

Lambton Area Water Supply System Water Master Plan Update Servicing Options Review

Project No.: 60624749

September 24, 2020



Agenda

1. System Assessment Results Review
2. System Constraints Review
3. West Lambton Reservoir Strategy
4. Servicing Options Review
5. Next Step

1. Flow Projections – ADD (ML/d)

<i>Year</i>	<i>Sarnia</i>	<i>Point Edward</i>	<i>St. Clair</i>	<i>Plympton/ Wyoming</i>	<i>Lambton Shores</i>	<i>Watford-Warwick</i>	<i>Alvinston</i>	<i>Petrolia</i>	<i>Chatham-Kent</i>	<i>LAWSS*</i>
<i>2016</i>	29.55	1.17	13.92	2.43	1.03	1.38	0.25	0.07	0.01	49.80
<i>2017</i>	29.38	1.18	12.49	2.36	0.93	1.38	0.25	0.08	0.01	48.06
<i>2018</i>	28.45	1.17	14.51	2.43	0.94	1.26	0.25	0.10	0.02	49.11
<i>2019</i>	29.25	1.14	14.40	2.50	0.91	1.10	0.25	0.11	0.02	49.69
<i>2026</i>	31.35	1.23	16.12	2.81	1.08	1.44	0.26	0.21	0.04	54.54
<i>2031</i>	32.86	1.28	17.35	3.03	1.21	1.68	0.26	0.28	0.05	58.00
<i>2036</i>	34.36	1.34	18.58	3.26	1.33	1.92	0.26	0.35	0.06	61.47
<i>2041</i>	35.87	1.40	19.81	3.48	1.45	2.16	0.27	0.41	0.07	64.93
<i>Growth Rate (2016 – 2031)</i>	11.2%	10.0%	24.7%	25.0%	17.0%	21.7%	4.7%	-	-	16.5%

1. Flow Projections – MDD (ML/d)

<i>Year</i>	<i>Sarnia</i>	<i>Point Edward</i>	<i>St. Clair</i>	<i>Plympton/ Wyoming</i>	<i>Lambton Shores</i>	<i>Watford- Warwick</i>	<i>Alvinston</i>	<i>Petrolia</i>	<i>Chatham-Kent</i>	<i>LAWSS*</i>
2016	59.1	2.3	27.8	4.9	2.1	2.8	0.5	0.1	0.0	99.6
2017	58.8	2.4	25.0	4.7	1.9	2.8	0.5	0.2	0.0	96.1
2018	56.9	2.3	29.0	4.9	1.9	2.5	0.5	0.2	0.0	98.2
2019	58.5	2.3	28.8	5.0	1.8	2.2	0.5	0.2	0.0	99.4
2026	62.7	2.5	32.2	5.6	2.2	2.9	0.5	0.4	0.1	109.1
2031	65.7	2.6	34.7	6.1	2.4	3.4	0.5	0.6	0.1	116.0
2036	68.7	2.7	37.2	6.5	2.7	3.8	0.5	0.7	0.1	122.9
2041	71.7	2.8	39.6	7.0	2.9	4.3	0.5	0.8	0.1	129.9

* MDD Factor = 2 x AVG

2. System Assessments Summary

- Treatment Plant Capacity
 - Sufficient to meet future growth as is.
- Pumping Capacity
 - Sufficient to meet future growth as is.
- Storage Capacity
 - Sufficient to meet future growth with minor modifications to current operational practices.

3. West Lambton Reservoir Background

- Twinned 45ML steel tank (90ML total)
- Station storage provides redundancy to overall system.
- Station pumping required for St. Clair water supply sustainability

3. West Lambton Reservoir Background

- Existing Reservoirs not required to address growth but is required for system resiliency.
- Existing Reservoirs requires \$13M in rehabilitation based on recent condition assessment. (\$6.5M each)
- LAWSS current Capital Plan sets work to begin in 2021.
- Rehabilitation would only extend the service life for 20year max.

3. West Lambton Reservoir Requirements

How resilient does LAWSS want to be with respect to storage?

Option 1 : 21ML for providing peak flow events

Option 2 : 46ML for providing full redundancy to the system (2041 storage requirement for Zone 1)

3. West Lambton Reservoir Strategy

The following replacement/refurbishment strategies were reviewed based on Option 2 (45ML)

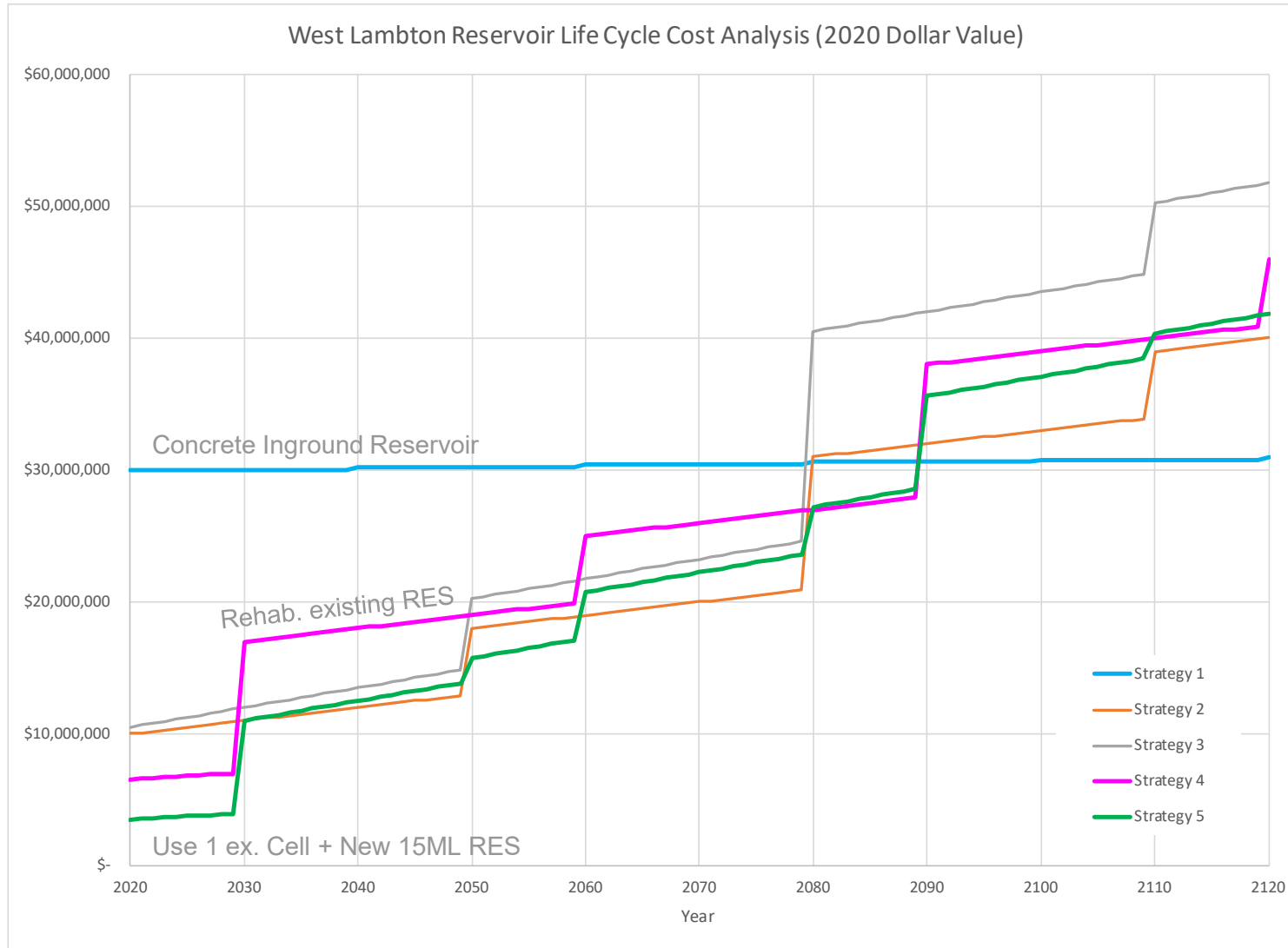
- Strategy 1: Construct New Concrete Reservoir
 - 100 yr life span & minimum O&M costs
- Strategy 2: Non-AWWA Standard Glass Line Steel Tank (23ML ea & require 2)
 - 30 yr life span & require major maintenance for every 10yr
- Strategy 3: AWWA Standard Glass Line Steel Tank (15ML ea & require 3)
 - 30 yr life span & require major maintenance for every 10yr

3. West Lambton Reservoir Strategy

- Strategy 4: Proceed with required rehabilitation
 - Rehab Cell No.1 and decommission Cell No.2
 - Remove tank redundancy
 - Extend service life for 20yr max
 - Require new tank(s) after 20yr
- Strategy 5: Install new tanks in different phasing
 - Minimize initial investment
 - Maximize the utilization of existing tank

3. West Lambton Reservoir

Life Cycle Cost Analysis Results

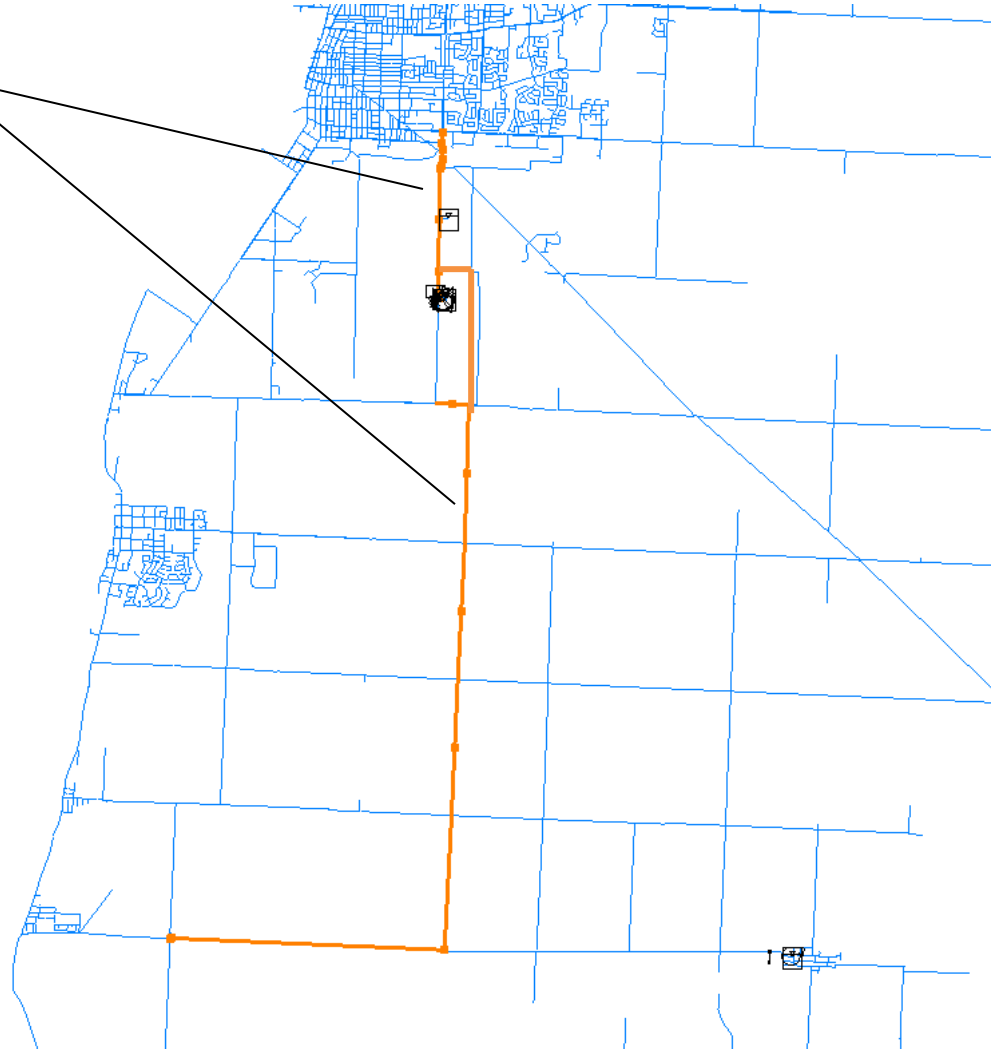


3. West Lambton Reservoir Strategy

- Recommended Strategy (No.5):
 - Decommission existing reservoir (1 cell)
 - Install AWWA standard glass line steel tank
 - 15 ML for \$3.5M
 - Replace 2nd cell with another 15ML tank(s) when life span reached
 - Life span = 30yr
 - Could be extended by another 30yr via major rehabilitation
 - Relatively low capital cost
 - Can defer capital investment
 - Use of existing foundation must be confirmed

4. 2041 MDD Baseline Scenario

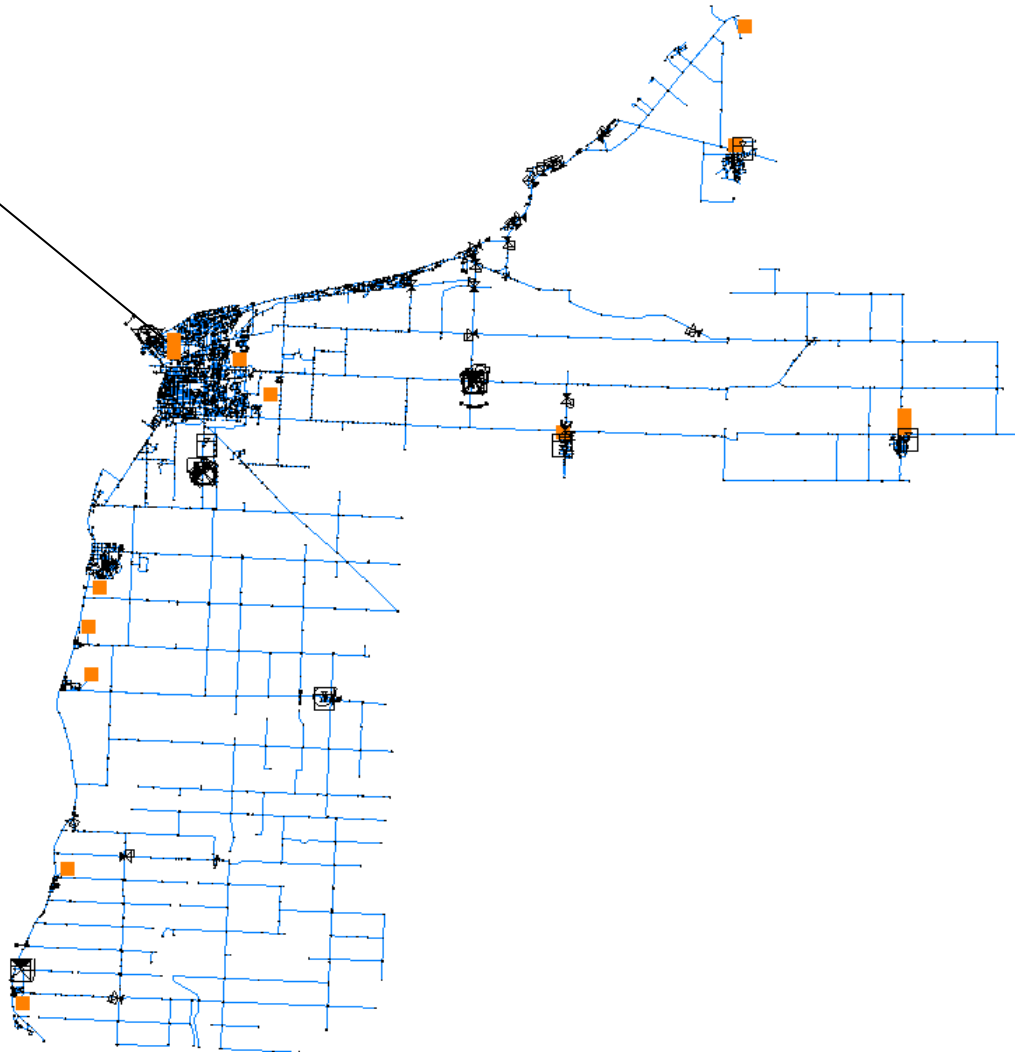
Scenario ran with Grid
Reinforcement &
Transmission Main
Twinning



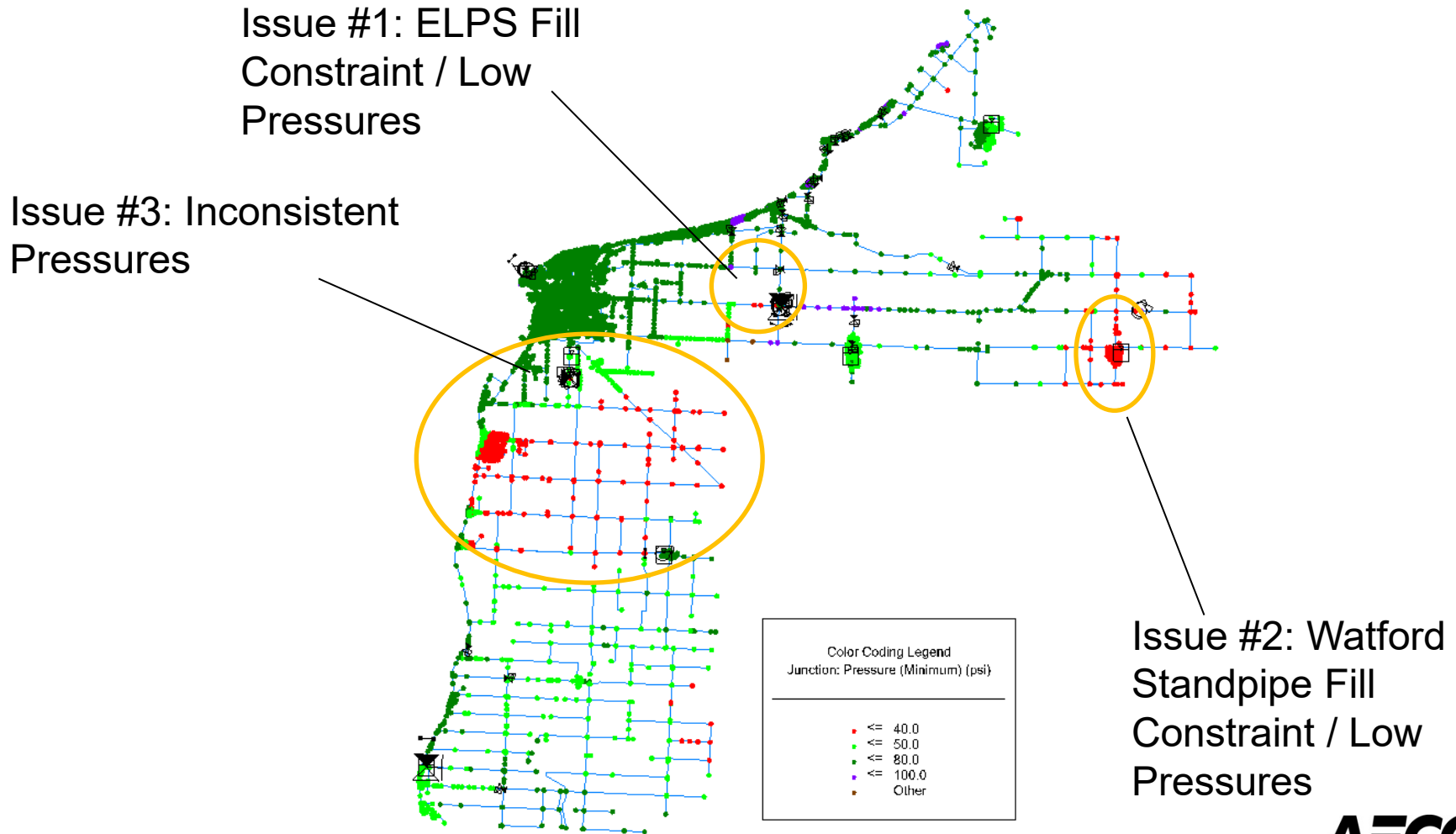
4. 2041 MDD Baseline Scenario – Future Demand Allocation

Future Demand
Growth Locations

LAWSS Member	MDD (L/s)
Sarnia	564
Point Edward	22
St. Clair	450
Future Demand Growth in Sarnia	153
Future Demand Growth in Point Edward	6
Future Demand Growth in St. Clair	125
Sarnia + St. Clair - 2019 Modelling Demand	1036
Sarnia + St. Clair - 2041 Modelling Demand	1320
Lambton Shores	21
Plympton-Wyoming	23
Future Demand Growth in Lambton Shores	12
Forest System - 2019 Modelling Demand	44
Forest System - 2041 Modelling Demand	56
Watford-Warwick	26
Plympton-Wyoming	37
Future Demand Growth in Watford	25
Future Demand Growth in Wyoming	23
Watford System - 2019 Modelling Demand	63
Watford System - 2041 Modelling Demand	111
Total 2019 Modelling Demand for LAWSS	1143
Total 2041 Modelling Demand for LAWSS	1487



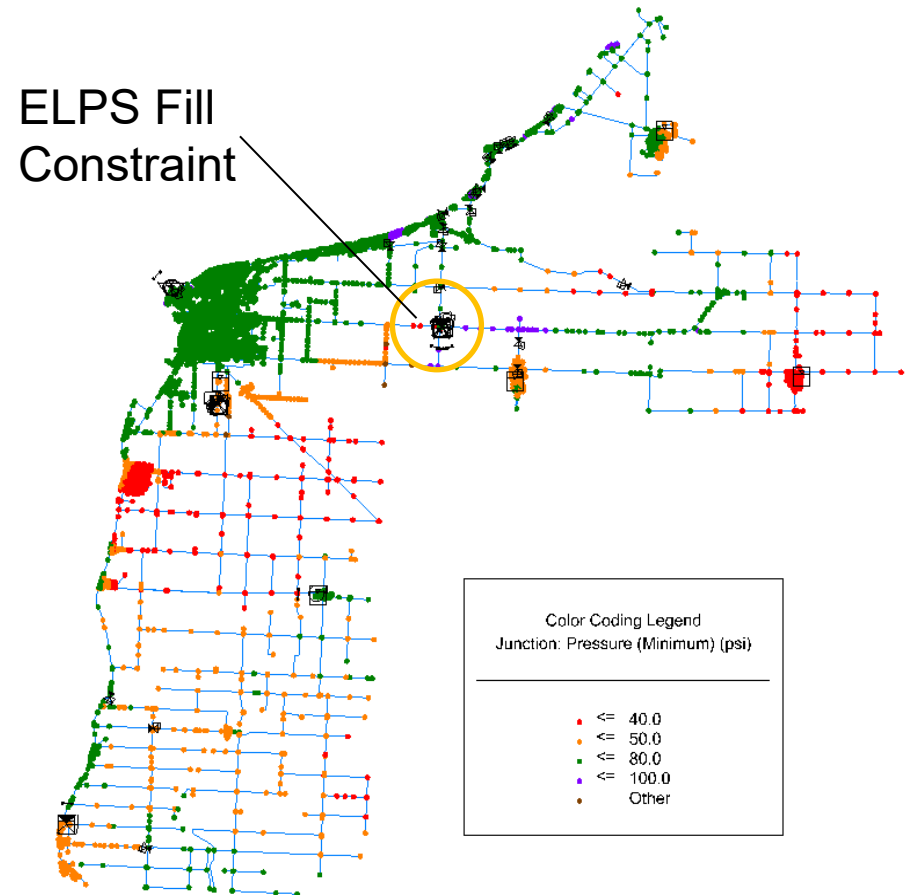
4. System Issues



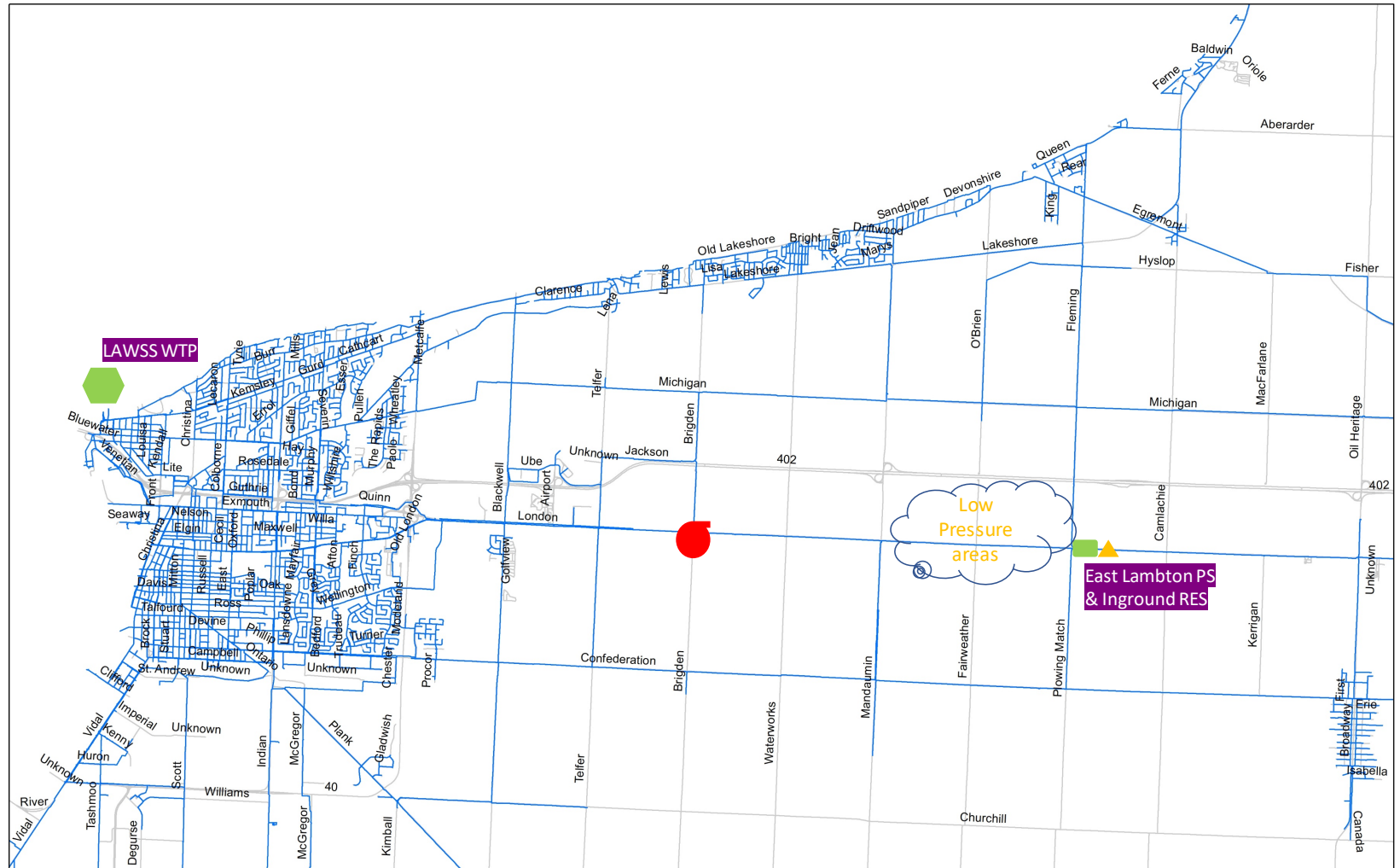
4. Issue #1: Mitigation Alternatives for ELPS Fill Constraints

- Option 1: Re-purposing an Existing Transmission Main
- Option 2: New Booster Pumping Station between WTP and ELPS
- Option 3: New Transmission Main
- Option 4: New local watermain from East Lambton PS (Forest)

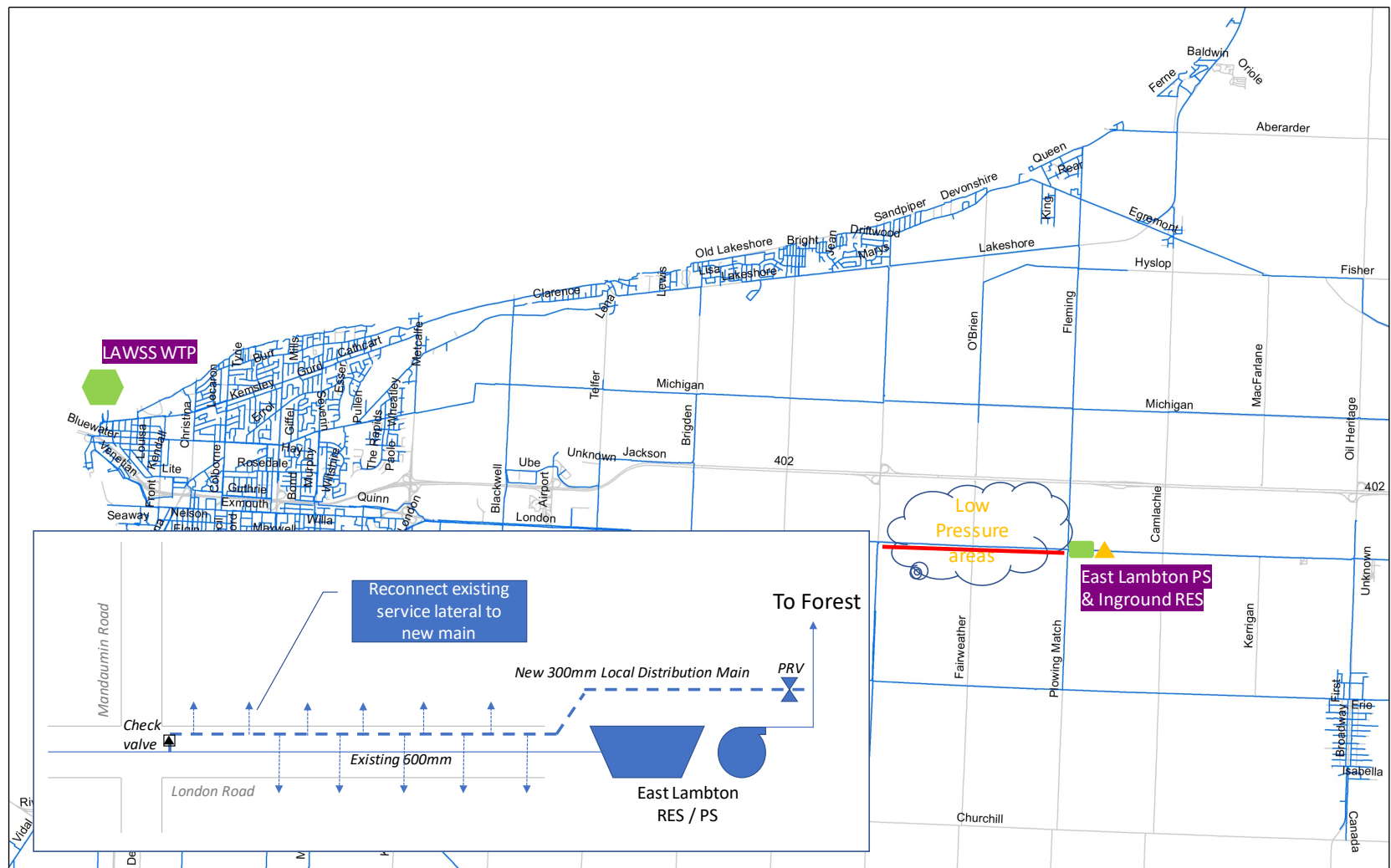
Option	Est. Costs
Option 1	\$ 3.8M
Option 2	\$ 6.0M
Option 3	\$ 58.0M
Option 4	\$ 6.0M



4. Recommended Option for Issue No.1 (Option 2)

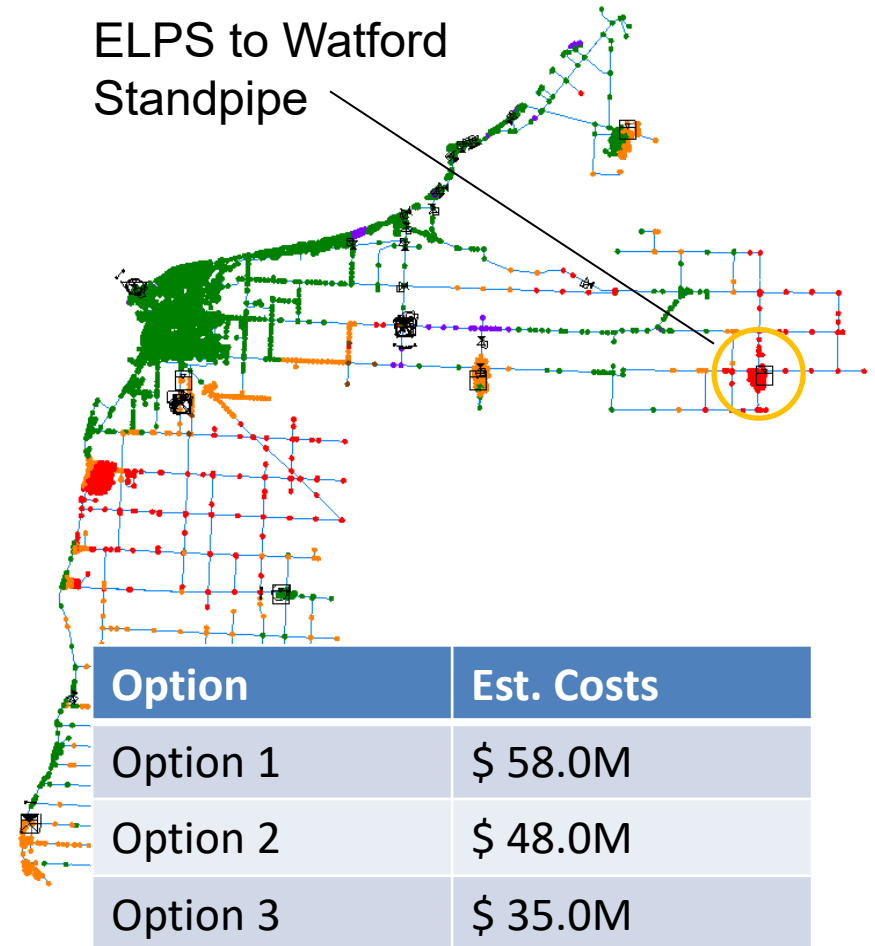


4. Recommended Option for Issue No.1 (Option 4)

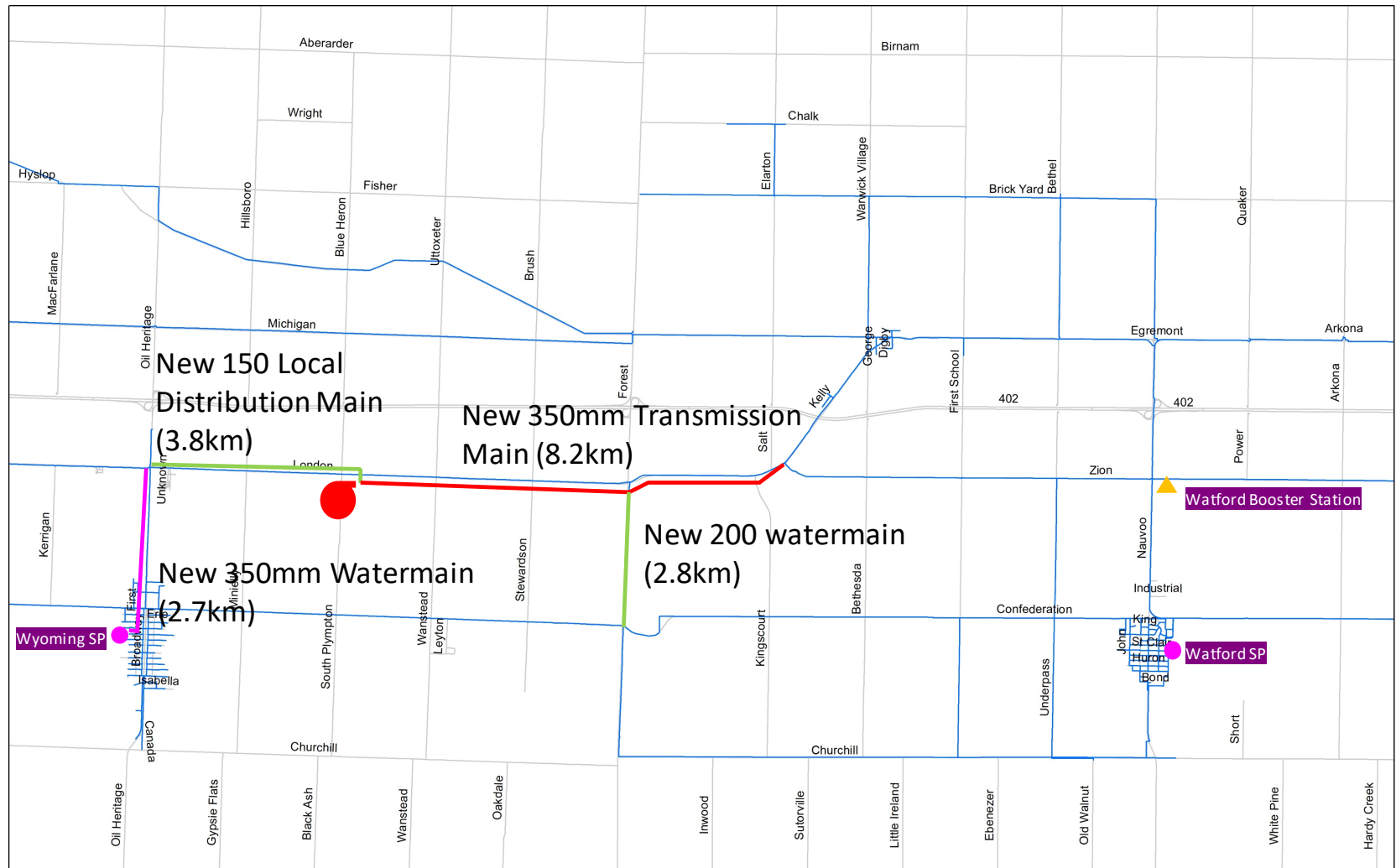


4. Issue #2: Mitigation Options for ELPS to Watford Standpipe

- Option 1: New Transmission Main along Michigan Line and Confederation Line
- Option 2: New Pressure Zone in East Lambton (Watford)
 - New Booster Station
 - New watermains
 - New Local Supply Line
 - Acquire Wyoming SP
- Option 3: New Pressure Zone in East Lambton (Watford)
 - New Booster Station
 - New watermains (less than Option 2)
 - New Local Supply Line
 - Acquire Wyoming SP

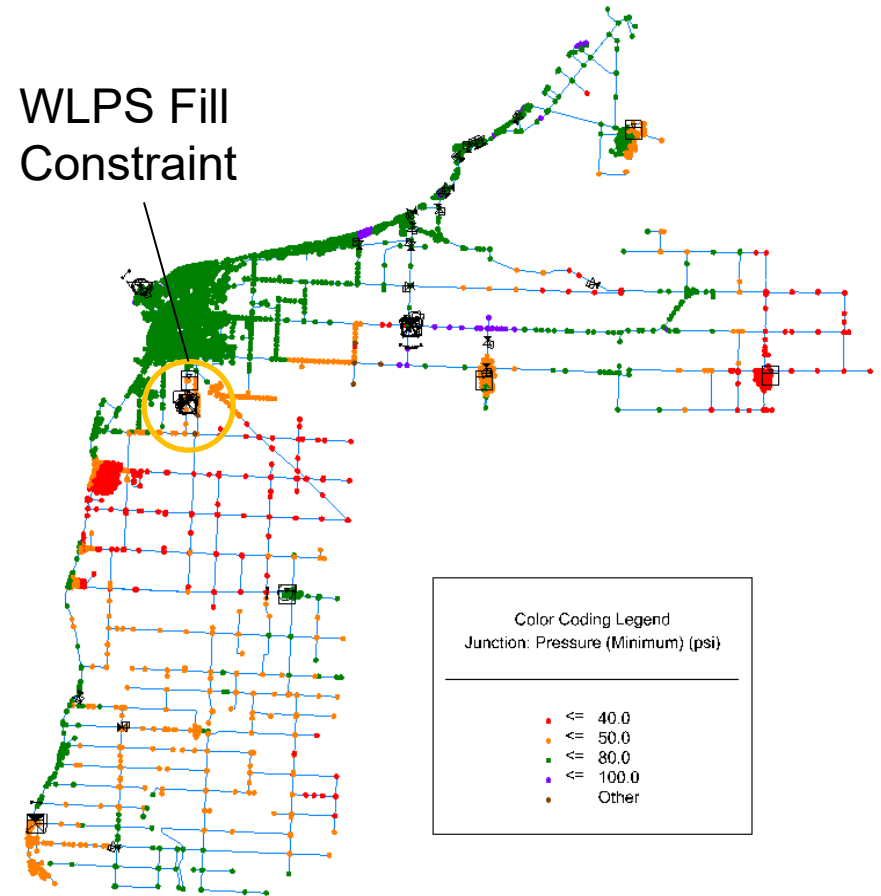


4. Recommended Option for Issue No.2 (Option 3)



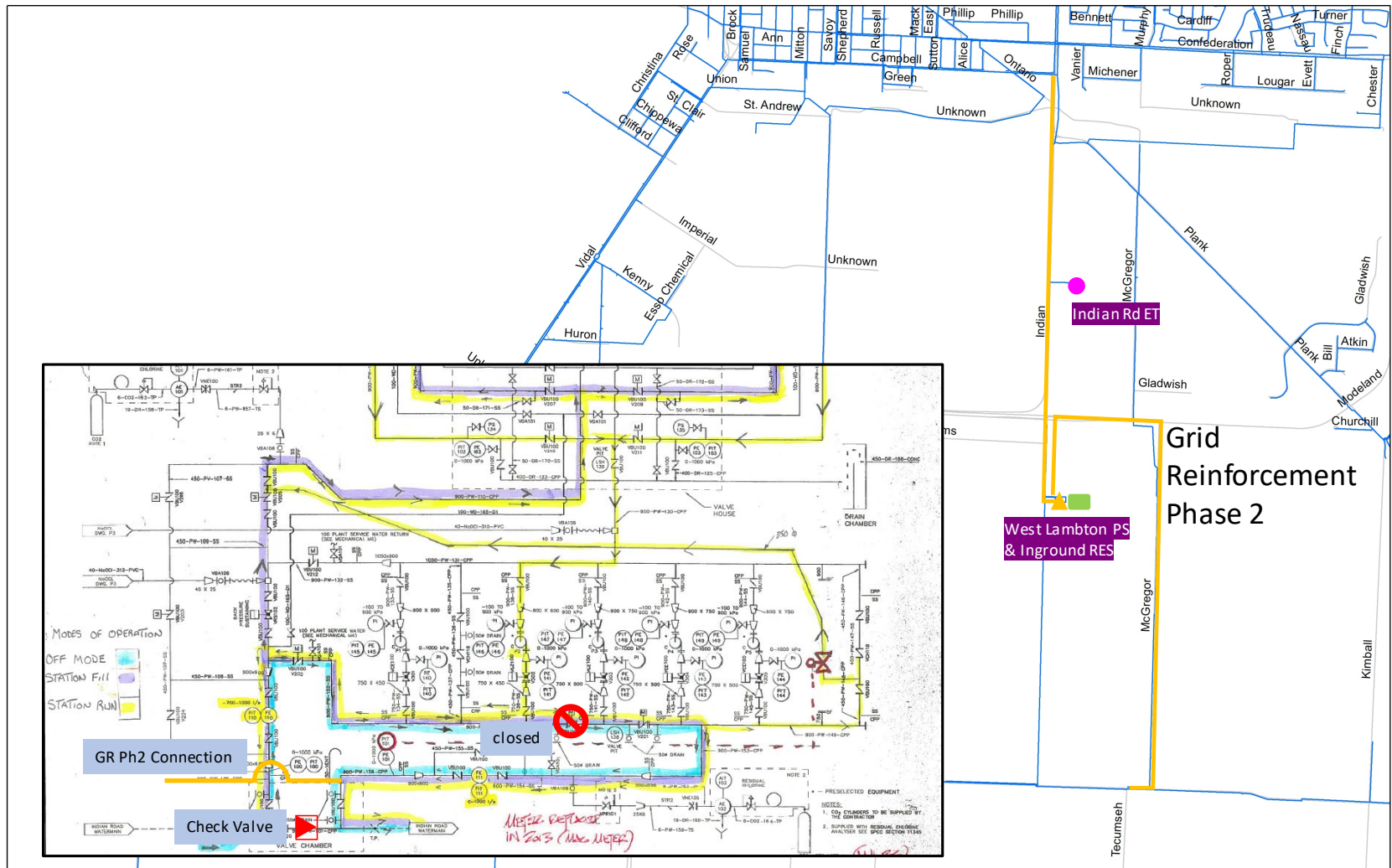
4. Issue 3: WLPS Fill Constraints

- Option 1: Zone Separation and Modifications to WLPS Fill Operations



Option	Est. Costs
Option 1	\$ 1.6M

4. Recommended Option for Issue No.3 (Option 3)



5. Next Step

- Online PIC No.1
 - present overview of LAWSS, need for improvements and potential solutions / strategies
 - Early October 2020
- Evaluate and confirm preferred solutions / strategies
- PIC No.2
 - Present preferred solution / strategy
 - Early December 2020
- Project File
 - Early 2021

Thank You