

October 24, 2019
JLR File No.: 27550

VIA: Email

Ms. Allison Kershaw
Manager of Water and Wastewater Services
Town of The Blue Mountains
32 Mill Street, Box 310
N0H 2H0

Dear Ms. Kershaw:

**Re: Town of The Blue Mountains
Municipal Master Plan for Town-Wide Water Distribution System
Project File – Engineer’s Seal Letter**

We are pleased to provide this Project File for the Town of The Blue Mountains Municipal Master Plan for Town-Wide Water Distribution System project. J.L Richards & Associates Limited acted as the prime consultant for this project and is responsible for the overall project management and preparation of the Project File.

Our efforts were supplemented by our sub-consultant, Golder, to provide additional hydrogeological and geotechnical background and expertise. Golder’s contributions are as follows: Geotechnical and Hydrogeological Study (Appendix A), Ecological Survey and Environmental Impact Study (Appendix B), Stage 1 Archaeological Assessment (Appendix C), and Cultural Heritage Impact Assessment (Appendix D).

Jane Wilson, P. Eng., prepared and/or coordinated the completion of the above work for J.L. Richards & Associates. Michael Troop, P. Eng., acted as the Project Manager and Senior Environmental Engineer on the project and reviewed the final documents. Accordingly, Jane and Michael have affixed, signed, and dated their Engineer seals below.

Please let us know if there are any questions.

Yours very truly,
J.L. RICHARDS & ASSOCIATES LIMITED

The hard copy version of this letter has been sealed and signed by:

Jane Wilson, P. Eng.
Environmental Engineer
J.L. Richards & Associates Limited

Michael Troop, P. Eng.
Associate, Senior Environmental Engineer
J.L. Richards & Associates Limited

JW:kb

Master Plan – Project File Report
Executive Summary

**Town of The Blue Mountains
Municipal Master Plan for
Town-Wide Water Distribution System**



EXECUTIVE SUMMARY

The Town of The Blue Mountains (the Town) is located along the shore of Nottawasaga Bay in Georgian Bay in Grey County. The Town has undertaken a Town-Wide Master Plan Municipal Class Environmental Assessment (Schedule 'B') to establish a long-term solution for the provision of water servicing. Recent reviews of the Town's Official Plan and other planning documents indicate increased growth pressure, resulting in an estimated population of 18,900 by 2023. The purpose of the Water Distribution System Master Plan is to evaluate the Town's long-term water distribution needs and to identify a preferred solution to be implemented as required to match the Town's growth.

Existing Conditions

Preliminary studies conducted include assessments of the geology and hydrogeology, natural environment, archaeological resources, cultural heritage sites, source water protection, and a review of the planning context. Overall, the findings of these studies suggest that there are no major natural environment considerations required for the design and construction of the proposed water supply infrastructure. Once preferred watermain routes and sites are selected, site specific investigations may be required.

Design Criteria

Based on a review of available data, design standards and discussion with Town staff, the unit rate parameters summarized in in Table E-1, next page, were used to estimate future water demands.

Municipal Master Plan for Town-Wide Water Distribution System

Table E-1 ADD, MDD Unit Rates for Future Water Demands

Parameter	Value	Notes
ADD	0.745 m ³ /unit/day	Equivalent to 350 L/day/capita, assuming 2.13 people per unit from the Technical Memorandum No. 1. This value is within the range in the MECP Water Design Guideline (2008) and assumes that the current transition from a seasonal to permanent population base continues.
MDD	20-Year 1.416 m ³ /unit/day Build-Out 1.341 m ³ /unit/day	Maximum day demand has been developed using the MECP Water Design Guideline (2008) in consideration of the service populations in each planning horizon. The maximum day factor in 2038 is estimated to be 1.9 and 1.8 at build-out.
ICI ADD	28 m ³ /ha/day	From the MECP Design Guidelines for Drinking Water Systems (2008).

System Requirements

Based on growth forecasts and design criteria developed for projecting demand, the following system requirements were identified:

- Condition of Water System Facilities:** Based on constructed age there are a number of facilities that have components that may be nearing the end of their useful life. These older facilities include portions of the WTP, two (2) booster pumping stations (Happy Valley and Arrowhead Rd.), and the Victoria St. Elevated Tower. It may be beneficial for the Town to conduct a condition assessment of all facilities, particularly those that are nearing the end of their anticipated useful life, to better understand near-term maintenance requirements.
- Water Treatment Plant and Supplemental Supply Capacity:** The current water supply is adequate to meet the 20-year servicing needs of the Town. In the build-out scenario, there is a treated water supply deficit of 16,246 m³/day, if no water is obtained from the Town of Collingwood. The current water system is long and lacks looping and redundancy. It also is reliant on the Thornbury water treatment plant, located at the west end of the Town. As a result, two (2) challenges at build-out are: 1) providing adequate supply to meet projected demands, and 2) reducing the resources required (i.e. pumping and feedermain capacity) to supply the areas east of Arrowhead Booster Pumping Station (BPS).

Municipal Master Plan for Town-Wide Water Distribution System

- **Storage Requirements:** Water storage requirements were established using a combination of the FUS methodology and MECP methodology. Using this approach there are pressure zones with immediate, 20-year, or build-out storage deficits. Notably, PZ 2 has a 1,200 m³ deficit in 2018 which increases to 1,700 m³ at build out. Town wide, there is a 2,000 m³ deficit in 20 years and 6,000 m³ storage shortfall at build-out.
- **Distribution System Pressures and Fire Flows:** The current system pressures were assessed under the existing average, peak hour, and fire flow demand scenarios. In general, pressures fall within the recommended operating pressure criteria outlined in The Blue Mountains Engineering Standards (April 2009); however, there are some deficiencies. A number of projects to address system pressure deficiencies were previously identified by C3 Water (2015) and have been included under all future servicing scenarios.

Overall, key issues to be addressed by this Master Plan are 1) water supply deficiencies at build-out, and 2) storage deficiencies in all planning periods.

Development and Analysis of Alternatives

An options analysis was performed for alternative solutions address the system deficiencies. This included an initial screening of alternatives, detailed evaluation of the screened alternatives, and selection of the preferred alternative. The alternatives were evaluated using criteria in four (4) major categories:

- Natural Environmental and Archaeology
- Technical Considerations
- Social Environment
- Financial Impacts

Every alternative was assigned an evaluation impact level for each criteria, as it was recognized that more than one alternative or technology could address the problem. An Opinion of Probable Cost (OPCC) was included for each alternative.

Preferred Water Servicing Solutions

The following projects have been identified as the preferred distribution system upgrades and solutions for the Master Plan:

- **Water Distribution System Improvements (Various):** Implement solutions identified by C3 Water (2015) to address the existing and future watermain and pressure zone deficiencies.
 - **0 – 5 years:** Install a check valve that will allow water to flow into Zone 3 from Zone 1 should the HGL in Zone 3 drop below the HGL in Zone 1. This will provide Timberleif Ridge and the Clubhouse with additional fire and emergency supply protection.
 - **0 – 5 years:** Pending the outcome of the Hidden Lake Class EA (C.C. Tatham and Associates), it is recommended that Zone 1a be transferred into Zone 4 as the lands along Alta Road develop and that Wards Rd BPS be decommissioned. Refer the Class EA for project details (completion date is to be determined).
 - **0 – 5 years:** It is recommended that pressure Zone 4c be reconfigured to provide a smaller pressure range at an anticipated HGL of 265 m. This project is currently in conceptual design. Refer to the conceptual design report for project details (completed summer 2019).
 - **0 – 5 Years:** It is recommended that the existing pressure Zone 4B be added into Zone 4. It is understood that the PRV is not currently operating. Existing pressures in the area are suitable with the Zone 4 HGL.
 - **0 – 5 Years:** Due to the system's inability to provide fire flows, the fire hydrant on Happy Valley road should be removed from service and a reduction to rural fire fighting enacted.
 - **Various Timing:** Upsize watermain and add looping to improve fire flow in Zone 1 and Zone 4. To be implemented in coordination with other watermain or road improvements projects.
 - **Build-Out:** Add two (*2) additional PRVs to provide Zone 2a with flows, especially during emergency and fire events.

Municipal Master Plan for Town-Wide Water Distribution System

- **Future Water Distribution Network (Build-Out/20-Years):** Based on the allocation of future residential and ICI growth (refer to Section 5.0), the existing water distribution system is to be extended into future growth areas.
- **Pressure Zone 1(east side), 4 (a,b,c,d) and 5 Supply:**
 - **0 – 5 Years:** Complete a Schedule 'C' Water Supply Class EA for East Pressure Zones. Projects to meet 20-year and build-out demands would be contingent on the outcome of the Class EA.
 - **20-Years/Build Out:** Implement findings of the Schedule 'C' Water Supply Class EA. For interim budgeting purposes, the cost of upgrading the Arrowhead Road BPS and feedermain from the Thornbury WTP has been carried forward. Actual project costs will be contingent on the outcome of the Class EA.
- **Pressure Zone 1, 2 and 3 Storage:**
 - **0 – 5 Years (Zone 2 and Zone 1):** Complete a Schedule 'B' Class EA and Pre-Design for West Side Water Storage. For planning purposes, the cost to (1) construct a 1,700 m³ reservoir in Lora Bay and 0.5 km of distribution feedermain, and (2) decommission the existing Victoria St tower and construct a 1,000 m³ elevated tower at a new location in Thornbury (Tomahawk Municipal Lands) including 0.3 km of feedermain from the elevated tower to the existing feedermain that have been carried forward.
- **Pressure Zone 4 Storage:**
 - **0 – 5 Years:** Conduct a Schedule 'B' Class EA and Pre-Design for East Side Storage (concurrently with Schedule 'C' Water Supply Class EA).
 - **20-Years:** Pending outcome of Schedule B Class EA for East Side Water Storage Class EA and pre-design, construct 1,000 m³ of storage below grade near the Happy Valley Reservoir site. Location and sizing of the reservoir should be confirmed during the Class EA.

Municipal Master Plan for Town-Wide Water Distribution System

- **Build-Out:** Pending outcome of Schedule B Class EA for East Side Water Storage Class EA and pre-design, construct an additional 2,300 m³ of storage below grade near the Happy Valley Reservoir site. Consideration could be given to constructing the storage required for build-out in one (1) phase in the 20-year time period, or offsetting the storage required by increasing water supply. The sizing and phasing of the reservoir construction should be confirmed during the Class EA.

- **Pressure Zone 5 Storage:** Given that the area to be served is relatively small, and considering the high cost of a new elevated storage tower, it is recommend that the 'do nothing' alternative is carried forward.

The watermain network and infrastructure proposed for the 20-years and build-out scenarios are illustrated in Figures ES-1 through ES-5.

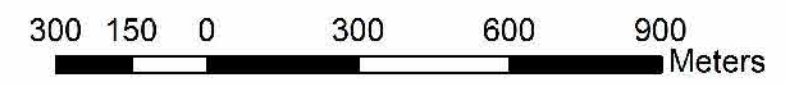
Opinion of Probable Cost

To assist with planning in the 20-year and build out timeframes, a Class 'D' level cost projection summary is shown in Table E-2.



Legend

- 150 Watermain Diameter in meters
- Existing Watermain
- 20-year Watermain
- Build-Out Watermain
- Infill
- Preferred Alternative
- 5 Pressure Zones
- Service Area Boundary
- Lora Bay



Build-Out:
Two additional PRVs to provide Zone 2a with emergency and fire flows.

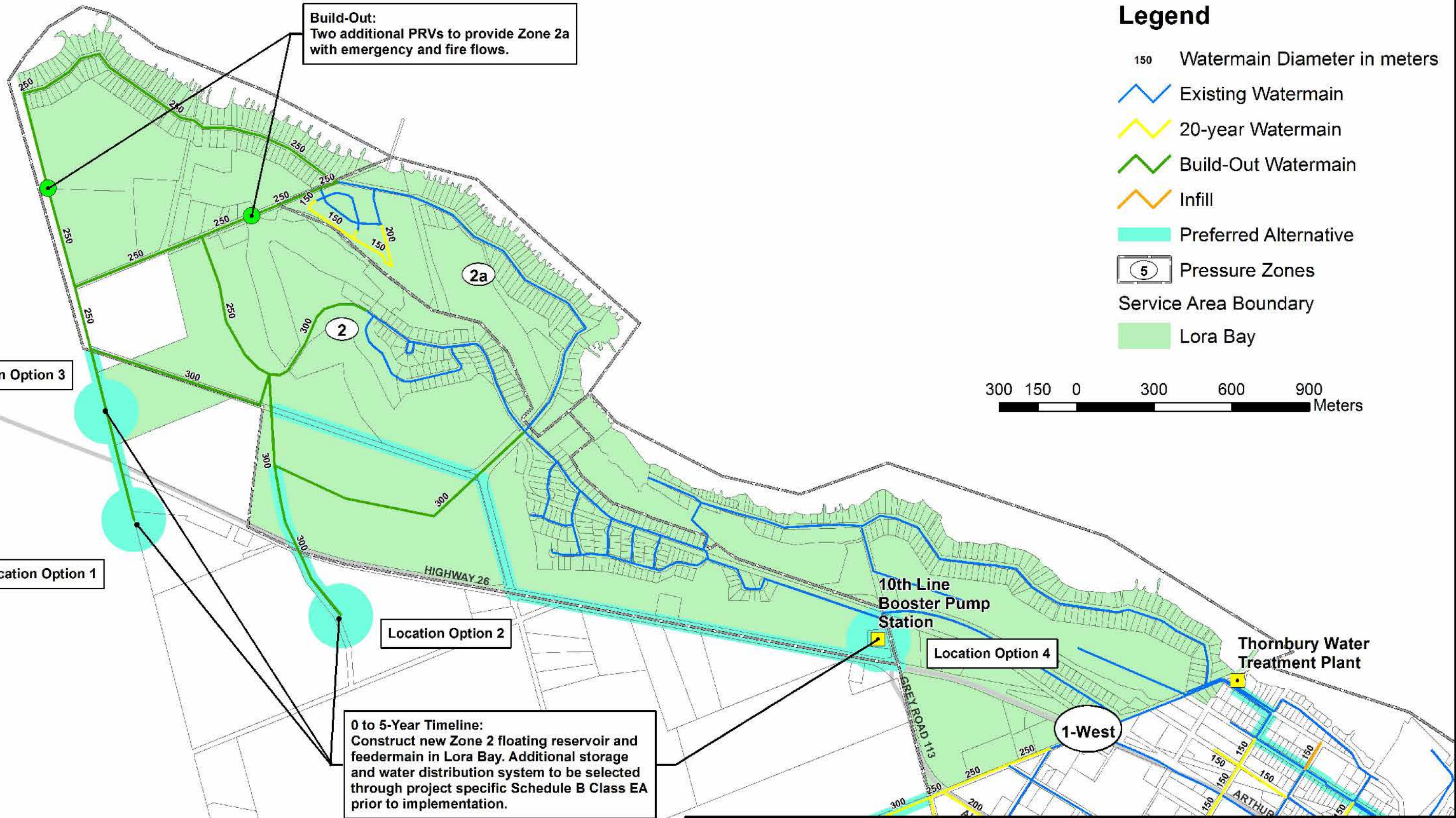
Location Option 3

Location Option 1

Location Option 2

Location Option 4

0 to 5-Year Timeline:
Construct new Zone 2 floating reservoir and feedermain in Lora Bay. Additional storage and water distribution system to be selected through project specific Schedule B Class EA prior to implementation.



PROJECT:
THE TOWN OF THE BLUE MOUNTAINS TOWN-WIDE WATER DISTRIBUTION SYSTEM
THE TOWN OF THE BLUE MOUNTAINS, ONTARIO

DRAWING:
FUTURE WATER DISTRIBUTION NETWORK, 20-YEARS AND BUILD OUT PRESSURE ZONES 2 AND 2a (LORA BAY)

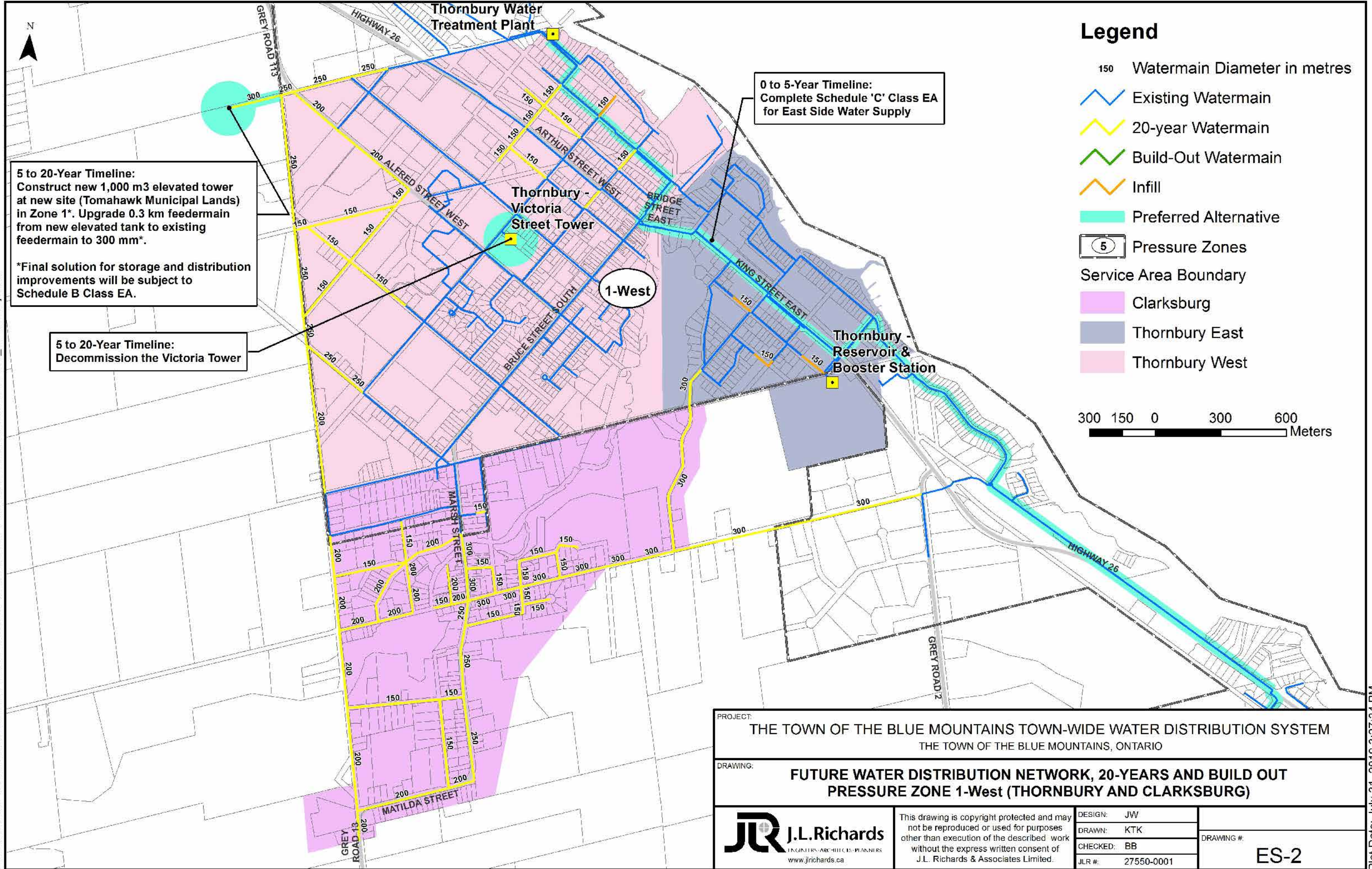


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DRAWING #:
ES-1

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PROJECT: THE TOWN OF THE BLUE MOUNTAINS TOWN-WIDE WATER DISTRIBUTION SYSTEM
THE TOWN OF THE BLUE MOUNTAINS, ONTARIO

DRAWING: FUTURE WATER DISTRIBUTION NETWORK, 20-YEARS AND BUILD OUT
PRESSURE ZONE 1-West (THORNBURY AND CLARKSBURG)

JLR J.L.Richards
ENGINEERS-ARCHITECTS-PLANNERS
www.jlrichards.ca

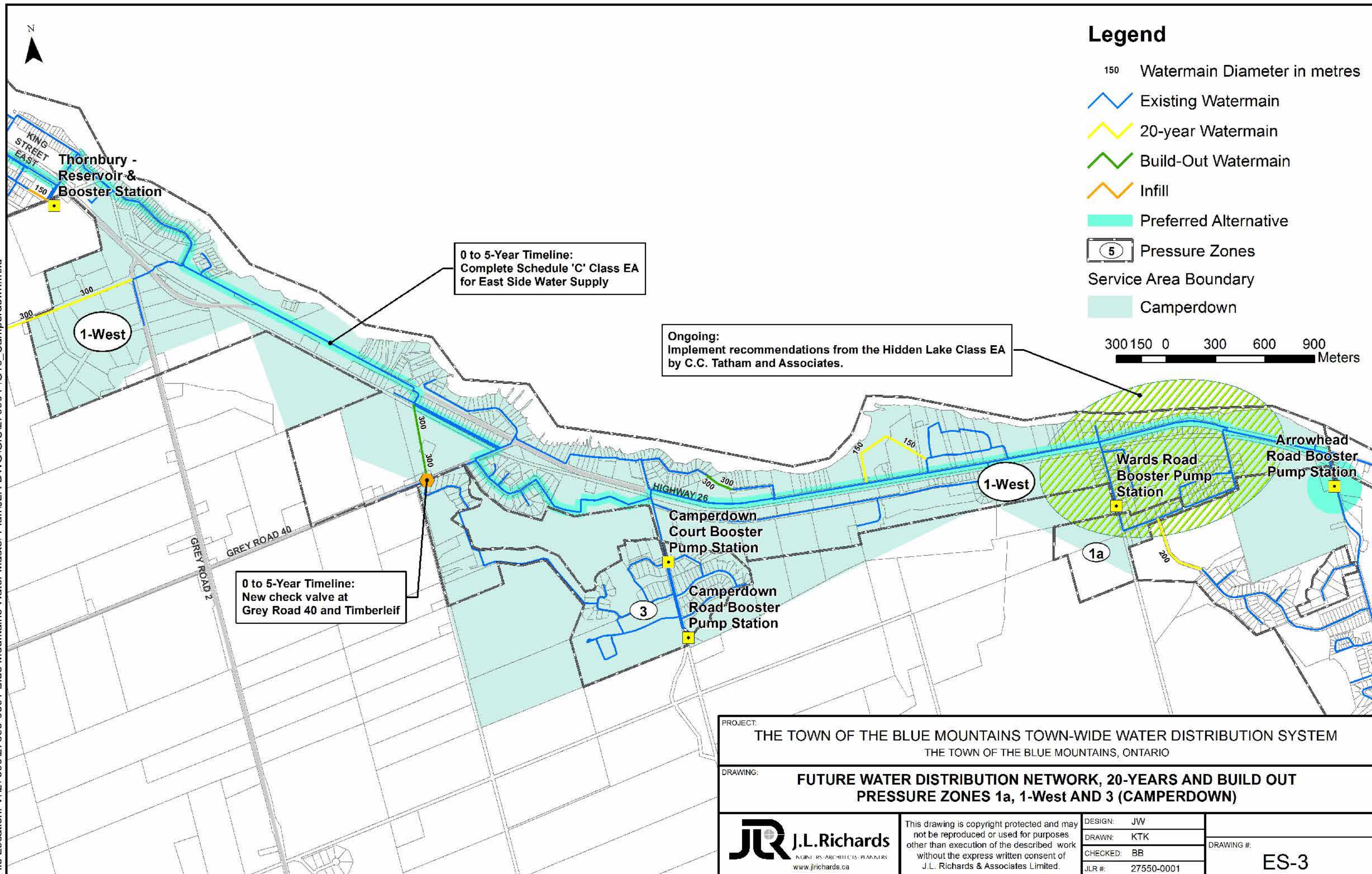
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ES-2

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PROJECT:		THE TOWN OF THE BLUE MOUNTAINS TOWN-WIDE WATER DISTRIBUTION SYSTEM THE TOWN OF THE BLUE MOUNTAINS, ONTARIO	
DRAWING:		FUTURE WATER DISTRIBUTION NETWORK, 20-YEARS AND BUILD OUT PRESSURE ZONES 1a, 1-West AND 3 (CAMPERDOWN)	
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Legend

- 150 Watermain Diameter in metres
- Existing Watermain
- 20-year Watermain
- Build-Out Watermain
- Infill
- Preferred Alternative
- Pressure Zones
- Service Area Boundary
- CRAIGLEITH
- SWISS MEADOWS

0 to 5-Year Timeline:
Complete Schedule 'C' Class EA
for East Side Water Supply

Ongoing:
Complete Zone 4c pressure zone modifications
based on conceptual design (planned for 2019)

0 to 5-Year Timeline:
Complete Schedule 'C' Class EA
for East Side Water Supply

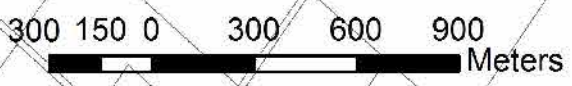
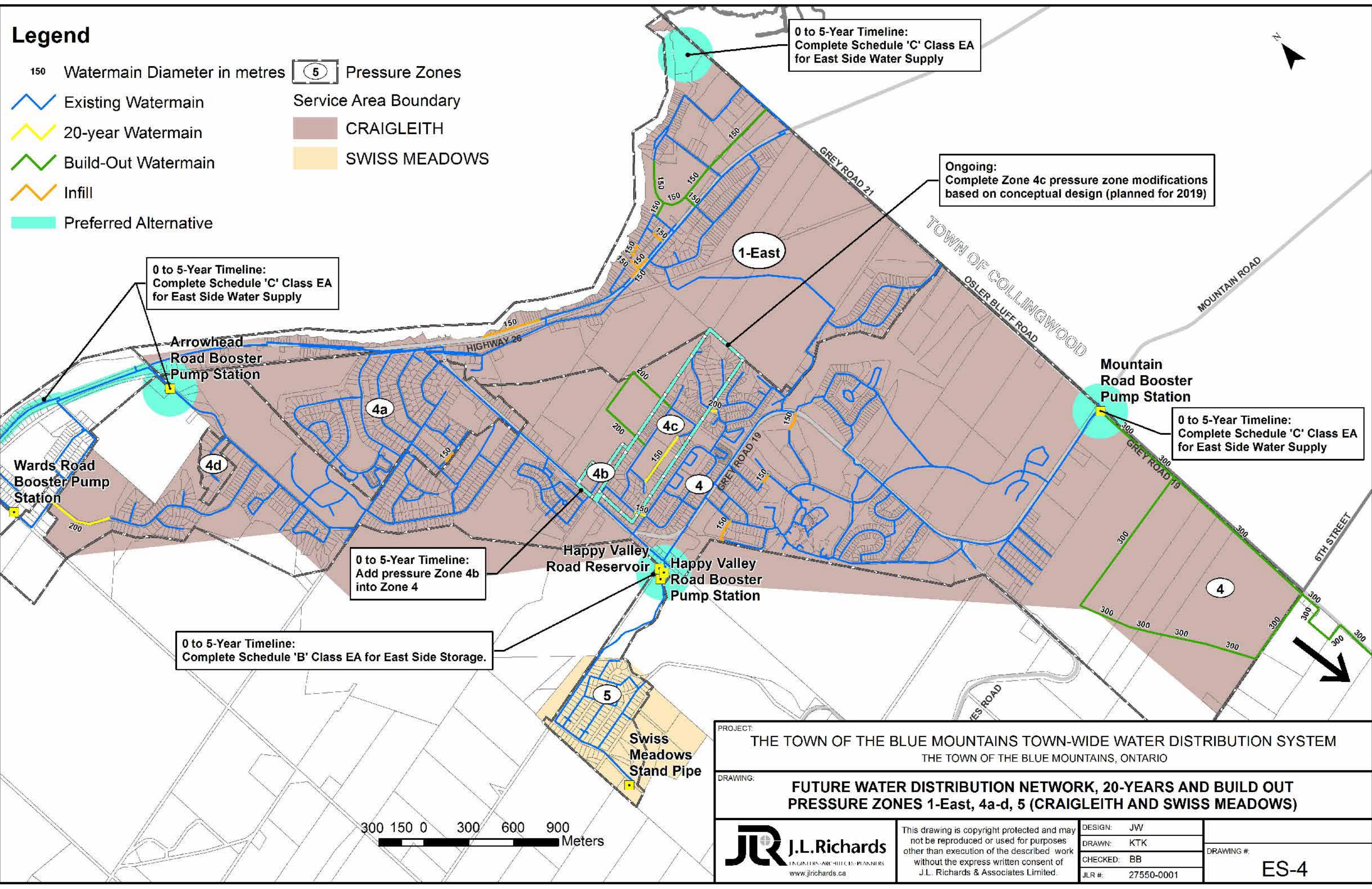
0 to 5-Year Timeline:
Complete Schedule 'C' Class EA
for East Side Water Supply

0 to 5-Year Timeline:
Add pressure Zone 4b
into Zone 4

0 to 5-Year Timeline:
Complete Schedule 'B' Class EA for East Side Storage.

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PROJECT:
THE TOWN OF THE BLUE MOUNTAINS TOWN-WIDE WATER DISTRIBUTION SYSTEM
THE TOWN OF THE BLUE MOUNTAINS, ONTARIO

DRAWING:
FUTURE WATER DISTRIBUTION NETWORK, 20-YEARS AND BUILD OUT
PRESSURE ZONES 1-East, 4a-d, 5 (CRAIGLEITH AND SWISS MEADOWS)

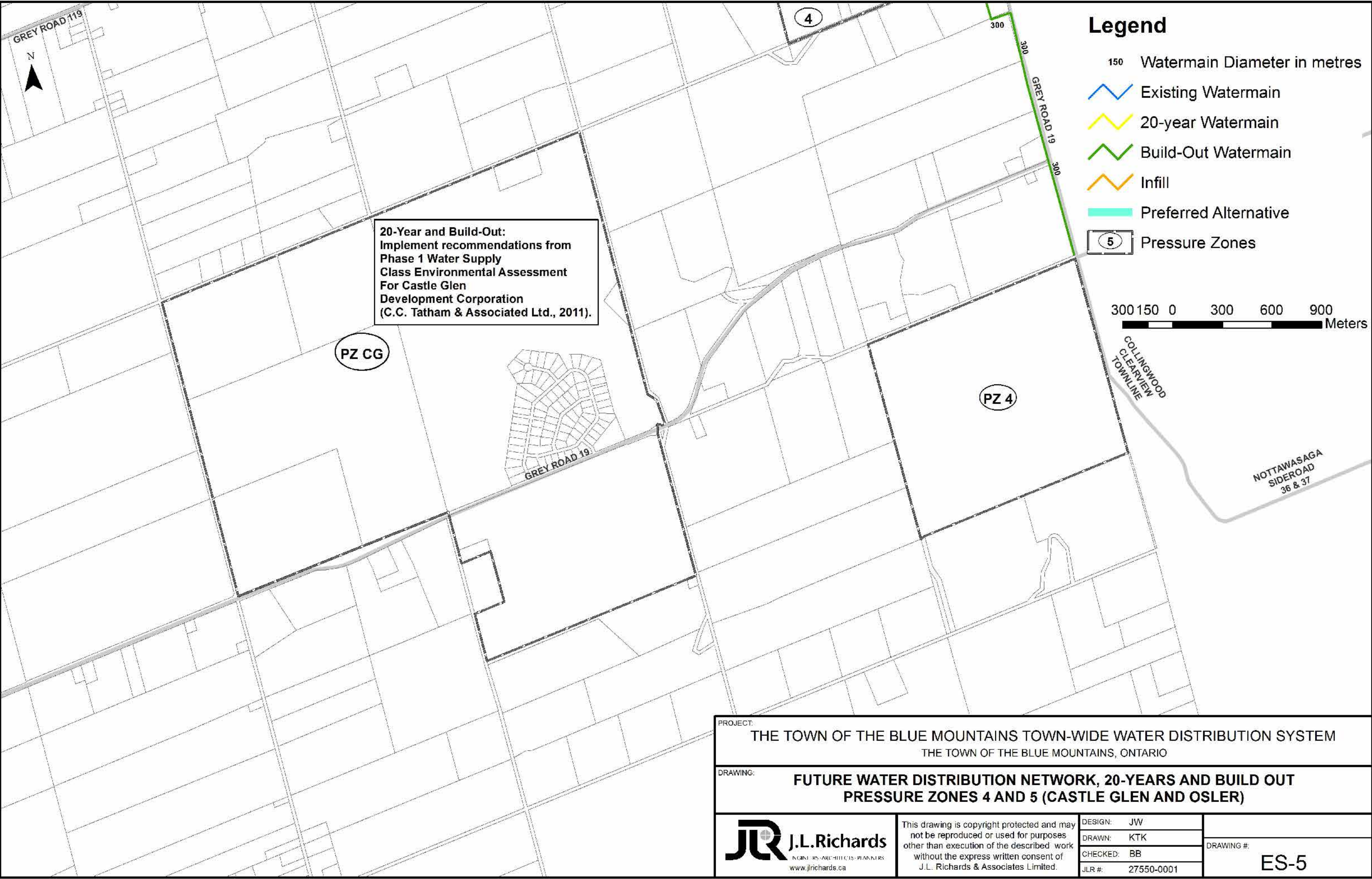
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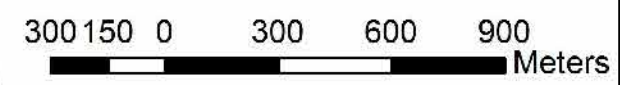
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20-Year and Build-Out:
 Implement recommendations from
 Phase 1 Water Supply
 Class Environmental Assessment
 For Castle Glen
 Development Corporation
 (C.C. Tatham & Associated Ltd., 2011).

Legend

- 150 Watermain Diameter in metres
- Existing Watermain
- 20-year Watermain
- Build-Out Watermain
- Infill
- Preferred Alternative
- Pressure Zones



PROJECT: THE TOWN OF THE BLUE MOUNTAINS TOWN-WIDE WATER DISTRIBUTION SYSTEM THE TOWN OF THE BLUE MOUNTAINS, ONTARIO			
DRAWING: FUTURE WATER DISTRIBUTION NETWORK, 20-YEARS AND BUILD OUT PRESSURE ZONES 4 AND 5 (CASTLE GLEN AND OSLER)			
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			DRAWING #: ES-5

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**Municipal Master Plan for
Town-Wide Water Distribution System**

Table E-2 Proposed Opinion of Probable Costs in Chronological Order (in 2018 dollars)

Type	0- 5 Years Project Description	Capital Cost ⁽¹⁾⁽²⁾	Project Completion
Supply	Complete Schedule 'C' Water Supply Class EA for East Pressure Zones	\$500,000	0 - 5 years
Storage	Complete Schedule 'B' Class EA and Pre-Design for West Pressure Zones Storage	\$250,000	0 - 5 years
Storage	Complete Schedule 'B' Class EA and Pre-Design for East Side Water Storage	\$250,000	0 - 5 years
	Studies 0 - 5 Years Total	\$1,000,000	
Storage	Pending outcome of Class EA - Construct new 1,700 m3 reservoir on the west side of Zone 2 (south of Hwy 26)	\$2,700,000	0 - 5 years
Storage	Pending outcome of Class EA - 0.5 km, 300mm feedermain from new Zone 2 reservoir to distribution system ⁽³⁾	\$450,000	0 - 5 years
Camperdown	Implement findings from Hidden Lake Class EA (C.C. Tatham and Associates)	TBD	0 - 5 years
Camperdown	Check valve at Grey Road 40 and Timberleif	\$110,000	0 - 5 years
Craigleith	Implement findings from Zone 4C Pressure Zone Modification Conceptual Design (JLR)	\$580,000	0 - 5 years
Craigleith	Add pressure Zone 4b into Zone 4 (PRV currently not operating)	\$0	0 - 5 years
	Projects 0 - 5 Years Sub-Total	\$3,840,000	
	General Requirements ⁽⁴⁾ (9.5%)	\$370,000	
	Engineering and Contingency (22%)	\$850,000	
	Projects 0 - 5 Years Total	\$5,060,000	
	TOTAL 0 - 5 YEARS (ROUNDED)	\$6,060,000	

**Municipal Master Plan for
Town-Wide Water Distribution System**

Type	5 - 20 Years Project Description	Capital Cost⁽¹⁾⁽²⁾	Project Completion
Supply	Implement findings from Schedule 'C' Water Supply Class EA for East Pressure Zones	\$10,620,000	5 - 20 years
Storage	Pending outcome of Class EA - Decommission existing Victoria Street Tower (end of service life) ⁽⁵⁾	\$250,000	5 - 20 years
Storage	Pending outcome of Class EA - Construct new 1,000 m ³ elevated tank at new site in Zone 1 (Tomahawk Municipal Lands)	\$2,100,000	5 - 20 years
Storage	Pending outcome of Class EA - 0.3 km, 300 feedermain from new elevated tank to existing feedermain ⁽⁶⁾	\$700,000	5 - 20 years
Storage	Pending outcome of Class EA - Add 1,000 m ³ below grade storage facility near the Happy Valley Reservoir site	\$2,300,000	5 - 20 years
Distribution	Distribution system extensions to service 20-year development areas	\$13,210,000	5 - 20 years
Distribution	Distribution system upgrades to infill development areas and to improve looping	\$1,890,000	5 - 20 years
	Projects 5 - 20 Years Sub-Total	\$20,450,000	
	General Requirements ⁽⁴⁾ (9.5%)	\$1,950,000	
	Engineering and Contingency (22%)	\$4,500,000	
	Projects 5 - 20 Years Total	\$26,900,000	
	TOTAL 5 - 20 YEARS (ROUNDED)	\$40,870,000	

**Municipal Master Plan for
Town-Wide Water Distribution System**

Type	Build-Out Project Description	Capital Cost ⁽¹⁾⁽²⁾	Project Completion
Storage	Pending outcome of Class EA - Expand the below grade storage near the Happy Valley Reservoir site to add 2,300 m ³	\$2,640,000	Build-out
Distribution	Add two additional PRVs to provide Zone 2a with flows	\$154,000	Build-out
Distribution	Distribution system extensions to service build-out development areas	\$10,950,000	Build-out
	Projects Build-Out Sub-Total	\$13,744,000	
	General Requirements ⁽⁴⁾ (9.5%)	\$1,310,000	
	Engineering and Contingency (22%)	\$3,030,000	
	Projects Built-Out Total	\$18,084,000	
	TOTAL BUILD-OUT (ROUNDED)	\$18,084,000	

Table Notes:

- (1) Based on Class D costing estimates as outlined in Section 8
- (2) All sizing (e.g. treatment capacity, tank size, pump capacity, watermain diameter, etc.), is conceptual in nature and should be confirmed during detailed design.
- (3) Cost is to connect to new feedermain to be constructed north of Highway 26. Costs for feedermain constructed to service new development in Lora Bay are provided separately.
- (4) Includes insurance and bonding, mobilization and demobilization, legal, etc. per the Towns Development Changes Study
- (5) For interim budgeting purposes, the cost of upgrading the Arrowhead Road BPS and feedermain from the Thornbury WTP has been carried forward. Actual project costs will be contingent on the outcome of the Schedule 'C' Class EA for East Pressure Zones.
- (6) Cost is to connect to new feedermain to be constructed on Grey Road 113. Costs for feedermain constructed to service new development in Thornbury are provided separately.

Municipal Master Plan for Town-Wide Water Distribution System

Consultation

To facilitate the consultation process, the project team met frequently with Town staff. A Public Information centre (PIC) was held in May 2019 to inform the public, project stakeholders, and review agencies of the proposed alternatives, cost estimates, and mitigation members. In total, 18 members of the public attended the PIC; comment forms were provided. All stakeholder comments were recorded and are included in this Master Plan.

Next Steps

The Master Plan has been placed on public record for 30 calendar days for review by the public, stakeholder agencies, and other interested parties. A notice indicating the completion of the Master Plan and its public record filing has been issued to the public and all interested parties who were previously contacted and who indicated interest to stay involved in the planning process. The review period is intended to resolve any outstanding project concerns between the Town and the party expressing concerns. The Master Plan will then be reviewed and revised, with consideration given to comments received from the public.



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