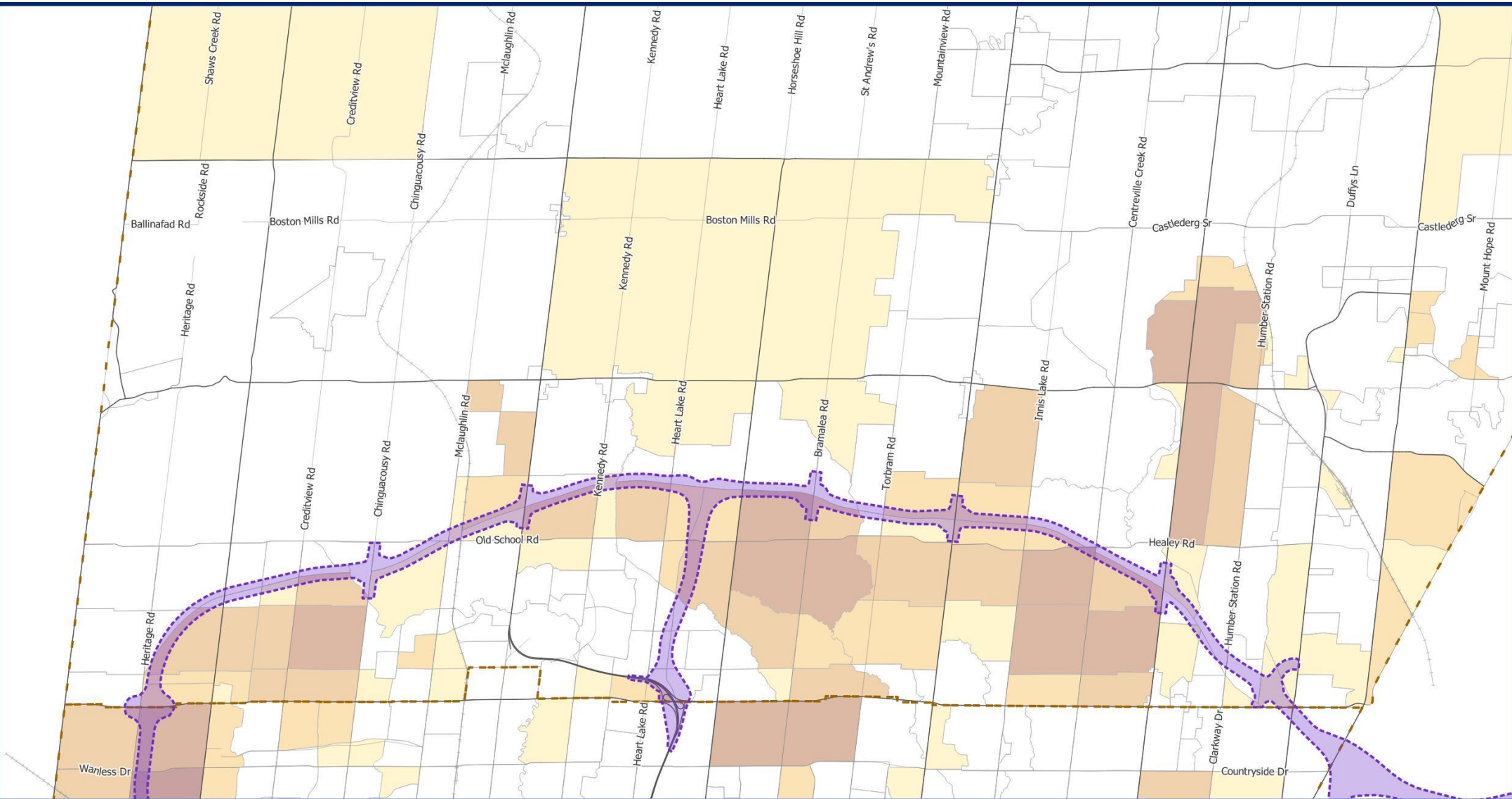


Figure A-1  
**Total Growth 2041-2051 Scenario 0**

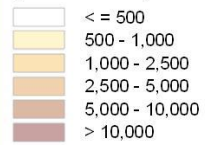






WWW Servicing Analysis for the Peel Settlement Area Boundary Expansion (SABE)

**Total Growth 2041 - 2051 (Scn16 - Scn4)**



**Other Features**

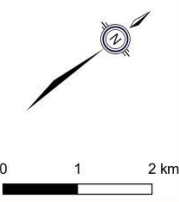
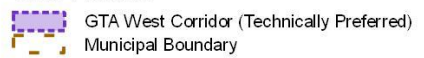
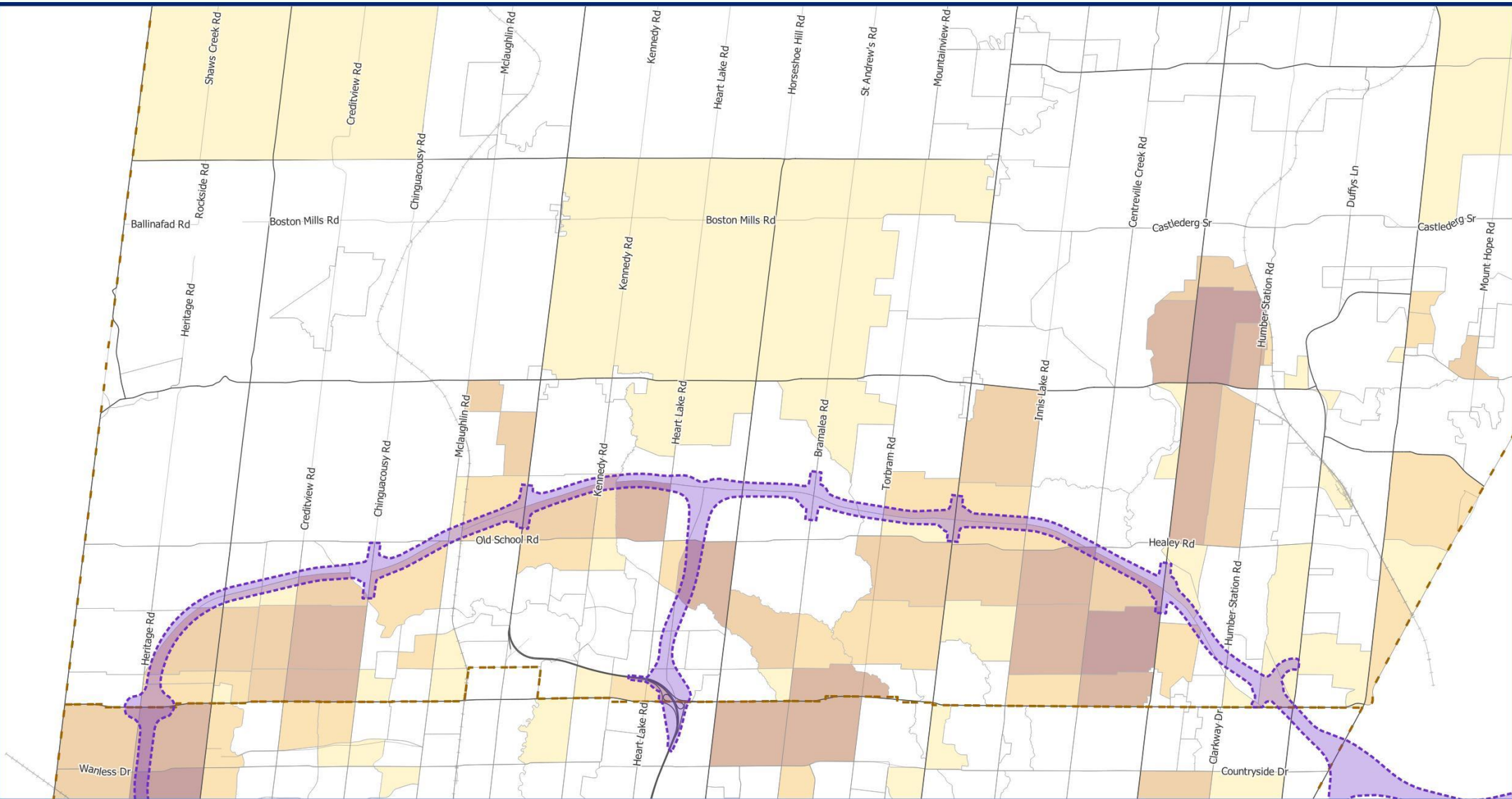


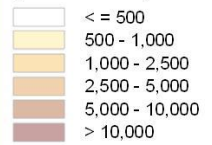
Figure A-2  
**Total Growth 2041-2051 Scenario 1**  
 55 intensification 65 ppj





WWW Servicing Analysis for the Peel Settlement Area Boundary Expansion (SABE)

**Total Growth 2041 - 2051 (Scn16 - Scn1)**



**Other Features**

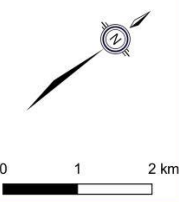
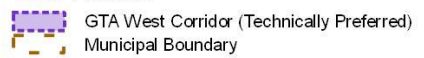
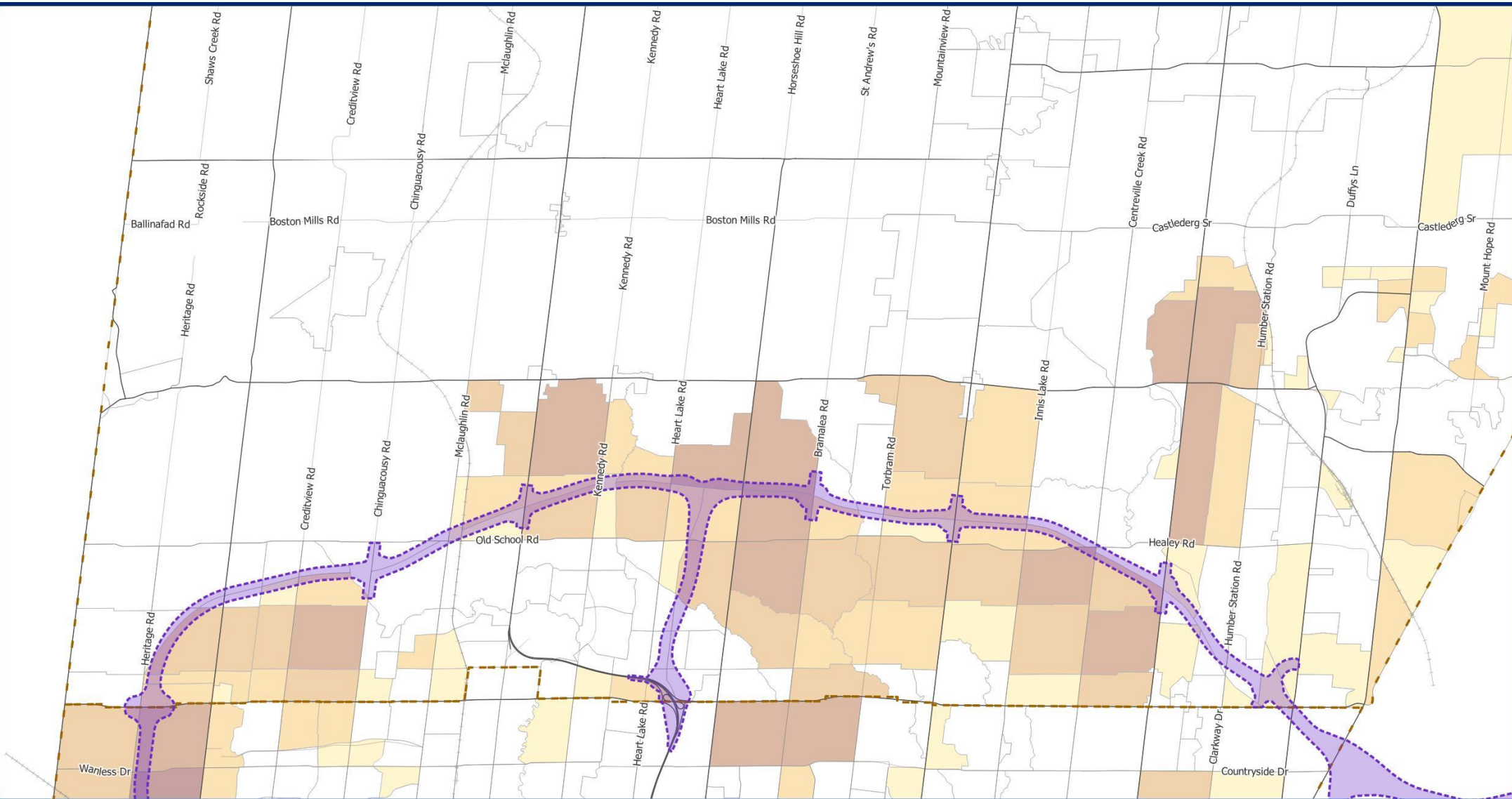


Figure A-3  
**Total Growth 2041-2051 Scenario 2**  
 55 intensification 75 ppj

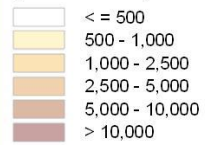






WWW Servicing Analysis for the Peel Settlement Area Boundary Expansion (SABE)

**Total Growth 2041 - 2051 (Scn16 - Scn2)**



**Other Features**

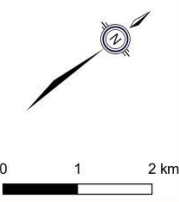
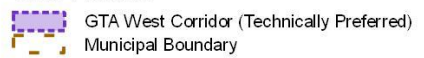
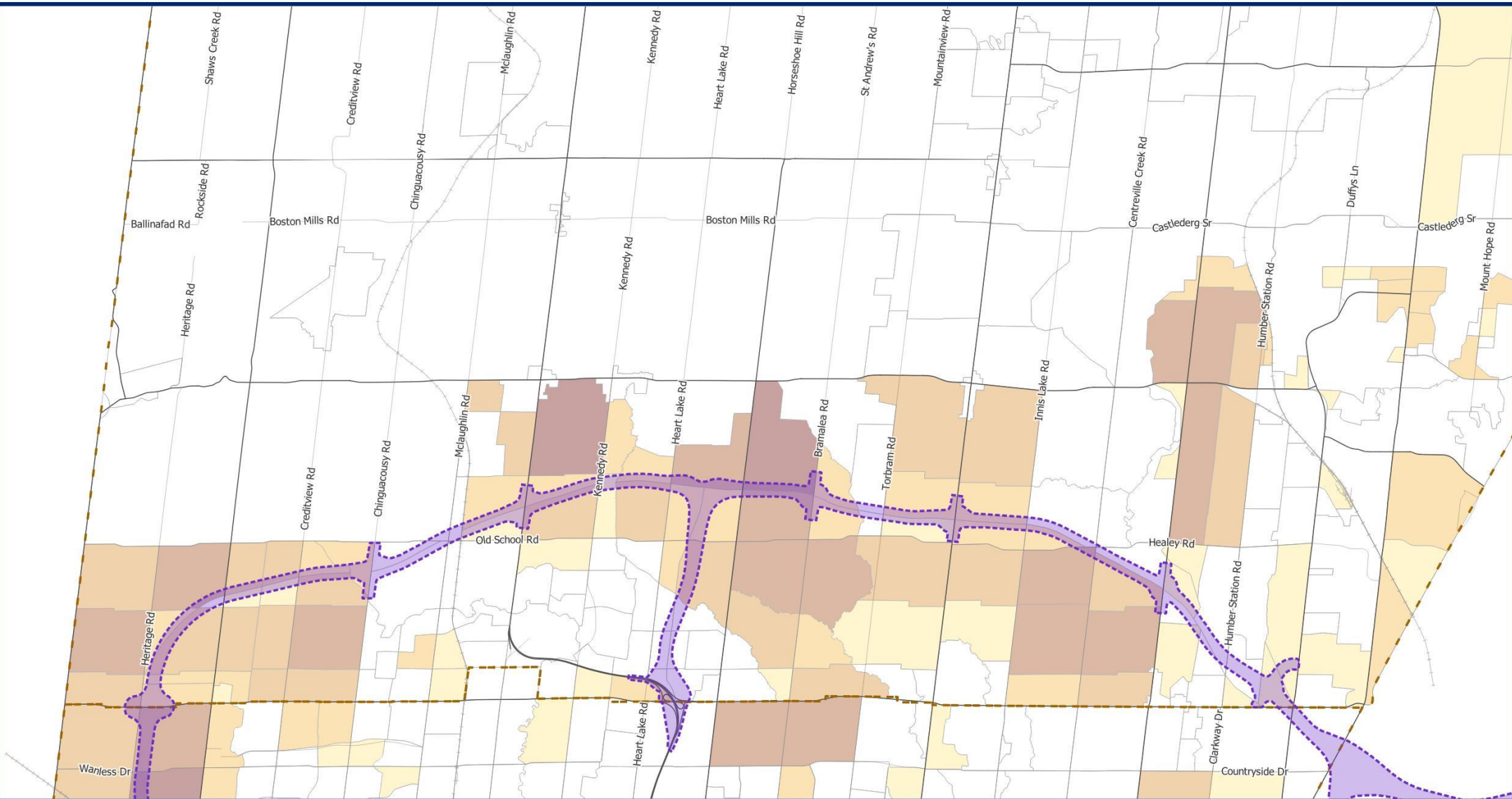


Figure A-4  
**Total Growth 2041-2051 Scenario 3**  
 55 intensification 55 ppj







WWW Servicing Analysis for the Peel Settlement Area Boundary Expansion (SABE)

**Total Growth 2041 - 2051 (Scn16 - Scn3)**

[Lightest Yellow]	<= 500
[Light Yellow]	500 - 1,000
[Yellow]	1,000 - 2,500
[Orange]	2,500 - 5,000
[Dark Orange]	5,000 - 10,000
[Darkest Orange/Brown]	> 10,000

**Other Features**

[Purple Dashed Line]	GTA West Corridor (Technically Preferred)
[Yellow Dashed Line]	Municipal Boundary

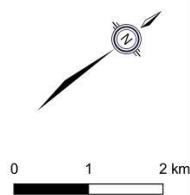


Figure A-5  
**Total Growth 2041-2051 Scenario 4**  
 50 intensification 65 ppj

