PEEL REGION

WEST CALEDON STORAGE FACILITY AND TRANSMISSION MAIN SCHEDULE 'C' CLASS EA

Volume 1: Supporting Technical Studies and Documents

Appendix 1A: Technical Memo 1 - Storage Needs

Prepared by:
GEI Consultants Canada

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Region of Peel
working with you

Schedule C Municipal Class EA Environmental Assessment

West Caledon Storage Facility and Transmission Main

Technical Memo 1 – Storage Needs

Prepared by: GEI Consultants (Formerly GM BluePlan)
Royal Centre, 3300 Highway No. 7
Suite 402, Vaughan, Ontario, L4K 4M3

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LIST OF ABBREVIATIONS

Term of Acronym	Definition
ADD	Average Day Demand
BPE	Best Planning Estimate
EA	Environmental Assessment
Equiv.	Equivalent Population and Employment
MDD	Maximum Day Demand
MDF	Maximum Day Factor
MECP	Ministry of the Environment, Conservation and Parks
Memo	Technical Memorandum
ML	Megalitre
MSP	Master Servicing Plan
Region	Region of Peel
SGU	Small Geographic Units
W	West
WTP	Water Treatment Plant

1.0 Introduction and Purpose

The purpose of this memorandum (memo) is to outline the storage needs for the Region's Pressure Zone 7 West (W) at different time horizons based on the Region of Peel's (Region) 2051 Best Planning Estimates (BPE's). This memo supports the Class Environmental Assessments (EA) study's Problem and Opportunity Statement and quantifies the base storage demand. This memo establishes the study's design basis. Using the design basis, the Class EA will generate a range of alternative solutions to meet the storage requirements which will be evaluated against various criteria to generate a recommended servicing solution based on the overall merits of each alternative.

2.0 Population Forecasts

The 2020 Water and Wastewater Master Plan for the Lake-based Systems (Master Plan) used the Region's approved 2041 growth projections to generate a Water Capital Plan that recommended water storage needs for Pressure Zone 7W. The recommended project for Pressure Zone 7W included a new water feedermain and storage facility.

Since the filing of the 2020 Master Plan, population and employment growth projections have been updated to a 2051 horizon. The new 2051 growth projections drive the storage needs in Pressure Zone 7W for this Class EA Study. The following analysis was completed using 2051 Small Geographic Units (SGU) forecasts by Pressure Zone for 2031, 2041, and 2051 (as per the Peel Region 2025 Master Plan, Growth Scenario 1, Version 0, updated November 4, 2024). **Table 1** provides planning forecasts to 2051.

Table 1. Total Population and Employment Anticipated to 2051

Pressure Zone	2021 Residential Population	2021 Employment Population	2021 Equiv. Population	2031 Residential Population	2031 Employment Population	2031 Equiv. Population	2041 Residential Population	2041 Employment Population	2041 Equiv. Population	2051 Residential Population	2051 Employment Population	2051 Equiv. Population
1W	26,392	9,910	36,302	37,339	12,558	49,896	39,530	14,459	53,989	43,061	15,821	58,883
1C	45,587	16,237	61,824	54,330	19,952	74,282	69,601	22,883	92,485	82,267	25,547	107,814
2W	53,608	13,950	67,558	74,687	21,315	96,002	76,025	22,695	98,720	79,231	23,170	102,401
2C	82,945	32,251	115,195	80,397	31,330	111,726	91,622	33,430	125,052	107,172	36,192	143,364
3W	64,660	20,288	84,948	73,040	25,046	98,085	75,727	26,589	102,316	80,038	27,905	107,942
3C	144,332	95,089	239,421	184,105	142,617	326,722	190,700	148,809	339,509	209,300	157,004	366,304
4W	202,591	80,248	282,838	202,336	93,473	295,809	207,552	99,391	306,943	216,206	104,387	320,593
4C	102,454	154,683	257,137	122,489	191,861	314,350	127,380	196,468	323,848	135,927	200,549	336,475
4E	36,819	19,104	55,923	67,030	27,022	94,052	66,763	29,109	95,871	67,605	30,774	98,378
5W	107,912	26,202	134,114	162,879	35,002	197,880	170,723	38,219	208,941	174,817	44,227	219,043
5C	152,317	86,272	238,590	157,497	116,988	274,485	175,442	129,200	304,642	191,567	144,226	335,794
5E	82,392	33,246	115,639	100,176	42,079	142,256	121,258	54,513	175,771	128,663	61,190	189,853
6W	151,399	25,589	176,988	179,873	25,826	205,699	230,695	33,260	263,955	259,804	41,020	300,824
6C	150,447	26,556	177,003	147,540	23,815	171,355	144,807	24,535	169,342	143,844	24,659	168,503
6E	14,107	4,362	18,469	48,605	16,910	65,515	86,704	33,533	120,237	121,791	42,136	163,927
6B	27,471	23,023	50,494	25,212	21,258	46,470	26,611	22,723	49,334	29,782	27,464	57,246
7W	**6,955**	**1,054**	**8,010**	**20,212**	**1,576**	**21,788**	**30,342**	**2,388**	**32,729**	**50,656**	**9,248**	**59,904**
7C	24,023	4,287	28,311	34,685	7,147	41,832	52,593	13,231	65,825	54,558	30,255	84,813
7E	1,307	498	1,805	10,015	1,866	11,882	20,300	4,519	24,819	48,775	11,137	59,912
7B	0	0	0	5,462	761	6,223	9,316	1,020	10,336	18,082	2,585	20,667
8E	93	21	114	92	37	130	91	39	130	85	41	126
Non-Lake-Based	29,226	8,522	37,748	34,340	8,396	42,736	36,223	8,973	45,197	36,773	10,459	47,232
Total	1,507,038	681,394	2,188,432	1,822,341	866,834	2,689,175	2,050,006	959,985	3,009,991	2,280,004	1,069,993	3,349,997
Total WEST	613,517	177,241	790,758	750,364	214,795	965,160	830,595	236,999	1,067,593	903,813	265,776	1,169,590
Total CENTRAL + EAST	864,295	495,631	1,359,925	1,037,637	643,642	1,681,280	1,183,188	714,013	1,897,201	1,339,418	793,758	2,133,176
Total Lake-Based	**1,477,812**	**672,872**	**2,150,684**	**1,788,001**	**858,438**	**2,646,439**	**2,013,783**	**951,012**	**2,964,794**	**2,243,231**	**1,059,534**	**3,302,765**

3.0 Peel Storage

3.1 Existing Storage

The calculations in this memo represent total storage needs based on the Ministry of the Environment, Conservation, and Parks (MECbibP) water storage criteria.

The Region currently provides a combination of pumped and floating storage to each pressure zone from multiple facilities. The percentage splits for how storage is provided are calculated and validated through hydraulic modelling and a continually updated water system schematic.

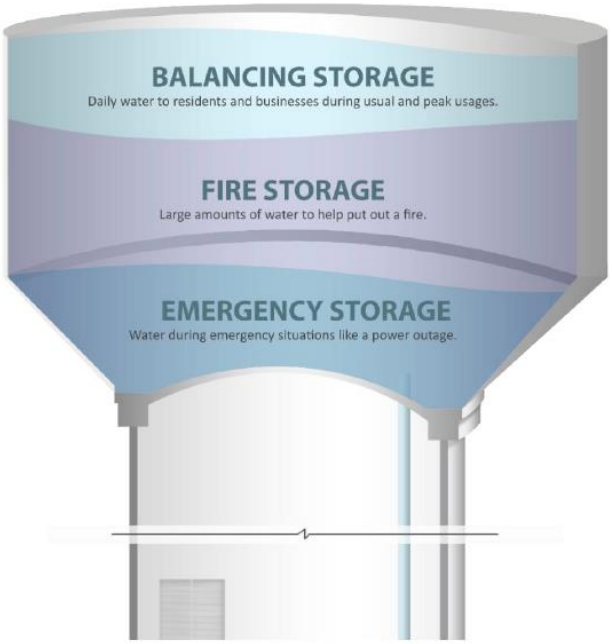
Provision of water storage for Pressure Zone 7W may include a combination of floating and/or pumped storage, which will be further reviewed through the Class EA process and the development of storage concepts and strategies.

4.0 Storage Need Calculations

4.1 Methodology

The MECP Total Treated Water Storage Requirements[1] are calculated with the summation of A+B+C where:

- A = Fire storage
- B = Equalization storage (25% of MDD)
- C = Emergency storage (25% of A+B)



4.1.1 Fire Flow Requirements

The MECP provides fire flow criteria. The required fire storage, based on respective Pressure Zone equivalent population, represents “A” in the total treated water storage requirements. The A values are presented in **Table 2.**

[1] Ministry of Environment, Conservation and Park. *Pumping Facilities and Treated Water Storage*. September 13, 2023, https://www.ontario.ca/document/design-guidelines-drinking-water-systems/pumping-facilities-and-treated-water-storage#section-1

Table 2. MECP Fire Flow Requirements

Equiv. Population Low	Equiv. Population High	Fire Flow (L/s)	Duration (hr)	Fire Storage (ML)
500	1,000	38	2	0.27
1,001	1,500	64	2	0.46
1,501	2,000	79	2	0.57
2,001	3,000	95	2	0.68
3,001	4,000	110	2	0.79
4,001	5,000	125	2	0.90
5,001	6,000	144	2	1.04
6,001	10,000	159	3	1.72
10,001	13,000	189	3	2.04
13,001	17,000	220	3	2.38
17,001	27,000	250	4	3.60
27,001	33,000	318	5	5.72
33,001	40,000	348	5	6.26
40,001	10,000,000	378	6	8.16

Table 3. Pressure Zone Fire Storage (A)

Pressure Zone	2021 Fire Storage (ML)	2031 Fire Storage (ML)	2041 Fire Storage (ML)	2051 Fire Storage (ML)
1W	6.26	8.16	8.16	8.16
1C	8.16	8.16	8.16	8.16
2W	8.16	8.16	8.16	8.16
2C	8.16	8.16	8.16	8.16
3W	8.16	8.16	8.16	8.16
3C	8.16	8.16	8.16	8.16
4W	8.16	8.16	8.16	8.16
4C	8.16	8.16	8.16	8.16
4E	8.16	8.16	8.16	8.16

Pressure Zone	2021 Fire Storage (ML)	2031 Fire Storage (ML)	2041 Fire Storage (ML)	2051 Fire Storage (ML)
5W	8.16	8.16	8.16	8.16
5C	8.16	8.16	8.16	8.16
5E	8.16	8.16	8.16	8.16
6W	8.16	8.16	8.16	8.16
6C	8.16	8.16	8.16	8.16
6E	3.60	8.16	8.16	8.16
6B	8.16	8.16	8.16	8.16
7W	**1.72**	**3.60**	**5.72**	**8.16**
7C	5.72	8.16	8.16	8.16
7E	0.57	2.04	3.60	8.16
7B	0.00	1.72	2.04	3.60
8E	0.00	0.00	0.00	0.00
TOTAL	**132.11**	**146.08**	**150.08**	**158.64**

4.1.2 Maximum Day Peaking Factors

The Maximum Day Demand (MDD) value is required to calculate the equalization storage (B). The MDD is equal to the Average Day Demand (ADD) x Maximum Day Factor (MDF).

The ADD varies between pressure zone, forecast year, and population type, while the MDF varies between forecast year (only for 2021) and population type. The MDF values are summarized in **Table 4** below, while the ADD and MDD values are presented in **Table 5** and **Table 6**.

Table 4: Maximum Day Factor (MDF) Values

Population Type	Forecast Year	MDF	Calculation Method
Residential	2021	1.612	Starting Point Method
Residential	2031, 2041, 2051	1.8	Design Criteria
Employment	2021	1.254	Starting Point Method
Employment	2031, 2041, 2051	1.4	Design Criteria

Note the ADD and MDF values for 2021 is based on the starting point method using historical water demand data between 2017 and 2021 as it is not considered a "forecasted" year anymore. Therefore, the 2021 ADD is calculated using the historical average day flows measured at the water treatment plants (WTPs) and the 2021 MDF is calculated using the historical maximum day flows measured at the WTPs. This flow represents the total flow pumped from the plants, and York Region water demands are subtracted to obtain a Region of Peel lake-based only water demand. Thus, the starting point MDF is to compensate for the difference between the calculated MDD using the design criteria and the starting point MDD using historical water demand data. The below shows example calculations.

1. Calculate total ADD using the total Peel population and the ADD design criteria.

Residential:	1,477,812	x	250 L/cap/d	=	369.45 ML/d
Employment:	672,851	x	210 L/cap/d	=	141.30 ML/d
Total				=	510.75 ML/d

   The total residential and employment flow split is 72.3% and 27.7% respectively.

2. Calculate 2021 ADD for Pressure Zone 7W using the residential/employment population for Pressure Zone 7W and the ADD design criteria.

Residential:	6,955	x	250 L/cap/d	=	1.75 ML/d
Employment:	1,054	x	210 L/cap/d	=	0.22 ML/d

   This represents 0.34% and 0.04% of the total ADD for residential and employment respectively. Based on this ratio, we can determine that 0.34% and 0.04% of the average day starting point should be allocated to Pressure Zone 7W

Residential:	488.83 ML/d	x	0.34%	=	**1.66** ML/d
Employment:	488.83 ML/d	x	0.04%	=	**0.21** ML/d

3. Calculate the residential and employment ADD using the average day starting point based on the total residential and employment flow split ratio.

Residential:	488.83 ML/d	x	72.3%	=	353.59 ML/d
Employment:	488.83 ML/d	x	27.7%	=	135.23 ML/d

4. Calculate the total MDD using the demand criteria.

Residential:	353.59 ML/d	x	1.8	=	636.47 ML/d
Employment:	135.23 ML/d	x	1.4	=	189.33 ML/d
Total				=	825.79 ML/d

   Comparing to the starting point MDD of 739.76, it is lower than the calculated MDD by 10%. Therefore, the 2021 MDF should be decreased by the same ratio to compensate for the difference.

	739.76 ML/d	÷	825.79 ML/d	=	0.896
Residential:	1.8	x	0.896	=	1.612
Employment	1.4	x	0.896	=	1.254

   The 2021 MDD for Pressure Zone 7W is calculated using the decreased MDF.

2021 Residential:	**1.66** ML/d	x	1.612	=	**2.68**	ML/d
2021 Employment:	**0.21** ML/d	x	1.254	=	**0.27**	ML/d

5. Calculate all other forecasted years using the 2021 ADD and 2021 MDF as a starting point, along with the ADD and MDF design criteria values.

   2021 ADD +((20xx pop – 2021 pop) x ADD design criteria) ÷ 1,000,000)
   2021 MDD + ((20xx ADD – 2021 ADD) x MDF design criteria)

   For Pressure Zone 7W, 2041:

   Residential ADD: 1.66 ML/d +((30,342 -6,955) x 250 L/cap/d ÷1,000,000 L/ML) = 7.51 ML/d
   Employment ADD: 0.21 ML/d + ((2,388 -1,054) x 210 L/cap/d ÷ 1,000,000 L/ML) = 0.49 ML/d

   Residential MDD: 2.68 ML/d + (7.51 ML/d – 1.66 ML/d) x 1.8) = 13.21 ML/d
   Employment MDD: 0.27 ML/d + ((0.49 ML/d – 0.21 ML/d) x 1.4) = 0.66 ML/d

The equalization storage (B) is equal to 25% of the Residential MDD + Employment MDD. The B values are presented in **Table 6**.

Table 5. Residential Population Average Day Demands and Maximum Day Demands

Pressure Zone	2021 ADD (ML)	2021 MDD (ML)	2031 ADD (ML)	2031 MDD (ML)	2041 ADD (ML)	2041 MDD (ML)	2051 ADD (ML)	2051 MDD (ML)
1W	6.31	10.18	9.05	15.11	9.60	16.09	10.48	17.68
1C	10.91	17.59	13.09	21.52	16.91	28.39	20.08	34.09
2W	12.83	20.68	18.10	30.17	18.43	30.77	19.23	32.21
2C	19.85	32.00	19.21	30.85	22.02	35.91	25.90	42.90
3W	15.47	24.95	17.57	28.72	18.24	29.93	19.32	31.87
3C	34.53	55.68	44.48	73.58	46.13	76.55	50.78	84.92
4W	48.47	78.16	48.41	78.05	49.71	80.39	51.88	84.29
4C	24.51	39.53	29.52	48.54	30.75	50.74	32.88	54.59
4E	8.81	14.21	16.36	27.80	16.30	27.68	16.51	28.06
5W	25.82	41.63	39.56	66.37	41.52	69.90	42.55	71.74
5C	36.44	58.77	37.74	61.10	42.23	69.17	46.26	76.43
5E	19.71	31.79	24.16	39.79	29.43	49.28	31.28	52.61
6W	36.23	58.41	43.34	71.22	56.05	94.09	63.33	107.19
6C	36.00	58.04	35.27	56.74	34.59	55.51	34.35	55.07
6E	3.38	5.44	12.00	20.97	21.52	38.11	30.30	53.90
6B	6.57	10.60	6.01	9.58	6.36	10.21	7.15	11.64
7W	**1.66**	**2.68**	**4.98**	**8.65**	**7.51**	**13.21**	**12.59**	**22.35**
7C	5.75	9.27	8.41	14.07	12.89	22.13	13.38	23.01
7E	0.31	0.50	2.49	4.42	5.06	9.05	12.18	21.86
7B	0.00	0.00	1.37	2.46	2.33	4.19	4.52	8.14
8E	0.02	0.04	0.02	0.04	0.02	0.03	0.02	0.03
TOTAL	**353.59**	**570.16**	**431.14**	**709.74**	**487.59**	**811.34**	**544.95**	**914.60**

Table 6. Employment Population Average Day Demands and Maximum Day Demands

Pressure Zone	2021 ADD (ML)	2021 MDD (ML)	2031 ADD (ML)	2031 MDD (ML)	2041 ADD (ML)	2041 MDD (ML)	2051 ADD (ML)	2051 MDD (ML)
1W	1.99	2.50	2.55	3.28	2.95	3.84	3.23	4.24
1C	3.26	4.09	4.04	5.18	4.66	6.05	5.22	6.83
2W	2.80	3.52	4.35	5.68	4.64	6.09	4.74	6.23
2C	6.48	8.13	6.29	7.86	6.73	8.48	7.31	9.29
3W	4.08	5.11	5.08	6.51	5.40	6.97	5.68	7.35
3C	19.11	23.97	29.09	37.94	30.39	39.76	32.11	42.17
4W	16.13	20.23	18.91	24.12	20.15	25.86	21.20	27.32
4C	31.09	38.99	38.90	49.92	39.86	51.27	40.72	52.47
4E	3.84	4.82	5.50	7.14	5.94	7.76	6.29	8.25
5W	5.27	6.60	7.11	9.19	7.79	10.14	9.05	11.90
5C	17.34	21.75	23.79	30.78	26.35	34.37	29.51	38.78
5E	6.68	8.38	8.54	10.98	11.15	14.63	12.55	16.60
6W	5.14	6.45	5.19	6.52	6.75	8.71	8.38	10.99
6C	5.34	6.69	4.76	5.89	4.91	6.10	4.94	6.14
6E	0.88	1.10	3.51	4.79	7.00	9.68	8.81	12.20
6B	4.63	5.80	4.26	5.28	4.56	5.72	5.56	7.11
7W	**0.21**	**0.27**	**0.32**	**0.42**	**0.49**	**0.66**	**1.93**	**2.67**
7C	0.86	1.08	1.46	1.92	2.74	3.71	6.31	8.72
7E	0.10	0.13	0.39	0.53	0.94	1.31	2.33	3.25
7B	0.00	0.00	0.16	0.22	0.21	0.30	0.54	0.76
8E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	**135.23**	**169.60**	**174.20**	**224.15**	**193.64**	**251.37**	**216.43**	**283.27**

Table 7. Total Equalization Storage (B)

Pressure Zone	2021 Equalization Storage (ML)	2031 Equalization Storage (ML)	2041 Equalization Storage (ML)	2051 Equalization Storage (ML)
1W	3.2	4.6	5.0	5.5
1C	5.4	6.7	8.6	10.2
2W	6.1	9.0	9.2	9.6
2C	10.0	9.7	11.1	13.0
3W	7.5	8.8	9.2	9.8
3C	19.9	27.9	29.1	31.8
4W	24.6	25.5	26.6	27.9
4C	19.6	24.6	25.5	26.8
4E	4.8	8.7	8.9	9.1
5W	12.1	18.9	20.0	20.9
5C	20.1	23.0	25.9	28.8
5E	10.0	12.7	16.0	17.3
6W	16.2	19.4	25.7	29.5
6C	16.2	15.7	15.4	15.3
6E	1.6	6.4	11.9	16.5
6B	4.1	3.7	4.0	4.7
7W	**0.7**	**2.3**	**3.5**	**6.3**
7C	2.6	4.0	6.5	7.9
7E	0.2	1.2	2.6	6.3
7B	0.0	0.7	1.1	2.2
8E	0.0	0.0	0.0	0.0
TOTAL	**184.9**	**233.5**	**265.7**	**299.5**

4.1.3 Emergency Storage

The Emergency Storage (C) as shown in **Table 8** represents 25% of A+B.

Table 8. Emergency Storage (C)

Pressure Zone	2021 Emergency Storage (ML)	2031 Emergency Storage (ML)	2041 Emergency Storage (ML)	2051 Emergency Storage (ML)
1W	2.4	3.2	3.3	3.4
1C	3.4	3.7	4.2	4.6
2W	3.6	4.3	4.3	4.4
2C	4.5	4.5	4.8	5.3
3W	3.9	4.2	4.3	4.5
3C	7.0	9.0	9.3	10.0
4W	8.2	8.4	8.7	9.0
4C	6.9	8.2	8.4	8.7
4E	3.2	4.2	4.3	4.3
5W	5.1	6.8	7.0	7.3
5C	7.1	7.8	8.5	9.2
5E	4.6	5.2	6.0	6.4
6W	6.1	6.9	8.5	9.4
6C	6.1	6.0	5.9	5.9
6E	1.3	3.7	5.0	6.2
6B	3.1	3.0	3.0	3.2
7W	**0.6**	**1.5**	**2.3**	**3.6**
7C	2.1	3.0	3.7	4.0
7E	0.2	0.8	1.5	3.6
7B	0.0	0.6	0.8	1.5
8E	0.0	0.0	0.0	0.0
TOTAL	**79.3**	**94.9**	**103.9**	**114.5**

4.2 Water Storage Requirements

The MECP Total Treated Water Storage Requirements as shown in **Table 9** represents A+B+C. For Pressure Zone 7W, this highlights the total storage needs for 2021, 2031, 2041, and 2051.

Table 9. Total Treated Water Storage Requirements (A+B+C)

Pressure Zone	2021 Total Storage Needs (ML)	2031 Total Storage Needs (ML)	2041 Total Storage Needs (ML)	2051 Total Storage Needs (ML)
1W	11.8	15.9	16.4	17.1
1C	17.0	18.5	21.0	23.0
2W	17.8	21.4	21.7	22.2
2C	22.7	22.3	24.1	26.5
3W	19.6	21.2	21.7	22.5
3C	35.1	45.1	46.5	49.9
4W	40.9	42.1	43.4	45.1
4C	34.7	41.0	42.1	43.7
4E	16.1	21.1	21.3	21.5
5W	25.3	33.8	35.2	36.3
5C	35.4	38.9	42.6	46.2
5E	22.8	26.1	30.2	31.8
6W	30.5	34.5	42.3	47.1
6C	30.4	29.8	29.5	29.3
6E	6.5	18.3	25.1	30.9
6B	15.3	14.8	15.2	16.1
7W	**3.1**	**7.3**	**11.5**	**18.0**
7C	10.4	15.2	18.3	20.1
7E	0.9	4.1	7.7	18.0
7B	0.0	3.0	4.0	7.3
8E	0.0	0.0	0.0	0.0
TOTAL	**396.3**	**474.4**	**519.7**	**572.6**

5.0 Summary

The calculated base total storage needs for Pressure Zone 7W for the different planning horizon years are as follows:

- 2021: 3 ML
- 2031: 8 ML
- 2041: 12 ML
- 2051: 18 ML

The next steps of the Class EA are to use the total storage requirements calculation as well as current Peel Region pressure zone operational practices, theoretical capacities of water storage facility types, technical needs, environmental constraints, and topographical information to develop a broad range of storage concepts and alternatives, in line with the Class EA process. The year 2051 is to be used as the baseline target for storage needs within this Class EA, however, storage concepts will also consider potential post-period servicing.

PEEL REGION

WEST CALEDON STORAGE FACILITY AND TRANSMISSION MAIN SCHEDULE 'C' CLASS EA

Volume 1: Supporting Technical Studies and Documents

Appendix 1B: Technical Memo 2 - Design Basis

Prepared by:
GEI Consultants Canada

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GEI Consultants

Region of Peel
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Schedule C Municipal Class EA Environmental Assessment

West Caledon Storage Facility and Transmission Main

Technical Memo 2 – Design Basis

Prepared by: GEI Consultants (Formerly GM BluePlan)
Royal Centre, 3300 Highway No. 7
Suite 402, Vaughan, Ontario, L4K 4M3

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LIST OF ABBREVIATIONS

Term of Acronym	Definition
BS	Bolton (Water) System
CS	Central (Water) System
ES	East (Water) System
ET	Elevated Tank
HGL	Hydraulic Grade Line
MECP	Ministry of the Environment, Conservation and Parks
ML	Megalitre
MSP	Master Servicing Plan
N/A	Not Applicable
SGU	Small Geographic Unit (Planning Data)
TWL	Top Water Level
WS	West (Water) System

1.0 Introduction

The purpose of this memorandum (memo) is to confirm design criteria that will be used to calculate sizing of infrastructure needs for the evaluation of alternative servicing solutions. Secondly, the memo outlines the alternative storage concepts for Pressure Zone 7W that will be reviewed and evaluated. Thirdly this memo will establish the study's design basis for each of the alternative storage concepts to meet the storage needs as presented in Technical Memo #1.

2.0 Region of Peel Facility Types

The Peel Region (Region) currently operates its water servicing using various types of water storage facilities. As shown in **Table 1**, the Region operates using a combination of elevated tanks, in-ground reservoirs, partial in-ground reservoirs, and standpipes across the West, Central, and East Trunk Systems.

The review, evaluation and selection of a preferred conceptual storage solution considers multiple factors including, but not limited to, the size of service area, land elevation/topography features, financial considerations, and anticipated short and long-term capacity and demands. To support the review and development of conceptual storage alternatives for the Pressure Zone 7W study area, a review of the existing Region water facilities was undertaken. **Table 2** lists the storage facilities and capacities for each of the Region's pressure zones.

Table 1. Existing Region Lake-Based Water Facilities

West Trunk System	Central Trunk System	East Trunk System
• Snelgrove Elevated Tank (WS6) • Alloa Reservoir (WS5) and Pumping Station (LLP6W, HLP7W) • West Brampton Reservoir (WS4) and Pumping Station (LLP5W, HLP6W) • Meadowvale North Reservoir (WS3) and Pumping Station (LLP4W, HLP5W) • Streetsville Reservoir (WS2) and Pumping Station (LLP3W, HLP4W) • Herridge Reservoir (WS1) and Pumping Station (HLP3W, LLP2W) • Lorne Park Water Treatment Plant and Pumping Stations	• Mayfield West Elevated Tank (CS7) • North Brampton Reservoir (CS5) and Pumping Station (LLP6C, HLP7C) • East Brampton Reservoir (CS4) and Pumping Station (LLP5C, HLP6C) • Beckett Sproule Reservoir (CS3) and Pumping Station (LLP4C, HLP5C) • Hanlan Reservoir (CS2) and Pumping Station (LLP3C, HLP4C) • Silverthorn Reservoir (CS1) and Pumping Station (LLP2C, HLP3C) • A. P. Kennedy Water Treatment Plant and Pumping Stations	• Bolton Elevated Tank, West Bolton Elevated Tank and Standpipes (BS6) • Tullamore Reservoir (ES4) and Pumping Station (LLP5E, HLP6E) • Airport Road Reservoir (ES3) and Pumping Station (LLP4E, HLP5E, York Transfer) • Beckett Sproule Transfer Pumping Station

Table 2. Existing and Future Region Water Facilities by Pressure Zone

Pressure Zone	Facility Type	Year in Service	Total Volume (ML)
WS7	**Subject of this Class EA**	**2027**	**TBD**
WS6	Snelgrove Elevated Tank	1976	3.8
WS5	Alloa Reservoir Cell 1	2018	17.5
	Alloa Reservoir Cell 2	2018	17.5
	Alloa Reservoir Cell 3	Post-2041	17.5
WS4	West Brampton Reservoir Cell 1	2011	20.0
	West Brampton Reservoir Cell 2	2011	20.0
	West Brampton Reservoir Cell 3	2031	20.0
WS3	Meadowvale North Reservoir Cell 1	1989	12.5
	Meadowvale North Reservoir Cell 2	1989	12.5
	Meadowvale North Reservoir Cell 3	2002	15.0
	Meadowvale North Reservoir Cell 4	2002	15.0
WS2	Streetsville Reservoir Cell 1	1971	23.0
	Streetsville Reservoir Cell 2	2011	25.0
	Streetsville Reservoir Cell 3	Post-2041	20.0
WS1	Herridge South Reservoir	1972	32.0
	Herridge North Reservoir	1989	15.0
CS7	Mayfield West Elevated Tank	2010	9.2
CS6	Victoria Reservoir Cell 1	2026	20.0
	Victoria Reservoir Cell 2	2026	20.0
CS5	North Brampton Reservoir Cell 1	1983	11.4
	North Brampton Reservoir Cell 2	1983	11.4
	North Brampton Reservoir Cell 3	1992	15.0
	North Brampton Reservoir Cell 4	1992	15.0
CS4	East Brampton Reservoir Cell 1	1973	9.5
	East Brampton Reservoir Cell 2	1973	9.5
	East Brampton Reservoir Cell 3	1989	10.0
	East Brampton Reservoir Cell 4	1989	10.0
CS3	Beckett Sproule Reservoir Cell 1	1966	22.5
	Beckett Sproule Reservoir Cell 2	1966	22.5
	Beckett Sproule Reservoir Cell 3	2010	24.0
	Beckett Sproule Reservoir Cell 4	2010	24.0
CS2	Hanlan South Reservoir	1966	45.0
	Hanlan North Reservoir	2004	25.0
	Balancing Reservoir	2004	4.0
	Hanlan West Reservoir Cell 1	Post-2041	20.0
	Hanlan West Reservoir Cell 2	Post-2041	20.0
CS1	Silverthorn Reservoir (Old) Cell 1	1964	22.7
	Silverthorn Reservoir (Old) Cell 2	1964	22.7
	Silverthorn Reservoir (New)	2027	25.0
BS7	North Bolton Elevated Tank	TBD	8.5
ES7	East Caledon Elevated Tank	TBD	10.0

Pressure Zone	Facility Type	Year in Service	Total Volume (ML)
BS6	Bolton Elevated Tank	1986	4.5
	West Bolton Elevated Tank	2014	9.1
	Bolton Standpipe No. 1	n/a	4.5
	Bolton Standpipe No. 2	n/a	0.6
ES5	Sandhill Reservoir Cell 1	TBD	15.0
	Sandhill Reservoir Cell 2	TBD	15.0
	Sandhill Reservoir Cell 3	TBD	15.0
ES4	Tullamore Reservoir Cell 1	2013	24.0
	Tullamore Reservoir Cell 2	2013	24.0
ES3	Airport Road Reservoir Cell 1A	2003	8.5
	Airport Road Reservoir Cell 1B	2003	8.5
	Airport Road Reservoir Cell 2A	2003	8.5
	Airport Road Reservoir Cell 2B	2003	8.5
	Airport Road Reservoir Cell 3A	2014	20

3.0 Water Storage Design Criteria

This section outlines the Region and Ministry of Environment, Conservation and Parks (MECP) design criteria for water infrastructure.

3.1 Peel Design Criteria

The following criteria were defined in the Region's 2020 Water and Wastewater Master Servicing Plan (MSP) and are used for planning and sizing of infrastructure within the Region. This criterion will be used to develop the conceptual alternative solutions under this EA.

3.1.1 Water Pumping Stations

Pumping stations are rated on their firm capacity, which is defined as the capacity of the pumping station with the largest pump out of service. For each pressure zone, the pumping stations should be able to:

- Provide peak hour demands in the immediate serviced zones.
- Have capacity to transfer maximum day demands to the upper serviced pressure zones.
- Capacity expansions are required once the pumping station's firm capacity reaches the required maximum day demand or peak hour demand, depending on high-lift or low-lift requirements.

EA relevance: if a pumped storage option is selected, this criterion will ensure adequate pumping capacity at the corresponding Pumping Stations.

3.1.2 Water Storage Facilities

Required storage is dictated by the ability to provide the required equalization storage, fire storage and emergency supply to maintain a satisfactory level of service. Reservoir storage capacity at each pumping station is based on the following:

- **Equalization**: 25 percent of the maximum day demand for the upper pressure zones serviced by each pumping station from the reservoir.
- **Fire**: in accordance with the MECP guidelines, to a maximum of 378 L/s for 6 hours when the total equivalent population (Residential plus Employment) for each zone is greater than 40,000[2].
- **Emergency**: 25 percent of the equalization requirement plus 25 percent of fire storage for the lower pressure zone at the reservoir's hydraulic grade line (HGL).

Given that Peel's water supply system typically operates under pumped supply, the reservoirs do not supply the pressure zone at the reservoir's HGL. Rather, they float the lower zone and control the operating pressure. As such, the typical storage capacity criteria are also cross-referenced against storage volumes required for the pressure zones serviced by that pumping facility.

EA relevance: to ensure appropriate storage sizing for pressure district servicing.

3.1.3 Transmission Mains

Transmission mains are designed based on water demands and service levels (e.g., pressure, velocity, head loss), including:

- Convey the combined maximum day demands for the local zone and each subsequent upper zone.
- Transfer flow with an acceptable HGL and typically below 100 psi.
- Maintain velocities within transmission mains below 2.0 m/s.
- Oversizing can be considered in areas where future potential growth is expected to occur.

Transmission mains are typically fed from the low-lift pumps, which also directly feed the local distribution system. As such, transmission main maximum flow is based on current pumping capacity, pressure head and the need to operate these pumps with an acceptable HGL.

EA relevance: to ensure appropriate sizing for the transmission mains that feed the downstream storage facilities.

3.1.4 Security of Supply

The Region's lake-based water system is designed to include multiple facilities servicing the same zone, which provide supply security to the system. In addition to the multiple facilities for supply security, the following key water components are included in the system for further providing sustainable water service to the customers:

- Emergency power supply (standby power).
- Storage facilities.
- Cross pressure zones connections (pressure reducing valves, check valves, etc.).
- Consideration of transmission main twinning to address growth and system security.
- Operational strategy.

3.2 MECP Storage Guidelines

In accordance with the MECP Guidelines for the Design of Water Distribution Systems, 2008[1]:

[1] Ministry of Environment, Conservation and Park. *Pumping Facilities and Treated Water Storage*. September 13, 2023, https://www.ontario.ca/document/design-guidelines-drinking-water-systems/pumping-facilities-and-treated-water-storage#section-1

- Treated water storage facilities should be designed with sufficient capacity to allow maintenance of adequate flows and pressures in the distribution system during peak hour water demand, and to meet critical water demands during fire flow and emergency conditions (including the provision of stand-by power would also influence the sizing of storage facilities). Storage volumes should be designed based on projected design populations.
- One of the most important design objectives for water storage is to minimize the chance of contamination of the treated water. The purpose of water storage is to ensure continuity of supply and maintain system pressure. The materials and designs used for treated water storage facilities should provide structural stability and durability as well as preserve the quality of the stored water.
- The storage needs for Pressure Zone 7W are presented in Technical Memorandum #1. This includes the standard MECP total storage calculation as follows:

  Total Storage = Fire Storage (A) + Equalization Storage (B) + Emergency Storage (C)

4.0 Storage Concepts Development

Based on the Region's population and employment projections and calculations completed in Technical Memorandum #1, the following are the projected storage needs for Pressure Zone 7W:

- 2021: 3 ML
- 2031: 8 ML
- 2041: 12 ML
- 2051: 18 ML

4.1 Service Area Details & Elevations

This EA is focused on servicing Pressure Zone 7W needs. To support servicing decisions, other Region zones and facilities have been reviewed for guidance purposes for operational continuity. **Table 3** outlines pressure zone and approximate water storage serviceability details and is illustrated in **Figure 4-1** for Zone 7W.

Table 3. Pressure Zone Serviceability

Pressure Zone	Top Water Level	Serviceable Elevation
Zone 1	143.6 m	74.8 – 106.5 m
Zone 2	175.2 m	106.5 – 137.1 m
Zone 3	205.7 m	137.1 – 167.6 m
Zone 4	236.2 m	167.6 – 198.1 m
Zone 5	266.7 m	198.1 – 228.6 m
Zone 6	297.2 m	228.6 – 259.1 m
Zone 7	**327.7 m**	**259.1 – 289.6 m**

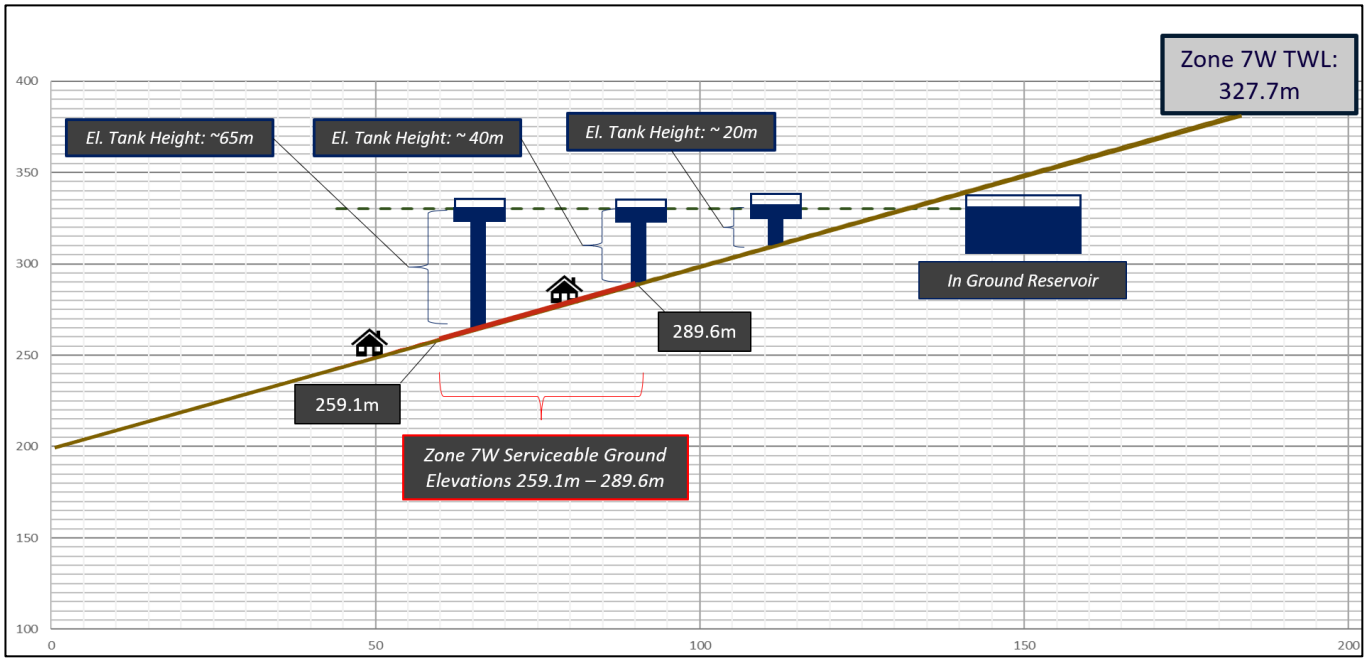

Figure 4-1: Zone 7W Serviceable Ground Elevations for Elevated Tank

Table 4. Reservoir Serviceability

		Elevations (Approx.)		Relative Level			
Reservoir	**Pressure Zone**	**Ground Level (masl)**	**Top of Reservoir (masl)**	**Ground Level (m)**	**Top of Reservoir (m)**	**Typical Low Operating (%)**	**Typical High Operating (%)**
Silverthorn	Zone 1	137.16	143.6	0	6.44	40%	90%
Herridge		138	143.6	0	5.6	40%	90%
Hanlan	Zone 2	168.15	175.2	0	7.05	40%	90%
Streetsville		169.55	175.2	0	5.65	40%	90%
Beckett Sproule	Zone 3	198.72	205.7	0	6.98	40%	90%
Meadowvale		201	206.95	0	5.95	40%	80%
Airport		197.2	205.7	0	8.5	40%	90%
East Brampton	Zone 4	229.21	236.2	0	6.99	40%	90%
West Brampton		231.15	236.25	0	5.1	40%	90%
Tullamore		230.2	236.21	0	6.01	40%	90%
Alloa	Zone 5	260	266.7	0	6.7	40%	90%
North Brampton		260.26	266.7	0	6.44	40%	90%

* Note: Draft elevations are pulled from Peel InfoWater Model v. 2021-02-01. These values are approximate.

Table 5. Elevated Tank Serviceability

		Elevations (Approx.)		Relative Level			
Tanks	**Pressure Zone**	**Bottom of Bowl (masl)**	**Top of Tank (masl)**	**Bottom of Bowl (m)**	**Top of Tank (m)**	**Typical Low Operating (%)**	**Typical High Operating (%)**
Snelgrove ET	Zone 6	286.51	297.18	0	10.67	40%	85%
Bolton ET		286	297.2	0	11.2	70%	90%
West Bolton		290	297.2	0	7.2	50%	85%
Mayfield West ET	Zone 7	316.6	327.7	0	11.1	40%	80%

* Note: Draft elevations are pulled from Peel InfoWater Model v. 2021-02-01. These values are approximate.

4.2 Storage Types

To support the selection of technically viable water storage alternatives, existing Region and other Greater Golden Horseshoe facilities were benchmarked to generate typical parameters. For this EA, four (4) water storage types were considered including: In-ground Reservoir, Partial In-Ground Reservoir, Elevated Tank(s), and/or Standpipe(s). **Table 6** includes a brief overview of each storage type and technical considerations.

Based on varied elevation needs for the respective storage types outlined in **Table 6** and **Table 7**, the study area was reviewed for general supportive siting locations.

Table 6. Storage Types and Details

Storage Types	TWL Height Above Ex. Grade:	Supporting Ground Elevation	Capacity Range	Site Area
In Ground Reservoir: *Underground structure*	~0m – 6m	324m - 335m	10ML – 40ML+	Varies
Partial In-Ground: *Above-grade buried structure*	~12m (Victoria Reservoir Reference)	318m - 324m	10ML – 40ML+	Varies
Elevated Tank(s): *Above-ground tower with storage at top*	20m – 60m	270m - 310m	1ML – 10ML	~100m x 100m ideal
Standpipe: *Above-ground Cyclindrical storage volume*	0m – 30m+	300m - 330m	1ML – 20ML	~100m x 100m ideal

Table 7. Storage Concept Alternatives

Concept	TWL Height Above Ex. Grade:	Supporting Ground Elevation	Capacity Range	Site Area	Needs for 2051*
1: Do Nothing	N/A	N/A	N/A	N/A	N/A
2: Limit Growth	N/A	N/A	N/A	N/A	N/A
3: In Ground Reservoir (Base of Reservoir Supported by Ground)	0m – 6m	324m - 335m	10ML – 40ML+	Varies	20ML Reservoir
4: Partial In-Ground (Base of Reservoir Supported by other Structure above ground)	~12m (Victoria Res Reference)	318m - 324m	10ML – 40ML+	Varies	20ML Reservoir
5: Elevated Tank(s) + Pumped Storage	20m – 60m	270m - 310m	1ML – 10ML	~100m x 100m ideal	• 2 x 10ML Tanks, **or** • 1 Tank + Pumped (Alloa/Victoria)
6: Standpipe(s) + Pumped Storage	0m – 30m+	300m - 330m	1ML – 30ML	~100m x 100m ideal	• 1 x 20ML Standpipe, **or** • 2 x 10ML Standpipes, **or** • 1 Tank + Pumped (Alloa/Victoria)
7: Pumped Storage Only	N/A	N/A	N/A	N/A	• 20ML Pumped (Alloa/Victoria)

* 2051 needs based on Peel Region 2025 Master Plan, Growth Scenario 1, Version 0, updated November 4, 2024

5.0 Summary & Preliminary Concepts

To meet the storage needs presented in Technical Memorandum #1, alternative storage concepts were developed. There are several options available for Region servicing including elevated tanks, reservoirs, and/or standpipes.

The following outlines the storage concepts that will be reviewed and screened against a range of evaluation criteria:

1. Do Nothing
2. Limit Growth
3. In Ground Reservoir
4. Partial In-Ground Reservoir
5. Elevated Tank(s) + Pumped Storage
6. Standpipe(s) + Pumped Storage
7. Pumped Storage Only

The next step is to develop screening criteria to evaluate the servicing concepts noted in **Table 7**. Once selected, the preferred storage concept will be used to generate further refined servicing solution alternatives, which will undergo a multiple bottom-line evaluation process to ultimately select a preferred alternative strategy.

PEEL REGION

WEST CALEDON STORAGE FACILITY AND TRANSMISSION MAIN SCHEDULE 'C' CLASS EA

Volume 1: Supporting Technical Studies and Documents

Appendix 1C: Storage Concepts and Elevated Tank Site Evaluation

Prepared by:
GEI Consultants Canada

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Storage Concept Alternatives Evaluation

Storage Concept Alternatives

The table below presents the alternative storage concepts considered for Pressure Zone 7W. In total, seven (7) storage alternatives were reviewed. The storage concept alternatives were evaluated against the established design criteria. A list of pros and cons were developed for each alternative. The alternative providing the greatest benefits in meeting all key requirements under the balanced evaluation criteria was selected as the preferred storage concept for Pressure Zone 7W.

Storage Concept Alternatives for Pressure Zone 7W

Storage Requirement	1. Do Nothing	2. Limit Growth	3. In-Ground Reservoir	4. Partial In-Ground	5. Elevated Tank(s) + Pumped Storage	6. Standpipe(s) + Pumped Storage	7. Pumped Storage Only
Technical Viability	• A storage solution is required to service projected growth as aligned with the Region's and Provincial mandated targets. • "Do nothing" does not satisfy the Problem and Opportunity Statement or meet existing and future servicing needs. • Alternative was removed from further consideration.	• A storage solution is required to service projected growth as aligned with the Region's and Provincial mandated targets. • "Limit growth" does not satisfy the Problem and Opportunity Statement or meet existing and future servicing needs. • Alternative was removed from further consideration.	**Pros** • Satisfies the Problem and Opportunity Statement. • Can meet existing and future servicing needs. • Provides a reliable water supply. • Ability to align with future growth (phasing) for 2031, 2041, 2051, and post 2051 water demands, and system storage needs through phased construction of reservoir cells. • Ability to adapt to climate change with storage facility resiliency due to increased system demands and/or reduction in supply capacity. **Cons** • Reservoir would be considerably distant from service area • Distance of storage facility will increase watermain construction risk based on environmental crossings and extended distance. • Increased water quality risk would need to be mitigated due to length of watermain • May require higher pressure from PD7 pump	**Pros** • Satisfies the Problem and Opportunity Statement. • Can meet existing and future servicing needs. • Provides a reliable water supply. • Ability to align with future growth (phasing) for 2031, 2041, 2051, and post 2051 water demands, and system storage needs. • Ability to adapt to climate change with storage facility resiliency due to increased system demands and/or reduction in supply capacity. **Cons** • Limited land elevation available within study area to support storage concept. • Reservoir would be considerable distance from service area. • Distance of storage facility will increase watermain construction risk based on environmental crossings and extended distance. • Requires elevated structure with limited siting flexibility. • Increased water quality risk would need to be	**Pros** • Satisfies the Problem and Opportunity Statement. • Can meet existing and future servicing needs. • Ability to align with future growth (phasing) for 2031, 2041, 2051, and post 2051 water demands, and system storage needs. • Increased flexibility for siting location(s) and potential connections to support Zone 7C. • Increased flexibility for alternative watermain alignments due to increased site location options. • Improved connectivity for future servicing. • Shorter watermain required. • Provides a reliable water supply. • Aligns with existing and future land use. • Ability to adapt to climate change with storage facility resiliency due to increased system demands, reduction in supply capacity, and/or vulnerability to climate related failures such as flooding.	**Pros** • Satisfies the Problem and Opportunity Statement. • Can meet existing and future servicing needs. • Ability to align with future growth (phasing) for 2031, 2041, 2051, and post 2051 water demands, and system storage needs. • Provides a reliable water supply. • Aligns with existing and future land use. • Ability to adapt to climate change with storage facility resiliency due to increased system demands, reduction in supply capacity, and/or vulnerability to climate related failures such as flooding. **Cons** • Limited land elevation available within study area to support storage concept. • Storage would be considerable distance from service area. • Distance of storage facility will increase watermain construction risk based on environmental crossings and extended distance.	**Pros** • Satisfies the Problem and Opportunity Statement. • Can meet existing and future servicing needs. • Ability to align with future growth (phasing) for 2031, 2041, 2051, and post 2051 water demands, and system storage needs. • Provides suitable land elevation to support storage type. • Will provide a reliable water supply. • Minimizes and manages construction risk. • Aligns with existing and future land use. **Cons** • Doesn't support current Regional operations and servicing practices and standards. • No floating storage; increased reliance on Alloa Res/PS and potentially Victoria Res/PS for pumped supply. • Increased operational risk. • Reduced ability to adapt to climate change with potential increased system demands, reduction to supply

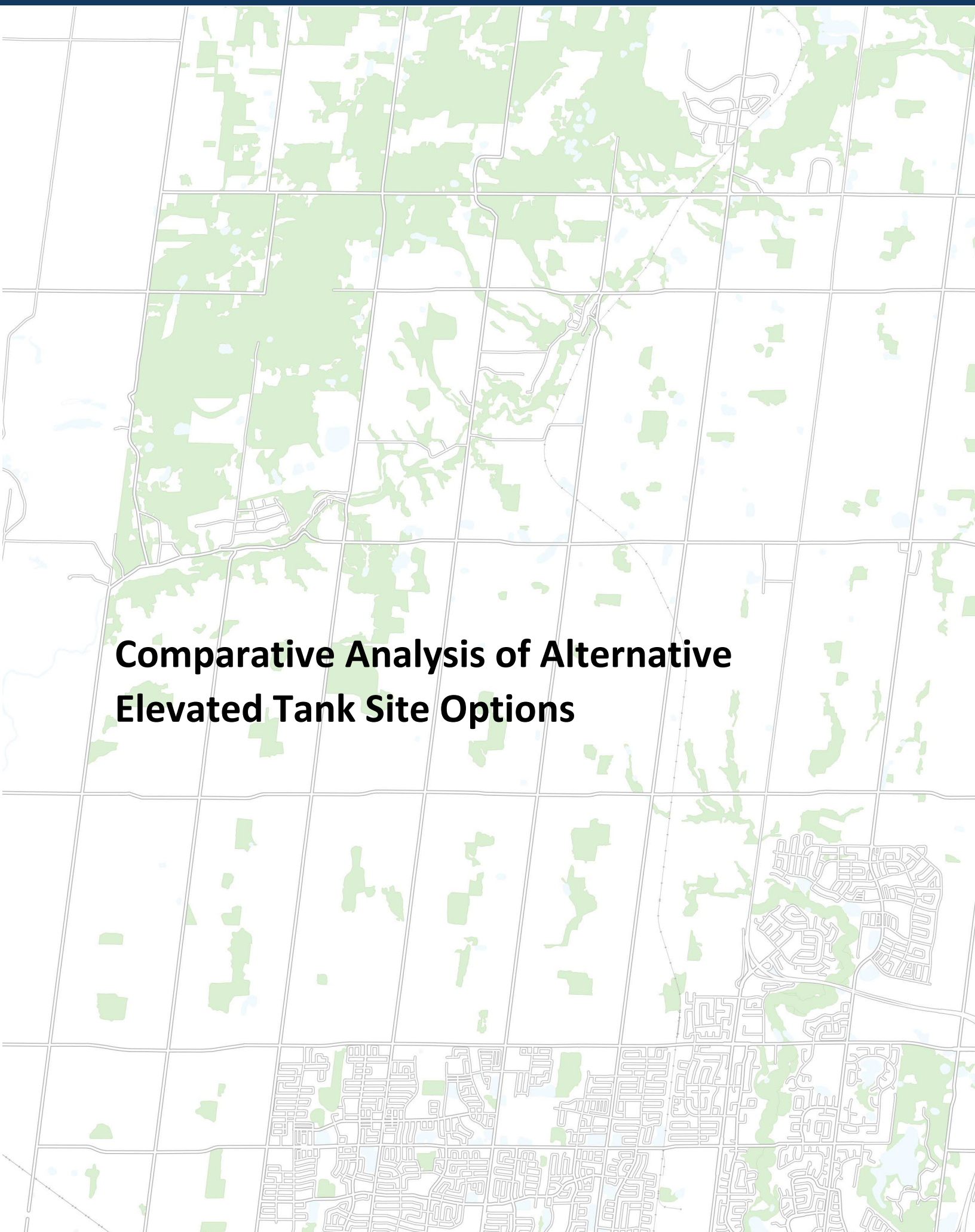
Storage Requirement	1. Do Nothing	2. Limit Growth	3. In-Ground Reservoir	4. Partial In-Ground	5. Elevated Tank(s) + Pumped Storage	6. Standpipe(s) + Pumped Storage	7. Pumped Storage Only
			station due to potential watermain length.	mitigated due to length of watermain • May require higher pressure for pumped area due to potential watermain length. No real technical need for partial in-ground versus in-ground; locations are technically available for in-ground reservoir within study area. No technical benefit for partial in-ground option.	**Cons** • Manageable construction risk with siting flexibility but will require elevated structure. • Max storage tank size requires multiple tanks or elevated tank + pumped strategy to meet long term needs.	• Increased water quality risk would need to be mitigated due to length of watermain • Limited usable storage due to standpipe design compared to elevated tank alternative. • Max storage tank size requires multiple tanks or Standpipe + pumped strategy to meet long term needs.	capacity, and/or vulnerability to flooding.
Environmental Impacts	-	-	**Pros** • Locations can avoid groundwater and well supplies. **Cons** • Increased potential to impact sensitive environmental features based on site elevation requirements/required water crossing (features include wetlands, terrestrial habitat/features, vegetation, wood lots, and steep slopes identified by Conservation Authorities, Municipalities, or the Province of Ontario). • Limited flexibility to avoid storage siting within environmental features or protected areas. • Supporting elevations for storage alternative. require major crossing of Credit River.	**Pros** • Locations can avoid groundwater and well supplies. **Cons** • Increased potential to impact sensitive environmental features based on site elevation requirements/required water crossing (features include wetlands, terrestrial habitat/features, vegetation, wood lots, and steep slopes identified by Conservation Authorities, Municipalities, or the Province of Ontario). • Limited flexibility to avoid storage siting within environmental features or protected areas. • Supporting elevations for storage alternative still requires major crossing of Credit River. There is	**Pros** • Ability to avoid/minimize impact to sensitive environmental features (wetlands, terrestrial habitat/features, vegetation, wood lots, and steep slopes identified by Conservation Authorities, Municipalities, or the Province of Ontario). • Elevation flexibility removes need for major water crossing. • Flexibility to avoid storage siting within environmental features or protected areas. • Protects groundwater and well supplies. • Larger siting area(s) available to avoid or minimize impact to the environment. • Shorter watermain length will reduce number of watercourse and/or environmental feature crossings.	**Pros** • Locations can avoid groundwater and well supplies. **Cons** • Increased potential to impact sensitive environmental features based on site elevation requirements/required water crossing (features include wetlands, terrestrial habitat/features, vegetation, wood lots, and steep slopes identified by Conservation Authorities, Municipalities, or the Province of Ontario). • Limited flexibility to avoid storage siting within environmental features or protected areas. • Supporting elevations for storage alternative still requires major crossing of Credit River. There is no environmental benefit to raise reservoir.	**Pros** • Ability to avoid/minimize impact to sensitive environmental features (wetlands, terrestrial habitat/features, vegetation, wood lots, and steep slopes identified by Conservation Authorities, Municipalities, or the Province of Ontario). • Flexibility to avoid storage siting within environmental features or protected areas. • Protects groundwater and well supplies. **Cons** • Relies on increased pumped supply increasing use of energy and emissions.

Storage Requirement	1. Do Nothing	2. Limit Growth	3. In-Ground Reservoir	4. Partial In-Ground	5. Elevated Tank(s) + Pumped Storage	6. Standpipe(s) + Pumped Storage	7. Pumped Storage Only
				no environmental benefit to raise reservoir.	**Cons** • Limited construction size would require multiple sites if demand is met through floating facilities.	• Limited construction size would require multiple sites if demand is met through floating facilities.	
Policy/ Jurisdictional	-	-	**Pros** • Avoids potential impact to Brampton Flying Club and opportunity to meets requirements with respect to height restrictions. • Limited potential to switch Cheltenham over to lake-based servicing. (Would require Provincial approval). Reassurance could be given to Cheltenham residents that a switchover is not planned in the future as part of this strategy. **Cons** • Increased coordination with City of Brampton/Town of Caledon to comply with municipal policies. • Requires consultation and compliance within TRCA and CVC regulated areas. • Increased consultation and jurisdiction complexity with Niagara Escapement Commission (NEC) for facility siting within regulated areas. • Requires extending servicing infrastructure into the Greenbelt although not providing	**Pros** • Avoids potential impact to Brampton Flying Club and opportunity to meets requirements with respect to height restrictions. • Limited potential to switch Cheltenham over to lake-based servicing. (Would require Provincial approval). Reassurance could be given to Cheltenham residents that a switchover is not planned in the future as part of this strategy. **Cons** • Increased coordination with City of Brampton/Town of Caledon to comply with municipal policies. • Requires consultation and compliance within TRCA and CVC regulated areas. • Increased consultation and jurisdiction complexity with Niagara Escapement Commission (NEC) for facility siting within regulated areas. • Requires extending servicing infrastructure into the Greenbelt although not providing	**Pros** • Aligns with respective City of Brampton/Town of Caledon and Regional municipal policies. • Minimizes impact/complies with multiple Conservation Authorities (Toronto and Region Conservation Authority/Credit Valley Conservation) regulated areas. • Minimizes impact/compiles with Niagara Escapement Commission regulated areas. • Minimizes coordination needs for approval or permits. **Cons** • Increased coordination to avoid potential impacts or conflicts to Brampton Flying Club with respect to height restrictions/ conflicts.	**Pros** • Minimizes potential impact to Brampton Flying Club and opportunity to meets requirements with respect to height restrictions (due to distance of suitable siting locations). • Aligns with respective City of Brampton/Town of Caledon and Regional municipal policies. **Cons** • Increased coordination to avoid potential impacts or conflicts to Brampton Flying Club with respect to height restrictions/ conflicts. • Increased coordination with City of Brampton/Town of Caledon to comply with municipal policies. • Requires consultation and compliance within TRCA and CVC regulated areas. • Increased consultation and jurisdiction complexity with Niagara Escapement Commission (NEC) for facility siting within regulated areas.	**Pros** • Aligns with respective City of Brampton/Town of Caledon and Regional municipal policies. • Minimizes impact/complies with multiple Conservation Authorities (Toronto and Region Conservation Authority/Credit Valley Conservation) regulated areas. • Minimizes impact/compiles with Niagara Escapement Commission regulated areas. • Avoids potential impact to Brampton Flying Club and opportunity to meets requirements with respect to height restrictions.

Storage Requirement	1. Do Nothing	2. Limit Growth	3. In-Ground Reservoir	4. Partial In-Ground	5. Elevated Tank(s) + Pumped Storage	6. Standpipe(s) + Pumped Storage	7. Pumped Storage Only
			new servicing into Greenbelt area which is restrictive. May be perceived as objectional.	new servicing into Greenbelt area which is restrictive. May be perceived as objectional.		• Requires extending servicing infrastructure into the Greenbelt although not providing new servicing into Greenbelt area which is restrictive. May be perceived as objectional.	
Social and Cultural Impacts	-	-	**Pros** • Ability to minimize visual/height/shadow impact to existing/future residents related to storage concept. • Ability to protect cultural heritage features or areas of scenic value. **Cons** • Increased potential impact to surrounding existing uses that are not municipally serviced due facility sited outside of service area. • Increased potential impact related to Indigenous Communities due to limitation of technically viable locations for storage facility siting. • Increased potential impacts to protected countryside and prime agricultural areas with limited flexibility for storage facility siting.	**Pros** • Ability to minimize visual/height/shadow impact to existing/future residents related to storage concept. • Ability to protect cultural heritage features or areas of scenic value. **Cons** • Increased potential impact to surrounding existing uses that are not municipally serviced due facility sited outside of service area. • Increased potential impact related to Indigenous Communities due to limitation of technically viable locations for storage facility siting. • Increased potential impacts to protected countryside and prime agricultural areas with limited flexibility for storage facility siting.	**Pros** • Ability to minimize impact to existing residents related to storage proximity to conflicting areas. • Ability to protect cultural heritage features. • Minimizes potential impact to Indigenous Communities with greater flexibility for storage facility siting. • Minimizes potential impact to protected countryside and prime agricultural areas with flexibility for storage facility siting. • Range of topography and potential sites at varying elevations could provide opportunity for shorter tower at higher ground elevations. **Cons** • Potential aesthetic impacts with future developments due to elevated tank. • Tall tower has aesthetic and shadow impacts.	**Pros** • Ability to reduce impact to existing residents related to elevated storage concept aesthetic (due to distance of suitable siting locations). • Ability to protect cultural heritage features or areas. **Cons** • Potential aesthetic impacts with future developments due to elevated structure. • Increased potential impact to surrounding existing uses that are not municipally serviced due facility sited outside of service area. • Increased potential impact related to Indigenous Communities due to limitation of technically viable locations for storage facility siting. • Increased potential impacts to protected countryside and prime agricultural areas with limited flexibility for storage facility siting.	**Pros** • Ability to minimize impact to existing/future residents related to storage concept aesthetic/proximity to conflicting areas. • Ability to protect cultural heritage features or areas of scenic value. • Minimizes impact to Indigenous Communities with flexibility for storage facility siting. • Minimizes impact to protected countryside and prime agricultural areas with flexibility for storage facility siting.

Storage Requirement	1. Do Nothing	2. Limit Growth	3. In-Ground Reservoir	4. Partial In-Ground	5. Elevated Tank(s) + Pumped Storage	6. Standpipe(s) + Pumped Storage	7. Pumped Storage Only
Financial	-	-	**Pros** • Enables phased construction of storage cells as demands increase, limiting need for total upfront capital spend. **Cons** • Greatest length of watermain required due to limited area supporting inground storage elevations. • Requires major environmental/water crossing(s) increasing construction cost. • Increased potential for features impact mitigation (i.e., archaeological, natural environment, etc.). • Increased potential operational cost anticipated with pumping, water quality etc.	**Pros** • Enables phased construction of storage cells as demands increase, limiting need for total upfront capital spend. **Cons** • Greatest length of watermain required due to limited area supporting storage elevations. • Requires major environmental/water crossing(s) increasing construction cost. • Increased potential for features impact mitigation (i.e., archaeological, natural environment, etc.). • Elevated reservoir would increase costs compared to in-ground due to raised structure and site area needs. • Increased potential operational cost anticipated with pumping, water quality etc.	**Pros** • Opportunity for shortest watermain length due to siting flexibly with supporting storage elevations. • Avoids major environmental/water crossings. • Reduced potential impact for features impact (i.e., archaeological, natural environment, etc.). • Elevated Tanks provide a relatively low-cost option for floating storage. • Reduced upfront construction costs for elevated infrastructure and shorter watermain length compared to reservoir alternatives.	**Pros** • Elevated Tanks provide a relatively low-cost option for floating storage. • Slightly reduced upfront construction costs for elevated infrastructure and slightly shorter watermain length compared to reservoir alternatives. **Cons** • Long watermain required due to limited area supporting storage siting elevations. • Requires major environmental/water crossing(s) increasing construction cost. • Increased potential for features impact mitigation (i.e., archaeological, natural environment, etc.). • Increased potential operational cost anticipated with pumping, water quality etc.	**Pros** • Opportunity for shorter watermain length due to siting flexibly with supporting storage elevations. • Avoids major environmental/water crossings. • Reduced potential impact for features impact (i.e., archaeological, natural environment, etc.). **Cons** • Length of watermain required due to restricted areas with supporting storage elevations.
Evaluation Result	• Storage concept does not satisfy the study's Problem and Opportunity Statement and was removed from the evaluation process.	• Storage concept does not satisfy the study's Problem and Opportunity Statement and was removed from the evaluation process.	• Alternative provides good technical solution but has limited site availability outside of sensitive environmental features and has far proximity from the service area. Alternative has increased watermain costs due to required length.	• Alternative provides good technical solution but has limited site availability outside of sensitive environmental features and has far proximity from the service area. Alternative has further increased costs compared to Alternative #3 due to additional structural requirements of the storage facility. No	• Alternative provides greatest flexibility for siting within the service area with opportunity for phased construction to meet growth demands, provides improved connectivity, requires a shorter watermain(s) than reservoir alternatives minimizing environmental impact, adheres to policies, and	• Alternative provides similar benefits as Alternative #5, but the standpipe does not have the same design, site flexibility and storage benefits as the elevated tank.	• Alternative does not provide floating storage, redundancy, or emergency back-up and does not meet Regional operations and servicing practices/standards.

Storage Requirement	1. Do Nothing	2. Limit Growth	3. In-Ground Reservoir	4. Partial In-Ground	5. Elevated Tank(s) + Pumped Storage	6. Standpipe(s) + Pumped Storage	7. Pumped Storage Only
				tangible benefits for partial in-ground over in-ground.	provides a cost-effective storage concept.		



Comparative Analysis of Alternative Elevated Tank Site Options

Comparative Analysis of Alternative Elevated Tank Site Options

Group of Evaluation Criteria	Criteria	Component	Site A	Site B	Site C	Site D	Site E
General		General Location	Located south-east of the intersection of Heritage Road and Old School Road.	Located south-west of the intersection of Mississauga Road and Old School Road.	Located south-east of the intersection of Mississauga Road and Old School Road.	Located south-east of the intersection of Mississauga Road and Old School Road.	Located south-west of the intersection of Creditview Road and Old School Road.
		Site Area/Description	• 2 ha site with frontage on Heritage Road. • 40.03 ha property lot	• 2 ha site with frontage on Mississauga Road. • 39.33 ha property lot	• 2 ha site with frontage on Mississauga . • 20.11 ha property lot	• 2 ha site with frontage on Mississauga Road. • 19.45 ha property lot	• 2 ha site with frontage on Old School Road. • 50.91 ha property lot
Natural Environment	Significant Natural Features	Impacts to Woodlots, Valleylands, Provincially Significant Wetlands (PSW), Locally Significant Wetlands, unevaluated wetlands, ESA, and ANSI	• The site does not contain any locally or provincially significant natural features. • All lots can accommodate a 2 ha site that can avoid local and significant natural features and minimum setbacks; Site Options considered equal. (3)	• The site does not contain any locally or provincially significant natural features. • All lots can accommodate a 2 ha site that can avoid local and significant natural features and minimum setbacks; Site Options considered equal. (3)	• The site does not contain any locally or provincially significant natural features. • All lots can accommodate a 2 ha site that can avoid local and significant natural features and minimum setbacks; Site Options considered equal. (3)	• The site does not contain any locally or provincially significant natural features. • All lots can accommodate a 2 ha site that can avoid local and significant natural features and minimum setbacks; Site Options considered equal. (3)	• The site does not contain any locally or provincially significant natural features. • All lots can accommodate a 2 ha site that can avoid local and significant natural features and minimum setbacks; Site Options considered equal. (3)
	Aquatic & Terrestrial Ecosystem	Impacts to Watersheds/Sub watersheds, Aquatic and Terrestrial Species Habitat and Wildlife with ESA or SARA Status	• Open agricultural area may support waterfowl significant wildlife habitat (SWH). • Agricultural fringe areas may support reptile hibernation SWH • The site does not contain any significant headwater drainage features • All lots can accommodate a 2 ha site that can avoid aquatic ecosystems and minimum setbacks; no impact anticipated and no difference between Site Options. (3) • Further field investigations required to verify wild habitat for each Site Options. (3)	• Open agricultural area may support waterfowl SWH. • Agricultural fringe areas may support reptile hibernation SWH • The site does not contain any headwater drainage features. • Additional field verification required • All lots can accommodate a 2 ha site that can avoid aquatic ecosystems and minimum setbacks; no impact anticipated and no difference between Site Options. (3) • Further field investigations required to verify wild habitat for each Site Options. (3)	• Open agricultural area may support waterfowl SWH. • Agricultural fringe areas may support reptile hibernation SWH • The site does not contain any headwater drainage features. • Property has potential habitat for Species of Conservation Concern (SCC) • Additional field verification required • All lots can accommodate a 2 ha site that can avoid aquatic ecosystems and minimum setbacks; no impact anticipated and no difference between Site Options.(3) • Further field investigations required to verify wild habitat for each site (3)	• Open agricultural area may support waterfowl SWH. • Agricultural fringe areas may support reptile hibernation SWH • The site does not contain any headwater drainage features. • Property has potential habitat for SCC • Additional field verification required • All lots can accommodate a 2 ha site that can avoid aquatic ecosystems and minimum setbacks; no impact anticipated and no difference between Site Options. (3) • Further field investigations required to verify wild habitat for each Site Options. (3)	• Open agricultural area may support waterfowl SWH. • Agricultural fringe areas may support reptile hibernation SWH • The site does not contain any headwater drainage features. • Property has potential habitat for SCC) • Additional field verification required • All lots can accommodate a 2 ha site that can avoid aquatic ecosystems and minimum setbacks; no impact anticipated and no difference between Site Options. (3) • Further field investigations required to verify wild habitat for each Site Options. (3)

<table>
<tr><th>Group of Evaluation Criteria</th><th>Criteria</th><th>Component</th><th>Site A</th><th>Site B</th><th>Site C</th><th>Site D</th><th>Site E</th></tr>
<tr><td></td><td colspan="2">Natural Environment Score</td><td colspan="5">All sites through use of desktop and preliminary screening avoid all major features, all sites may require further field validation and SARs review to assess potential impacts/mitigation measures (9)</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td rowspan="5">Technical Suitability</td><td>Environmental Site Assessment/ Contamination Potential</td><td>Risk of groundwater contamination</td><td>• All Site Options have nearby private well users, a private well survey is recommended to support any required impact/mitigation prior to construction.
• Site is not located within a vulnerable area; risk of groundwater contamination is low. (3)</td><td>• All Site Options have nearby private well users, a private well survey is recommended to support any required impact/mitigation prior to construction.
• Site is not located within a vulnerable area; risk of groundwater contamination is low. (3)</td><td>• All Site Options have nearby private well users, a private well survey is recommended to support any required impact/mitigation prior to construction.
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• Site is not located within a vulnerable area; risk of groundwater contamination is low. (3)</td><td>• All Site Options have nearby private well users, a private well survey is recommended to support any required impact/mitigation prior to construction.
• Site is not located within a vulnerable area; risk of groundwater contamination is lower. (3)</td></tr>
<tr><td>Constructability Geotechnical</td><td>Dewatering and Excavation</td><td>• Oak Ridges Moraine aquifer anticipated to be below site and groundwater is anticipated to be relatively shallow.
• Potential for high inflows would be expected if deep open cut excavations is required below the groundwater table that encounter aquifers. (2)
• Dewatering needs to be further reviewed, anticipate standard mitigation measures – common to other sites.</td><td>• Oak Ridges Moraine aquifer anticipated to be below site and groundwater is anticipated to be relatively shallow.
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• Potential for high inflows would be expected if deep open cut excavations is required below the groundwater table that encounter aquifers. (2)
• Dewatering needs to be further reviewed, anticipate standard mitigation measures – common to other sites.</td><td>• Oak Ridges Moraine aquifer is not present below site.
• Lower potential for high inflows associated with deep open cut excavations. (3)
• Dewatering needs to be further reviewed, anticipate standard mitigation measures – common to other sites.</td></tr>
<tr><td>Operations/ Maintenance</td><td>Water Quality</td><td>• Site A further from service area; will impact operations – more volume of the tank used for turnover required to ensure good water quality. (1)
• Site access located on Town road.</td><td>• Site B is close to service area; will benefit operations – less volume of the tank used for turnover required to ensure good water quality. (3)
• Site access located on Regional road.</td><td>• Site C further from service area; will impact operations – more volume of the tank used for turnover required to ensure good water quality. (2)
• Site access located on Regional road.</td><td>• Site D is closest to service area; will benefit operations – less volume of the tank used for turnover volume to ensure good water quality. (3)
• Site access located on Regional road.</td><td>• Site E further from service area; will impact operations – more volume of the tank used for turnover volume to ensure good water quality. (1)
• Site access located on Town road.</td></tr>
<tr><td></td><td>Site Elevations</td><td>• Approximate site elevation is 266, lower than ideal range (270-310 m). (2)</td><td>• Approximate site elevation is 275, within ideal range (270-310 m). (3)</td><td>• Approximate site elevation is 277, within ideal range (270-310 m). (3)</td><td>• Approximate site elevation is 275, within ideal range (270-310 m). (3)</td><td>• Approximate site elevation is 274 within ideal range (270-310 m). (3)</td></tr>
<tr><td colspan="2">Technical Score</td><td>8</td><td>11</td><td>10</td><td>11</td><td>10</td></tr>
</table>

Group of Evaluation Criteria	Criteria	Component	Site A	Site B	Site C	Site D	Site E
Socio-economic & Cultural Heritage	Provincial Land use Planning Policy	Provincial Planning Statement (PPS), Greenbelt Plan, and Alignment with Provincial Existing and Future Projects	• All Site Options located outside of the Greenbelt Area; located within Whitebelt Lands, which have potential for future development. • Site avoids the proposed Highway 413 Focused Analysis Area (FAA) and Transmission Corridor Narrowed Area of Interest (NAI).	• All Site Options located outside of the Greenbelt Area; located within Whitebelt Lands, which have potential for future development. • Site avoids the proposed Highway 413 FAA and Transmission Corridor NAI.	• All Site Options located outside of the Greenbelt Area; located within Whitebelt Lands, which have potential for future development. • Site avoids the proposed Highway 413 FAA and Transmission Corridor NAI.	• All Site Options located outside of the Greenbelt Area; located within Whitebelt Lands, which have potential for future development. • Site avoids the proposed Highway 413 FAA and Transmission Corridor NAI.	• All Site Options located outside of the Greenbelt Area; located within Whitebelt Lands, which have potential for future development. • Site avoids the proposed Highway 413 FAA and Transmission Corridor NAI.
	Regional/Local Land use Planning Policy	Official Plans, Secondary Plans, Land Use Designations	• All Site Options are located on Prime Agricultural Area Land Use. • All Site Options are located outside of the Regional 2051 Urban Area boundary. (2)	• All Site Options are located on Prime Agricultural Area Land Use. • All Site Options are located outside of the Regional 2051 Urban Area boundary. • Close to proposed Highway 413 and Transmission Corridor. Opportunity to decrease existing agricultural land/future land use fragmentation and support siting of similar infrastructure/utilities land uses. (3)	• All Site Options are located on Prime Agricultural Area Land Use. • All Site Options are located outside of the Regional 2051 Urban Area boundary. (2)	• All Site Options are located on Prime Agricultural Area Land Use. • All Site Options are located outside of the Regional 2051 Urban Area boundary. • Adjacent to proposed Highway 413 and Transmission Corridor. Best opportunity to decrease existing agricultural land/future land use fragmentation and support siting of similar infrastructure/utilities land uses. (3)	• All Site Options are located on Prime Agricultural Area Land Use. • All Site Options are located outside of the Regional 2051 Urban Area boundary. (2)
	Agricultural Impact	Potential for direct and indirect impacts on farm and adjacent farm operations	• Site does not cross any farm field access points. • No impact to access of farm fields. • There are a total of 2 adjacent farm operations. • Construction of the proposed site has the potential to temporarily disrupt farm traffic and generate higher levels of dust for surrounding farm operations.	• Site does not cross any farm field access points. • No impact to access of farm fields. • There is a total of 1 adjacent farm operation. • Construction of the proposed site has the potential to temporarily disrupt farm traffic, impact surrounding tile drainage and generate higher levels of dust.	• Site crosses a farm field access point on Mississauga Road. • Site may impact access to farm fields. • There are no adjacent farm operations. • Construction of the proposed site would have negligible impacts on the surrounding farm operations in the area.	• Site does not cross any farm field access points. • No impact to access of farm fields. • There are no adjacent farm operations. • Construction of the proposed site would cause some minor indirect impacts to the other agricultural operations in the area. • There is no tile drainage on the property, no impact or	• Site does not cross any farm field access points. • No impact to access of farm fields. • There is a total of 2 adjacent farm operations. • Construction of the proposed site has the potential to temporarily disrupt farm traffic, restrict access to farm fields, impact surrounding tile drainage

Group of Evaluation Criteria	Criteria	Component	Site A	Site B	Site C	Site D	Site E
			• Site includes loss of 2ha of systematic tile drainage; impact would require mitigation similar to Site B and more than Site E. (1)	• Site includes loss of 2ha of systematic tile drainage; impact would require mitigation similar to Site A and more than Site E (1)	• There is no tile drainage on the property, no impact or mitigation required compared to Sites A, B and E. (3)	mitigation required compared to Sites A, B and E. (3)	and generate higher levels of dust. • Site includes loss of 1 ha of systematic tile drainage; impact would require mitigation but less that Sites A and B. (2)
	Community Impacts	Noise, aesthetic, vibration, and dust impacts to residents during construction	• All Site Options meet minimum residential property set back criteria. • All Site Options will require similar mitigation measures for noise, vibration and dust during construction. (3)	• All Site Options meet minimum residential property set back criteria. • All Site Options will require similar mitigation measures for noise, vibration and dust during construction. (3)	• All Site Options meet minimum residential property set back criteria. • All Site Options will require similar mitigation measures for noise, vibration and dust during construction. (3)	• All Site Options meet minimum residential property set back criteria. • All Site Options will require similar mitigation measures for noise, vibration and dust during construction. (3)	• All Site Options meet minimum residential property set back criteria. • All Site Options will require similar mitigation measures for noise, vibration and dust during construction. (3)
	Transportation Impacts	Impacts on through traffic, farm traffic, and residential traffic during construction	• All Site Options will have similar traffic impacts during construction. • Traffic plan mitigation plan will be required for all Site Options. • Site access would be located on Town-owned road.	• All Site Options will have similar traffic impacts during construction. • Traffic plan mitigation plan will be required for all Site Options. • Site access would be located on Region-owned road.	• All Site Options will have similar traffic impacts during construction. • Traffic plan mitigation plan will be required for all Site Options. • Site access would be located on Region-owned road.	• All Site Options will have similar traffic impacts during construction. • Traffic plan mitigation plan will be required for all Site Options. • Site access would be located on Region-owned road.	• All Site Options will have similar traffic impacts during construction. • Traffic plan mitigation plan will be required for all Site Options. • Site access would be located on Town-owned road.
	Archaeological Sites	Impacts to Archaeological resources	• All Site Options have archaeological potential and will require Stage 2 Archaeological Assessment. (2)	• All Site Options have archaeological potential and will require Stage 2 Archaeological Assessment. (2)	• All Site Options have archaeological potential and will require Stage 2 Archaeological Assessment. (2)	• All Site Options have archaeological potential and will require Stage 2 Archaeological Assessment. (2)	• All Site Options have archaeological potential and will require Stage 2 Archaeological Assessment. (2)
	Built Heritage	Impacts to built heritage resources, proximity to cultural heritage sites	• Heritage Road and Old School Road are considered historic roads. • No cultural heritage properties located within or near the site. • Further field investigations may be required for all Site Options to confirm impacts to cultural heritage resources.	• Mississauga Road and Old School Road are considered historic roads. • No cultural heritage properties located within or near the site. • Further field investigations may be required for all Site Options to confirm impacts to cultural heritage resources.	• Mississauga Road and Old School Road are considered historic roads. • No cultural heritage properties located within or near the site. • Further field investigations may be required for all Site Options to confirm impacts to cultural heritage resources.	• Mississauga Road and Old School Road are considered historic roads. • No cultural heritage properties located within or near the site. • Further field investigations may be required for all Site Options to confirm impacts to cultural heritage resources.	• Creditview Road and Old School Road are considered historic roads. • No cultural heritage properties located within or near the site. • Further field investigations may be required for all Site Options to confirm impacts to cultural heritage resources.
	Socio-economic & Cultural Heritage Score		8	9	10	11	9

Group of Evaluation Criteria	Criteria	Component	Site A	Site B	Site C	Site D	Site E
Policy/Jurisdictional	Property Owners	Cooperation of Property Owners	• Property owners not willing to negotiate land easement and/or acquisition. (1)	• Property owners not willing to negotiate land easement and/or acquisition. (1)	• Property owners not willing to negotiate land easement and/or acquisition. (1)	• Property owners not willing to negotiate land easement and/or acquisition. (1)	• Property owners not willing to negotiate land easement and/or acquisition. (1)
	Approval Agency Approvals	Permits and Approvals for DFO, Conservation Authorities Ministry of Energy and Energization (MOEE) and Ministry of Transportation (MTO)	• The site is located within both CVC and TRCA jurisdiction. • The site is adjacent to CVC regulated area; increased potential need for permitting and/or approvals. • Adjacent watercourse considered fish habitat; increased potential need for DFO permitting and approvals. (2)	• The site is located within TRCA jurisdiction. • No anticipated permits and/or approvals from DFO, TRCA, MOEE or MTO related to the site. (3)	• The site is located within TRCA jurisdiction. • No anticipated permits and/or approvals from DFO, TRCA, MOEE or MTO related to the site. (3)	• The site is located within TRCA jurisdiction. • Located outside but adjacent to proposed Highway 413 FAA and Transmission Corridor NAI. • No anticipated permits and/or approvals from DFO, TRCA, MOEE or MTO related to the site. (3)	• The site is located within TRCA jurisdiction. • The site is adjacent to TRCA regulated area; increased potential need for permitting and/or approvals. • Adjacent watercourse considered fish habitat; increased potential need for DFO permitting and/or approvals. (2)
	Jurisdictional & Legal Score		3	4	4	4	3
Financial	Capital Costs of Elevated Tank	Construction and Operation Costs	• Construction cost for the elevated tank is very similar between sites as there is marginal height difference. • All Site Options require further field investigations.	• Construction cost for the elevated tank is very similar between sites as there is marginal height difference. • All Site Options require further field investigations.	• Construction cost for the elevated tank is very similar between sites as there is marginal height difference. • All Site Options require further field investigations.	• Construction cost for the elevated tank is very similar between sites as there is marginal height difference. • All Site Options require further field investigations.	• Construction cost for the elevated tank is very similar between sites as there is marginal height difference. • All Site Options require further field investigations.
	Capital Costs of Transmission Main and Feedermain Alignments with Most Direct Route	Construction and Operation Costs	• Transmission main length (5375 m), feedermain length (4920 m). • This is the longest alignment option compared to other sites, requiring highest capital costs. (1)	• Transmission main length (3170 m), feedermain length (2635 m). • Site B is second shortest alignment option similar to Site D, compared to other sites, requiring lower capital costs. (3)	• Transmission main length (3425 m), feedermain length (2910 m). • This alignment option is longer compared to Site D and Site B, requiring additional capital costs. (2)	• Transmission main length (3115 m), feedermain length (2600 m). • Site D is the shortest alignment option compared to other sites, requiring lowest capital costs. (3)	• Transmission main length (4645 m), feedermain length (4190 m). • This alignment option is longer compared to Sites B, C and D requiring additional capital costs. (1)
	Financial Score		1	3	2	3	1

Summary of Results

Group of Evaluation Criteria	Site A	Site B	Site C	Site D	Site E
Natural Environment	3	3	3	3	3
Technical Suitability	2	3	2	3	2
Social-economic & Cultural Heritage	2	2	2	3	2
Policy/Jurisdictional	1	2	2	2	1
Financial	1	3	2	3	1
OVERALL EVALUATION	Least Preferred (9)	Less Preferred (13)	Less Preferred (11)	Most Preferred (14)	Least Preferred (9)

PEEL REGION

WEST CALEDON STORAGE FACILITY AND TRANSMISSION MAIN SCHEDULE 'C' CLASS EA

Volume 1: Supporting Technical Studies and Documents

Appendix 1D: Conceptual Design Drawings

Prepared by:
GEI Consultants Canada

Peel Region is committed to ensuring that all Regional services, programs, and facilities are inclusive and accessible. Please contact the Project Team if you need any accommodations to provide comments and/or feedback for this Study.

PROJECT No. 24-1193

WEST CALEDON STORAGE FACILITY

750 AND 600 WM ON MISSISSAUGA ROAD FROM MAYFIELD ROAD TO OLD SCHOOL ROAD AND ALLOA PUMPING STATION AND ELEVATED TANK AT 12901 MISSISSAUGA ROAD

PRELIMINARY DESIGN

GEI Consultants Canada

Region of Peel working with you

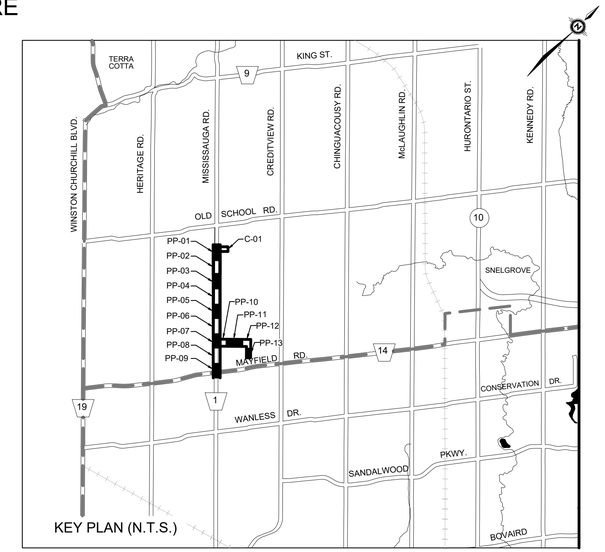
Document 2025-XXXT

DRAWING INDEX

SHEET NUMBER	PLAN NUMBER	DRAWING TITLE
1	G-01	INDEX, LEGEND AND NOTES - G01
2	PP-01	PROPOSED 600 AND 750 WATERMAIN STA. 0+000 TO STA. 0+305
3	PP-02	PROPOSED 600 AND 750 WATERMAIN STA. 0+305 TO STA. 0+620
4	PP-03	PROPOSED 600 AND 750 WATERMAIN STA. 0+620 TO STA. 0+935
5	PP-04	PROPOSED 600 AND 750 WATERMAIN STA. 0+935 TO STA. 1+250
6	PP-05	PROPOSED 600 AND 750 WATERMAIN STA. 1+250 TO STA. 1+565
7	PP-06	PROPOSED 600 AND 750 WATERMAIN STA. 1+565 TO STA. 1+880
8	PP-07	PROPOSED 600 AND 750 WATERMAIN STA. 1+880 TO STA. 2+195
9	PP-08	PROPOSED 600 WATERMAIN STA. 2+195 TO STA. 2+510
10	PP-09	PROPOSED 600 WATERMAIN STA. 2+510 TO STA. 2+700
11	PP-10	PROPOSED 750 WATERMAIN STA. 3+990 TO STA. 4+285
12	PP-11	PROPOSED 750 WATERMAIN STA. 4+285 TO STA. 4+600
13	PP-12	PROPOSED 750 WATERMAIN STA. 4+600 TO STA. 4+870
14	PP-13	PROPOSED 750 WATERMAIN STA. 4+870 TO STA. 5+056.56
15	C-01	ELEVATED TANK SITE PLAN
16	DET-01	ELEVATED TANK PROFILE VIEW
17	DET-02	ALLOA PS PROCESS PIPING MODIFICATIONS - PROCESS SECTION

NOMENCLATURE

PE	PLAIN END
FL	FLANGED
WJ	WELDED JOINT
EX.	EXISTING
w/	WITH
c/w	COMPLETE WITH
(TYP.)	TYPICAL
Ø	DIAMETER
CPP	CONCRETE PRESSURE PIPE
SS	STAINLESS STEEL
PS	PAINTED STEEL
DI	DUCTILE IRON
BFV	BUTTERFLY VALVE
CV	CHECK VALVE
HV	HAND VALVE
AV	AIR VALVE
GM	GAS METER
RD	ROOF DRAIN



LEGEND

V	VALVE
HYD	HYDRANT
WV	WATER VALVE
W/S	WATER SERVICE
STM	STORM MANHOLE
SAN	SANITARY MANHOLE
CB	CATCH BASIN
HP	HYDRO POLE AND GUY WIRE
HH	HAND WELL
LS	LIGHT STANDARD
BOL	BOLLARD
	EXTERIOR DOOR
SN	SIGN
BH.3	BOREHOLE
	SIB
VALVE BOX	VALVE AND BOX TO BE REMOVED AND DISPOSED OF OFF SITE
	ASPHALT TO BE REMOVED
//////	REMOVAL
	CONIFEROUS/DECIDUOUS TREE
356.00	TOPOGRAPHICAL CONTOUR (M.A.S.L.)
STM 300	STORM PIPE
SAN 250	SANITARY PIPE
WM 300	WATER MAIN
PROP. 300 STM	PROPOSED STORM PIPE
PROP. 300 SAN	PROPOSED SANITARY PIPE
PROP. 300 WM	PROPOSED WATER MAIN
H	UNDERGROUND HYDRO
G	GAS
B	BELL
TV	CABLE
x x x x	FENCE
	RIGHT OF WAY (R.O.W.)
	PROPERTY LINE
	TRCA REGULATION LIMIT

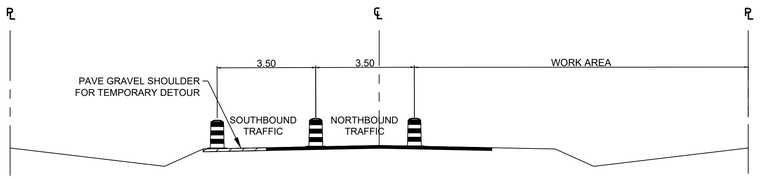
NOTES

GENERAL

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE NOTED.
2. THE CONTRACTOR SHALL RECTIFY ALL DISTURBED AREAS TO ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE OWNER.
3. CONTRACTOR SHALL COORDINATE CONSTRUCTION AND EQUIPMENT DELIVERY TO MINIMIZE DISRUPTIONS TO OPERATION OF STATION. CONTRACTOR SHALL MAINTAIN ACCESS TO FACILITY FOR OWNER AND OPERATIONS STAFF AT ALL TIMES.
4. ALL DIMENSIONS TO BE CHECKED AND VERIFIED ON THE SITE PRIOR TO ANY CONSTRUCTION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER BEFORE PROCEEDING.
5. UNLESS OTHERWISE NOTED, THE MOST STRINGENT DRAWINGS AND SPECIFICATIONS FROM TOWN OF CALEDON, REGION OF PEEL, OPSD AND OPSS ARE TO CONSTITUTE PART OF THIS CONTRACT.
6. EXISTING STRUCTURES ARE NOT TO BE DISTURBED UNLESS OTHERWISE NOTED, ENCROACHMENT ON ADJACENT PROPERTIES IS NOT PERMITTED.
7. COMPLY WITH THE INSPECTION REQUIREMENTS OUTLINED IN THE TOWN OF CALEDON BUILDING PERMIT.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING CONSTRUCTION, INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS ALL IN ACCORDANCE WITH MTO BOOK 7 AS A MINIMUM. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS FOR THE TOWN OF CALEDON AND REGION OF PEEL.
9. THE CONTRACTOR SHALL ENDEAVOUR TO PREVENT MUD TRACKING ONTO EXISTING RIGHT-OF-WAYS AND SHALL PROVIDE FOR CLEANUP AT THEIR OWN EXPENSE AS DIRECTED BY THE OWNER. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR CONTROLLING DUST ON THE SITE AND SHALL PROVIDE SUITABLE CONTROLLING MEASURES AT THEIR OWN EXPENSE.
10. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.
11. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION. LOCATION OF EXISTING UTILITIES TO BE VERIFIED IN THE FIELD USING A PRIVATE UTILITY LOCATOR. CONTRACTOR SHALL UTILIZE HAND OR HYDRO VAC EXCAVATION TECHNIQUES WITHIN 1.0m OF EXISTING BURIED UTILITIES.
12. ALL UTILITIES SHALL BE LOCATED, SUPPORTED AND PROTECTED TO THE SATISFACTION OF THE UTILITY COMPANY AND THE REGION OF PEEL.
13. REFER TO THE GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION REPORTS FOR INFORMATION REGARDING SUBSURFACE SOIL AND GROUNDWATER CONDITIONS.
14. CONTRACTOR SHALL OBTAIN ROAD OCCUPANCY PERMITS FROM THE TOWN OF CALEDON AT THEIR OWN EXPENSE. TRAFFIC CONTROL MEASURES SHALL COMPLY WITH MTO BOOK 7 AS A MINIMUM.
15. LIMITS OF CONSTRUCTION ARE CONFINED TO PROPERTY BOUNDARY, CONSTRUCTION EASEMENTS OR AREAS WITH ACTIVE PERMISSION TO ENTER AGREEMENTS.
16. CONTRACTOR SHALL NOT REMOVE OR DAMAGE ANY TREES UNLESS THEY ARE INDICATED AS REMOVAL ITEMS ON THE DRAWINGS.
17. REFER TO THE CONTRACT DOCUMENTS FOR SEQUENCE OF CONSTRUCTION REQUIREMENTS.
18. WITHIN A MINIMUM OF FORTY-EIGHT HOURS PRIOR TO COMMENCING CONSTRUCTION WITHIN THE MUNICIPAL RIGHT-OF-WAY, THE CONTRACTOR MUST CONTACT THE FOLLOWING:

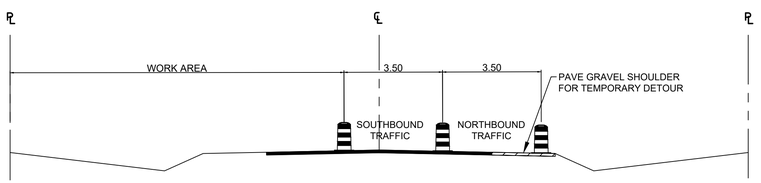
THE TOWN OF CALEDON PUBLIC WORKS DEPARTMENT	905-584-2272
ENBRIDGE CONSUMERS GAS	905-759-7924
HYDRO ONE	519-941-1211
BELL CANADA	416-296-6929
ROGERS CABLE	905-897-3914

19. THE SUITABILITY OF ALL FILL MATERIALS ARE TO BE CONFIRMED BY A PROFESSIONAL GEOTECHNICAL ENGINEER PRIOR TO INSTALLATION OF ANY ROAD BASE OR BEDDING MATERIALS.
20. ALL TEMPORARY CONSTRUCTION FENCING AND HOARDING SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS.
21. SILT FENCE(S) TO BE INSTALLED AND MAINTAINED TO PREVENT SILT FLOWING ONTO ADJACENT LANDS. SILTATION CONTROL SHALL BE ERECTED PRIOR TO ANY GRADING OR CONSTRUCTION AND SHALL BE IN GOOD REPAIR THROUGHOUT THE CONSTRUCTION AND GRADING PHASES. SEE STAGING, EROSION AND SEDIMENT CONTROL PLAN FOR ADDITIONAL REQUIREMENT.
22. ANY CHANGES IN GRADES, CATCH BASINS OR STORM AND SANITARY SEWERS REQUIRE THE APPROVAL OF GM BLUEPLAN ENGINEERING LIMITED.
23. ALL LANDSCAPING TO BE INSTALLED AS SOON AS POSSIBLE OR PRIOR TO THE END OF THE FIRST GROWING SEASON. LANDSCAPING TO BE MAINTAINED UNTIL IT IS ESTABLISHED.
24. NO STOCKPILING OF FILL IS PERMITTED ON SITE.
25. SLOPES IN LANDSCAPE AREAS AND ON BERMS SHALL NOT EXCEED 3 HORIZONTAL TO 1 VERTICAL, UNLESS NOTED OTHERWISE.



MISSISSAUAGA ROAD
TRAFFIC MANAGEMENT
CONCEPT FOR PROPOSED 750Ø WATERMAIN IN NORTHBOUND SHOULDER
(TYPICAL)

N.T.S



MISSISSAUAGA ROAD
TRAFFIC MANAGEMENT
CONCEPT FOR PROPOSED 600Ø WATERMAIN IN SOUTHBOUND SHOULDER
(TYPICAL)

N.T.S

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.

Chkd.

Approved by

10m 0 10 20 30m

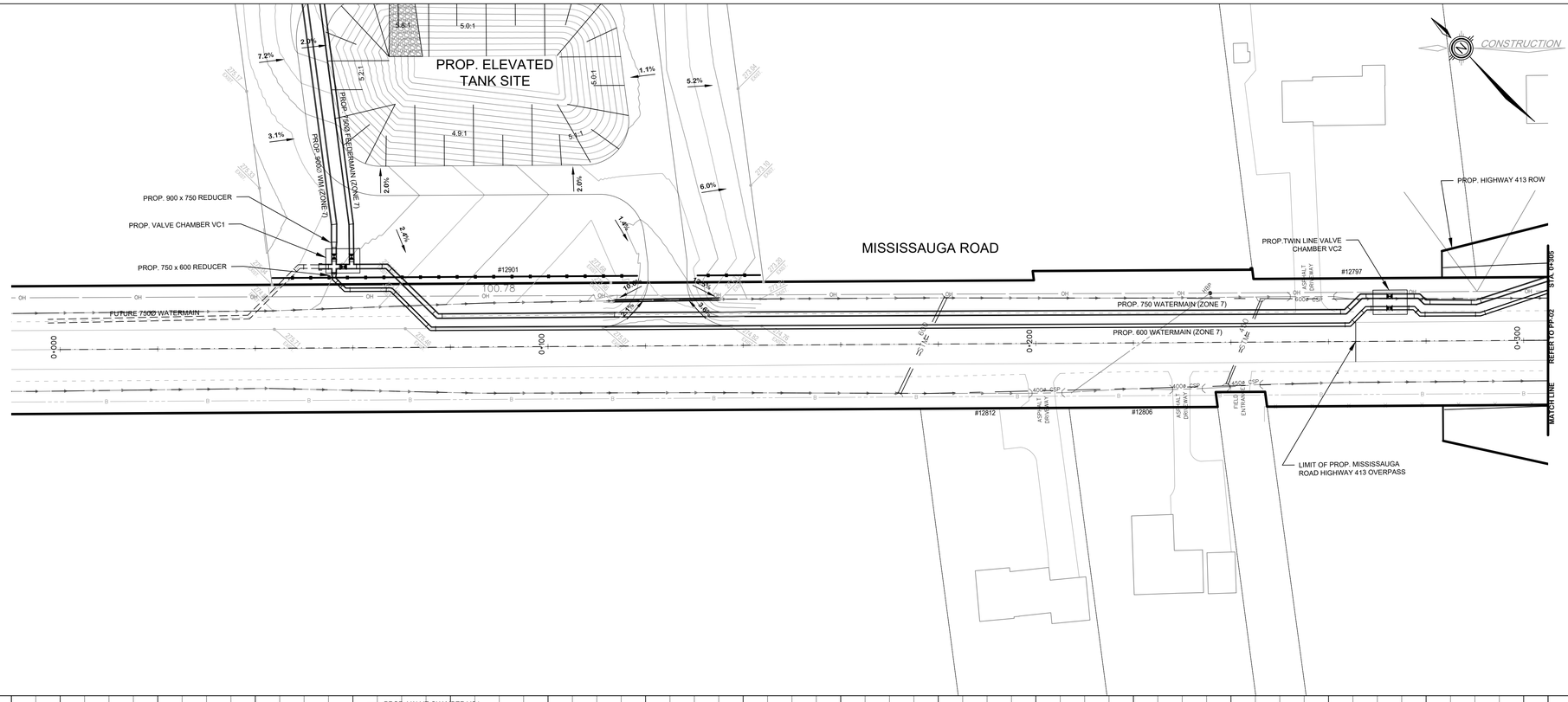
GEI Consultants Canada

Region of Peel working with you

WEST CALEDON STORAGE FACILITY

INDEX, LEGEND AND NOTES - G01

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	AUGUST 2025	Sheet	1 of 17	Plan No.	G-01



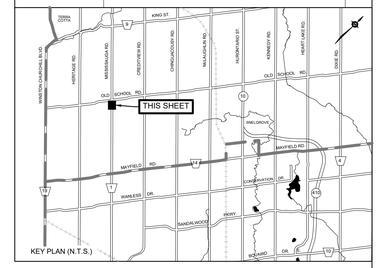
			271.57	271.50	271.43	271.36	271.29	271.22	271.15	271.08	271.01	270.93	270.02	269.61	BOT.EL. OF 600 WM.
			271.42	270.25	270.18	270.10	270.03	269.96	269.88	269.81	269.74	269.66	269.59	269.47	BOT.EL. OF 750 WM.
	276.06	275.83	275.64	275.46	275.28	275.09	274.90	274.70	274.51	274.36	274.20	274.01	273.83	273.64	EX. ROAD ELEV.
0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting **All** Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by _____ Chkd. _____ Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

MISSISSAUGA ROAD

(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

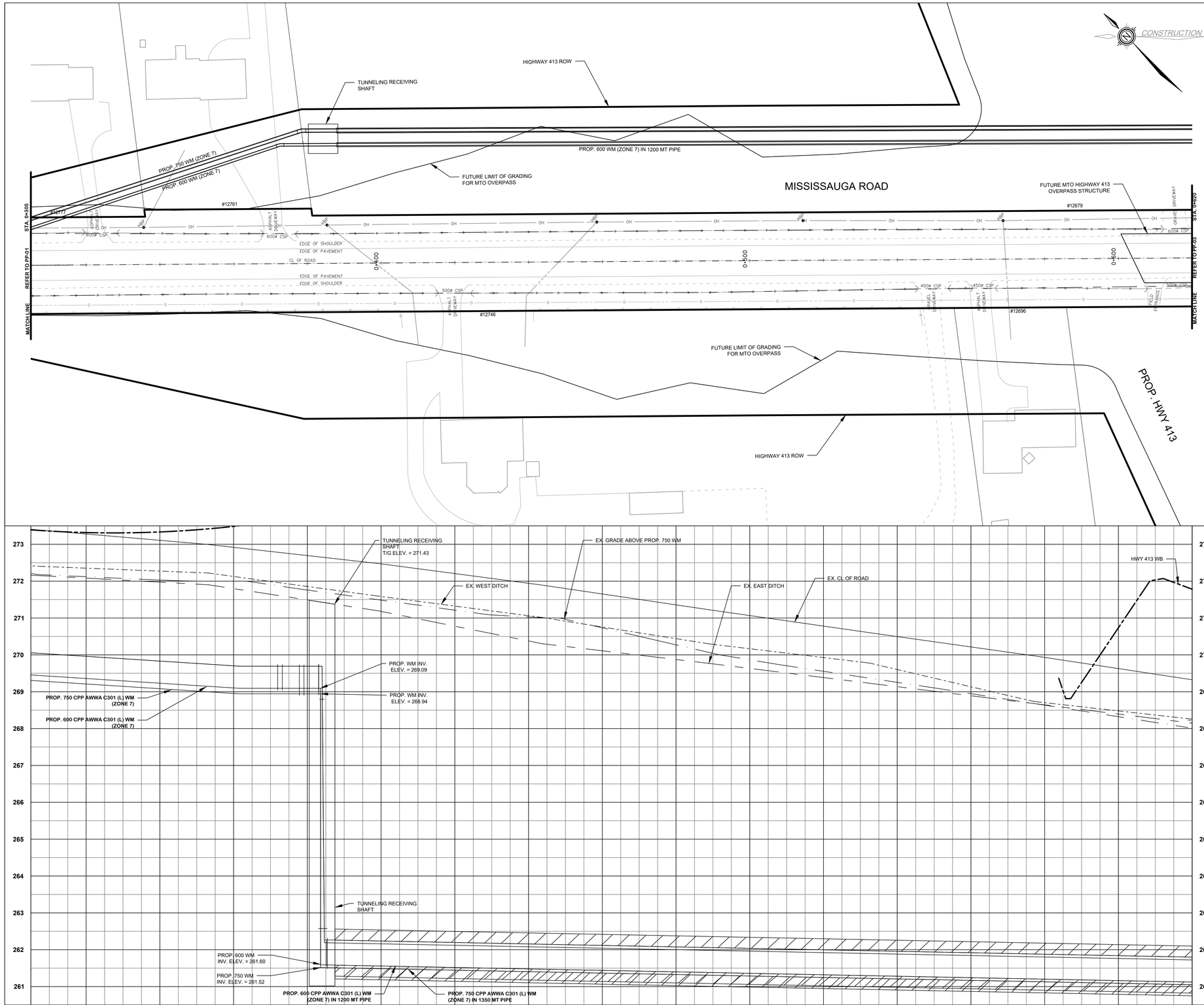
PROPOSED 600 AND 750 WATERMAIN

STA. 0+000 TO STA. 0+305

CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	2 of 17

Project No. 24-1193

Plan No. **PP-01**



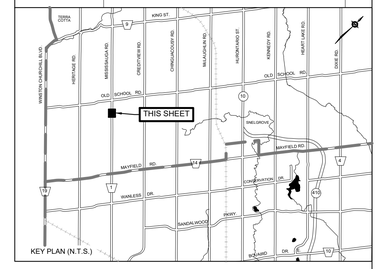
269.36	269.23	269.10	269.09	261.56	261.52	261.48	261.44	261.40	261.36	261.32	261.28	261.24	261.20	261.16	BOT.EL. OF 600 WM.
269.21	269.08	268.95	268.94	261.48	261.44	261.41	261.37	261.33	261.29	261.25	261.21	261.17	261.13	261.09	BOT.EL. OF 750 WM.
273.28	273.11	272.92	272.69	272.47	272.21	271.94	271.65	271.36	271.07	270.78	270.50	270.21	269.93	269.63	EX. ROAD ELEV.
0+320	0+340	0+360	0+380	0+400	0+420	0+440	0+460	0+480	0+500	0+520	0+540	0+560	0+580	0+600	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

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All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

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Designed by

Chkd

Approved by

NOTICE TO CONTRACTOR

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ENERSOURCE, HYDRO MISSISSAUGA
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FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

MISSISSAUGA ROAD

(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

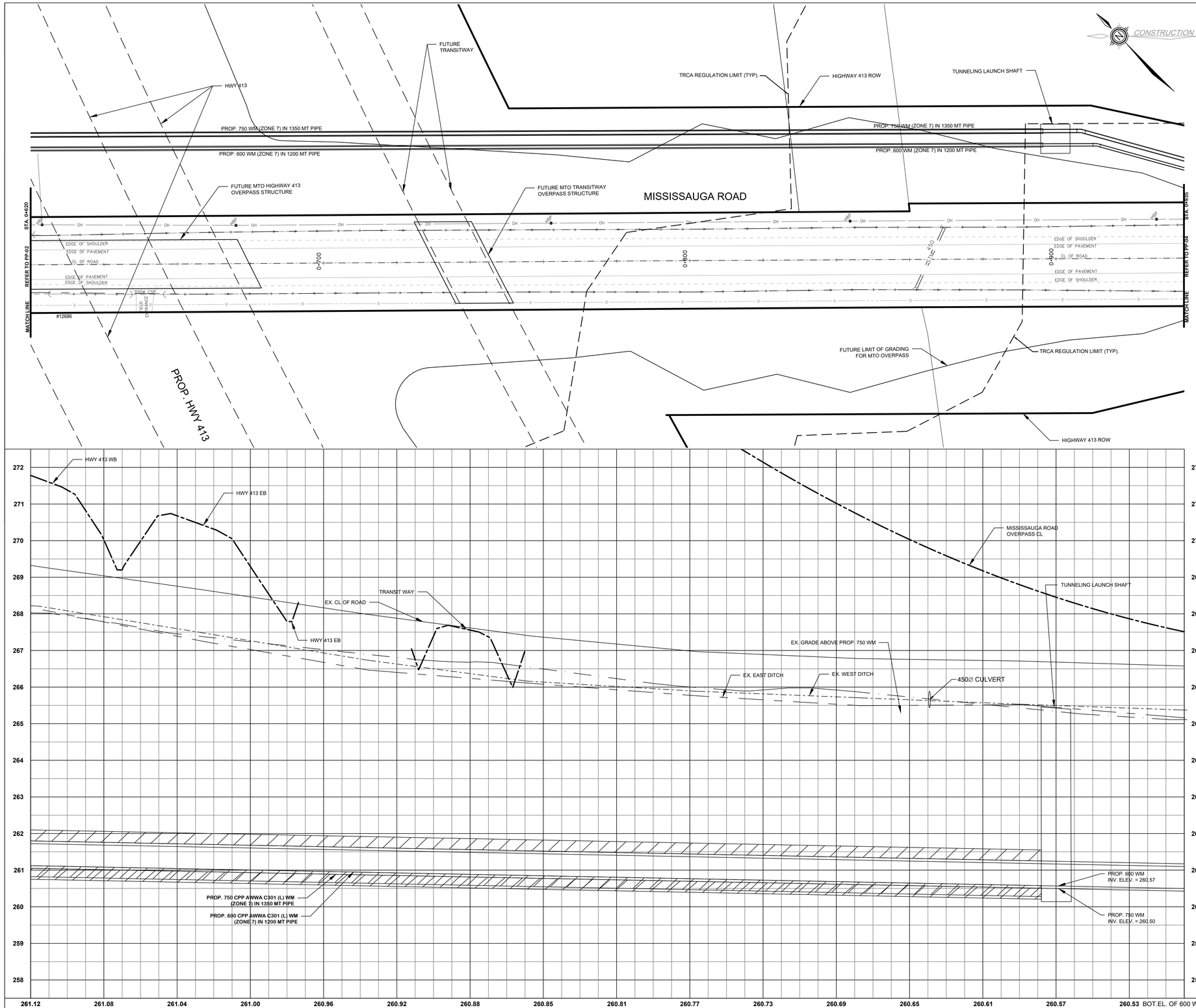
PROPOSED 600 AND 750 WATERMAIN

STA. 0+305 TO STA. 0+620

CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	3 of 17

Project No. 24-1193

Plan No. **PP-02**



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261.05	261.01	260.97	260.93	260.89	260.85	260.81	260.77	260.73	260.69	260.66	260.62	260.58	260.54	260.50	260.46 BOT.EL. OF 750 WM.
269.32	269.04	268.76	268.46	268.16	267.88	267.61	267.36	267.18	266.99	266.89	266.80	266.76	266.73	266.68	266.62 EX. ROAD ELEV.
0+620	0+640	0+660	0+680	0+700	0+720	0+740	0+760	0+780	0+800	0+820	0+840	0+860	0+880	0+900	0+920 ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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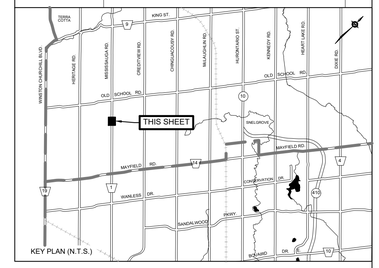
REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



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10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

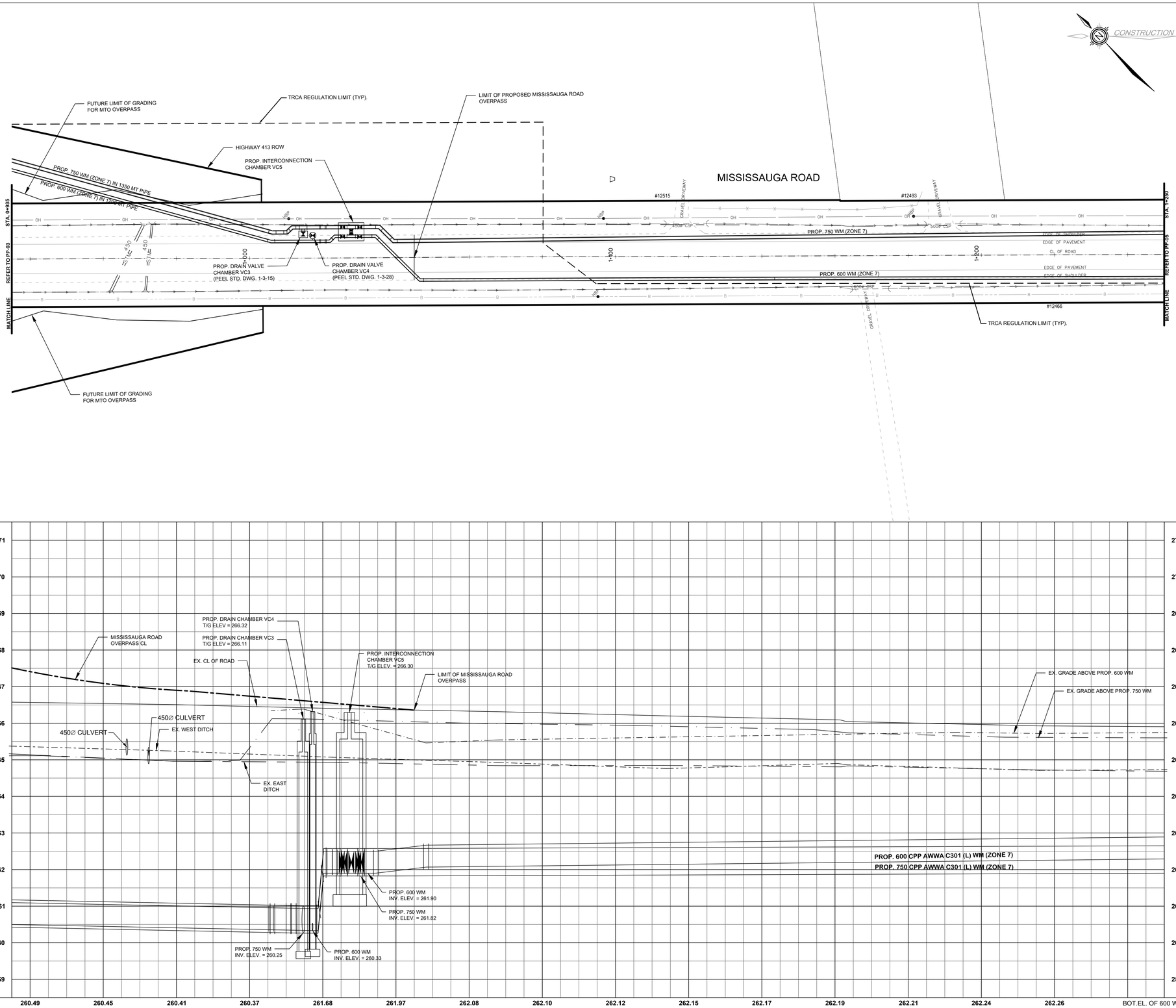
MISSISSAUGA ROAD

(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

PROPOSED 600 AND 750 WATERMAIN

STA. 0+620 TO STA. 0+935

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	JUNE 2025	Sheet	4 of 17	Plan No.	**PP-03**



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260.42	260.37	260.33	260.29	261.60	261.82	261.83	261.84	261.85	261.85	261.86	261.87	261.87	261.88	261.89	BOT.EL. OF 750 WM.
266.57	266.54	266.51	266.46	266.41	266.37	266.33	266.29	266.24	266.19	266.14	266.09	266.01	265.96	265.93	EX. ROAD ELEV.
0+940	0+960	0+980	1+000	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	ROAD CHAINAGE

SERVICE DATA

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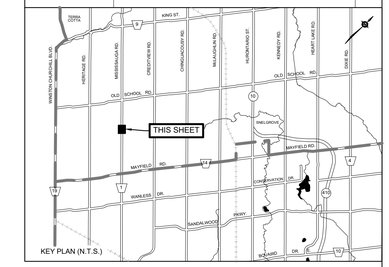
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



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FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

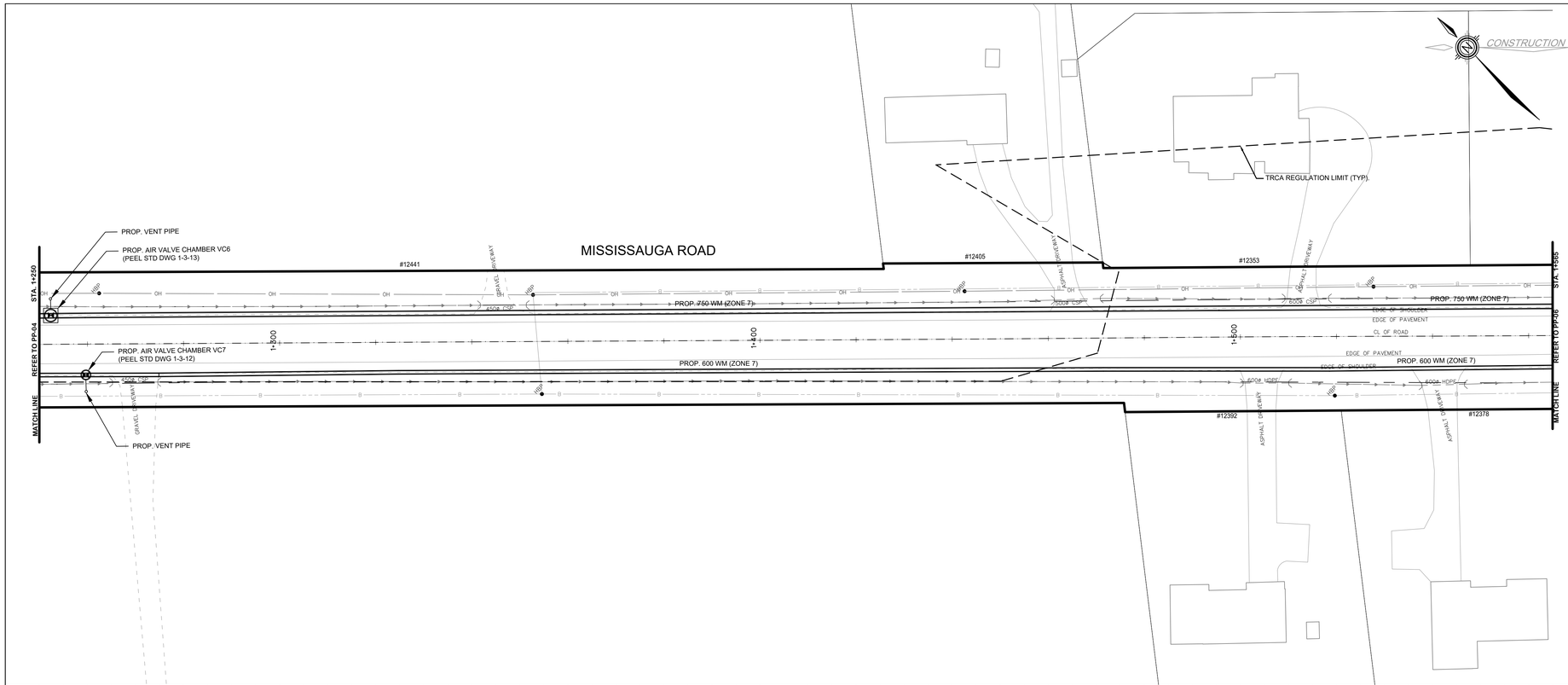
MISSISSAUGA ROAD

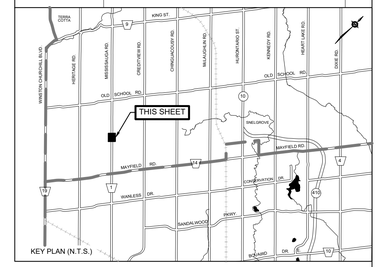
(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

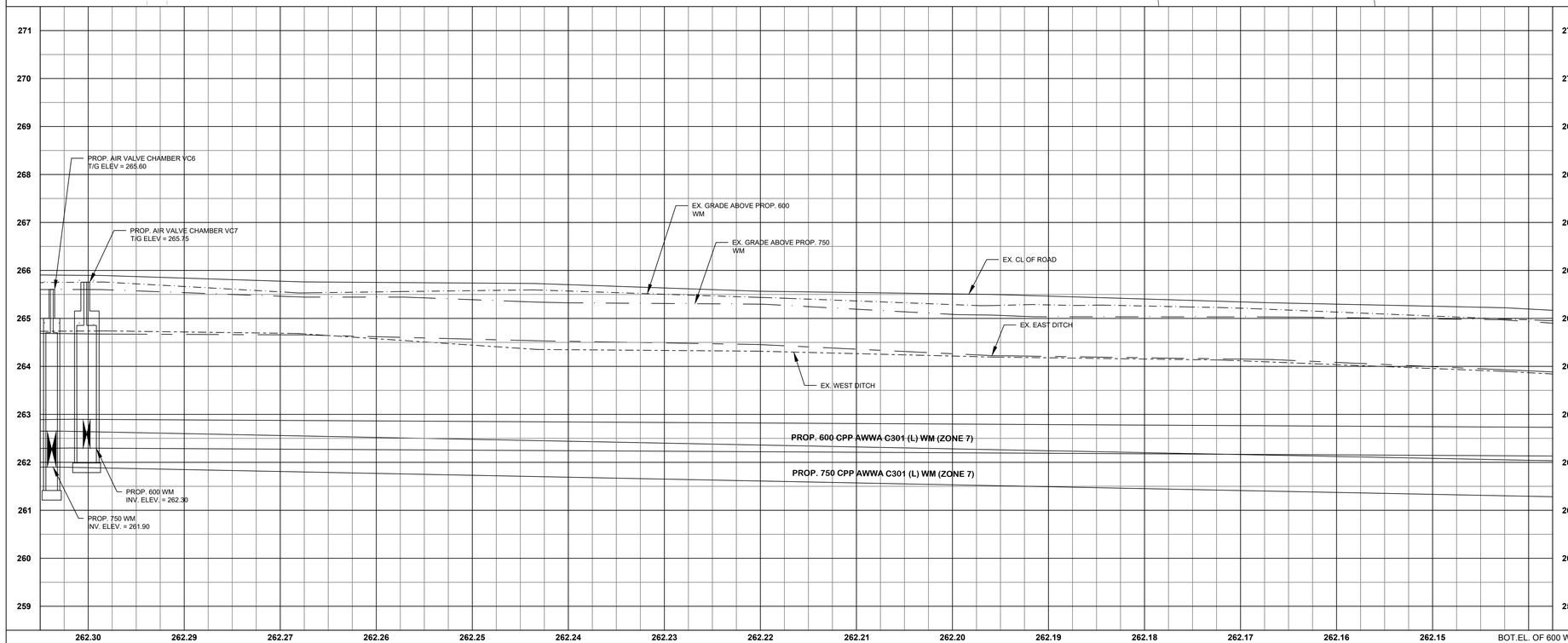
PROPOSED 600 AND 750 WATERMAIN

STA. 0+935 TO STA. 1+250

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	JUNE 2025	Sheet	5 of 17	Plan No.	**PP-04**







262.30	262.29	262.27	262.26	262.25	262.24	262.23	262.22	262.21	262.20	262.19	262.18	262.17	262.16	262.15	BOT.EL. OF 600 WM.
261.89	261.85	261.81	261.77	261.73	261.69	261.65	261.61	261.57	261.53	261.49	261.45	261.41	261.37	261.33	BOT.EL. OF 750 WM.
265.90	265.84	265.78	265.75	265.74	265.70	265.63	265.57	265.54	265.51	265.46	265.40	265.34	265.30	265.25	EX. ROAD ELEV.
1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440	1+460	1+480	1+500	1+520	1+540	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

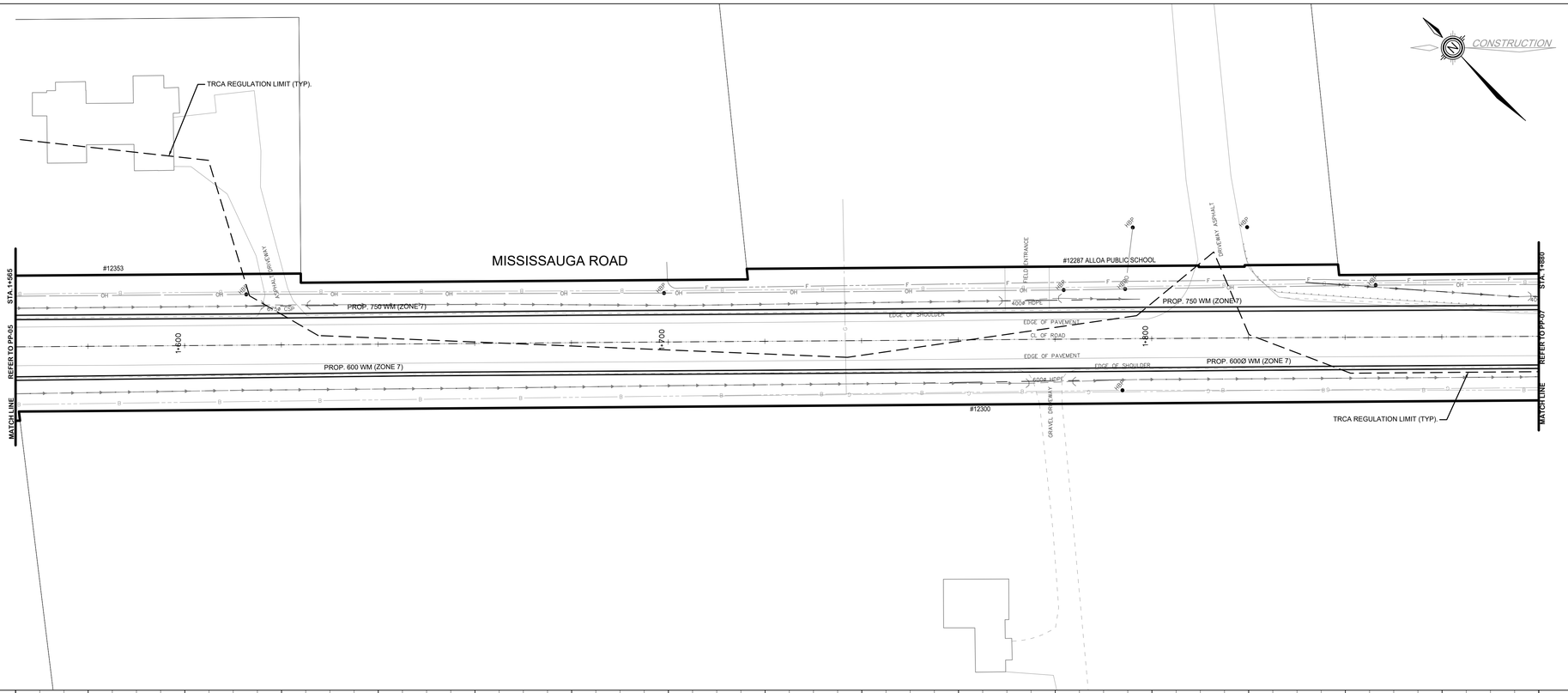
MISSISSAUGA ROAD

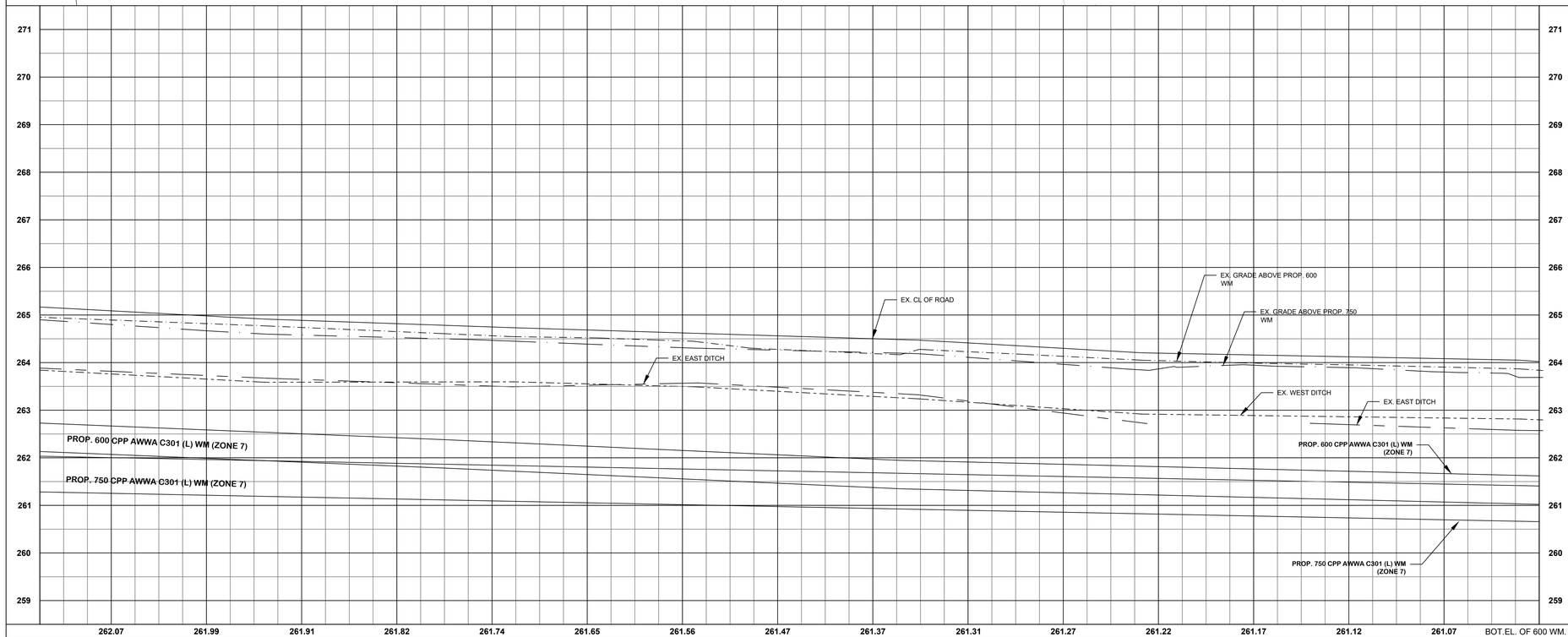
(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

PROPOSED 600 AND 750 WATERMAIN

STA. 1+250 TO STA. 1+565

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	JUNE 2025	Sheet	6 of 17	Plan No.	PP-05





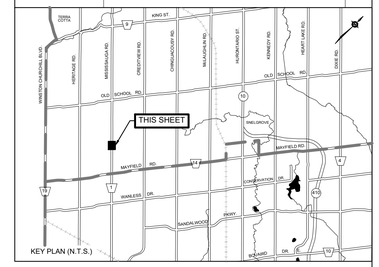
262.07	261.99	261.91	261.82	261.74	261.65	261.56	261.47	261.37	261.31	261.27	261.22	261.17	261.12	261.07	BOT.EL. OF 600 WM.
261.25	261.21	261.17	261.13	261.09	261.05	261.01	260.98	260.94	260.90	260.86	260.82	260.78	260.74	260.70	BOT.EL. OF 750 WM.
265.09	264.98	264.89	264.82	264.75	264.69	264.62	264.56	264.50	264.41	264.30	264.20	264.16	264.12	264.08	EX. ROAD ELEV.
1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760	1+780	1+800	1+820	1+840	1+860	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

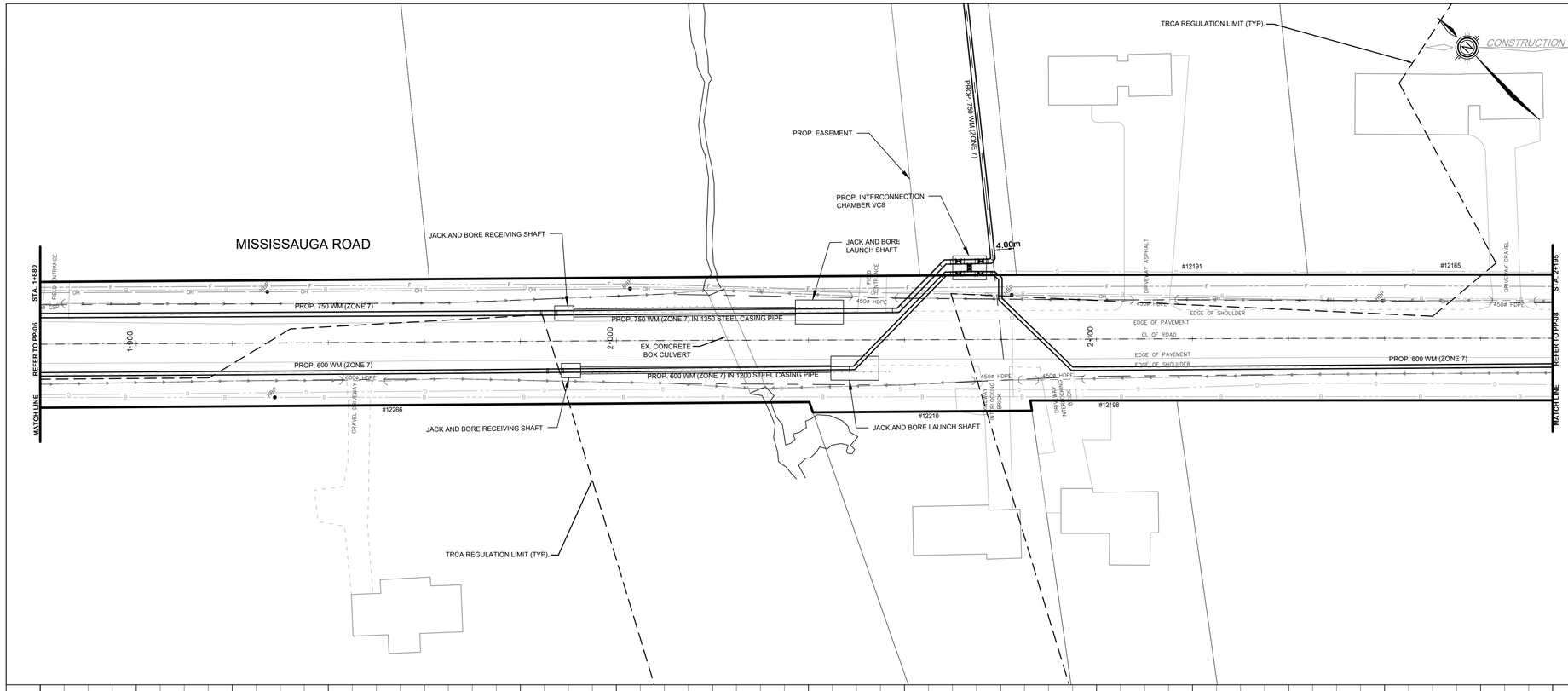
MISSISSAUGA ROAD

(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

PROPOSED 600 AND 750 WATERMAIN

STA. 1+565 TO STA. 1+880

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	JUNE 2025	Sheet	7 of 17	Plan No.	**PP-06**



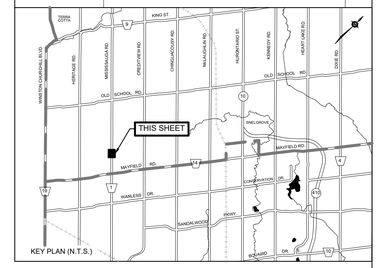
	260.90	260.77	260.47	260.00	259.52	256.20	256.02	255.84	255.80	255.84	259.37	259.74	260.11	260.48	260.85 BOT.EL. OF 600 WM.
	260.62	260.58	260.32	259.84	259.37	256.04	255.87	255.72	255.73						BOT.EL. OF 750 WM.
	263.88	263.75	263.64	263.54	263.44	263.34	263.25	263.15	263.05	263.15	263.26	263.38	263.50	263.61	263.73 EX. ROAD ELEV.
	1+900	1+920	1+940	1+960	1+980	2+000	2+020	2+040	2+060	2+080	2+100	2+120	2+140	2+160	2+180 ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting **All** Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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CITY OF MISSISSAUGA WORKS DEPT.
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HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

MISSISSAUGA ROAD

(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

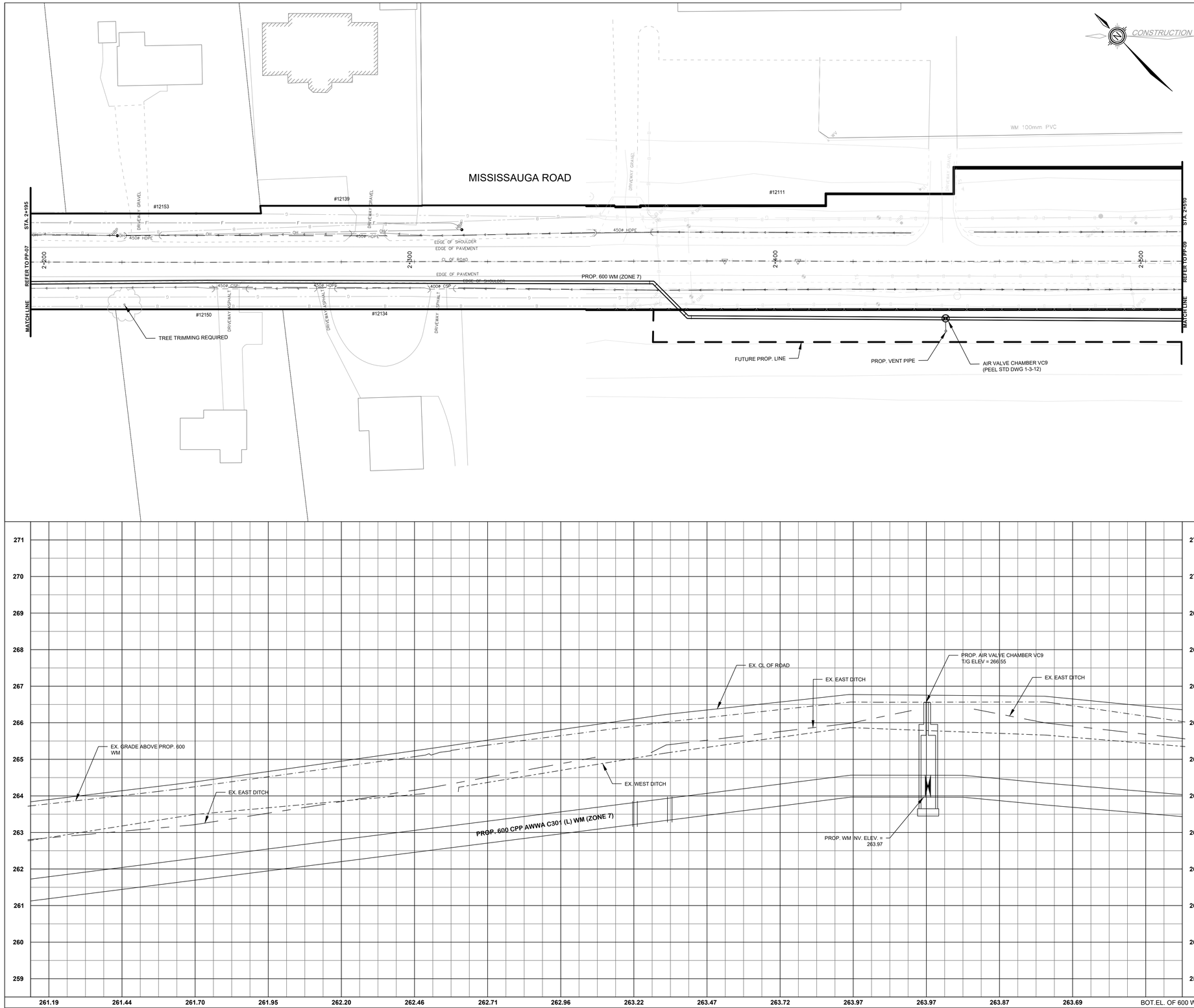
PROPOSED 600 AND 750 WATERMAIN

STA. 1+880 TO STA. 2+195

CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	8 of 17

Project No. 24-1193

Plan No. **PP-07**



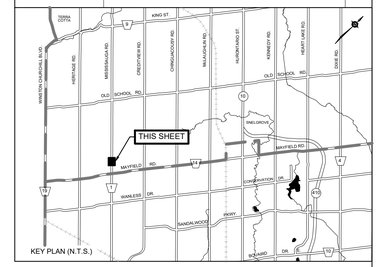
261.19	261.44	261.70	261.95	262.20	262.46	262.71	262.96	263.22	263.47	263.72	263.97	263.97	263.87	263.69	BOT.EL. OF 600 WM.
															BOT.EL. OF 750 WM.
263.90	264.14	264.38	264.67	264.95	265.24	265.52	265.81	266.10	266.35	266.57	266.77	266.75	266.74	266.65	EX. ROAD ELEV.
2+200	2+220	2+240	2+260	2+280	2+300	2+320	2+340	2+360	2+380	2+400	2+420	2+440	2+460	2+480	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

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All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

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Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

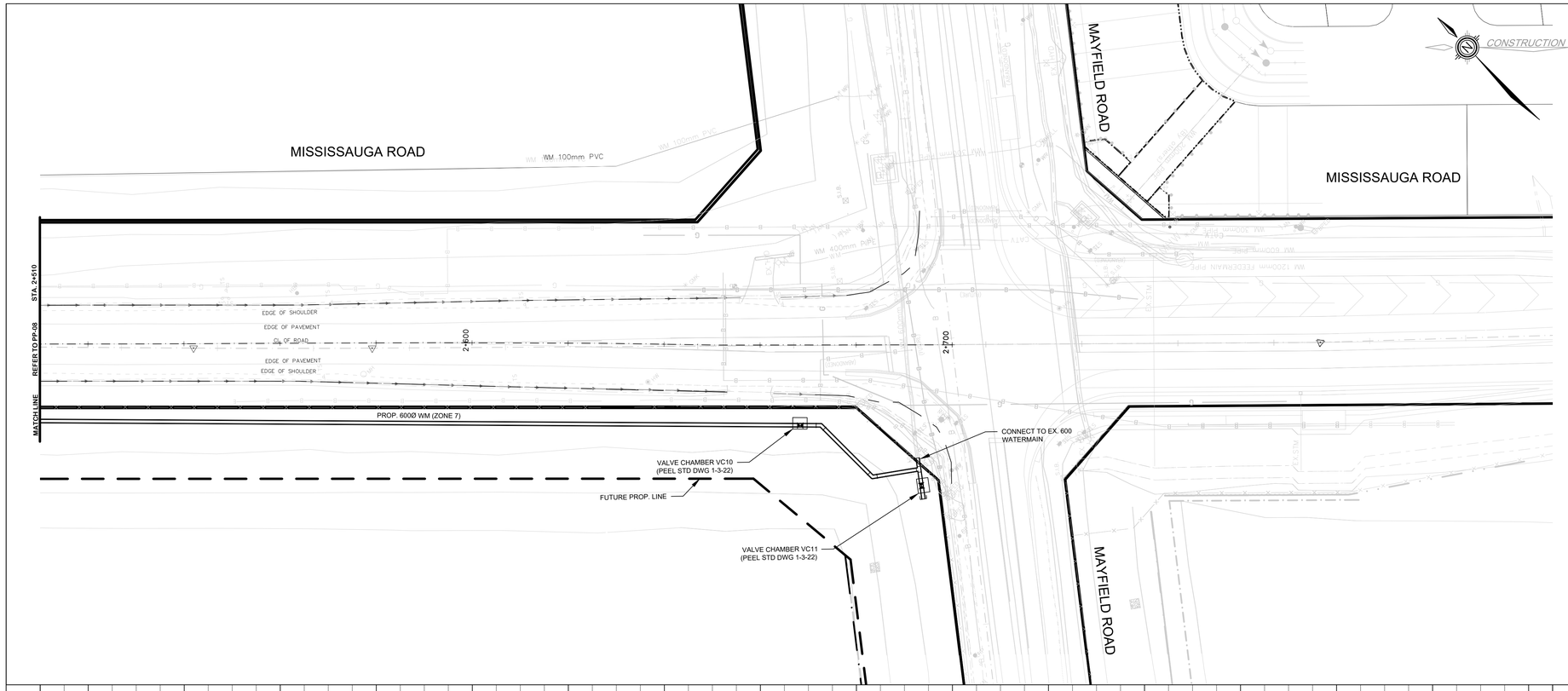
MISSISSAUGA ROAD

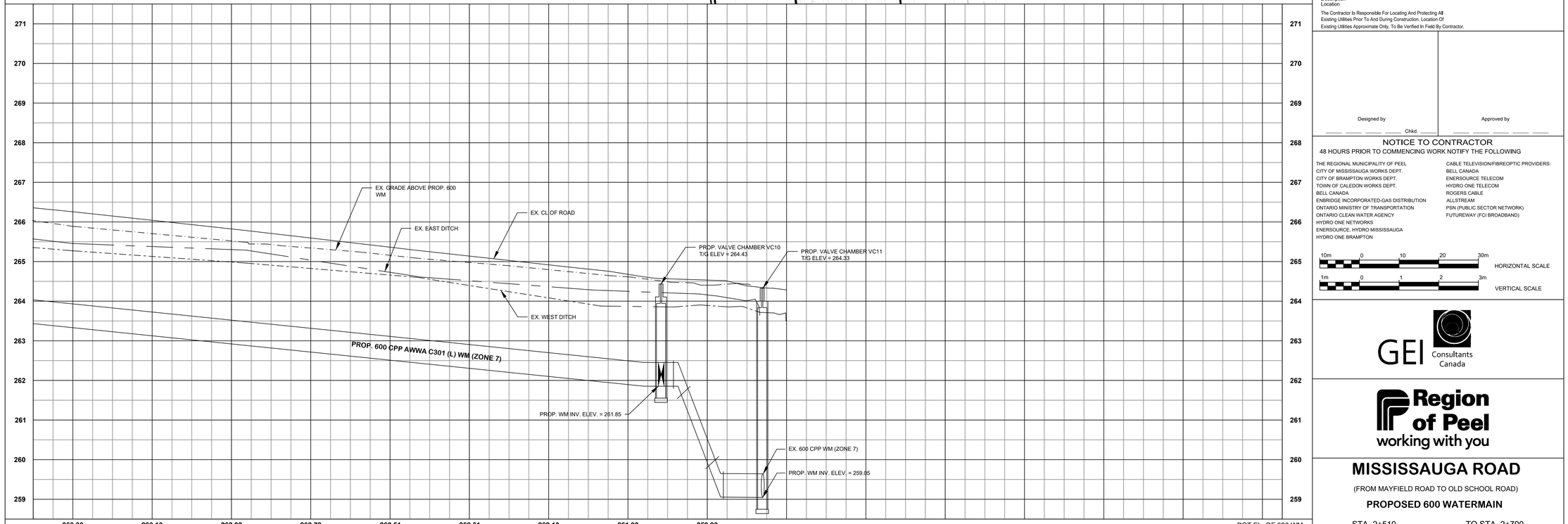
(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

PROPOSED 600 WATERMAIN

STA. 2+195 TO STA. 2+510

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	JUNE 2025	Sheet	9 of 17	Plan No.	**PP-08**





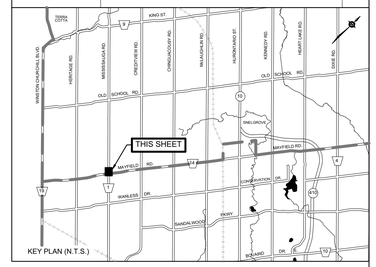
263.33	263.13	262.92	262.72	262.51	262.31	262.10	261.90	259.93		BOT.EL. OF 600 WM.
										BOT.EL. OF 750 WM.
266.26	266.04	265.82	265.59	265.36	265.14	264.92	264.68	264.53	264.29	EX. ROAD ELEV.
2+520	2+540	2+560	2+580	2+600	2+620	2+640	2+660	2+680	2+700	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE: HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

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ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

MISSISSAUGA ROAD

(FROM MAYFIELD ROAD TO OLD SCHOOL ROAD)

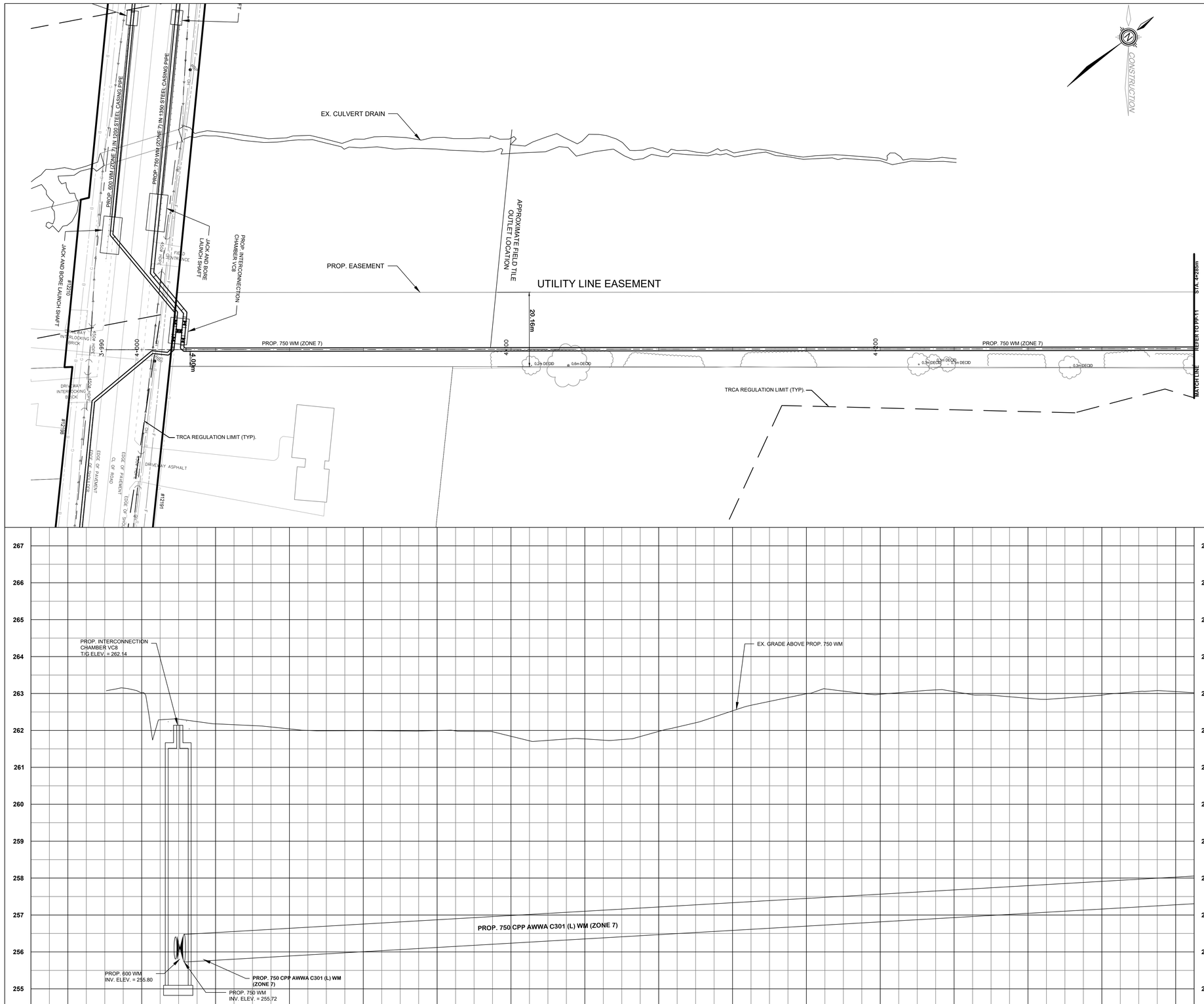
PROPOSED 600 WATERMAIN

STA. 2+510 TO STA. 2+700

CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	10 of 17

Project No. 24-1193

Plan No. **PP-09**



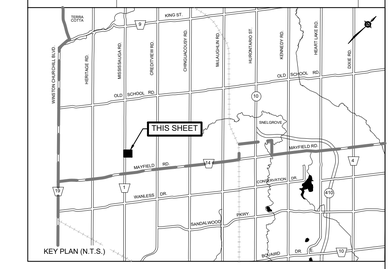
															BOT.EL. OF 600 WM.
		255.77	255.89	256.01	256.12	256.24	256.35	256.47	256.58	256.70	256.81	256.93	257.05	257.16	BOT.EL. OF 750 WM.
	263.03	262.18	262.04	261.99	262.00	261.84	261.77	261.97	262.53	262.99	262.98	263.05	262.87	262.96	EX. ROAD ELEV.
3+980	4+000	4+020	4+040	4+060	4+080	4+100	4+120	4+140	4+160	4+180	4+200	4+220	4+240	4+260	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

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All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

UTILITY EASEMENT

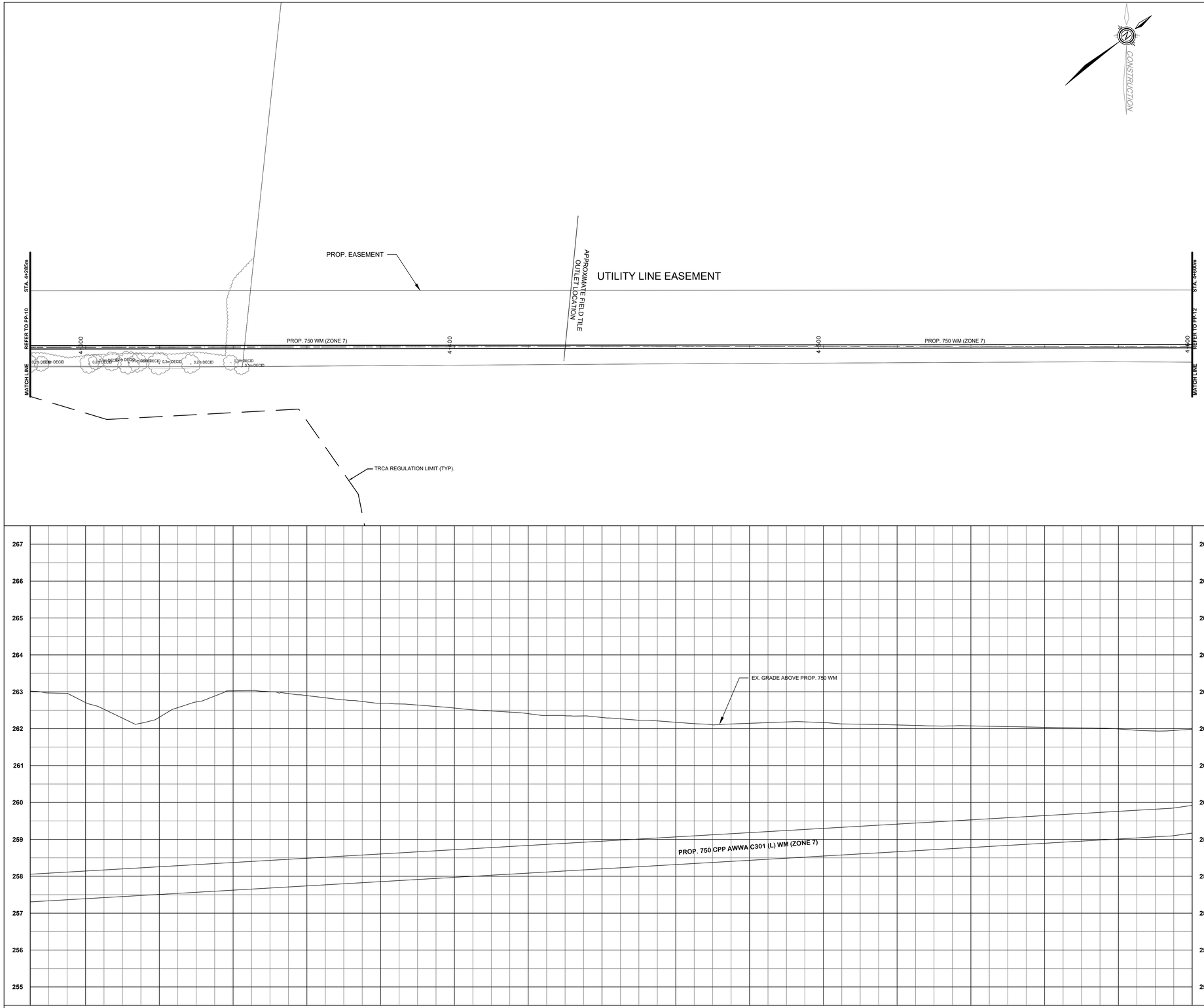
PROPOSED 750 WATERMAIN

STA. 3+990 TO STA. 4+285

CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	11 of 17

Project No. 24-1193

Plan No. **PP-10**



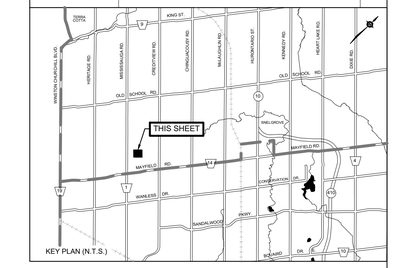
																BOT.EL. OF 600 WM.
257.39	257.51	257.62	257.74	257.85	257.97	258.09	258.20	258.32	258.43	258.55	258.66	258.78	258.90	259.01	BOT.EL. OF 750 WM.
262.71	262.31	263.03	262.90	262.69	262.56	262.41	262.30	262.17	262.15	262.17	262.10	262.08	262.04	261.99	EX. ROAD ELEV.
4+300	4+320	4+340	4+360	4+380	4+400	4+420	4+440	4+460	4+480	4+500	4+520	4+540	4+560	4+580	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



General Notes

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All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

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Designed by

Chkd

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

Region of Peel working with you

UTILITY EASEMENT

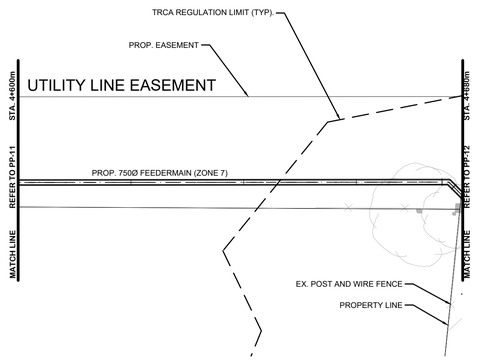
PROPOSED 750 WATERMAIN

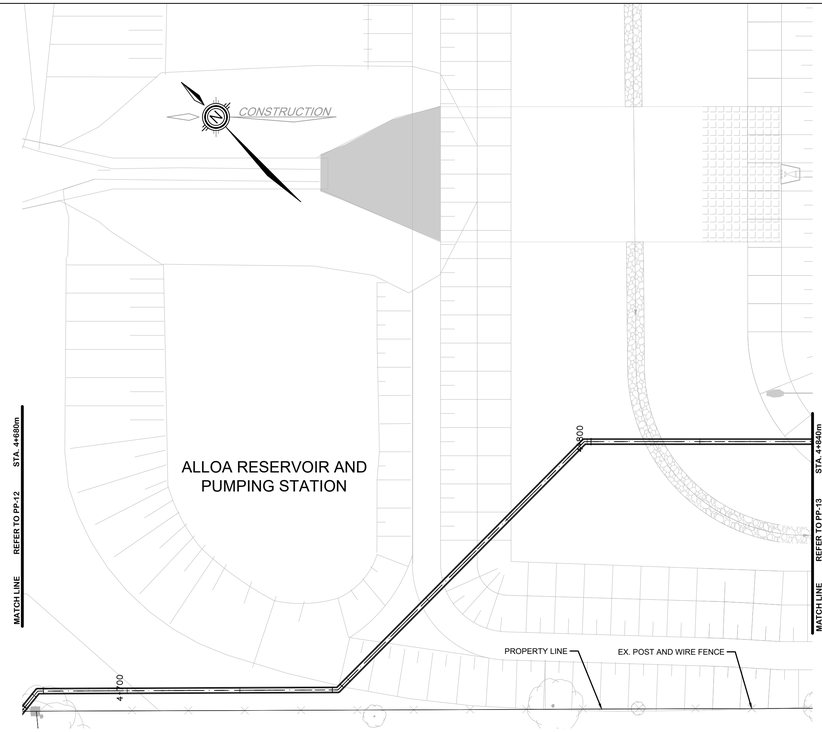
STA. 4+285 TO STA. 4+600

CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	12 of 17

Project No. 24-1193

Plan No. **PP-11**



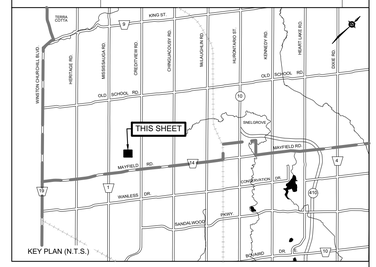


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



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10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

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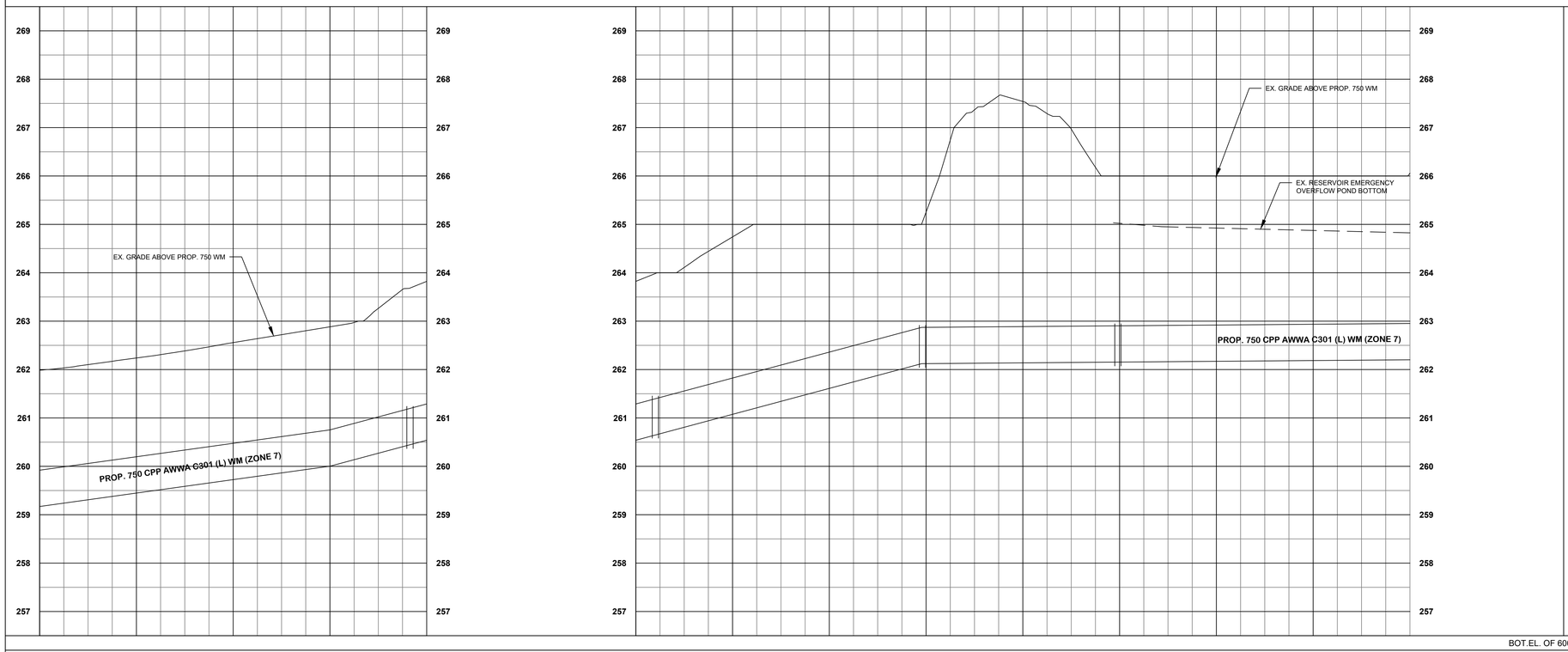
UTILITY EASEMENT & ALLOA PUMPING STATION

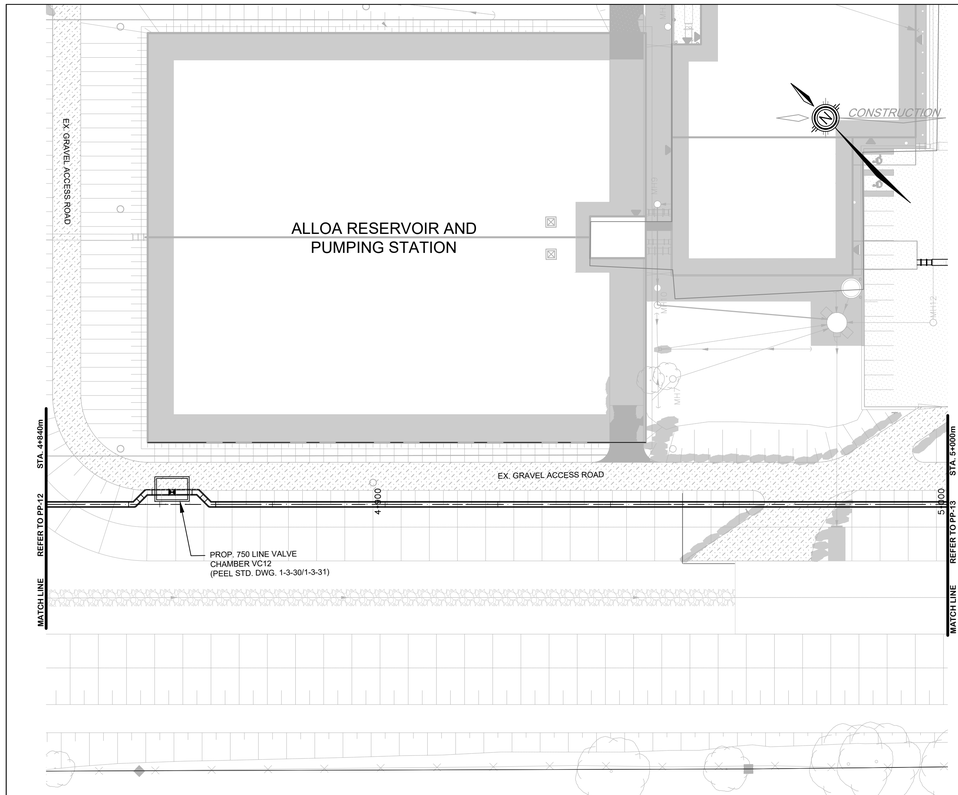
PROPOSED 750 WATERMAIN

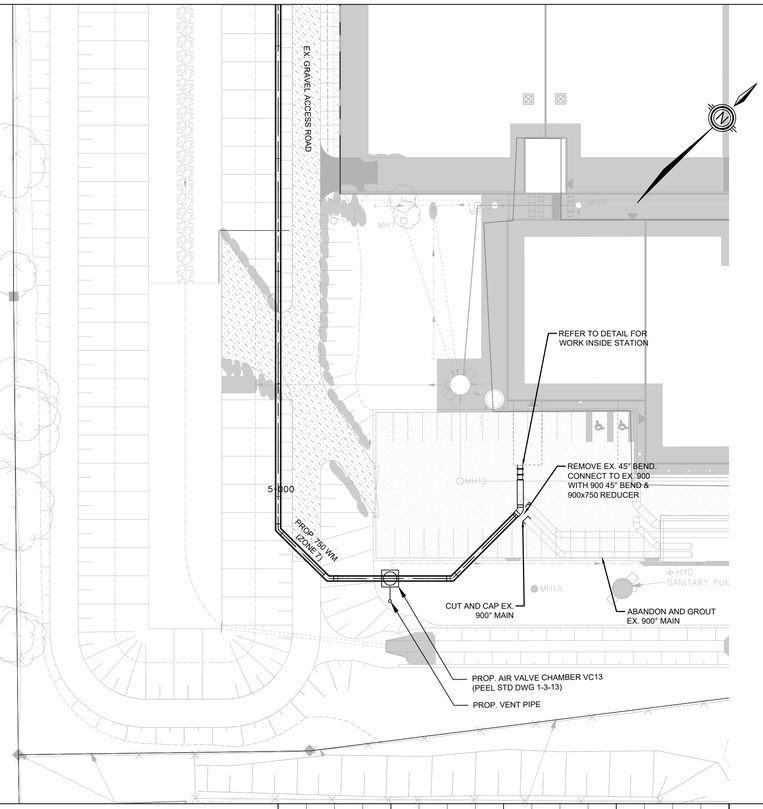
STA. 4+600 TO STA. 4+870



	259.45	259.73	260.00	260.54	260.54	261.07	261.61	262.12	262.14	262.15	262.17	262.19	262.20	BOT.EL. OF 600 WM.
	262.24	262.56	262.88	263.82	263.82	264.74	265.00	265.25	267.54	266.00	266.00	266.00	266.06	BOT.EL. OF 750 WM.
	262.24	262.56	262.88	263.82	263.82	264.74	265.00	265.25	267.54	266.00	266.00	266.00	266.06	EX. ROAD ELEV.
	4+620	4+640	4+660	4+680	4+680	4+700	4+720	4+740	4+760	4+780	4+800	4+820	4+840	ROAD CHAINAGE

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	JUNE 2025	Sheet	13 of 17	Plan No.	PP-12





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STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
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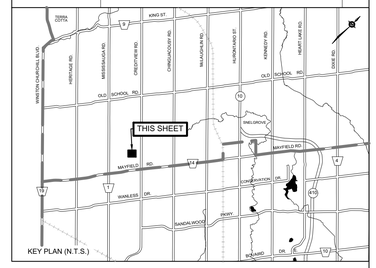

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10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

GEI Consultants Canada

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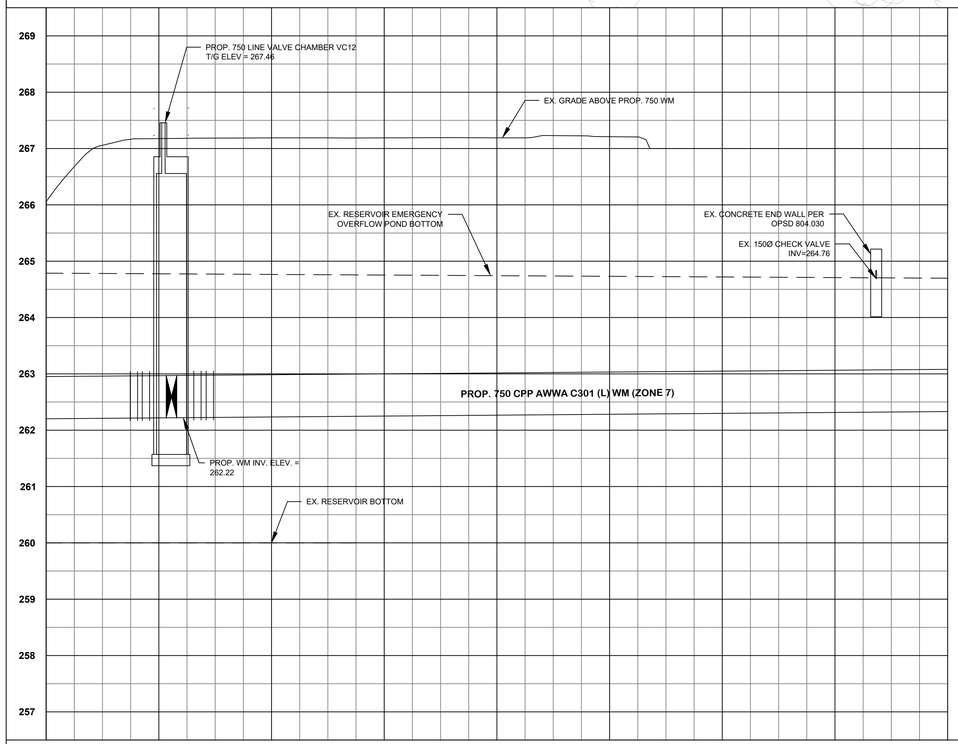
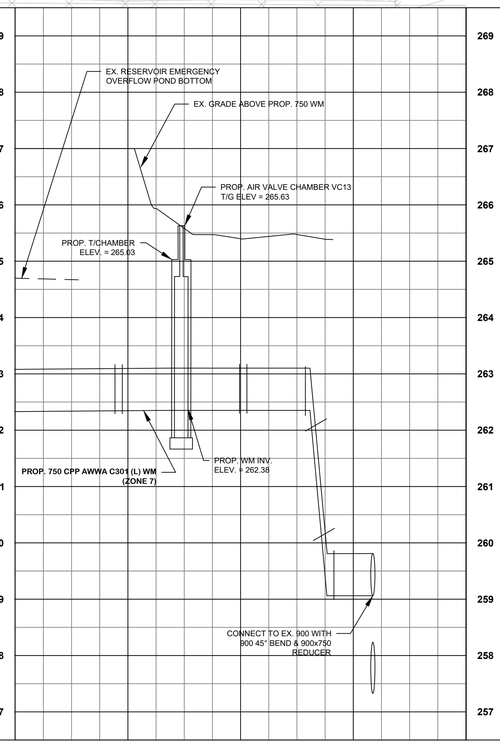
UTILITY EASEMENT & ALLOA PUMPING STATION

PROPOSED 750 WATERMAIN

STA. 4+870 TO STA. 5+056.56





								BOT.EL. OF 600 WM.				
262.22	262.23	262.25	262.27	262.28	262.30	262.31	262.33	262.33	262.35	262.35	259.06	BOT.EL. OF 750 WM.
267.18	267.19	267.19	267.19	267.21	267.00	267.00	267.00	267.00	267.00	265.40		EX. ROAD ELEV.
4+860	4+880	4+900	4+920	4+940	4+960	4+980	5+000	5+000	5+020	5+040	5+060	ROAD CHAINAGE

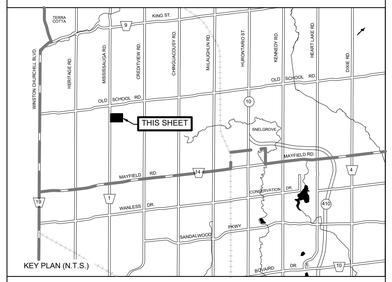
CAD Area	X-XX	Area	X-XX
Checked by	B.P.	Drawn by	S.G.
Date	JUNE 2025	Sheet	14 of 17

Project No. 24-1193

Plan No. **PP-13**

CONSTRUCTION

REVISIONS		
DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.



Chkd. _____ Approved by

5 0 5 10 20
1:500 (m)

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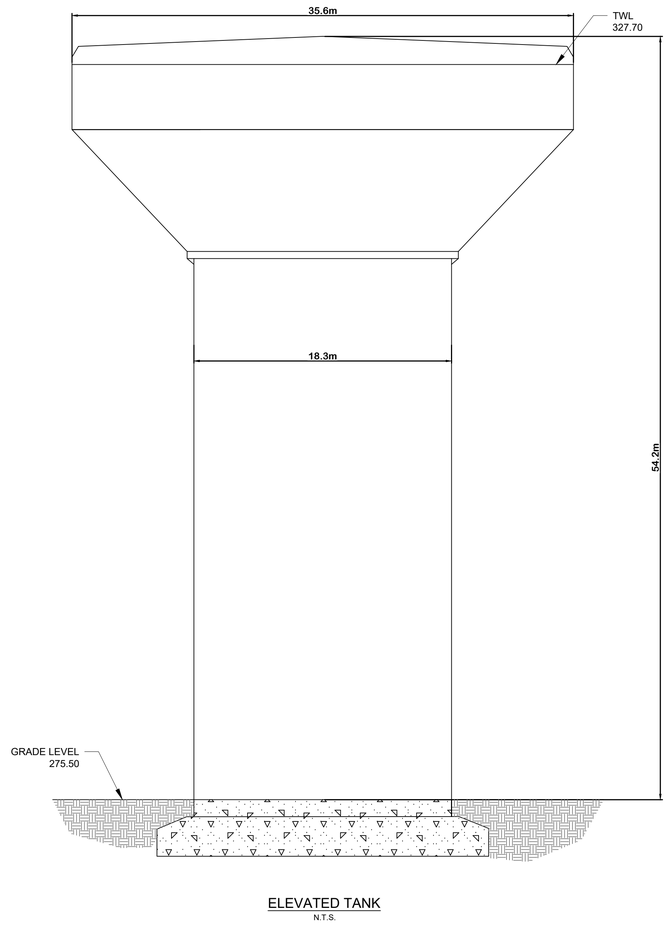
ELEVATED TANK SITE PLAN

12901 MISSISSAUGA ROAD

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.	Plan No.	C-01
Date	AUGUST 2025	Sheet	15 of 17		



ELEVATED TANK
N.T.S.

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.

Chkd.

Approved by

10m 0 10 20 30m

GEI Consultants Canada

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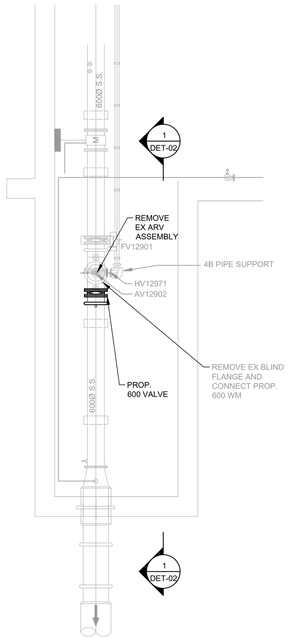
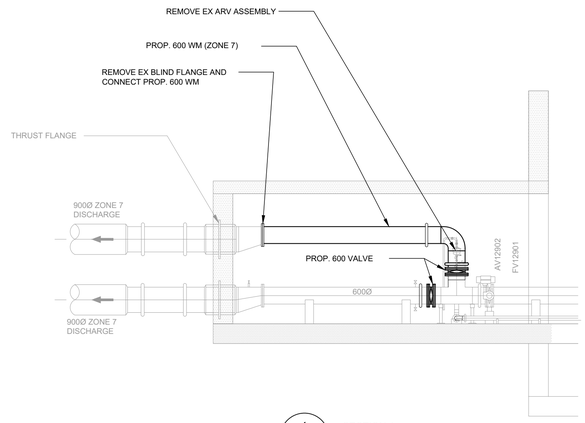
working with you

ELEVATED TANK PROFILE VIEW

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	AUGUST 2025	Sheet	16 of 17	Plan No.	**DET-01**



PLAN VIEW



1 DET-02 SECTION 1
N.T.S.

900Ø C.P.P. ZONE 7 DISCHARGE, REFER TO YARD PIPING DRAWING
N.T.S

REVISIONS

DATE	DETAILS	INIT.
FEB. 27, 2026	PRELIMINARY DESIGN	B.P.

Chkd.

Approved by

10m 0 10 20 30m

GEI Consultants Canada

Region of Peel working with you

ALLOA PS PROCESS PIPING MODIFICATIONS

PROCESS SECTION

CAD Area	X-XX	Area	X-XX	Project No.	24-1193
Checked by	B.P.	Drawn by	S.G.		
Date	AUGUST 2025	Sheet	17 of 17	Plan No.	DET-02

PEEL REGION

WEST CALEDON STORAGE FACILITY AND TRANSMISSION MAIN SCHEDULE 'C' CLASS EA

Volume 1: Supporting Technical Studies and Documents

Appendix 1E: Conceptual Design Cost Estimates

Prepared by:
GEI Consultants Canada

Peel Region is committed to ensuring that all Regional services, programs, and facilities are inclusive and accessible. Please contact the Project Team if you need any accommodations to provide comments and/or feedback for this Study.

750mmØ and 600mmØ Watermain

Description	2025$			
	Base $	Add-on %	Add-on $	
Installation Cost 600mm WM	$ 12,205,482			
Installation Cost 750mm WM	$ 22,473,592			
General		$ 0	$ 3,121,117	
Provisional		$ 0	$ 2,080,744	
Construction Contingency		$ 0	$ 3,467,907	
Construction Costs (Hard)	$ 43,348,843			
Design Costs (Soft)		$ 0	$ 9,103,257	
Project Contingency		$ 0	$ 10,490,420	Hst
Total Project Costs WM	$ 62,942,521	$ 0	$ 1,107,788	
Total	**$ 64,050,309**	$ 1	$ 28,263,446	
Total Minus Additional Costs	$ 35,786,863			

Elevated Tank and Site Works

Description	2025$			
	Base $	Add-on %	Add-on $	
Installation Cost	$ 18,486,500.00			
General		-	-	
Provisional		-	-	
Construction Contingency		25%	$ 4,621,625.00	
Construction Costs (Hard)	$ 23,108,125.00			
Design Costs (Soft)		-	-	
Project Contingency		-	-	Hst
Total Project Cost	$ 23,108,125.00	1.76%	$ 406,703.00	
Total	**$ 23,514,828.00**	25%	$ 4,621,625.00	
Total Minus Additional Costs	$ 18,486,500.00			

Landmark Estimate **$ 18,700,000.00**

Bulk Water Station

Description	2025$			
	Base $	Add-on %	Add-on $	
Installation Cost	$ 97,002			
General		-	-	
Provisional		-	-	
Construction Contingency		$ 0	$ 24,250	
Construction Costs (Hard)	$ 121,252			
Design Costs (Soft)		-	-	
Project Contingency		-	-	Hst
Total Project Cost	$ 121,252	$ 0	$ 2,134	
Total	**$ 123,386**	$ 0	$ 24,250	
Total Minus Additional Costs	$ 97,002			

900mm and 750mm Watermain from ET to VC#1

Description	2025$			
	Base $	Add-on %	Add-on $	
Installation Cost	$ 829,554			
General		20%	$ 165,911	
Provisional		12%	$ 99,546	
Construction Contingency		20%	$ 165,911	
Construction Costs (Hard)	$ 1,260,922			
Design Costs (Soft)		25%	$ 315,230	
Project Contingency		10%	$ 157,615	Hst
Total Project Cost	$ 1,733,767	1.76%	$ 30,514	
Total	**$ 1,764,282**	87%	$ 904,214	
Total Minus Additional Costs	$ 860,068			

Total Project Cost

Description	2025$
Installation Cost	$ 54,092,130
General	$ 3,287,027
Provisional	$ 2,180,291
Construction Contingency	$ 8,279,694
Construction Cost (Hard)	$ 67,839,142
Design Costs (Soft)	$ 9,418,488
Project Contingency	$ 10,648,035
Total Project Cost	$ 87,905,665
Total Inc. HST	**$ 89,452,805**
Total Minus Additional Costs	$ 55,230,433

750mmØ Watermain Projects

Item No.	Description	Quantity/Length	UOM	Estimated Unit Price $2025/UOM	Total	Notes
1	750 MM PVC WATERMAIN FROM STA. 0+060 TO STA. 0+275 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	215	m	$ 3,662.37	$ 787,409.17	
1.1	PRECAST INTERCONNECTION CHAMBER #VC1 AT STATION 0+060, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 1,000,000.00	$ 1,000,000.00	Estimate Provided by Industry Experts as this is a complex chamber and is beyond the cost of what is provided in Peel MP Cost Estimates
	TOTAL INSTALLATION COST				**$ 1,787,409.17**	
2	750 MM PVC WATERMAIN FROM STA. 0+275 TO STA. 0+385 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	110	m	$ 3,662.37	$ 402,860.50	Open Cut Construction
2.1	750 MM PVC WATERMAIN SEWER MICRO TUNELLING INCLUDING, PIPE SUPPLY, SOIL DISPOSAL FROM STA. 0+385 TO 0+900	515	m	$ 7,334.28	$ 3,777,156.64	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
2.2	PRECAST INTERCONNECTION (TWIN) VALVE CHAMBER #VC2 AT STATION 0+275, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 1,000,000.00	$ 1,000,000.00	Estimate Provided by Industry Experts as this is a complex chamber and is beyond the cost of what is provided in Peel MP Cost Estimates
2.3	CONSTRUCTION OF SHAFT @STA. 0+385	1		$ 1,050,000.00	$1,050,000.00	Shaft Depth 12m, Shaft width 7m - all shafts costed as launch shafts to be conservative
2.4	CONSTRUCTION OF SHAFT @STA. 0+900	1	-	$ 1,050,000.00	$1,050,000.00	Shaft Depth 12m, Shaft width 7m - all shafts costed as launch shafts to be conservative
2.5	750 MM PVC WATERMAIN FROM STA. 0+900 TO STA. 1+015 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	115	m	$ 3,662.37	$ 421,172.34	Open Cut Construction
2.6	PRECAST DRAIN VALVE CHAMBER #VC3 AT STATION 1+015, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 490,857.88	$ 490,857.88	
	TOTAL INSTALLATION COST				**$ 8,192,047.37**	
3	750 MM PVC WATERMAIN FROM STA. 1+015 TO STA. 0+1250 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	235	m	$ 3,662.37	$ 860,656.53	Open Cut Construction
3.1	PRECAST INTERCONNECTION VALVE CHAMBER #VC5 AT STATION 1+030, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 1,000,000.00	$ 1,000,000.00	Estimate Provided by Industry Experts as this is a complex chamber and is beyond the cost of what is provided in Peel MP Cost Estimates
	TOTAL INSTALLATION COST				**$ 1,860,656.53**	
4	750 MM PVC WATERMAIN FROM STA. 1+250 TO 1+980 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	730	m	$ 3,662.37	$ 2,673,528.80	Open Cut Construction
4.1	PRECAST AIR VALVE CHAMBER #VC6 AT STATION 1+255, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 490,857.88	$ 490,857.88	
	TOTAL INSTALLATION COST				**$ 3,164,386.67**	
5	750 MM PVC WATERMAIN TUNNELING (J&B) FROM STA. 1+980 TO 2+040	60	m	$ 8,620.00	$ 517,200.00	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
5.1	JACK AND BORE LAUNCH SHAFT @STA. 1+980	1	-	$ 239,097.81	$ 239,097.81	All shafts are assumed as Launch to be conservative: Jack and bore shafts are cheaper because they're smaller, and use simpler equipment - just hydraulic rams rather than sophisticated miniature tunnel boring machines. Microtunnelling requires larger, deeper shafts with more robust construction to support heavier equipment and tighter tolerances for precise guidance systems.
5.2	JACK AND BORE RECEIVING SHAFT @STA. 2+040	1		$ 239,097.81	$ 239,097.81	All shafts are assumed as Launch to be conservative: Jack and bore shafts are cheaper because they're smaller, and use simpler equipment - just hydraulic rams rather than sophisticated miniature tunnel boring machines. Microtunnelling requires larger, deeper shafts with more robust construction to support heavier equipment and tighter tolerances for precise guidance systems.
	TOTAL INSTALLATION COST				**$ 995,395.63**	
6	750 MM PVC WATERMAIN FROM STA. 3+970 TO 5+060 (ALLOA PUMP STATION), TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE. RESTORATION. CONNECTIONS/TESTING	1090	m	$ 3,662.37	$ 3,991,981.35	Open Cut Construction
6.1	PRECAST INTERCONNECTION CHAMBER #VC8 AT STA. 4+010, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 1,500,000.00	$ 1,500,000.00	Estimate Provided by Industry Experts as this is a complex chamber and is beyond the cost of what is provided in Peel MP Cost Estimates. Cost is interpolated from the estimate for inteconnection chamber cost at 4m depth ($1,000,000) to a approx. 6m depth.
6.2	PRECAST AIR VALVE CHAMBER #VC12 AT STA. 4+860 TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 490,857.88	$ 490,857.88	
6.3	PRECAST AIR VALVE CHAMBER #VC13 AT STA. 5+030, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 490,857.88	$ 490,857.88	
	TOTAL INSTALLATION COST				**$ 6,473,697.11**	
	750MM WATERMAIN INSTALLATION COST				**$ 22,473,592.48**	

600mmØ Watermain Projects						
Item No.	Description	Quantity/Length	UOM	Estimated Unit Price $2025/UOM	Total	Notes
1	600 MM PVC WATERMAIN FROM STA. 0+060 TO STA. 0+275 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	215	m	$ 3,253.98	$ 699,605.11	750mm Project carries Interconnection Chamber VC1 and VC2 Cost
	TOTAL INSTALLATION COST				**$ 699,605.11**	
2	600 MM PVC WATERMAIN FROM STA. 0+275 TO STA. 0+385 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	110	m	$ 3,253.98	$ 357,937.50	Open Cut Construction
2.1	600 MM PVC WATERMAIN SEWER MICRO TUNELLING INCLUDING, PIPE SUPPLY, SOIL DISPOSAL FROM STA. 0+385 TO 0+900	515	m	$ 5,736.57	$ 2,954,334.25	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included Shafts for 600mm and 750mm watermain proposed to be shared - Cost can be found in 750mm project
2.2	600 MM PVC WATERMAIN FROM STA. 0+900 TO STA. 1+015 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	115	m	$ 3,253.98	$374,207.39	Open Cut Construction 750mm project carries Interconnection Chamber VC5 cost
2.3	PRECAST DRAIN CHAMBER #VC4 AT STATION 0+900, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 317,613.92	$317,613.92	
	TOTAL INSTALLATION COST				**$ 4,004,093.05**	
3	600 MM PVC WATERMAIN FROM STA. 1+015 TO STA. 0+1260 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	245	m	$ 3,253.98	$ 797,224.43	Open Cut Construction 750mm Project carries Interconnection Chamber VC5 Cost
	TOTAL INSTALLATION COST				**$ 797,224.43**	
4	600 MM PVC WATERMAIN FROM STA. 1+260 TO 1+980 , TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	720	m	$ 3,253.98	$ 2,342,863.63	Open Cut Construction
4.1	PRECAST AIR VALVE CHAMBER #VC7 AT STATION 1+260, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 317,613.92	$ 317,613.92	
	TOTAL INSTALLATION COST				**$ 2,660,477.55**	
5	600 MM PVC WATERMAIN TUNNELING (J&B) FROM STA. 1+980 TO 2+050	70	m	$ 6,440.00	$ 450,800.00	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
5.1	JACK AND BORE LAUNCH SHAFT @STA 1+980	1	-	$ 278,947.45	$ 278,947.45	
5.2	JACK AND BORE RECEIVING SHAFT @STA. 2+050	1		$ 278,947.45	$ 278,947.45	
	TOTAL INSTALLATION COST				**$ 1,008,694.90**	
6	600 MM PVC WATERMAIN FROM STA. 2+050 TO 2+440, TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION. CONNECTIONS/TESTING	390	m	$ 3,253.98	$ 1,269,051.13	Open Cut Construction 750mm Project carries Interconnection Chamber VC8 Cost
6.1	PRECAST AIR VALVE CHAMBERS #VC9 AT 2+440, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 317,613.92	$ 317,613.92	
	TOTAL INSTALLATION COST				**$ 1,586,665.06**	
7	600 MM PVC WATERMAIN FROM STA. 2+440 TO STA. 2+690, TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE. RESTORATION. CONNECTIONS/TESTING	250	m	$ 3,253.98	$ 813,494.32	Open Cut Construction
7.1	PRECAST VALVE CHAMBERS #VC10 AT STA. 2+665, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 317,613.92	$ 317,613.92	
7.2	PRECAST VALVE CHAMBERS #VC11 AT STA. 2+690, TO INCLUDE ALL PIPING, FITTINGS, VALVES, APPURTENANCES AND RESTORATION	1	-	$ 317,613.92	$ 317,613.92	
	TOTAL INSTALLATION COST				**$ 1,448,722.16**	
	600MM WATERMAIN INSTALLATION COST				**$ 12,205,482.27**	

750MM AND 650MM ADDITIONAL COSTS

Additional Costs					
GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$	3,121,116.73
PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$	2,080,744.48
CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$	3,467,907.47
TOTAL CONSTRUCTION COST (HARD)				**$**	**43,348,843.44**
GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$	866,976.87
ENGINEERING/DESIGN (INTERNAL)		$10,000,000 - $50,	6%	$	2,600,930.61
DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		$10,000,000 - $50,	12%	$	5,201,861.21
APPROVAL		$10,000,000 - $50,	1%	$	433,488.43
TOTAL DESIGN COSTS (SOFT)				**$**	**9,103,257.12**
PROJECT COMPLEXITY	Class 3	High	20%	$	10,490,420.11
TOTAL PROJECT COST				**$**	**62,942,520.67**

TOTAL WATERMAIN INSTALLATION COST		**$**	**34,679,074.75**
TOTAL WATERMAIN CONSTRUCTION COST (HARD)		**$**	**43,348,843.44**
TOTAL WATERMAIN DESIGN COSTS (SOFT)		**$**	**9,103,257.12**
TOTAL TOTAL PROJECT COST		**$**	**62,942,520.67**
TOTAL PROJECT COST (HST INCL.)	1.76%	**$**	**64,050,309.03**

ET & SITE WORKS

Item No.	Description	Quantity/Length	UOM	Estimated Unit Price $2025/UOM	Total	Notes
	1					
1	10 ML COMPOSITE ELEVATED TANK COMPLETE WITH SITE GRADING, LANDSCAPING, AND ALL APPURTENANCES	1		$ 18,486,500.00	$ 18,486,500.00	
	TOTAL INSTALLATION COST				**$ 18,486,500.00**	
	Additional Costs					
	CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	25%	$ 4,621,625.00	As this is a more detailed estimate, a contingency of 25% is being carried forward for the Elevated Tank
	TOTAL CONSTRUCTION COST (HARD)				**$ 23,108,125.00**	
	TOTAL PROJECT COST				**$ 23,108,125.00**	
	2					
2	900 MM PVC WATERMAIN FROM VALVE CHAMBER #VC1 TO ET (91M), TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	107	m	$ 4,124.70	$ 441,342.76	Open Cut Construction
	TOTAL INSTALLATION COST				**$ 441,342.76**	
	Additional Costs					
	GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	20%	$ 88,268.55	
	PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	12%	$ 52,961.13	
	CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	20%	$ 88,268.55	
	TOTAL CONSTRUCTION COST (HARD)				**$ 670,840.99**	
	GEOTECHNICAL/HYDROGEOLOGICAL		Low Complexity	0.5%	$ 3,354.20	
	ENGINEERING/DESIGN (INTERNAL)		<$10,000,000	8%	$ 53,667.28	
	DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		<$10,000,000	15%	$ 100,626.15	
	APPROVAL		<$10,000,000	2%	$ 10,062.61	
	TOTAL DESIGN COSTS (SOFT)				**$ 167,710.25**	
	PROJECT COMPLEXITY	Class 3	Low	10%	$ 83,855.12	
	TOTAL PROJECT COST				**$ 922,406.37**	
	3					
3	750 MM PVC WATERMAIN FROM VALVE CHAMBER #VC1 TO ET (91M), TO INCLUDE ALL FITTINGS, BEDDING, COMPACTED GRANULAR B BACKFILL TO SUBGRADE, RESTORATION, CONNECTIONS/TESTING	106	m	$ 3,662.37	$ 388,211.03	Open Cut Construction
	TOTAL INSTALLATION COST				**$ 388,211.03**	
	Additional Costs					
	GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	20%	$ 77,642.21	
	PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	12%	$ 46,585.32	
	CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	20%	$ 77,642.21	
	TOTAL CONSTRUCTION COST (HARD)				**$ 590,080.77**	
	GEOTECHNICAL/HYDROGEOLOGICAL		Low Complexity	0.5%	$ 2,950.40	
	ENGINEERING/DESIGN (INTERNAL)		<$10,000,000	8%	$ 47,206.46	
	DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		<$10,000,000	15%	$ 88,512.11	
	APPROVAL		<$10,000,000	2%	$ 8,851.21	
	TOTAL DESIGN COSTS (SOFT)				**$ 147,520.19**	
	PROJECT COMPLEXITY	Class 3	Low	10%	$ 73,760.10	
	TOTAL PROJECT COST				**$ 811,361.05**	
	4					
4	BULK WATER STATION (6.0M X 4.0M) TO INCLUDE CONCRETE, MASONRY, METAL, WOOD AND PLASTICS, THERMAL AND MOISTURE PROTECTION, DOORS AND WINDOWS, FINISHES, EQUIPMENT, INSTRUMENTATION, MECHANICAL, ELECTRICAL	1	-	$ 97,001.64	$ 97,001.64	The cost estimate for the BWS has been developed with input from industry experts with experience in comparable high-tier regions. To validate this estimate, it has been benchmarked against relevant divisions from other water infrastructure projects.
	TOTAL INSTALLATION COST				**$ 97,001.64**	
	Additional Costs					
	CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		<$2,000,000	25%	$ 24,250.41	As this is a more detailed estimate, a contingency of 25% is being carried forward for the Bulk Water Station
	TOTAL CONSTRUCTION COST (HARD)				**$ 121,252.05**	
	TOTAL PROJECT COST				**$ 121,252.05**	
	TOTAL CONSTRUCTION COST				**$ 19,413,055.43**	
	TOTAL PROJECT COST				**$ 24,963,144.47**	
	TOTAL PROJECT COST (HST INCL.)			1.76%	**$ 25,402,495.81**	

Project: West Caledon Water Tower
File: 2402146

Assumptions: Use building quote from Landmark as a basis
Including Div 1 - covered here for all components of the site
Div 2 - add grading costs for site and SWM
Div 3 to Div 16

Elevated Tower Cost

FORM OF TENDER - SCHEDULE OF ITEMS AND PRICES

ITEM	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL	Notes
PART A, TABLE B-1	**DIVISION 1 - GENERAL REQUIREMENTS**					Range of 4 to 8% of project total (excl. Provisional Items and Contingency)
1000	General Requirements	L.S.	1.00	$ 274,000.00	$ 274,000.00	1.5%
1110	Mobilization and Demobilization	L.S.	1.00	$ 182,700.00	$ 182,700.00	1.0%
1310	Project Management and Coordination	L.S.	1.00	$ 54,800.00	$ 54,800.00	0.3%
1330	Submittals	L.S.	1.00	$ 91,300.00	$ 91,300.00	0.5%
1351	Health and Safety	L.S.	1.00	$ 18,300.00	$ 18,300.00	0.1%
1510	Temporary Utilities	L.S.	1.00	$ 36,500.00	$ 36,500.00	0.2%
1520	Construction Facilities	L.S.	1.00	$ 54,800.00	$ 54,800.00	0.3%
1561	Environmental Protection	L.S.	1.00	$ 54,800.00	$ 54,800.00	0.3%
1610	Basic Product Requirements	L.S.	1.00	$ 18,300.00	$ 18,300.00	0.1%
1760	Warranty Work	L.S.	1.00	$ 73,100.00	$ 73,100.00	0.4%
1770	Closeout Procedures	L.S.	1.00	$ 36,500.00	$ 36,500.00	0.2%
1780	Closeout Submittals	L.S.	1.00	$ 18,300.00	$ 18,300.00	0.1%
1810	Testing and Commissioning	L.S.	1.00	$ 54,800.00	$ 54,800.00	0.3%
1820	Demonstration and Training	L.S.	1.00	$ 36,500.00	$ 36,500.00	0.2%
	All other Division 1 Requirements	L.S.	1.00	$ 91,300.00	$ 91,300.00	0.5%
	SUB-TOTAL - TABLE B-1				**$ 1,096,000.00**	
PART A, TABLE B-2	**DIVISION 2 - SITE WORKS**					
2050	Basic Site Materials and Methods	L.S.	1.00	$ 15,000.00	$ 15,000.00	
2250	Foundations	L.S.	1.00	$ 250,000.00	$ 250,000.00	used low end of the deep foundation range. A shallow foundation seems likely based o
2310	Excavation and Site Grading	L.S.	1.00	$ 600,000.00	$ 600,000.00	used low end of the range. $600k is conservative for this grading, inclusive of the SWM
2375	Erosion and Sediment Control	L.S.	1.00	$ 30,000.00	$ 30,000.00	
2531	Overflow channel	L.S.	1.00	$ 15,000.00	$ 15,000.00	OVF outlet channel
2675	Fencing	L.S.	1.00	$ 60,000.00	$ 60,000.00	used low end of the range.
2745	Paving	L.S.	1.00	$ 100,000.00	$ 100,000.00	used low end of the range.
2924	Landscaping and seeding	L.S.	1.00	$ 60,000.00	$ 60,000.00	used low end of the range.
	All other Division 2 Requirements	L.S.	1.00	$ -	$ -	
	SUB-TOTAL - TABLE B-2				**$ 1,130,000.00**	
PART A, TABLE B-3	**DIVISION 3 - CONCRETE**					
	Composite Elevated Tower (complete)	L.S.	1.00	$ 14,900,000.00	$ 14,900,000.00	as per Landmark Estimate
3600	Grout and Miscellaneous Concrete Work	L.S.	1.00	$ 25,000.00	$ 25,000.00	Bollards, OVF headwall, other structures.
	All other Division 3 Requirements	L.S.	1.00	$ 5,000.00	$ 5,000.00	
	SUB-TOTAL - TABLE B-3				**$ 14,930,000.00**	

BWS Estimate Summary

Estimates were taken from previous tenders from 2024 using Flow Point System quotes for BWS replacement and upgrades.

Description	Region	Length (m)	Width (m)	Footprint (m²)	$2025 Total (No Contingency)	$2025/m² (No Contingency)
BWS PLAINS RD W & BOTANICAL DR	Halton	9.50	2.00	19.000	$90,000	$4,737
GEULPH LINE	Halton Hills	9.40	2.12	19.928	$90,000	$4,516
TODD ROAD	Halton	9.40	2.12	19.928	$100,000	$5,018
				Average		**$4,757**
PROPOSED WEST CALEDON STORAGE EA BWS	Peel Region	9.43	2.08	19.621	**$93,340**	$4,757
			2025 Dollars	**4%**	**$**	**97,001.64**
			Contingency	**25%**	**$**	**24,250.41**

Note: this is just for the unit cost of the BWS. Site works (ie, curb, asphalt and concrete pad are proposed to be carried forward in Elevated Tank costing)

Standard Tunnelling Rate Double Pass / Single Pass

Gravity pipe

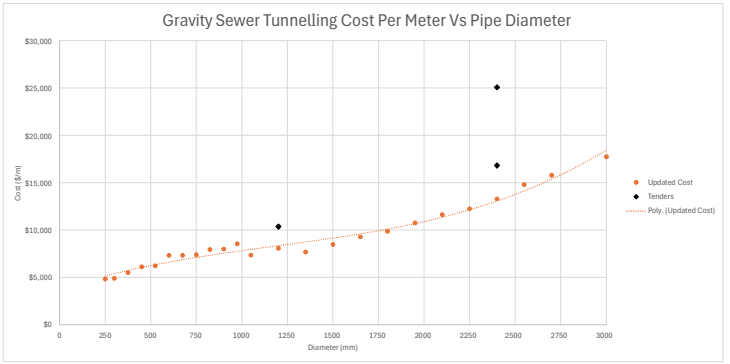
SAN or STM Pipe Diameter (mm)	Casing Pipe Diameter for Double Pass Installation (mm)	Jack and Bore ($/m)	Microtunnel ($/m)	Pipe Jacking ($/m)	TBM ($/m)	Blended Rate ($/m)	Blended Cost Curve ($/m)
250	600	$1,898	$7,748			$4,823	$5,144
300	600	$1,968	$7,818			$4,893	$5,388
375	700	$3,078	$7,923			$5,501	$5,731
450	800	$4,188	$8,028			$6,108	$6,049
525	900	$4,293	$8,133			$6,213	$6,344
600	1200	$6,408	$8,238			$7,323	$6,619
675	1300	$7,518	$7,155			$7,337	$6,875
750	1300	$7,623	$7,155			$7,389	$7,115
825	1400	$8,733	$7,155			$7,944	$7,341
900	1500	$8,838	$7,155			$7,997	$7,557
975	1600	$9,948	$7,155			$8,552	$7,763
1050	1600	$10,053	$7,155	$4,215	$8,000	$7,356	$7,962
1200	1800	$11,268	$7,155	$5,210	$8,667	$8,075	$8,351
1350	2000		$7,755	$6,304	$9,000	$7,687	$8,740
1500	2100		$8,355	$7,402	$9,667	$8,475	$9,150
1650	2300		$8,955	$8,528	$10,333	$9,272	$9,598
1800	2500		$9,555	$9,754	$10,333	$9,881	$10,103
1950	2700		$10,275	$10,943	$11,000	$10,740	$10,684
2100	2800		$11,355	$12,161	$11,333	$11,617	$11,360
2250	3000		$11,355	$13,414	$12,000	$12,257	$12,148
2400	3200		$12,355	$14,870	$12,667	$13,297	$13,068
2550	3400			$16,236	$13,333	$14,785	$14,138
2700	3600			$17,591	$14,000	$15,795	$15,377
3000	3900			$20,462	$15,000	$17,731	$18,436

Gravity Pipe Tunnelling Cost Curve ($/m)

Cost ($/m) = A*(Dia. mm)^3 + B*(Dia. mm)^2 + C*(Dia. mm) + D	
A=	9.194E-07
B=	-0.003281216
C=	6.475908437
D=	3715.87458

Tenders

Diameter (mm)	Tender No.	Length (m)	Unit Rate ($/m)	Type	Cost ($)
1200	2022-292T	269	$ 10,359	MT	$ 2,786,522
2400	2020-029T	6288	$ 16,814	MT	$ 105,725,642
2400	2022-004T	5040	$ 25,070	MT	$ 126,354,611



Standard Tunnelling Rate Single Pass / Double Pass

Pressure pipe

WM Pipe Diameter (mm)	casing pipe diameter for double pass installation (mm)	Jack and Bore ($/m)	Microtunnel ($/m)	Pipe Jacking ($/m)	HDD ($/m)	TBM ($/m)	Blended Rate ($/m)	Blended Cost Curve ($/m)
150	500	$1,088	$7,608		$715		$3,137	$ 3,120
300	600	$1,968	$7,818		$1,240		$3,675	$ 3,630
400	700	$2,640	$7,820		$1,590		$4,017	$ 4,171
600	1100	$6,440	$8,940		$2,290		$5,890	$ 5,737
750	1300	$8,620	$10,380		$2,815		$7,272	$ 7,334
900	1400	$10,130	$11,820				$10,975	$ 11,174
1050	1600	$12,310	$13,260				$12,785	$ 11,737
1200	1800	$14,490	$14,700	$5,210			$11,467	$ 12,157
1350	2000		$16,260	$6,304			$11,282	$ 12,456
1500	2100		$18,180	$7,402			$12,791	$ 12,660
1650	2300		$19,020	$8,528			$13,774	$ 12,791
1800	2500		$20,860	$9,754		$10,333	$13,649	$ 12,876
2100	2800			$12,161		$11,333	$11,747	$ 12,999
2400	3100			$14,870		$12,333	$13,601	$ 13,223

Pressure Pipe Tunnelling Cost Curve ($/m)

Diameter <=750mm

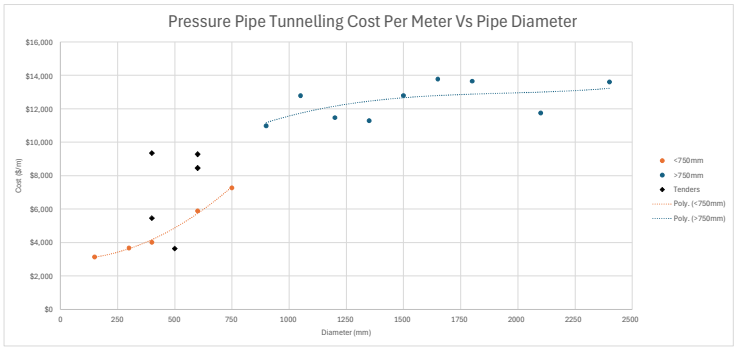
Cost ($/m) = A*(Dia. mm)^2 + B*(Dia. mm) + C	
A=	0.008061996
B=	-0.232271762
C=	2973.615924

Diameter >750mm

Cost ($/m) = A*(Dia. mm)^3 + B*(Dia. mm)^2 + C*(Dia. mm) + D	
A=	1.1936E-06
B=	-0.006962913
C=	13.92319616
D=	3412.901435

Tenders

Diameter (mm)	Tender No.	Length (m)	Unit Rate ($/m)	Type	Cost ($)
400	2023-586T	381	$ 9,345.00	MT	$ 3,560,445
400	2023-011T	63	$ 5,452.00	MT	$ 343,476
500	2023-083T	280	$ 3,639.00	HDD	$ 1,018,920
600	2023-088T	810	$ 8,458.00	MT	$ 6,850,980
600	2022-292T	353	$ 9,280.00	MT	$ 3,275,840



Shaft Costs

Micro Tunnelling $ 12,500 $ / m inside shaft dia. / m depth to tunnel liner invert

	Launch Shaft			Receiving Shaft		
Pipe Diameter (mm)	Diameter (mm)	Depth (m)	Cost ($)	Diameter (mm)	Depth (m)	Cost ($)
250	7	8	$ 700,000	5	8	$ 500,000
250	7	9	$ 787,500	5	9	$ 562,500
250	7	10	$ 875,000	5	10	$ 625,000
250	7	11	$ 962,500	5	11	$ 687,500
250	7	12	$ 1,050,000	5	12	$ 750,000
250	7	13	$ 1,137,500	5	13	$ 812,500
250	7	14	$ 1,225,000	5	14	$ 875,000
250	7	15	$ 1,312,500	5	15	$ 937,500
250	7	16	$ 1,400,000	5	16	$ 1,000,000
250	7	17	$ 1,487,500	5	17	$ 1,062,500
250	7	18	$ 1,575,000	5	18	$ 1,125,000
250	7	19	$ 1,662,500	5	19	$ 1,187,500
250	7	20	$ 1,750,000	5	20	$ 1,250,000
300	7	8	$ 700,000	5	8	$ 500,000
300	7	9	$ 787,500	5	9	$ 562,500
300	7	10	$ 875,000	5	10	$ 625,000
300	7	11	$ 962,500	5	11	$ 687,500
300	7	12	$ 1,050,000	5	12	$ 750,000
300	7	13	$ 1,137,500	5	13	$ 812,500
300	7	14	$ 1,225,000	5	14	$ 875,000
300	7	15	$ 1,312,500	5	15	$ 937,500
300	7	16	$ 1,400,000	5	16	$ 1,000,000
300	7	17	$ 1,487,500	5	17	$ 1,062,500
300	7	18	$ 1,575,000	5	18	$ 1,125,000
300	7	19	$ 1,662,500	5	19	$ 1,187,500
300	7	20	$ 1,750,000	5	20	$ 1,250,000
375	7	8	$ 700,000	5	8	$ 500,000
375	7	9	$ 787,500	5	9	$ 562,500
375	7	10	$ 875,000	5	10	$ 625,000
375	7	11	$ 962,500	5	11	$ 687,500
375	7	12	$ 1,050,000	5	12	$ 750,000
375	7	13	$ 1,137,500	5	13	$ 812,500
375	7	14	$ 1,225,000	5	14	$ 875,000
375	7	15	$ 1,312,500	5	15	$ 937,500
375	7	16	$ 1,400,000	5	16	$ 1,000,000
375	7	17	$ 1,487,500	5	17	$ 1,062,500

Gravity Sewer Shafts

Summary Table	Launch	Receiving
Pipe Dia. (mm)	Shaft Dia.	Shaft Dia.
250	7	5
300	7	5
375	7	5
450	7	5
525	7	5
600	7	5
675	7	5
750	7	5
825	7	5
900	7	5
975	7	5
1050	7	5
1200	7	5
1350	7	5
1500	7	5
1650	8	6
1800	8	6
1950	8	6
2100	9	7
2250	9	7
2400	9	7
2550	9	7
2700	10	8
3000	10	8

Watermain Shafts

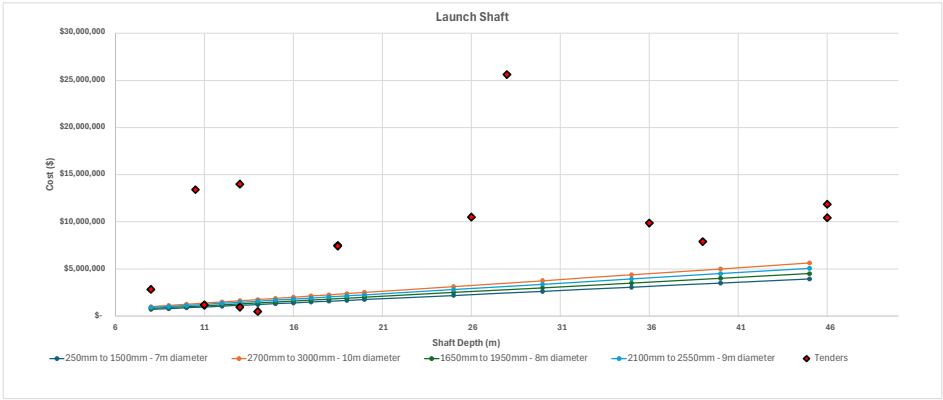
Summary Table	Launch	Receiving
Pipe Dia. (mm)	Shaft Dia.	Shaft Dia.
100	7	5
150	7	5
200	7	5
250	7	5
300	7	5
350	7	5
400	7	5
450	7	5
500	7	5
600	7	5
750	7	5
900	7	5
1050	8	6
1200	8	6
1350	8	6
1500	9	7
1650	9	7
1800	10	8
1950	10	8
2100	10	8
2250	10	8

Tenders

Pipe Diameter (mm)	Tender No.	Length (m)	Unit Rates ($/m)		Total Cost ($)		Assumed Shaft Depth (m)	Actual Shaft Diameter (mm)	Equivalent Diameter (m)	Actual Shaft Depth (m)	Shaft No.	
			Launch Shaft ($/m)	Receiving Shaft ($/m)	Launch Shaft	Receiving Shaft						
400mm	2023-586T	381	$ 2,450	$ 1,914	$ 933,450	$ 729,234	8	5 x 3	4.4	13		
400mm	2023-011T	63	$ 3,906	$ 1,916	$ 246,078	$ 120,708	8					
400mm	2023-173T	55.5	$ 8,170	$ 10,648	$ 453,435	$ 590,964	8					
600mm	2022-292T	353	$ 3,332	$ 1,548	$ 1,176,196	$ 546,444	-	13		11		$ 1,787,500.00
1200mm	2022-292T	269	$ -	$ 1,810	$ -	$ 486,890	-	2.6		14		$ 455,000.00
2400	2020-029T				$ 7,484,776	$ -	-	12		18.5	2A	$ 2,775,000.00
2400	2020-029T				$ 7,895,534	$ -	-	8		39	3	$ 3,900,000.00

375	7	18	$ 1,575,000	5	18	$ 1,125,000
375	7	19	$ 1,662,500	5	19	$ 1,187,500
375	7	20	$ 1,750,000	5	20	$ 1,250,000
450	7	8	$ 700,000	5	8	$ 500,000
450	7	9	$ 787,500	5	9	$ 562,500
450	7	10	$ 875,000	5	10	$ 625,000
450	7	11	$ 962,500	5	11	$ 687,500
450	7	12	$ 1,050,000	5	12	$ 750,000
450	7	13	$ 1,137,500	5	13	$ 812,500
450	7	14	$ 1,225,000	5	14	$ 875,000
450	7	15	$ 1,312,500	5	15	$ 937,500
450	7	16	$ 1,400,000	5	16	$ 1,000,000
450	7	17	$ 1,487,500	5	17	$ 1,062,500
450	7	18	$ 1,575,000	5	18	$ 1,125,000
450	7	19	$ 1,662,500	5	19	$ 1,187,500
450	7	20	$ 1,750,000	5	20	$ 1,250,000
525	7	8	$ 700,000	5	8	$ 500,000
525	7	9	$ 787,500	5	9	$ 562,500
525	7	10	$ 875,000	5	10	$ 625,000
525	7	11	$ 962,500	5	11	$ 687,500
525	7	12	$ 1,050,000	5	12	$ 750,000
525	7	13	$ 1,137,500	5	13	$ 812,500
525	7	14	$ 1,225,000	5	14	$ 875,000
525	7	15	$ 1,312,500	5	15	$ 937,500
525	7	16	$ 1,400,000	5	16	$ 1,000,000
525	7	17	$ 1,487,500	5	17	$ 1,062,500
525	7	18	$ 1,575,000	5	18	$ 1,125,000
525	7	19	$ 1,662,500	5	19	$ 1,187,500
525	7	20	$ 1,750,000	5	20	$ 1,250,000
600	7	8	$ 700,000	5	8	$ 500,000
600	7	9	$ 787,500	5	9	$ 562,500
600	7	10	$ 875,000	5	10	$ 625,000
600	7	11	$ 962,500	5	11	$ 687,500
600	7	12	$ 1,050,000	5	12	$ 750,000
600	7	13	$ 1,137,500	5	13	$ 812,500
600	7	14	$ 1,225,000	5	14	$ 875,000
600	7	15	$ 1,312,500	5	15	$ 937,500
600	7	16	$ 1,400,000	5	16	$ 1,000,000
600	7	17	$ 1,487,500	5	17	$ 1,062,500
600	7	18	$ 1,575,000	5	18	$ 1,125,000
600	7	19	$ 1,662,500	5	19	$ 1,187,500
600	7	20	$ 1,750,000	5	20	$ 1,250,000
675	7	8	$ 700,000	5	8	$ 500,000
675	7	9	$ 787,500	5	9	$ 562,500
675	7	10	$ 875,000	5	10	$ 625,000
675	7	11	$ 962,500	5	11	$ 687,500
675	7	12	$ 1,050,000	5	12	$ 750,000
675	7	13	$ 1,137,500	5	13	$ 812,500
675	7	14	$ 1,225,000	5	14	$ 875,000
675	7	15	$ 1,312,500	5	15	$ 937,500
675	7	16	$ 1,400,000	5	16	$ 1,000,000
675	7	17	$ 1,487,500	5	17	$ 1,062,500
675	7	18	$ 1,575,000	5	18	$ 1,125,000
675	7	19	$ 1,662,500	5	19	$ 1,187,500
675	7	20	$ 1,750,000	5	20	$ 1,250,000
750	7	8	$ 700,000	5	8	$ 500,000
750	7	9	$ 787,500	5	9	$ 562,500
750	7	10	$ 875,000	5	10	$ 625,000
750	7	11	$ 962,500	5	11	$ 687,500
750	7	12	$ 1,050,000	5	12	$ 750,000
750	7	13	$ 1,137,500	5	13	$ 812,500
750	7	14	$ 1,225,000	5	14	$ 875,000
750	7	15	$ 1,312,500	5	15	$ 937,500
750	7	16	$ 1,400,000	5	16	$ 1,000,000
750	7	17	$ 1,487,500	5	17	$ 1,062,500
750	7	18	$ 1,575,000	5	18	$ 1,125,000
750	7	19	$ 1,662,500	5	19	$ 1,187,500
750	7	20	$ 1,750,000	5	20	$ 1,250,000
825	7	8	$ 700,000	5	8	$ 500,000
825	7	9	$ 787,500	5	9	$ 562,500
825	7	10	$ 875,000	5	10	$ 625,000
825	7	11	$ 962,500	5	11	$ 687,500
825	7	12	$ 1,050,000	5	12	$ 750,000
825	7	13	$ 1,137,500	5	13	$ 812,500
825	7	14	$ 1,225,000	5	14	$ 875,000
825	7	15	$ 1,312,500	5	15	$ 937,500
825	7	16	$ 1,400,000	5	16	$ 1,000,000
825	7	17	$ 1,487,500	5	17	$ 1,062,500
825	7	18	$ 1,575,000	5	18	$ 1,125,000
825	7	19	$ 1,662,500	5	19	$ 1,187,500
825	7	20	$ 1,750,000	5	20	$ 1,250,000
900	7	8	$ 700,000	5	8	$ 500,000
900	7	9	$ 787,500	5	9	$ 562,500
900	7	10	$ 875,000	5	10	$ 625,000
900	7	11	$ 962,500	5	11	$ 687,500
900	7	12	$ 1,050,000	5	12	$ 750,000
900	7	13	$ 1,137,500	5	13	$ 812,500
900	7	14	$ 1,225,000	5	14	$ 875,000
900	7	15	$ 1,312,500	5	15	$ 937,500
900	7	16	$ 1,400,000	5	16	$ 1,000,000
900	7	17	$ 1,487,500	5	17	$ 1,062,500
900	7	18	$ 1,575,000	5	18	$ 1,125,000
900	7	19	$ 1,662,500	5	19	$ 1,187,500
900	7	20	$ 1,750,000	5	20	$ 1,250,000
975	7	8	$ 700,000	5	8	$ 500,000
975	7	9	$ 787,500	5	9	$ 562,500
975	7	10	$ 875,000	5	10	$ 625,000
975	7	11	$ 962,500	5	11	$ 687,500
975	7	12	$ 1,050,000	5	12	$ 750,000
975	7	13	$ 1,137,500	5	13	$ 812,500
975	7	14	$ 1,225,000	5	14	$ 875,000
975	7	15	$ 1,312,500	5	15	$ 937,500
975	7	16	$ 1,400,000	5	16	$ 1,000,000
975	7	17	$ 1,487,500	5	17	$ 1,062,500
975	7	18	$ 1,575,000	5	18	$ 1,125,000
975	7	19	$ 1,662,500	5	19	$ 1,187,500
975	7	20	$ 1,750,000	5	20	$ 1,250,000
1050	7	8	$ 700,000	5	8	$ 500,000
1050	7	9	$ 787,500	5	9	$ 562,500
1050	7	10	$ 875,000	5	10	$ 625,000
1050	7	11	$ 962,500	5	11	$ 687,500
1050	7	12	$ 1,050,000	5	12	$ 750,000
1050	7	13	$ 1,137,500	5	13	$ 812,500
1050	7	14	$ 1,225,000	5	14	$ 875,000
1050	7	15	$ 1,312,500	5	15	$ 937,500
1050	7	16	$ 1,400,000	5	16	$ 1,000,000

2400	2020-029T				$ 11,849,923	$ -	-	11		46	4	$ 6,325,000.00
2400	2020-029T				$ 7,430,976	$ -	-	12		18.5	2B	$ 2,775,000.00
2400	2020-029T				$ 10,427,785	$ -	-	8		46	5	$ 4,600,000.00
2400	2022-004T				$ 13,412,705			13.3 x 15	15.9	10.5	1	$ 2,086,875.00
2400	2022-004T				$ 9,874,738			7		36	5A	$ 3,150,000.00
2400	2022-004T				$ 10,496,696			8		26	6	$ 2,600,000.00
2400	2022-004T				$ 13,997,866			10.5 x 16	14.6	13	6A	$ 2,372,500.00
2400	2022-004T				$ 25,621,689			17		28	7	$ 5,950,000.00
2400	2022-004T				$ 2,816,129			7.5		8	12	$ 750,000.00



1050	7	17	$ 1,487,500	5	17	$ 1,062,500
1050	7	18	$ 1,575,000	5	18	$ 1,125,000
1050	7	19	$ 1,662,500	5	19	$ 1,187,500
1050	7	20	$ 1,750,000	5	20	$ 1,250,000
1200	10	8	$ 1,000,000	5	8	$ 500,000
1200	10	9	$ 1,125,000	5	9	$ 562,500
1200	10	10	$ 1,250,000	5	10	$ 625,000
1200	10	11	$ 1,375,000	5	11	$ 687,500
1200	10	12	$ 1,500,000	5	12	$ 750,000
1200	10	13	$ 1,625,000	5	13	$ 812,500
1200	10	14	$ 1,750,000	5	14	$ 875,000
1200	10	15	$ 1,875,000	5	15	$ 937,500
1200	10	16	$ 2,000,000	5	16	$ 1,000,000
1200	10	20	$ 2,500,000	5	17	$ 1,062,500
1200	10	30	$ 3,750,000	5	18	$ 1,125,000
1200	10	40	$ 5,000,000			
1200	13	45	$ 7,312,500	5	19	$ 1,187,500
1200	13	50	$ 8,125,000	5	20	$ 1,250,000
1350	7	8	$ 700,000	5	8	$ 500,000
1350	7	9	$ 787,500	5	9	$ 562,500
1350	7	10	$ 875,000	5	10	$ 625,000
1350	7	11	$ 962,500	5	11	$ 687,500
1350	7	12	$ 1,050,000	5	12	$ 750,000
1350	7	13	$ 1,137,500	5	13	$ 812,500
1350	7	14	$ 1,225,000	5	14	$ 875,000
1350	7	15	$ 1,312,500	5	15	$ 937,500
1350	7	16	$ 1,400,000	5	16	$ 1,000,000
1350	7	17	$ 1,487,500	5	17	$ 1,062,500
1350	7	18	$ 1,575,000	5	18	$ 1,125,000
1350	7	19	$ 1,662,500	5	19	$ 1,187,500
1350	7	20	$ 1,750,000	5	20	$ 1,250,000
1500	7	8	$ 700,000	5	8	$ 500,000
1500	7	9	$ 787,500	5	9	$ 562,500
1500	7	10	$ 875,000	5	10	$ 625,000
1500	7	11	$ 962,500	5	11	$ 687,500
1500	7	12	$ 1,050,000	5	12	$ 750,000
1500	7	13	$ 1,137,500	5	13	$ 812,500
1500	7	14	$ 1,225,000	5	14	$ 875,000
1500	7	15	$ 1,312,500	5	15	$ 937,500
1500	7	16	$ 1,400,000	5	16	$ 1,000,000
1500	7	17	$ 1,487,500	5	17	$ 1,062,500
1500	7	18	$ 1,575,000	5	18	$ 1,125,000
1500	7	19	$ 1,662,500	5	19	$ 1,187,500
1500	7	20	$ 1,750,000	5	20	$ 1,250,000
1500	7	25	$ 2,187,500	5	25	$ 1,562,500
1500	7	30	$ 2,625,000	5	30	$ 1,875,000
1500	7	35	$ 3,062,500	5	35	$ 2,187,500
1500	7	40	$ 3,500,000	5	40	$ 2,500,000
1500	7	45	$ 3,937,500	5	45	$ 2,812,500
1650	8	8	$ 800,000	6	8	$ 600,000
1650	8	9	$ 900,000	6	9	$ 675,000
1650	8	10	$ 1,000,000	6	10	$ 750,000
1650	8	11	$ 1,100,000	6	11	$ 825,000
1650	8	12	$ 1,200,000	6	12	$ 900,000
1650	8	13	$ 1,300,000	6	13	$ 975,000
1650	8	14	$ 1,400,000	6	14	$ 1,050,000
1650	8	15	$ 1,500,000	6	15	$ 1,125,000
1650	8	16	$ 1,600,000	6	16	$ 1,200,000
1650	8	17	$ 1,700,000	6	17	$ 1,275,000
1650	8	18	$ 1,800,000	6	18	$ 1,350,000
1650	8	19	$ 1,900,000	6	19	$ 1,425,000
1650	8	20	$ 2,000,000	6	20	$ 1,500,000
1800	8	8	$ 800,000	6	8	$ 600,000
1800	8	9	$ 900,000	6	9	$ 675,000
1800	8	10	$ 1,000,000	6	10	$ 750,000
1800	8	11	$ 1,100,000	6	11	$ 825,000
1800	8	12	$ 1,200,000	6	12	$ 900,000
1800	8	13	$ 1,300,000	6	13	$ 975,000
1800	8	14	$ 1,400,000	6	14	$ 1,050,000
1800	8	15	$ 1,500,000	6	15	$ 1,125,000
1800	8	16	$ 1,600,000	6	16	$ 1,200,000
1800	8	17	$ 1,700,000	6	17	$ 1,275,000
1800	8	18	$ 1,800,000	6	18	$ 1,350,000
1800	8	19	$ 1,900,000	6	19	$ 1,425,000
1800	8	20	$ 2,000,000	6	20	$ 1,500,000
1950	8	8	$ 800,000	6	8	$ 600,000
1950	8	9	$ 900,000	6	9	$ 675,000
1950	8	10	$ 1,000,000	6	10	$ 750,000
1950	8	11	$ 1,100,000	6	11	$ 825,000
1950	8	12	$ 1,200,000	6	12	$ 900,000
1950	8	13	$ 1,300,000	6	13	$ 975,000
1950	8	14	$ 1,400,000	6	14	$ 1,050,000
1950	8	15	$ 1,500,000	6	15	$ 1,125,000
1950	8	16	$ 1,600,000	6	16	$ 1,200,000
1950	8	17	$ 1,700,000	6	17	$ 1,275,000
1950	8	18	$ 1,800,000	6	18	$ 1,350,000
1950	8	19	$ 1,900,000	6	19	$ 1,425,000
1950	8	20	$ 2,000,000	6	20	$ 1,500,000
1950	8	25	$ 2,500,000	6	25	$ 1,875,000
1950	8	30	$ 3,000,000	6	30	$ 2,250,000
1950	8	35	$ 3,500,000	6	35	$ 2,625,000
1950	8	40	$ 4,000,000	6	40	$ 3,000,000
1950	8	45	$ 4,500,000	6	45	$ 3,375,000
2100	9	8	$ 900,000	7	8	$ 700,000
2100	9	9	$ 1,012,500	7	9	$ 787,500
2100	9	10	$ 1,125,000	7	10	$ 875,000
2100	9	11	$ 1,237,500	7	11	$ 962,500
2100	9	12	$ 1,350,000	7	12	$ 1,050,000
2100	9	13	$ 1,462,500	7	13	$ 1,137,500
2100	9	14	$ 1,575,000	7	14	$ 1,225,000
2100	9	15	$ 1,687,500	7	15	$ 1,312,500
2100	9	16	$ 1,800,000	7	16	$ 1,400,000
2100	9	17	$ 1,912,500	7	17	$ 1,487,500
2100	9	18	$ 2,025,000	7	18	$ 1,575,000
2100	9	19	$ 2,137,500	7	19	$ 1,662,500
2100	9	20	$ 2,250,000	7	20	$ 1,750,000
2250	9	8	$ 900,000	7	8	$ 700,000
2250	9	9	$ 1,012,500	7	9	$ 787,500
2250	9	10	$ 1,125,000	7	10	$ 875,000
2250	9	11	$ 1,237,500	7	11	$ 962,500
2250	9	12	$ 1,350,000	7	12	$ 1,050,000
2250	9	13	$ 1,462,500	7	13	$ 1,137,500
2250	9	14	$ 1,575,000	7	14	$ 1,225,000
2250	9	15	$ 1,687,500	7	15	$ 1,312,500
2250	9	16	$ 1,800,000	7	16	$ 1,400,000
2250	9	17	$ 1,912,500	7	17	$ 1,487,500

2250	9	18	$ 2,025,000	7	18	$ 1,575,000
2250	9	19	$ 2,137,500	7	19	$ 1,662,500
2250	9	20	$ 2,250,000	7	20	$ 1,750,000
2400	9	8	$ 900,000	7	8	$ 700,000
2400	9	9	$ 1,012,500	7	9	$ 787,500
2400	9	10	$ 1,125,000	7	10	$ 875,000
2400	9	11	$ 1,237,500	7	11	$ 962,500
2400	9	12	$ 1,350,000	7	12	$ 1,050,000
2400	9	13	$ 1,462,500	7	13	$ 1,137,500
2400	9	14	$ 1,575,000	7	14	$ 1,225,000
2400	9	15	$ 1,687,500	7	15	$ 1,312,500
2400	9	16	$ 1,800,000	7	16	$ 1,400,000
2400	9	17	$ 1,912,500	7	17	$ 1,487,500
2400	9	18	$ 2,025,000	7	18	$ 1,575,000
2400	9	19	$ 2,137,500	7	19	$ 1,662,500
2400	9	20	$ 2,250,000	7	20	$ 1,750,000
2550	9	8	$ 900,000	7	8	$ 700,000
2550	9	9	$ 1,012,500	7	9	$ 787,500
2550	9	10	$ 1,125,000	7	10	$ 875,000
2550	9	11	$ 1,237,500	7	11	$ 962,500
2550	9	12	$ 1,350,000	7	12	$ 1,050,000
2550	9	13	$ 1,462,500	7	13	$ 1,137,500
2550	9	14	$ 1,575,000	7	14	$ 1,225,000
2550	9	15	$ 1,687,500	7	15	$ 1,312,500
2550	9	16	$ 1,800,000	7	16	$ 1,400,000
2550	9	17	$ 1,912,500	7	17	$ 1,487,500
2550	9	18	$ 2,025,000	7	18	$ 1,575,000
2550	9	19	$ 2,137,500	7	19	$ 1,662,500
2550	9	20	$ 2,250,000	7	20	$ 1,750,000
2550	9	25	$ 2,812,500	7	25	$ 2,187,500
2550	9	30	$ 3,375,000	7	30	$ 2,625,000
2550	9	35	$ 3,937,500	7	35	$ 3,062,500
2550	9	40	$ 4,500,000	7	40	$ 3,500,000
2550	9	45	$ 5,062,500	7	45	$ 3,937,500
2700	10	8	$ 1,000,000	8	8	$ 800,000
2700	10	9	$ 1,125,000	8	9	$ 900,000
2700	10	10	$ 1,250,000	8	10	$ 1,000,000
2700	10	11	$ 1,375,000	8	11	$ 1,100,000
2700	10	12	$ 1,500,000	8	12	$ 1,200,000
2700	10	13	$ 1,625,000	8	13	$ 1,300,000
2700	10	14	$ 1,750,000	8	14	$ 1,400,000
2700	10	15	$ 1,875,000	8	15	$ 1,500,000
2700	10	16	$ 2,000,000	8	16	$ 1,600,000
2700	10	17	$ 2,125,000	8	17	$ 1,700,000
2700	10	18	$ 2,250,000	8	18	$ 1,800,000
2700	10	19	$ 2,375,000	8	19	$ 1,900,000
2700	10	20	$ 2,500,000	8	20	$ 2,000,000
3000	10	8	$ 1,000,000	8	8	$ 800,000
3000	10	9	$ 1,125,000	8	9	$ 900,000
3000	10	10	$ 1,250,000	8	10	$ 1,000,000
3000	10	11	$ 1,375,000	8	11	$ 1,100,000
3000	10	12	$ 1,500,000	8	12	$ 1,200,000
3000	10	13	$ 1,625,000	8	13	$ 1,300,000
3000	10	14	$ 1,750,000	8	14	$ 1,400,000
3000	10	15	$ 1,875,000	8	15	$ 1,500,000
3000	10	16	$ 2,000,000	8	16	$ 1,600,000
3000	10	17	$ 2,125,000	8	17	$ 1,700,000
3000	10	18	$ 2,250,000	8	18	$ 1,800,000
3000	10	19	$ 2,375,000	8	19	$ 1,900,000
3000	10	20	$ 2,500,000	8	20	$ 2,000,000
3000	10	25	$ 3,125,000	8	25	$ 2,500,000
3000	10	30	$ 3,750,000	8	30	$ 3,000,000
3000	10	35	$ 4,375,000	8	35	$ 3,500,000
3000	10	40	$ 5,000,000	8	40	$ 4,000,000
3000	10	45	$ 5,625,000	8	45	$ 4,500,000

FORM OF TENDER - SCHEDULE OF ITEMS AND PRICES						Notes
ITEM	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL	
PART A, TABLE B-4	**DIVISION 4 - MASONRY**					
4200	Masonry and Accessories	L.S.	1.00	$ -	$ -	included in tank estimate above
4211	Brick Unit Masonry	L.S.	1.00	$ -	$ -	n/a
	All other Division 4 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-4				**$ -**	
PART A, TABLE B-5	**DIVISION 5 - METAL**					
5500	Miscellaneous Metal	L.S.	1.00	$ 20,000.00	$ 20,000.00	intermediate landings added
	All other Division 5 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-5				**$ 20,000.00**	
PART A, TABLE B-6	**DIVISION 6 - WOOD AND PLASTICS**					
6100	Rough Carpentry	L.S.	1.00	$ -	$ -	included in tank estimate above
	All other Division 6 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-6				**$ -**	
PART A, TABLE B-7	**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**					
7140	External Waterproofing Wall Membrane	L.S.	1.00	$ -	$ -	included in tank estimate above
7210	Building Insulation	L.S.	1.00	$ -	$ -	included in tank estimate above
7260	Air & Vapour Barriers	L.S.	1.00	$ -	$ -	included in tank estimate above
7660	Metal Roofing	L.S.	1.00	$ -	$ -	included in tank estimate above
	All other Division 7 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-7				**$ -**	
PART A, TABLE B-8	**DIVISION 8 - DOORS AND WINDOWS**					
8100	Hollow Metal Doors and Frames	L.S.	1.00	$ -	$ -	included in tank estimate above
8331	Overhead Rolling Doors	L.S.	1.00	$ -	$ -	n/a
8500	Aluminum Windows	L.S.	1.00	$ -	$ -	n/a
8710	Finish Hardware	L.S.	1.00	$ -	$ -	included in tank estimate above
8800	Glass and Glazing	L.S.	1.00	$ -	$ -	n/a
	All other Division 8 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-8				**$ -**	
PART A, TABLE B-9	**DIVISION 9 - FINISHES**					
9900	Painting	L.S.	1.00	$ 60,000.00	$ 60,000.00	additional for colour logo. Base coating included in overall tank estimate below.
	Pipe coatings	L.S.	1.00	$ 20,000.00	$ 20,000.00	added from options list in Landmark proposal
	All other Division 9 Requirements	L.S.	1.00	$ -	$ -	n/a

FORM OF TENDER - SCHEDULE OF ITEMS AND PRICES						Notes
ITEM	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL	
	SUB-TOTAL - TABLE B-9				**$ 80,000.00**	
PART A, TABLE B-10	**DIVISION 11 - EQUIPMENT**					
11000	Equipment General Requirements	L.S.	1.00	$ 5,000.00	$ 5,000.00	
11005	Identification and Labeling of Equipment	L.S.	1.00	$ 2,500.00	$ 2,500.00	
11100	Valves	L.S.	1.00	$ -	$ -	included in estimate above
11200	Chemical Feed system	L.S.	1.00	$ 100,000.00	$ 100,000.00	used low end of the range
11210	Electromagnetic Flow Meter	L.S.	1.00	$ -	$ -	included in estimate above
	All other Division 11 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-10				**$ 107,500.00**	
PART A, TABLE B-11	**DIVISION 13 - INSTRUMENTATION**					
13010	Instrumentation General Requirements	L.S.	1.00	$ 7,500.00	$ 7,500.00	
13110	Control Panels and Enclosures	L.S.	1.00	$ 150,000.00	$ 150,000.00	used $150k from low end of the landmark allowance. Balance shown in Div 16)
	All other Division 13 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-11				**$ 157,500.00**	
PART A, TABLE B-12	**TABLE B-12: DIVISION 15 - MECHANICAL**					
15050	Basic Mechanical Materials and Couplings	L.S.	1.00	$ 15,000.00	$ 15,000.00	
15075	Mechanical Piping Identification	L.S.	1.00	$ 1,500.00	$ 1,500.00	
15220	Plumbing and HVAC	L.S.	1.00	$ 185,000.00	$ 185,000.00	used mid-point of range from landmark allowance
15305	Portable Fire Extinguishers	L.S.	1.00	$ -	$ -	
15760	Unit Heaters and Accessories	L.S.	1.00	$ -	$ -	included
15820	Dampers and Actuators	L.S.	1.00	$ -	$ -	
15830	Fans and Dehumidifiers	L.S.	1.00	$ -	$ -	
	Rescue equipment (working at heights)	L.S.	1.00	$ 25,000.00	$ 25,000.00	used high end of the range
15955	Piping Leakage Testing	L.S.	1.00	$ 2,500.00	$ 2,500.00	
	All other Division 15 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-12				**$ 229,000.00**	
PART A, TABLE B-13	**DIVISION 16 - ELECTRICAL**					
16000	Scope of Work	L.S.	1.00	$ 7,500.00	$ 7,500.00	n/a
16010	Electrical and Controls	L.S.	1.00	$ 550,000.00	$ 550,000.00	remainder from landmark allowance for electrical and controls
16051	Installation of Cables in Trenches and in Ducts	L.S.	1.00	$ -	$ -	included
16053	Meter and Switchboard Instruments	L.S.	1.00	$ -	$ -	included
16062	Grounding Secondary	L.S.	1.00	$ -	$ -	included
16071	Fastenings and Supports	L.S.	1.00	$ -	$ -	included
16105	Concrete Encased Ductbanks	L.S.	1.00	$ -	$ -	included
16122	Wires and Cables (0-1000V)	L.S.	1.00	$ -	$ -	included
16131	Splitter, Junction, Pull Boxes and Cabinets	L.S.	1.00	$ -	$ -	included

FORM OF TENDER - SCHEDULE OF ITEMS AND PRICES						
ITEM	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL	Notes
16132	Outlet Boxes, Conduit Boxes, and Fittings	L.S.	1.00	$ -	$ -	included
16133	Conduits, Conduit fastening and Conduit Fittings	L.S.	1.00	$ -	$ -	included
16141	Wiring Devices	L.S.	1.00	$ -	$ -	included
16153	Connectors and Terminations	L.S.	1.00	$ -	$ -	included
16223	Motor Starters to 600V	L.S.	1.00	$ -	$ -	included
16225	Motor Control Centres	L.S.	1.00	$ -	$ -	n/a
16271	Dry Type Transformers up to 600V Primary	L.S.	1.00	$ -	$ -	included
16301	Automatic Transfer Switch	L.S.	1.00	$ -	$ -	see below
16412	Molded Case Circuit Breakers	L.S.	1.00	$ -	$ -	included
16414	Disconnect Switches	L.S.	1.00	$ -	$ -	included
16441	Panelboards	L.S.	1.00	$ -	$ -	included
16612	Surge Protection Equipment	L.S.	1.00	$ -	$ -	included
16135	Cable tray	L.S.	1.00	$ -	$ -	included
16238	Power Diesel Generator	L.S.	1.00	$ 175,000.00	$ 175,000.00	add as an option for conservative estimate. Confirm with Peel if needed.
16423	Control Devices	L.S.	1.00	$ -	$ -	included
16901	Instrumentation	L.S.	1.00	$ -	$ -	included
16950	Short Circuit, Coordination and Arc Flash	L.S.	1.00	$ 4,000.00	$ 4,000.00	
	All other Division 16 Requirements	L.S.	1.00	$ -	$ -	n/a
	SUB-TOTAL - TABLE B-13				**$ 736,500.00**	
	Total of all Divisions				**$ 18,486,500.00**	
	Contingency		**25%**		**$ 4,621,625.00**	
	Grand Total				**$ 23,108,125.00**	

Standard Tunnelling Rate Double Pass / Single Pass

Gravity pipe

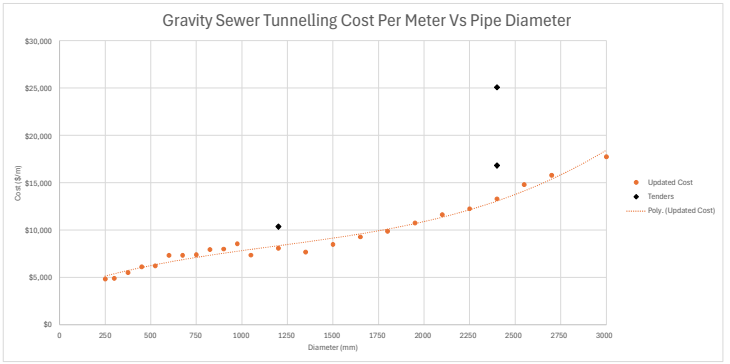
SAN or STM Pipe Diameter (mm)	Casing Pipe Diameter for Double Pass Installation (mm)	Jack and Bore ($/m)	Microtunnel ($/m)	Pipe Jacking ($/m)	TBM ($/m)	Blended Rate ($/m)	Blended Cost Curve ($/m)
250	600	$1,898	$7,748			$4,823	$5,144
300	600	$1,968	$7,818			$4,893	$5,388
375	700	$3,078	$7,923			$5,501	$5,731
450	800	$4,188	$8,028			$6,108	$6,049
525	900	$4,293	$8,133			$6,213	$6,344
600	1200	$6,408	$8,238			$7,323	$6,619
675	1300	$7,518	$7,155			$7,337	$6,875
750	1300	$7,623	$7,155			$7,389	$7,115
825	1400	$8,733	$7,155			$7,944	$7,341
900	1500	$8,838	$7,155			$7,997	$7,557
975	1600	$9,948	$7,155			$8,552	$7,763
1050	1600	$10,053	$7,155	$4,215	$8,000	$7,356	$7,962
1200	1800	$11,268	$7,155	$5,210	$8,667	$8,075	$8,351
1350	2000		$7,755	$6,304	$9,000	$7,687	$8,740
1500	2100		$8,355	$7,402	$9,667	$8,475	$9,150
1650	2300		$8,955	$8,528	$10,333	$9,272	$9,598
1800	2500		$9,555	$9,754	$10,333	$9,881	$10,103
1950	2700		$10,275	$10,943	$11,000	$10,740	$10,684
2100	2800		$11,355	$12,161	$11,333	$11,617	$11,360
2250	3000		$11,355	$13,414	$12,000	$12,257	$12,148
2400	3200		$12,355	$14,870	$12,667	$13,297	$13,068
2550	3400			$16,236	$13,333	$14,785	$14,138
2700	3600			$17,591	$14,000	$15,795	$15,377
3000	3900			$20,462	$15,000	$17,731	$18,436

Gravity Pipe Tunnelling Cost Curve ($/m)

Cost ($/m) = A*(Dia. mm)^3 + B*(Dia. mm)^2 + C*(Dia. mm) + D	
A=	9.194E-07
B=	-0.003281216
C=	6.475908437
D=	3715.87458

Tenders

Diameter (mm)	Tender No.	Length (m)	Unit Rate ($/m)	Type	Cost ($)
1200	2022-292T	269	$ 10,359	MT	$ 2,786,522
2400	2020-029T	6288	$ 16,814	MT	$ 105,725,642
2400	2022-004T	5040	$ 25,070	MT	$ 126,354,611



Standard Tunnelling Rate Single Pass / Double Pass

Pressure pipe

WM Pipe Diameter (mm)	casing pipe diameter for double pass installation (mm)	Jack and Bore ($/m)	Microtunnel ($/m)	Pipe Jacking ($/m)	HDD ($/m)	TBM ($/m)	Blended Rate ($/m)	Blended Cost Curve ($/m)
150	500	$1,088	$7,608		$715		$3,137	$ 3,120
300	600	$1,968	$7,818		$1,240		$3,675	$ 3,630
400	700	$2,640	$7,820		$1,590		$4,017	$ 4,171
600	1100	$6,440	$8,940		$2,290		$5,890	$ 5,737
750	1300	$8,620	$10,380		$2,815		$7,272	$ 7,334
900	1400	$10,130	$11,820				$10,975	$ 11,174
1050	1600	$12,310	$13,260				$12,785	$ 11,737
1200	1800	$14,490	$14,700	$5,210			$11,467	$ 12,157
1350	2000		$16,260	$6,304			$11,282	$ 12,456
1500	2100		$18,180	$7,402			$12,791	$ 12,660
1650	2300		$19,020	$8,528			$13,774	$ 12,791
1800	2500		$20,860	$9,754		$10,333	$13,649	$ 12,876
2100	2800			$12,161		$11,333	$11,747	$ 12,999
2400	3100			$14,870		$12,333	$13,601	$ 13,223

Pressure Pipe Tunnelling Cost Curve ($/m)

Diameter <=750mm

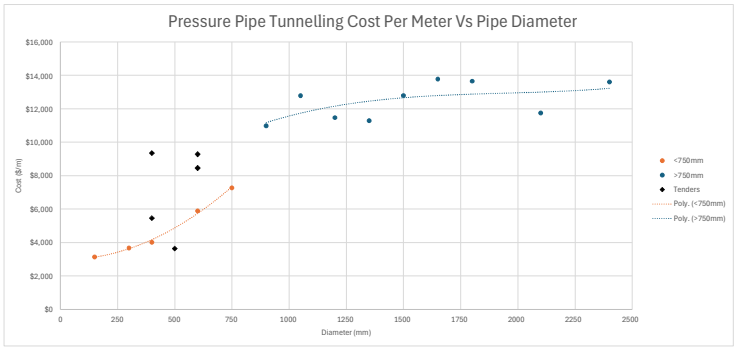
Cost ($/m) = A*(Dia. mm)^2 + B*(Dia. mm) + C	
A=	0.008061996
B=	-0.232271762
C=	2973.615924

Diameter >750mm

Cost ($/m) = A*(Dia. mm)^3 + B*(Dia. mm)^2 + C*(Dia. mm) + D	
A=	1.1936E-06
B=	-0.006962913
C=	13.92319616
D=	3412.901435

Tenders

Diameter (mm)	Tender No.	Length (m)	Unit Rate ($/m)	Type	Cost ($)
400	2023-586T	381	$ 9,345.00	MT	$ 3,560,445
400	2023-011T	63	$ 5,452.00	MT	$ 343,476
500	2023-083T	280	$ 3,639.00	HDD	$ 1,018,920
600	2023-088T	810	$ 8,458.00	MT	$ 6,850,980
600	2022-292T	353	$ 9,280.00	MT	$ 3,275,840



Shaft Costs

Micro Tunnelling $ 12,500 $ / m inside shaft dia. / m depth to tunnel liner invert

	Launch Shaft			Receiving Shaft		
Pipe Diameter (mm)	Diameter (mm)	Depth (m)	Cost ($)	Diameter (mm)	Depth (m)	Cost ($)
250	7	8	$ 700,000	5	8	$ 500,000
250	7	9	$ 787,500	5	9	$ 562,500
250	7	10	$ 875,000	5	10	$ 625,000
250	7	11	$ 962,500	5	11	$ 687,500
250	7	12	$ 1,050,000	5	12	$ 750,000
250	7	13	$ 1,137,500	5	13	$ 812,500
250	7	14	$ 1,225,000	5	14	$ 875,000
250	7	15	$ 1,312,500	5	15	$ 937,500
250	7	16	$ 1,400,000	5	16	$ 1,000,000
250	7	17	$ 1,487,500	5	17	$ 1,062,500
250	7	18	$ 1,575,000	5	18	$ 1,125,000
250	7	19	$ 1,662,500	5	19	$ 1,187,500
250	7	20	$ 1,750,000	5	20	$ 1,250,000
300	7	8	$ 700,000	5	8	$ 500,000
300	7	9	$ 787,500	5	9	$ 562,500
300	7	10	$ 875,000	5	10	$ 625,000
300	7	11	$ 962,500	5	11	$ 687,500
300	7	12	$ 1,050,000	5	12	$ 750,000
300	7	13	$ 1,137,500	5	13	$ 812,500
300	7	14	$ 1,225,000	5	14	$ 875,000
300	7	15	$ 1,312,500	5	15	$ 937,500
300	7	16	$ 1,400,000	5	16	$ 1,000,000
300	7	17	$ 1,487,500	5	17	$ 1,062,500
300	7	18	$ 1,575,000	5	18	$ 1,125,000
300	7	19	$ 1,662,500	5	19	$ 1,187,500
300	7	20	$ 1,750,000	5	20	$ 1,250,000
375	7	8	$ 700,000	5	8	$ 500,000
375	7	9	$ 787,500	5	9	$ 562,500
375	7	10	$ 875,000	5	10	$ 625,000
375	7	11	$ 962,500	5	11	$ 687,500
375	7	12	$ 1,050,000	5	12	$ 750,000
375	7	13	$ 1,137,500	5	13	$ 812,500
375	7	14	$ 1,225,000	5	14	$ 875,000
375	7	15	$ 1,312,500	5	15	$ 937,500
375	7	16	$ 1,400,000	5	16	$ 1,000,000
375	7	17	$ 1,487,500	5	17	$ 1,062,500

Gravity Sewer Shafts

Summary Table	Launch	Receiving
Pipe Dia. (mm)	Shaft Dia.	Shaft Dia.
250	7	5
300	7	5
375	7	5
450	7	5
525	7	5
600	7	5
675	7	5
750	7	5
825	7	5
900	7	5
975	7	5
1050	7	5
1200	7	5
1350	7	5
1500	7	5
1650	8	6
1800	8	6
1950	8	6
2100	9	7
2250	9	7
2400	9	7
2550	9	7
2700	10	8
3000	10	8

Watermain Shafts

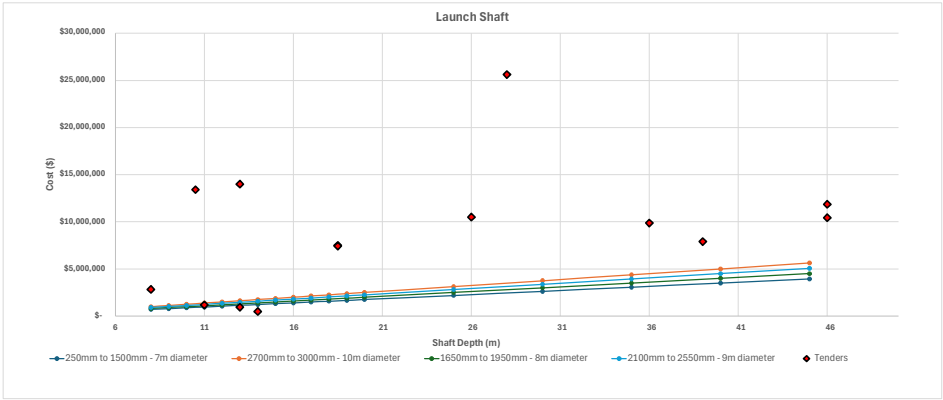
Summary Table	Launch	Receiving
Pipe Dia. (mm)	Shaft Dia.	Shaft Dia.
100	7	5
150	7	5
200	7	5
250	7	5
300	7	5
350	7	5
400	7	5
450	7	5
500	7	5
600	7	5
750	7	5
900	7	5
1050	8	6
1200	8	6
1350	8	6
1500	9	7
1650	9	7
1800	10	8
1950	10	8
2100	10	8
2250	10	8

Tenders

Pipe Diameter (mm)	Tender No.	Length (m)	Unit Rates ($/m)		Total Cost ($)		Assumed Shaft Depth (m)	Actual Shaft Diameter (mm)	Equivalent Diameter (m)	Actual Shaft Depth (m)	Shaft No.	
			Launch Shaft ($/m)	Receiving Shaft ($/m)	Launch Shaft	Receiving Shaft						
400mm	2023-586T	381	$ 2,450	$ 1,914	$ 933,450	$ 729,234	8	5 x 3	4.4	13		
400mm	2023-011T	63	$ 3,906	$ 1,916	$ 246,078	$ 120,708	8					
400mm	2023-173T	55.5	$ 8,170	$ 10,648	$ 453,435	$ 590,964	8					
600mm	2022-292T	353	$ 3,332	$ 1,548	$ 1,176,196	$ 546,444	-	13		11		$ 1,787,500.00
1200mm	2022-292T	269	$ -	$ 1,810	$ -	$ 486,890	-	2.6		14		$ 455,000.00
2400	2020-029T				$ 7,484,776	$ -	-	12		18.5	2A	$ 2,775,000.00
2400	2020-029T				$ 7,895,534	$ -	-	8		39	3	$ 3,900,000.00

375	7	18	$ 1,575,000	5	18	$ 1,125,000
375	7	19	$ 1,662,500	5	19	$ 1,187,500
375	7	20	$ 1,750,000	5	20	$ 1,250,000
450	7	8	$ 700,000	5	8	$ 500,000
450	7	9	$ 787,500	5	9	$ 562,500
450	7	10	$ 875,000	5	10	$ 625,000
450	7	11	$ 962,500	5	11	$ 687,500
450	7	12	$ 1,050,000	5	12	$ 750,000
450	7	13	$ 1,137,500	5	13	$ 812,500
450	7	14	$ 1,225,000	5	14	$ 875,000
450	7	15	$ 1,312,500	5	15	$ 937,500
450	7	16	$ 1,400,000	5	16	$ 1,000,000
450	7	17	$ 1,487,500	5	17	$ 1,062,500
450	7	18	$ 1,575,000	5	18	$ 1,125,000
450	7	19	$ 1,662,500	5	19	$ 1,187,500
450	7	20	$ 1,750,000	5	20	$ 1,250,000
525	7	8	$ 700,000	5	8	$ 500,000
525	7	9	$ 787,500	5	9	$ 562,500
525	7	10	$ 875,000	5	10	$ 625,000
525	7	11	$ 962,500	5	11	$ 687,500
525	7	12	$ 1,050,000	5	12	$ 750,000
525	7	13	$ 1,137,500	5	13	$ 812,500
525	7	14	$ 1,225,000	5	14	$ 875,000
525	7	15	$ 1,312,500	5	15	$ 937,500
525	7	16	$ 1,400,000	5	16	$ 1,000,000
525	7	17	$ 1,487,500	5	17	$ 1,062,500
525	7	18	$ 1,575,000	5	18	$ 1,125,000
525	7	19	$ 1,662,500	5	19	$ 1,187,500
525	7	20	$ 1,750,000	5	20	$ 1,250,000
600	7	8	$ 700,000	5	8	$ 500,000
600	7	9	$ 787,500	5	9	$ 562,500
600	7	10	$ 875,000	5	10	$ 625,000
600	7	11	$ 962,500	5	11	$ 687,500
600	7	12	$ 1,050,000	5	12	$ 750,000
600	7	13	$ 1,137,500	5	13	$ 812,500
600	7	14	$ 1,225,000	5	14	$ 875,000
600	7	15	$ 1,312,500	5	15	$ 937,500
600	7	16	$ 1,400,000	5	16	$ 1,000,000
600	7	17	$ 1,487,500	5	17	$ 1,062,500
600	7	18	$ 1,575,000	5	18	$ 1,125,000
600	7	19	$ 1,662,500	5	19	$ 1,187,500
600	7	20	$ 1,750,000	5	20	$ 1,250,000
675	7	8	$ 700,000	5	8	$ 500,000
675	7	9	$ 787,500	5	9	$ 562,500
675	7	10	$ 875,000	5	10	$ 625,000
675	7	11	$ 962,500	5	11	$ 687,500
675	7	12	$ 1,050,000	5	12	$ 750,000
675	7	13	$ 1,137,500	5	13	$ 812,500
675	7	14	$ 1,225,000	5	14	$ 875,000
675	7	15	$ 1,312,500	5	15	$ 937,500
675	7	16	$ 1,400,000	5	16	$ 1,000,000
675	7	17	$ 1,487,500	5	17	$ 1,062,500
675	7	18	$ 1,575,000	5	18	$ 1,125,000
675	7	19	$ 1,662,500	5	19	$ 1,187,500
675	7	20	$ 1,750,000	5	20	$ 1,250,000
750	7	8	$ 700,000	5	8	$ 500,000
750	7	9	$ 787,500	5	9	$ 562,500
750	7	10	$ 875,000	5	10	$ 625,000
750	7	11	$ 962,500	5	11	$ 687,500
750	7	12	$ 1,050,000	5	12	$ 750,000
750	7	13	$ 1,137,500	5	13	$ 812,500
750	7	14	$ 1,225,000	5	14	$ 875,000
750	7	15	$ 1,312,500	5	15	$ 937,500
750	7	16	$ 1,400,000	5	16	$ 1,000,000
750	7	17	$ 1,487,500	5	17	$ 1,062,500
750	7	18	$ 1,575,000	5	18	$ 1,125,000
750	7	19	$ 1,662,500	5	19	$ 1,187,500
750	7	20	$ 1,750,000	5	20	$ 1,250,000
825	7	8	$ 700,000	5	8	$ 500,000
825	7	9	$ 787,500	5	9	$ 562,500
825	7	10	$ 875,000	5	10	$ 625,000
825	7	11	$ 962,500	5	11	$ 687,500
825	7	12	$ 1,050,000	5	12	$ 750,000
825	7	13	$ 1,137,500	5	13	$ 812,500
825	7	14	$ 1,225,000	5	14	$ 875,000
825	7	15	$ 1,312,500	5	15	$ 937,500
825	7	16	$ 1,400,000	5	16	$ 1,000,000
825	7	17	$ 1,487,500	5	17	$ 1,062,500
825	7	18	$ 1,575,000	5	18	$ 1,125,000
825	7	19	$ 1,662,500	5	19	$ 1,187,500
825	7	20	$ 1,750,000	5	20	$ 1,250,000
900	7	8	$ 700,000	5	8	$ 500,000
900	7	9	$ 787,500	5	9	$ 562,500
900	7	10	$ 875,000	5	10	$ 625,000
900	7	11	$ 962,500	5	11	$ 687,500
900	7	12	$ 1,050,000	5	12	$ 750,000
900	7	13	$ 1,137,500	5	13	$ 812,500
900	7	14	$ 1,225,000	5	14	$ 875,000
900	7	15	$ 1,312,500	5	15	$ 937,500
900	7	16	$ 1,400,000	5	16	$ 1,000,000
900	7	17	$ 1,487,500	5	17	$ 1,062,500
900	7	18	$ 1,575,000	5	18	$ 1,125,000
900	7	19	$ 1,662,500	5	19	$ 1,187,500
900	7	20	$ 1,750,000	5	20	$ 1,250,000
975	7	8	$ 700,000	5	8	$ 500,000
975	7	9	$ 787,500	5	9	$ 562,500
975	7	10	$ 875,000	5	10	$ 625,000
975	7	11	$ 962,500	5	11	$ 687,500
975	7	12	$ 1,050,000	5	12	$ 750,000
975	7	13	$ 1,137,500	5	13	$ 812,500
975	7	14	$ 1,225,000	5	14	$ 875,000
975	7	15	$ 1,312,500	5	15	$ 937,500
975	7	16	$ 1,400,000	5	16	$ 1,000,000
975	7	17	$ 1,487,500	5	17	$ 1,062,500
975	7	18	$ 1,575,000	5	18	$ 1,125,000
975	7	19	$ 1,662,500	5	19	$ 1,187,500
975	7	20	$ 1,750,000	5	20	$ 1,250,000
1050	7	8	$ 700,000	5	8	$ 500,000
1050	7	9	$ 787,500	5	9	$ 562,500
1050	7	10	$ 875,000	5	10	$ 625,000
1050	7	11	$ 962,500	5	11	$ 687,500
1050	7	12	$ 1,050,000	5	12	$ 750,000
1050	7	13	$ 1,137,500	5	13	$ 812,500
1050	7	14	$ 1,225,000	5	14	$ 875,000
1050	7	15	$ 1,312,500	5	15	$ 937,500
1050	7	16	$ 1,400,000	5	16	$ 1,000,000

2400	2020-029T				$ 11,849,923	$ -	-	11		46	4	$ 6,325,000.00
2400	2020-029T				$ 7,430,976	$ -	-	12		18.5	2B	$ 2,775,000.00
2400	2020-029T				$ 10,427,785	$ -	-	8		46	5	$ 4,600,000.00
2400	2022-004T				$ 13,412,705			13.3 x 15	15.9	10.5	1	$ 2,086,875.00
2400	2022-004T				$ 9,874,738			7		36	5A	$ 3,150,000.00
2400	2022-004T				$ 10,496,696			8		26	6	$ 2,600,000.00
2400	2022-004T				$ 13,997,866			10.5 x 16	14.6	13	6A	$ 2,372,500.00
2400	2022-004T				$ 25,621,689			17		28	7	$ 5,950,000.00
2400	2022-004T				$ 2,816,129			7.5		8	12	$ 750,000.00



1050	7	17	$ 1,487,500	5	17	$ 1,062,500
1050	7	18	$ 1,575,000	5	18	$ 1,125,000
1050	7	19	$ 1,662,500	5	19	$ 1,187,500
1050	7	20	$ 1,750,000	5	20	$ 1,250,000
1200	10	8	$ 1,000,000	5	8	$ 500,000
1200	10	9	$ 1,125,000	5	9	$ 562,500
1200	10	10	$ 1,250,000	5	10	$ 625,000
1200	10	11	$ 1,375,000	5	11	$ 687,500
1200	10	12	$ 1,500,000	5	12	$ 750,000
1200	10	13	$ 1,625,000	5	13	$ 812,500
1200	10	14	$ 1,750,000	5	14	$ 875,000
1200	10	15	$ 1,875,000	5	15	$ 937,500
1200	10	16	$ 2,000,000	5	16	$ 1,000,000
1200	10	20	$ 2,500,000	5	17	$ 1,062,500
1200	10	30	$ 3,750,000	5	18	$ 1,125,000
1200	10	40	$ 5,000,000			
1200	13	45	$ 7,312,500	5	19	$ 1,187,500
1200	13	50	$ 8,125,000	5	20	$ 1,250,000
1350	7	8	$ 700,000	5	8	$ 500,000
1350	7	9	$ 787,500	5	9	$ 562,500
1350	7	10	$ 875,000	5	10	$ 625,000
1350	7	11	$ 962,500	5	11	$ 687,500
1350	7	12	$ 1,050,000	5	12	$ 750,000
1350	7	13	$ 1,137,500	5	13	$ 812,500
1350	7	14	$ 1,225,000	5	14	$ 875,000
1350	7	15	$ 1,312,500	5	15	$ 937,500
1350	7	16	$ 1,400,000	5	16	$ 1,000,000
1350	7	17	$ 1,487,500	5	17	$ 1,062,500
1350	7	18	$ 1,575,000	5	18	$ 1,125,000
1350	7	19	$ 1,662,500	5	19	$ 1,187,500
1350	7	20	$ 1,750,000	5	20	$ 1,250,000
1500	7	8	$ 700,000	5	8	$ 500,000
1500	7	9	$ 787,500	5	9	$ 562,500
1500	7	10	$ 875,000	5	10	$ 625,000
1500	7	11	$ 962,500	5	11	$ 687,500
1500	7	12	$ 1,050,000	5	12	$ 750,000
1500	7	13	$ 1,137,500	5	13	$ 812,500
1500	7	14	$ 1,225,000	5	14	$ 875,000
1500	7	15	$ 1,312,500	5	15	$ 937,500
1500	7	16	$ 1,400,000	5	16	$ 1,000,000
1500	7	17	$ 1,487,500	5	17	$ 1,062,500
1500	7	18	$ 1,575,000	5	18	$ 1,125,000
1500	7	19	$ 1,662,500	5	19	$ 1,187,500
1500	7	20	$ 1,750,000	5	20	$ 1,250,000
1500	7	25	$ 2,187,500	5	25	$ 1,562,500
1500	7	30	$ 2,625,000	5	30	$ 1,875,000
1500	7	35	$ 3,062,500	5	35	$ 2,187,500
1500	7	40	$ 3,500,000	5	40	$ 2,500,000
1500	7	45	$ 3,937,500	5	45	$ 2,812,500
1650	8	8	$ 800,000	6	8	$ 600,000
1650	8	9	$ 900,000	6	9	$ 675,000
1650	8	10	$ 1,000,000	6	10	$ 750,000
1650	8	11	$ 1,100,000	6	11	$ 825,000
1650	8	12	$ 1,200,000	6	12	$ 900,000
1650	8	13	$ 1,300,000	6	13	$ 975,000
1650	8	14	$ 1,400,000	6	14	$ 1,050,000
1650	8	15	$ 1,500,000	6	15	$ 1,125,000
1650	8	16	$ 1,600,000	6	16	$ 1,200,000
1650	8	17	$ 1,700,000	6	17	$ 1,275,000
1650	8	18	$ 1,800,000	6	18	$ 1,350,000
1650	8	19	$ 1,900,000	6	19	$ 1,425,000
1650	8	20	$ 2,000,000	6	20	$ 1,500,000
1800	8	8	$ 800,000	6	8	$ 600,000
1800	8	9	$ 900,000	6	9	$ 675,000
1800	8	10	$ 1,000,000	6	10	$ 750,000
1800	8	11	$ 1,100,000	6	11	$ 825,000
1800	8	12	$ 1,200,000	6	12	$ 900,000
1800	8	13	$ 1,300,000	6	13	$ 975,000
1800	8	14	$ 1,400,000	6	14	$ 1,050,000
1800	8	15	$ 1,500,000	6	15	$ 1,125,000
1800	8	16	$ 1,600,000	6	16	$ 1,200,000
1800	8	17	$ 1,700,000	6	17	$ 1,275,000
1800	8	18	$ 1,800,000	6	18	$ 1,350,000
1800	8	19	$ 1,900,000	6	19	$ 1,425,000
1800	8	20	$ 2,000,000	6	20	$ 1,500,000
1950	8	8	$ 800,000	6	8	$ 600,000
1950	8	9	$ 900,000	6	9	$ 675,000
1950	8	10	$ 1,000,000	6	10	$ 750,000
1950	8	11	$ 1,100,000	6	11	$ 825,000
1950	8	12	$ 1,200,000	6	12	$ 900,000
1950	8	13	$ 1,300,000	6	13	$ 975,000
1950	8	14	$ 1,400,000	6	14	$ 1,050,000
1950	8	15	$ 1,500,000	6	15	$ 1,125,000
1950	8	16	$ 1,600,000	6	16	$ 1,200,000
1950	8	17	$ 1,700,000	6	17	$ 1,275,000
1950	8	18	$ 1,800,000	6	18	$ 1,350,000
1950	8	19	$ 1,900,000	6	19	$ 1,425,000
1950	8	20	$ 2,000,000	6	20	$ 1,500,000
1950	8	25	$ 2,500,000	6	25	$ 1,875,000
1950	8	30	$ 3,000,000	6	30	$ 2,250,000
1950	8	35	$ 3,500,000	6	35	$ 2,625,000
1950	8	40	$ 4,000,000	6	40	$ 3,000,000
1950	8	45	$ 4,500,000	6	45	$ 3,375,000
2100	9	8	$ 900,000	7	8	$ 700,000
2100	9	9	$ 1,012,500	7	9	$ 787,500
2100	9	10	$ 1,125,000	7	10	$ 875,000
2100	9	11	$ 1,237,500	7	11	$ 962,500
2100	9	12	$ 1,350,000	7	12	$ 1,050,000
2100	9	13	$ 1,462,500	7	13	$ 1,137,500
2100	9	14	$ 1,575,000	7	14	$ 1,225,000
2100	9	15	$ 1,687,500	7	15	$ 1,312,500
2100	9	16	$ 1,800,000	7	16	$ 1,400,000
2100	9	17	$ 1,912,500	7	17	$ 1,487,500
2100	9	18	$ 2,025,000	7	18	$ 1,575,000
2100	9	19	$ 2,137,500	7	19	$ 1,662,500
2100	9	20	$ 2,250,000	7	20	$ 1,750,000
2250	9	8	$ 900,000	7	8	$ 700,000
2250	9	9	$ 1,012,500	7	9	$ 787,500
2250	9	10	$ 1,125,000	7	10	$ 875,000
2250	9	11	$ 1,237,500	7	11	$ 962,500
2250	9	12	$ 1,350,000	7	12	$ 1,050,000
2250	9	13	$ 1,462,500	7	13	$ 1,137,500
2250	9	14	$ 1,575,000	7	14	$ 1,225,000
2250	9	15	$ 1,687,500	7	15	$ 1,312,500
2250	9	16	$ 1,800,000	7	16	$ 1,400,000
2250	9	17	$ 1,912,500	7	17	$ 1,487,500

2250	9	18	$ 2,025,000	7	18	$ 1,575,000
2250	9	19	$ 2,137,500	7	19	$ 1,662,500
2250	9	20	$ 2,250,000	7	20	$ 1,750,000
2400	9	8	$ 900,000	7	8	$ 700,000
2400	9	9	$ 1,012,500	7	9	$ 787,500
2400	9	10	$ 1,125,000	7	10	$ 875,000
2400	9	11	$ 1,237,500	7	11	$ 962,500
2400	9	12	$ 1,350,000	7	12	$ 1,050,000
2400	9	13	$ 1,462,500	7	13	$ 1,137,500
2400	9	14	$ 1,575,000	7	14	$ 1,225,000
2400	9	15	$ 1,687,500	7	15	$ 1,312,500
2400	9	16	$ 1,800,000	7	16	$ 1,400,000
2400	9	17	$ 1,912,500	7	17	$ 1,487,500
2400	9	18	$ 2,025,000	7	18	$ 1,575,000
2400	9	19	$ 2,137,500	7	19	$ 1,662,500
2400	9	20	$ 2,250,000	7	20	$ 1,750,000
2550	9	8	$ 900,000	7	8	$ 700,000
2550	9	9	$ 1,012,500	7	9	$ 787,500
2550	9	10	$ 1,125,000	7	10	$ 875,000
2550	9	11	$ 1,237,500	7	11	$ 962,500
2550	9	12	$ 1,350,000	7	12	$ 1,050,000
2550	9	13	$ 1,462,500	7	13	$ 1,137,500
2550	9	14	$ 1,575,000	7	14	$ 1,225,000
2550	9	15	$ 1,687,500	7	15	$ 1,312,500
2550	9	16	$ 1,800,000	7	16	$ 1,400,000
2550	9	17	$ 1,912,500	7	17	$ 1,487,500
2550	9	18	$ 2,025,000	7	18	$ 1,575,000
2550	9	19	$ 2,137,500	7	19	$ 1,662,500
2550	9	20	$ 2,250,000	7	20	$ 1,750,000
2550	9	25	$ 2,812,500	7	25	$ 2,187,500
2550	9	30	$ 3,375,000	7	30	$ 2,625,000
2550	9	35	$ 3,937,500	7	35	$ 3,062,500
2550	9	40	$ 4,500,000	7	40	$ 3,500,000
2550	9	45	$ 5,062,500	7	45	$ 3,937,500
2700	10	8	$ 1,000,000	8	8	$ 800,000
2700	10	9	$ 1,125,000	8	9	$ 900,000
2700	10	10	$ 1,250,000	8	10	$ 1,000,000
2700	10	11	$ 1,375,000	8	11	$ 1,100,000
2700	10	12	$ 1,500,000	8	12	$ 1,200,000
2700	10	13	$ 1,625,000	8	13	$ 1,300,000
2700	10	14	$ 1,750,000	8	14	$ 1,400,000
2700	10	15	$ 1,875,000	8	15	$ 1,500,000
2700	10	16	$ 2,000,000	8	16	$ 1,600,000
2700	10	17	$ 2,125,000	8	17	$ 1,700,000
2700	10	18	$ 2,250,000	8	18	$ 1,800,000
2700	10	19	$ 2,375,000	8	19	$ 1,900,000
2700	10	20	$ 2,500,000	8	20	$ 2,000,000
3000	10	8	$ 1,000,000	8	8	$ 800,000
3000	10	9	$ 1,125,000	8	9	$ 900,000
3000	10	10	$ 1,250,000	8	10	$ 1,000,000
3000	10	11	$ 1,375,000	8	11	$ 1,100,000
3000	10	12	$ 1,500,000	8	12	$ 1,200,000
3000	10	13	$ 1,625,000	8	13	$ 1,300,000
3000	10	14	$ 1,750,000	8	14	$ 1,400,000
3000	10	15	$ 1,875,000	8	15	$ 1,500,000
3000	10	16	$ 2,000,000	8	16	$ 1,600,000
3000	10	17	$ 2,125,000	8	17	$ 1,700,000
3000	10	18	$ 2,250,000	8	18	$ 1,800,000
3000	10	19	$ 2,375,000	8	19	$ 1,900,000
3000	10	20	$ 2,500,000	8	20	$ 2,000,000
3000	10	25	$ 3,125,000	8	25	$ 2,500,000
3000	10	30	$ 3,750,000	8	30	$ 3,000,000
3000	10	35	$ 4,375,000	8	35	$ 3,500,000
3000	10	40	$ 5,000,000	8	40	$ 4,000,000
3000	10	45	$ 5,625,000	8	45	$ 4,500,000

Linear Unit Rates

Watermain & Forcemain Unit Rates

Diameter	Excavation	Bedding & Backfill	Pipe Supply & Install	Structures	Connections & Testing	Restoration	Total Unit Cost	Total Unit Cost - Structures
(mm)	($/m)	($/m)	($/m)	($/m)	($/m)	($/m)	($2025/m)	($2025/m)
400	$ 710	$ 218	$ 593	$ 588	$ 500	$ 465	**$ 3,074**	**$ 2,485**
450	$ 779	$ 238	$ 716	$ 263	$ 500	$ 471	**$ 2,968**	**$ 2,705**
500	$ 773	$ 242	$ 877	$ 296	$ 500	$ 477	**$ 3,165**	**$ 2,869**
600	$ 846	$ 269	$ 1,149	$ 362	$ 500	$ 490	**$ 3,616**	**$ 3,254**
750	$ 1,020	$ 325	$ 1,310	$ 560	$ 500	$ 508	**$ 4,222**	**$ 3,662**
900	$ 1,266	$ 396	$ 1,436	$ 593	$ 500	$ 526	**$ 4,717**	**$ 4,125**
1050	$ 1,379	$ 493	$ 1,843	$ 724	$ 500	$ 545	**$ 5,485**	**$ 4,760**
1200	$ 1,516	$ 553	$ 2,261	$ 922	$ 500	$ 563	**$ 6,314**	**$ 5,392**
1350	$ 1,678	$ 619	$ 2,865	$ 988	$ 500	$ 582	**$ 7,231**	**$ 6,244**
1500	$ 1,815	$ 681	$ 3,407	$ 1,152	$ 500	$ 600	**$ 8,156**	**$ 7,004**
1650	$ 1,991	$ 753	$ 4,042	$ 1,317	$ 500	$ 618	**$ 9,222**	**$ 7,905**
1800	$ 2,174	$ 828	$ 4,659	$ 1,481	$ 500	$ 637	**$ 10,280**	**$ 8,798**
2100	$ 2,517	$ 974	$ 5,191	$ 1,646	$ 500	$ 674	**$ 11,502**	**$ 9,856**

Watermain or Forcemain (Pressure Pipe) - Tunnelled installation (Blended)

Diameter	Tunnelling	Shafts	Total Unit Cost
(mm)	($/m)	($/m)	($2025/m)
400	$ 4,171	$ 3,985	$ 8,156
450	$ 4,562	$ 3,985	$ 8,547
500	$ 4,954	$ 3,985	$ 8,939
600	$ 5,737	$ 3,985	$ 9,722
750	$ 7,334	$ 3,985	$ 11,319
900	$ 11,174	$ 3,985	$ 15,159
1050	$ 11,737	$ 3,985	$ 15,722
1200	$ 12,157	$ 3,985	$ 16,142
1350	$ 12,456	$ 3,985	$ 16,441
1500	$ 12,660	$ 3,985	$ 16,645
1650	$ 12,791	$ 4,554	$ 17,346
1800	$ 12,876	$ 4,554	$ 17,430
2100	$ 12,999	$ 5,124	$ 18,123

Watermain or Forcemain (Pressure Pipe) - Tunnelled installation (Jack & Bore)

WM Pipe Diameter (mm)	casing pipe diameter for double pass installation (mm)	Jack and Bore ($/m)
150	500	$1,088
300	600	$1,968
400	700	$2,640
600	1100	$6,440
750	1300	$8,620
900	1400	$10,130
1050	1600	$12,310
1200	1800	$14,490
1350	2000	
1500	2100	
1650	2300	
1800	2500	
2100	2800	
2400	3100	

Watermain or Forcemain (Pressure Pipe)

Diameter	Unit Cost	Major Creek / Road	Minor Road / Utilities Corridor	Minor Creek
		Length = 150m	Length = 60m	Length = 20m
(mm)	($2025/m)	($2025/m)	($2025/m)	($2025/m)
400	$ 8,156	$ 1,226,033	$ 496,073	$ 183,324
450	$ 8,547	$ 1,285,141	$ 520,524	$ 194,041
500	$ 8,939	$ 1,344,249	$ 544,976	$ 204,758
600	$ 9,722	$ 1,462,465	$ 593,879	$ 226,192
750	$ 11,319	$ 1,704,432	$ 695,517	$ 275,471
900	$ 15,159	$ 2,280,767	$ 926,859	$ 355,152
1050	$ 15,722	$ 2,366,822	$ 964,515	$ 377,970
1200	$ 16,142	$ 2,432,027	$ 995,448	$ 403,680
1350	$ 16,441	$ 2,477,696	$ 1,015,333	$ 415,441
1500	$ 16,645	$ 2,510,150	$ 1,032,357	$ 433,949
1650	$ 17,346	$ 2,617,253	$ 1,079,240	$ 462,410
1800	$ 17,430	$ 2,631,845	$ 1,089,119	$ 478,536
2100	$ 18,123	$ 2,737,643	$ 1,135,481	$ 506,822

*Note Chamber costs included

Chambers

Unit Cost	V&C Unit Cost	Tender Info	Multiplier	2025 Chamber Unit Costs
400	$ 110,612	$ 224,347	2.03	$ 202,118
450	$ 126,413			$ 230,992
500	$ 142,215			$ 259,866
600	$ 173,818	$ 282,682	1.63	$ 317,614
750	$ 268,628			$ 490,858
900	$ 284,430			$ 519,732
1050	$ 347,636			$ 635,228
1200	$ 442,446			$ 808,472
1350	$ 474,050			$ 866,220
1500	$ 553,058			$ 1,010,590
1650	$ 632,066			$ 1,154,960
1800	$ 711,074			$ 1,299,330
2100	$ 790,083			$ 1,443,700
		Average	1.83	

# of chambers	2

	Length (m)
Major Creek / Road	150
Minor Road / Utilities Corridor	60
Minor Creek	20

Two chambers required per crossing (air & drain valve).

1. Escalated 2020 base costs to 2025 — The original 2020 Master Plan costs are multiplied by ~3.16× to get to 2025 dollars. This multiplier was derived by comparing actual Peel tender prices (from awarded contracts) against the 2020 estimates for 400mm and 600mm pipes.

2. Apply a chamber adjustment — That 2025 V&C cost is then multiplied by ~1.83× to get the final Chamber Unit Cost. This second factor accounts for the difference between V&C costs and full chamber costs, validating and calibrating using external neighbouring municipality tender data.

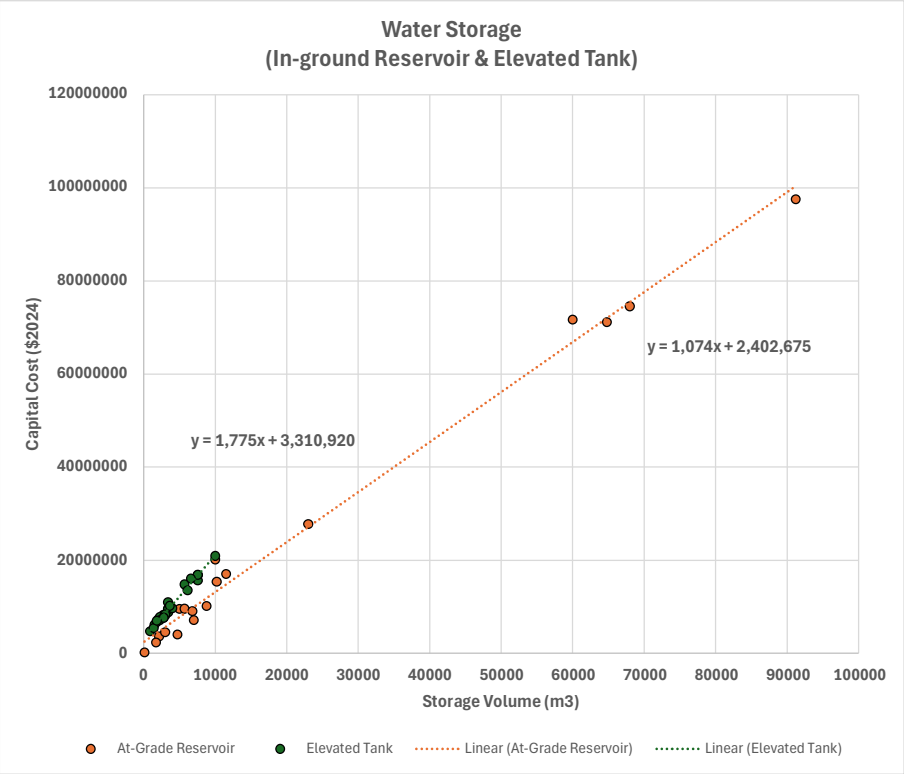
Interconnection Chambers

Estimate Provided by Industry Experts as this is a complex chamber and is beyond the cost of what is provided in Peel MP Cost Estimates

Depth (m)	Cost ($)
4	$ 1,000,000.00
6	$ 1,500,000.00

Vertical Unit Rates

Water Storage: In Ground Reservoirs **and** Elevated Tank



Elevated Tank Sizing:

y=mx+b	
m	1775.00
b	3310920.00

In Ground Reservoir Sizing:

y=mx+b	
m	1074.00
b	2402675.00

Elevated Tank Costing (Tank Only)			
Size (m3)	MP Cost $2025	Landmark Costs	% Difference
5,000	$ 12,185,920.00		
10,000	$ 21,060,920.00	$ 14,900,000.00	29%
15,000	$ 29,935,920.00		
20,000	$ 38,810,920.00		
25,000	$ 47,685,920.00		
30,000	$ 56,560,920.00		

As per Peel Master Plan Methodology:

Installation Cost	=	Basic Cost to Install Linear Infrastructure
Total Construction Cost	=	Basic Cost + General + Provisional + Construction Contingency
Total Design Cost	=	Geotechnical + Property/Easement + Engineering/Design + Design/Contract Administration + Approvals
Total Project Costs	=	Total Design Costs + Project Contingency (Complexity) + Total Construction Costs

General Items Cost as Percentage of Installation Cost

	Installation Cost ($)	Applicable Percentage (%) for General Items
Less Than	<$2,000,000	20%
	$2,000,000.00	17%
	$4,000,000.00	14%
	$6,000,000.00	12%
	$8,000,000.00	11%
	$10,000,000.00	10%
Greater Than	>10,000,000	9%

Provisional Items Allowance Cost as Percentage of Installation Cost

	Installation Cost ($)	Applicable Percentage (%) for Provisional Items Allowance
Less Than	<$2,000,000	12%
	$2,000,000.00	10%
	$4,000,000.00	9%
	$6,000,000.00	8%
	$8,000,000.00	7%
	$10,000,000.00	7%
Greater Than	>10,000,000	6%

Contingency Allowance Cost as Percentage of Installation Cost

	Installation Cost ($)	Applicable Percentage (%) for Construction Contingency Allowance
Less Than	<$2,000,000	20%
	$2,000,000.00	18%
	$4,000,000.00	15%
	$6,000,000.00	14%
	$8,000,000.00	13%
	$10,000,000.00	12%
Greater Than	>10,000,000	10%

Soft Costs

Geotechnical/Hydrogeological

Linear	
Low Complexity	0.50%
Medium Complexity	1.00%
High Complexity	2.00%
Facility	2.00%

Property/Easements

Linear	
Low Complexity	1.00%
Medium Complexity	1.50%
High Complexity	2.00%
Facility	2.00%

Engineering/Design (Internal)

Total Construction Cost	Percentage (%)
<$10,000,000	8%
$10,000,000 - $50,000,000	6%
>$50,000,000	4%

Design/Contract Administration

Total Construction Cost	Percentage (%)
<$10,000,000	15%
$10,000,000 - $50,000,000	12%
>$50,000,000	10%

Approvals

Total Construction Cost	Percentage (%)
<$10,000,000	1.50%
$10,000,000 - $50,000,000	1.00%
>$50,000,000	0.50%

Project Complexity

Estimate Class	Project Complexity		
	Low	Moderate	High
Class 4	10%	15%	25%
Class 3	10%	15%	20%
Class 2	10%	10%	15%
Class 1	10%	10%	10%

Class 4	
Low	10%
Moderate	15%
High	25%

Class 3	
Low	10%
Moderate	15%
High	20%

Building construction price indexes, by type of building

Type of Buildin Non-residential buildings

Table: 18-10-0135-01 (formerly CANSIM 327-0058)

Source: Statistics Canada
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810027602&pickMembers%5B0%5D=2.7&pickMembers%5B1%5D=3.1&cubeTimeFrame.startMonth=10&cubeTimeFrame.startYear=2022&referencePeriods=20221001%2C20221001

Toronto Series *As of July 31, 2023*

	2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		2024	
)17 BASE YEA	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR
QUARTER		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG
I	91.1		91.8	0.77%	93.7	2.07%	95.3	1.71%	98.9	3.78%	102.1	3.24%	107.4	5.20%	110.6	3.00%	114.2	3.30%	134.2	17.50%	150.6	12.20%	157.6	
II	91.2		92.4	1.32%	94.1	1.84%	96.9	2.98%	100.0	3.20%	104.1	4.10%	108.3	4.00%	111.1	2.60%	119.9	7.90%	140.9	17.50%	152.3	8.10%	159.6	
III	91.2		92.6	1.54%	94.3	1.84%	97.4	3.29%	100.4	3.08%	105.7	5.28%	109.2	3.30%	111.9	2.50%	125	11.70%	144.5	15.60%	155.3			
IV	91.3		93.0	1.86%	94.6	1.72%	98.1	3.70%	100.8	2.75%	106.6	5.75%	109.7	2.90%	112.1	2.20%	129.3	15.30%	148.1	14.50%	156.1			
Ann. Avg.	91.2		92.5	1.37%	94.2	1.87%	96.9	2.92%	100.0	3.20%	104.6	4.59%	108.7	3.80%	111.4	2.60%	122.1	9.60%	141.9	16.20%	153.6			

2022 - 2023	**8.2%**
2019 - 2025	**46.8%**
2020 - 2025	**43.3%**
2024 - 2025	**3.9%**

		Price Index	% Change (	Price Index	% Change (4% CPI)
2015	2015 - Q1	93.7		93.7	
	2015 - Q2	94.1	0.4%	94.1	0.4%
	2015 - Q3	94.3	0.2%	94.3	0.2%
	2015 - Q4	94.6	0.3%	94.6	0.3%
2016	2016 - Q1	95.3	0.7%	95.3	0.7%
	2016 - Q2	96.9	1.7%	96.9	1.7%
	2016 - Q3	97.4	0.5%	97.4	0.5%
	2016 - Q4	98.1	0.7%	98.1	0.7%
2017	2017 - Q1	98.9	0.8%	98.9	0.8%
	2017 - Q2	100	1.1%	100	1.1%
	2017 - Q3	100.4	0.4%	100.4	0.4%
	2017 - Q4	100.8	0.4%	100.8	0.4%
2018	2018 - Q1	102.1	1.3%	102.1	1.3%
	2018 - Q2	104.1	2.0%	104.1	2.0%
	2018 - Q3	105.7	1.5%	105.7	1.5%
	2018 - Q4	106.6	0.9%	106.6	0.9%
2019	2019 - Q1	107.4	0.8%	107.4	0.8%
	2019 - Q2	108.3	0.8%	108.3	0.8%
	2019 - Q3	109.2	0.8%	109.2	0.8%
	2019 - Q4	109.7	0.5%	109.7	0.5%
2020	2020 - Q1	110.6	0.8%	110.8	1%
	2020 - Q2	111.1	0.5%	111.9	1%
	2020 - Q3	111.9	0.7%	113.0	1%
	2020 - Q4	112.1	0.2%	114.2	1%
2021	2021 - Q1	114.2	1.9%	115.3	1%
	2021 - Q2	119.9	5.0%	116.4	1%
	2021 - Q3	125	4.3%	117.6	1%
	2021 - Q4	129.3	3.4%	118.8	1%
2022	2022 - Q1	134.2	3.8%	120.0	1%
	2022 - Q2	140.9	5.0%	121.2	1%
	2022 - Q3	144.5	2.6%	122.4	1%
	2022 - Q4	148.1	2.5%	123.6	1%
2023	2023 - Q1	150.6	1.7%	124.8	1%
	2023 - Q2	152.3	1.1%	126.1	1%
	2023 - Q3	155.3	2.0%	127.4	1%
	2023 - Q4	156.1	0.5%	128.6	1%
2024	2024 - Q1	157.6	1.0%	129.9	1%
	2024 - Q2	159.6	1.3%	131.2	1%
	2024 - Q3				
	2024 - Q4