Technical Memorandum

Project Name: Knipfel Private Water Distribution System Assessment

MTE File No.: C55037-100

To: Chad Woodhouse, Township of Wilmot

Date: December 4, 2024

cc: Jeff Molenhuis, Township of Wilmot
Autumn Hergott, Township of Wilmot

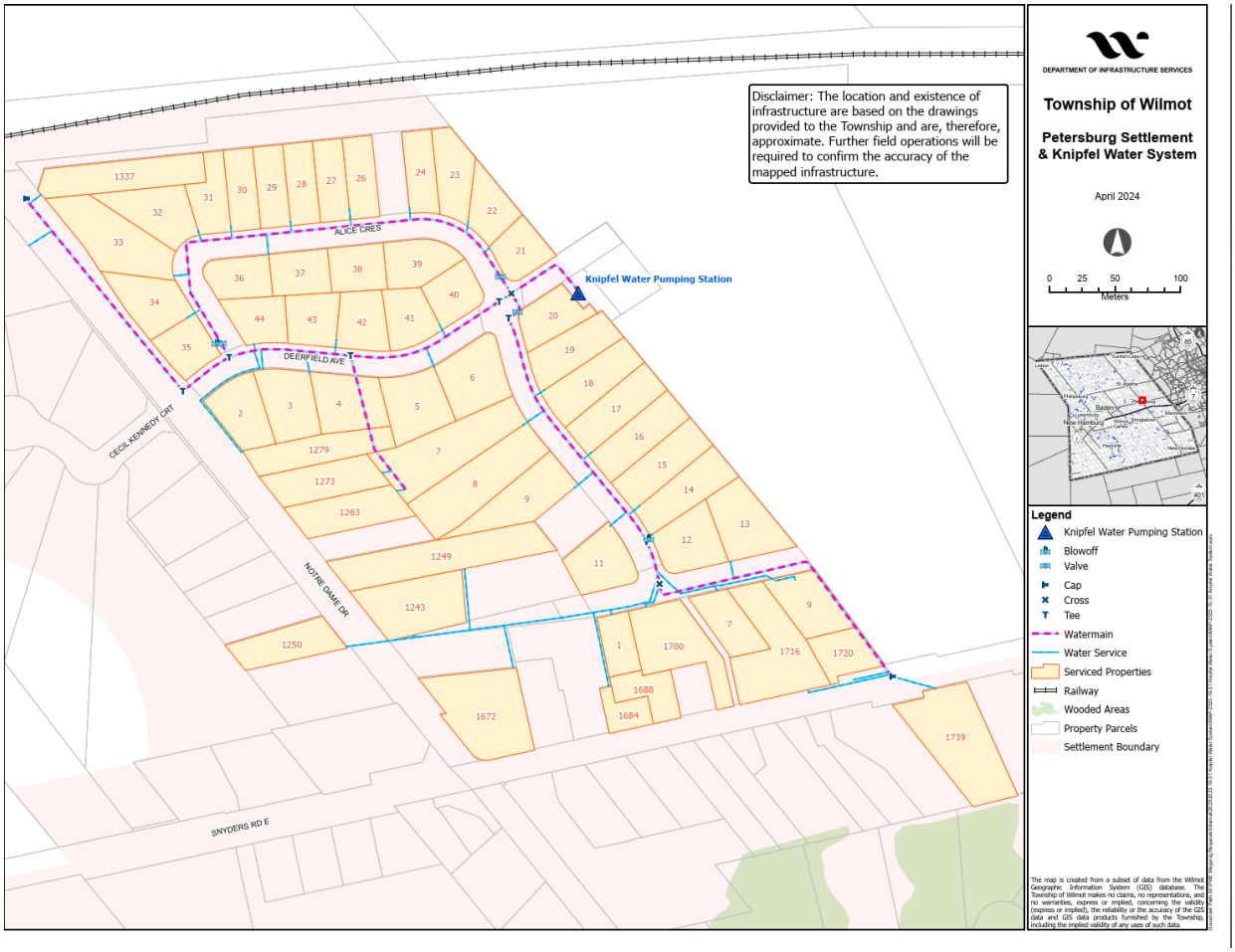
From: Dave Wilhelm, P. Eng

Re: Knipfel Private Water Distribution System Assessment

Introduction

The Knipfel Private Water Distribution System, located in the Deerfield Subdivision, Petersburg, Ontario, was first established in 1964. The Deerfield Subdivision is bounded by two regional roads - Notre Dame Dr. to the west and Snyders Rd. E. to the south as well as a railway corridor to the north and agricultural lands to the west. The subdivision includes Deerfield Ave., Redford Dr., and Alice Cr. As requested by the Township of Wilmot, the water distribution system that services the Deerfield Subdivision and some adjacent properties was assessed by MTE Consultants (MTE). Refer to **Figure 1** for a layout of the existing water system.

Figure 1: Existing Knipfel Private Water Distribution System



Existing Distribution System

MTE conducted two site visits, consulted the former owner/operator of the existing distribution system, and reviewed the background information and drawings to assess the existing conditions of the water distribution service in the Deerfield Subdivision.

The distribution system was installed circa. 1964 and it consists of 100 mm dia. Class 22 ductile iron piping with Tyton joints. The house services are 16 mm. Four flushing ports are installed. A variety of piping materials have been used throughout the distribution system and in some locations the distribution piping runs through private properties with no maintenance easements.

Distribution System Assessment

From MTE's assessment, the existing watermains are 100 mm diameter ductile iron pipes, which reportedly have lead joint construction. This does not meet the minimum standards as stipulated by the Region of Waterloo's Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS) and Ministry of the Environment, Conservation and Parks (MECP) guidelines. The minimum size has been established to facilitate flushing, maintenance, ensure adequate pressure for residents, enhance system redundancy, and improve overall water quality for public health and safety. The minimum pipe size allows standard repair materials to be stocked by the Township's Operations Division. The Township's Operation Division is required to follow the Township's Drinking Water Quality Management System (DWQMS) to ensure delivery of safe, potable water.

According to the Knipfel Private Water System's former owner/operator, there have been few issues with breaks over the lifetime of the system. However, the system has been experiencing lower levels of pressure. The Township has received water pressure complaints in recent years. Given the system's age, it is not known if the existing system is capable of operating at higher pressures and is not advisable to test further due to the risk of failure. Increased operating pressure could lead to pipe and joint failure. Such failure would result in leakage that would require repair or replacement. Such issues could occur on either the watermains or on the individual services leading to each house.

It is also noted that if operating pressure was increased on the existing system, leakage issues could become apparent immediately or they could develop over time due to the system's age and the depth of bury on the mains. In addition, the lack of valves throughout the system reduces the possibility of isolating leaks thereby requiring a water shutdown for most of the community during repairs.

It was reported to MTE that the house services have been constructed from a variety of pipe materials and joined with non-standard connectors. The individual water services to each building do not meet current Township standards. Detailed examination of the house services has not been completed since it would require complex excavation to expose the untraceable services for inspection.

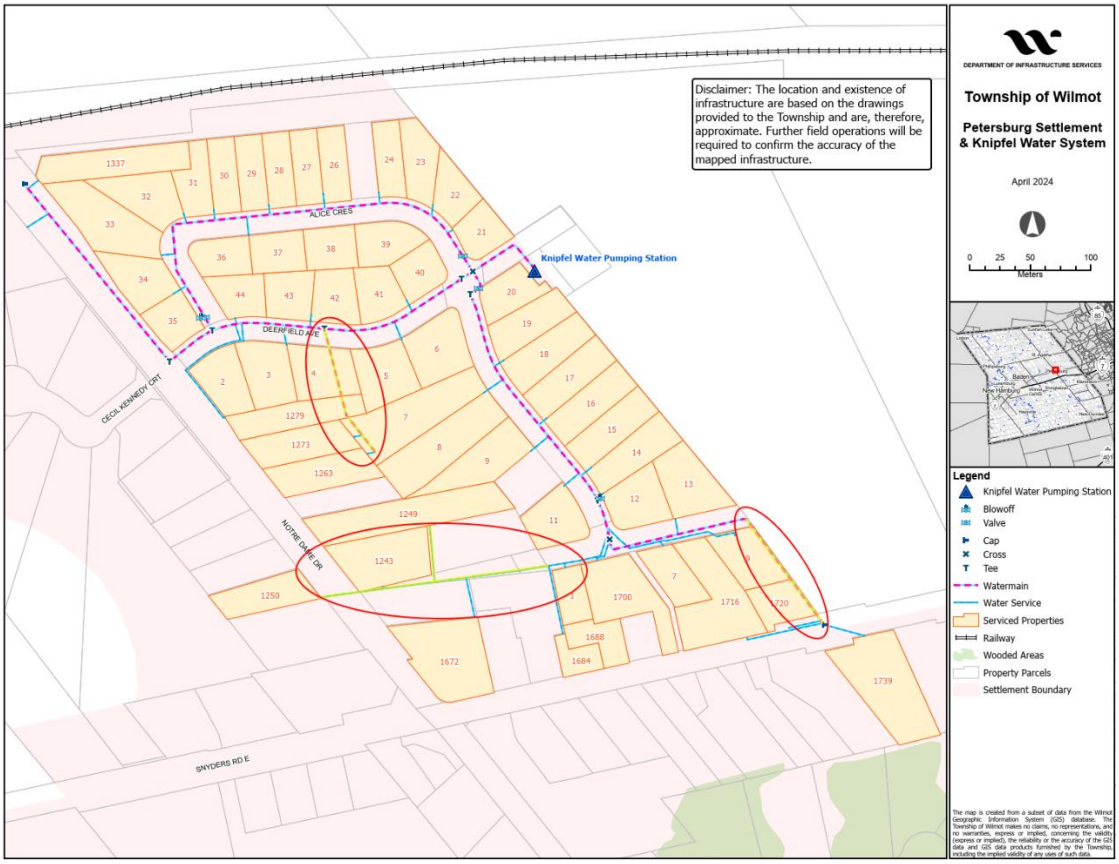
Significant portions of the watermains and house services are located on private land with no easements. These sections are identified on **Figure 2**. These are sections of pipe that cross private property in order to service a second private property. This is not an allowable approach for municipal services. Emergency repairs would require permission to enter from the landowner. In some of these areas on private properties, access to the underground piping is extremely challenging due to obstructions such as buildings, fences and/or vegetation.

Throughout the subdivision, there are four flushing ports which allow the watermains to be flushed for removal of sediment and other accumulations. The four flushing ports provide opportunity to flush the watermains that service a portion of the connected buildings. However, there is no ability to flush the watermain on Redford Drive. There are limited records available for Redford Drive so the location and size of the piping on this road are unclear. There is no flushing outlet past 14 Alice Crescent. Similarly,

there is no way to flush the long run of watermain servicing 1337 Notre Dame Drive and the municipal park building.

The existing Knipfel Private Water Distribution System has significant runs of dead-end pipe. This type of system layout is discouraged by local and provincial design guidelines as it can lead to water quality issues. Watermain looping with multiple connection points is a recommended design practice where feasible.

Figure 2: Services and Mains located on Private Properties



Design Standards

Ministry of Environment, Conservation and Parks Design Guidelines for Drinking Water recommends that all watermains, including those not designed to provide fire protection, should be sized after hydraulic analysis based on flow demands and pressure requirements. The system should be designed to maintain a minimum pressure of 140 kPa (20 psi) at ground level at all points in the distribution system under maximum day demand plus fire flow. The normal operating pressure in the distribution system should be approximately 350 to 480 kPa (50 to 70 psi) and not less than 275 kPa (40 psi). Maximum pressures in the distribution system should not exceed 700 kPa (100 psi) to avoid damage to household plumbing and unnecessary water and energy consumption. When static pressures exceed 700 kPa (100 psi), pressure reducing devices should be provided on mains or service connections in the distribution system. The Region of Waterloo will be responsible for operating the system such that it provides adequate pressure.

Pressure requirements according to section 1.0 of the Watermain Design Criteria for Future Alterations Authorized Under a Drinking Water Works Permit recommend a minimum pressure of 140 kPa (20 psi) at ground level under maximum day demand plus fire flow conditions. As per the Region of Waterloo's DGSSMS section B.2.4, The preferred pressure range for average day and maximum day is 350 kPa (50 psi) to 550 kPa (80 psi), minimum hour and peak hour is 275 kPa (40 psi) to 700 kPa (100 psi) and the minimum pressure detailed in emergency conditions is 140 kPa (20 psi).

Operating pressure of the system is established at the treatment and pumping system that is now owned and operated by the Region of Waterloo. The Region of Waterloo is responsible for ensuring that sufficient water pressure and flow is provided. The Township of Wilmot is responsible for ensuring that the distribution system can convey the water within the standard operating pressure range. The existing Knipfel Private Water System is currently operating with a source water pressure in the range of 275 kPa (40 psi) to 315 kPa (60 psi). Due to the age and condition of the equipment and piping, the water treatment system is only capable of operating within this low pressure range. As a result, the water pressure in some residences regularly drops below 275 kPa (40 psi) which is considered to be insufficient pressure except in rare, high demand cases. Increasing the water pressure in the system is not advisable due to the system's age and condition.

Watermain size requirements stipulated in the MECP Design Guidelines identifies the minimum size of watermains should be 150mm (6 in), with exception for watermains beyond the last hydrant of a cul-de-sac. The Region's DGSSMS also identifies the minimum watermain diameter as 150mm diameter.

Flushing hydrants or other flushing devices are recommended for systems that are not capable of providing fire flow and for dead-end watermains and areas where the degradation of water quality may be possible due to low consumption/flow conditions. Flushing devices should be sized to provide flows which will give a velocity of at least 0.8 m/s (2.6 ft/s) in the watermain being flushed. No flushing device should be directly connected to any sewer.

Relevant information on valves according to the MECP, as a minimum, the recommendations of the manufacturer regarding appropriate valves for an application should be considered, with confirmation from the manufacturer that the valves conform to relevant AWWA standards.

Water Quality

No specific review of the water quality in the distribution system as part of this assessment. Water quality can be affected by the distribution system when redundancy, looping or low use lead to minimal turnover or stagnant sections. Excessive water age, particularly in dead-ends can lead to bacterial growth; reduction in the residual chlorine concentration; and/or the formation of disinfection by-products. The joints used in distribution systems can also affect the water quality. In addition, discolouration has been reported which is a product of aging pipe material, joints, and low water turnover. The design of the water distribution system can have negative impacts on water quality. The Knipfel Private Water System currently has too many dead ends.

The following table summarizes the deficiencies within the Knipfel Private Water Distribution System that were identified through MTE's assessment.

Table 1: Deficiency List

Item	Deficiency	Regulation/Standard
Watermain Pipe Size	The existing watermain size is 100mm which is less than the Region standard of 150mm.	MECP- Design Guidelines for Drinking Water Systems– Section 2.4.1.2 DGSSMS – Section B.2.5.3.2
Watermain Age and Operating Pressure	The existing cast iron watermain pipe is reaching the end of its service life and more frequent failures are anticipated. Pressure complaints have been received from a limited number of users.	MECP- Design Guidelines for Drinking Water Systems– Section 10.3.3
Service Piping Materials	The house services have been constructed from a variety of pipe materials and joined with non-standard connectors.	DGSSMS – Section C.3.7
Watermain Locations	Sections of watermains and house services are located on private land with no easements. Obstructions on private lands make access challenging for the Township.	MECP Design Guidelines for Drinking Water Systems – Section 10.8
Watermain Flushing	There is no ability to flush the watermain on Redford Drive and Notre Dame Drive.	MECP, Design Guidelines for Drinking Water Systems – Section 10.5 DGSSMS – Section D.3.5.4
Watermain Looping	There are significant lengths of dead-end watermains and services.	MECP, Design Guidelines for Drinking Water Systems – Section 10.1.1 DGSSMS – Section B.2.5.8
Valves	System does not have a sufficient number of isolation valves for repairs and flushing	MECP, Design Guidelines for Drinking Water Systems – Section 10.6.2 DGSSMS – Section B.2.12.6
Buried Utility Locating	System does not have tracer wire material to facilitate repairs and locating	MECP, Design Guidelines for Drinking Water Systems - Section 10.3.3.1 DGSSMS – Section D.2.5.5
Pressure	System does not meet adequate pressure demand for users since pressure in residences drops below 275 kPa (40 psi)	MECP, Design Guidelines for Drinking Water Systems – Section 8.3 OBC – Section 7.3.7.2

It is noted that deviations from standards cannot occur, as they may lead to Opportunities for Improvement (OFI) or corrective actions under the Township's Drinking Water Quality Management System, which is essential for system licensing and operating compliance.

Potential Upgrades

MTE has determined three potential upgrade scenarios as follows:

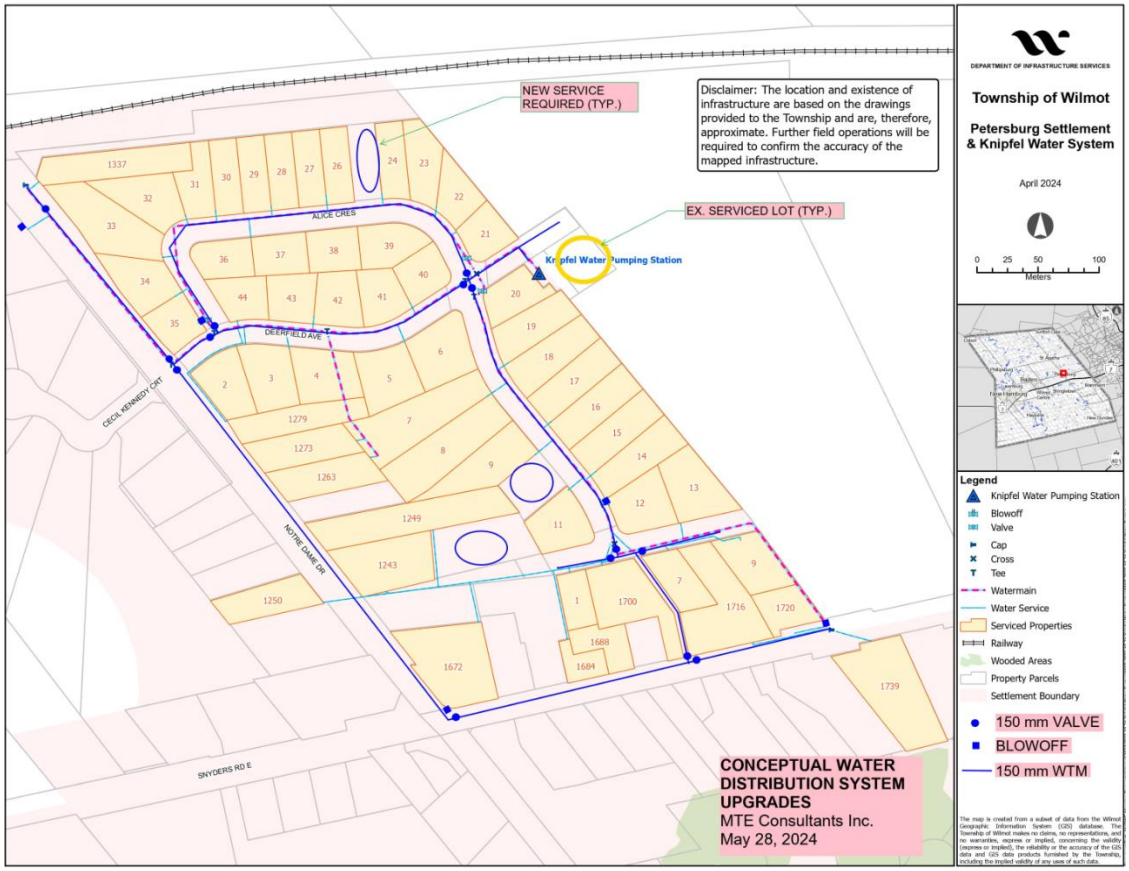
1. Servicing only Currently Connected Properties
    a) Watermain Replacement Only
    b) Road Urbanization
2. Servicing Currently Connected Properties and Properties Fronting Proposed Watermain in NE Petersburg Community (Watermain Replacement Only)

Scenario 1.a) includes the complete replacement of the water distribution system including the services to each house and restoration of disturbed areas only. This scenario would include roadwork and storm sewer repairs only if they are disturbed as part of the watermain replacement.

Scenario 1.b) includes the renewal of the Township's local roads within the Deerfield Subdivision. This would be a change from a rural road cross-section with roadside ditches to a semi-urban road cross-section that incudes concrete curbs, catchbasins, storm sewers and boulevards graded to drain onto the roads. Under this urbanization scenario, full width and full depth asphalt replacement would be done on local roads. This scenario would be complimentary to the complete replacement of the water distribution system including the services to each house.

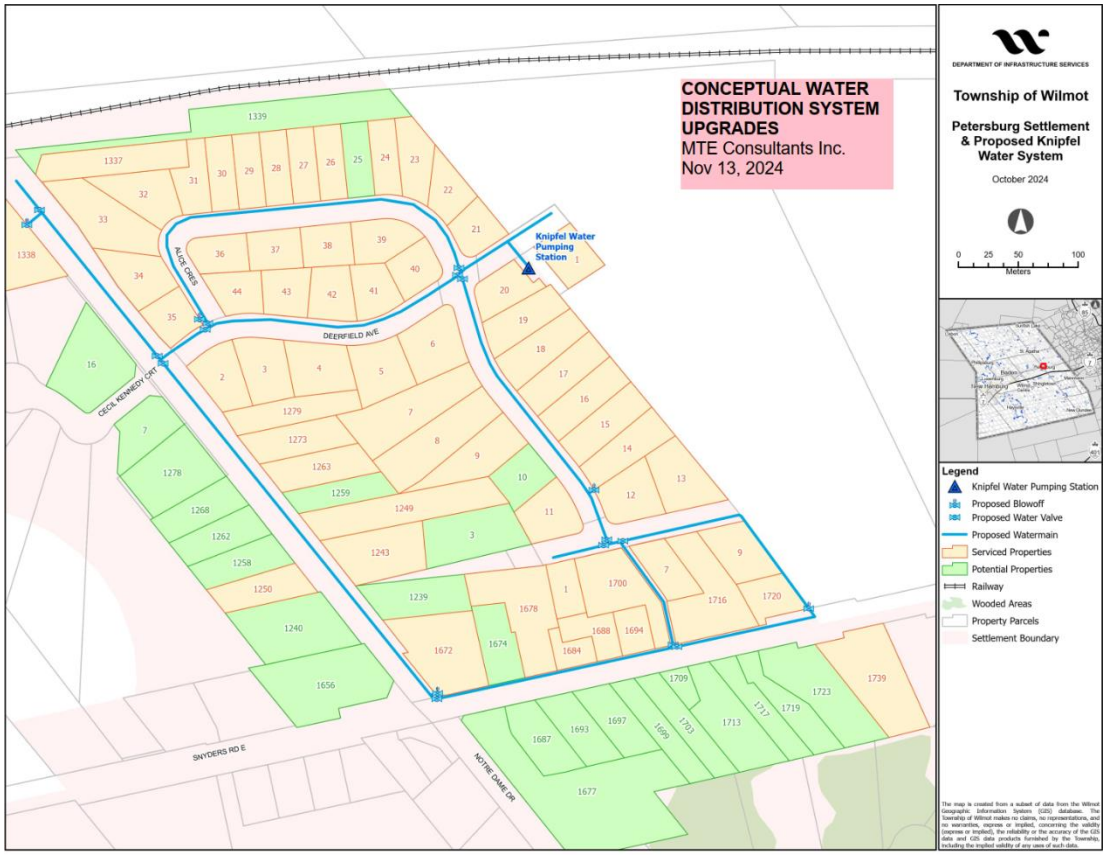
The following **Figure 3** illustrates a conceptual design for watermain replacement under Scenarios 1a. and 1b.

Figure 3: Scenario 1 a. and b.



Scenario 2 is identical to the first scenario with the addition of servicing properties on regional roads, Notre Dame Dr. and Snyders Rd East. Those properties fronting onto the regional roads along the proposed watermain alignment as indicated in green on **Figure 4** would be serviced.

Figure 4: Scenario 2



Estimated Capital Costs

Scenario 1.a), Watermain Replacement only, is estimated at $2,520,210 plus applicable taxes.

Scenario 1.b), Road Semi-urbanization, is estimated at $1,503,720 plus applicable taxes. Note that this cost only includes the road semi-urbanization. The watermain replacement cost would be in addition to this cost.

Scenario 2, Watermain Replacement with additional services installed on the regional roads, is estimated at $2,658,210 plus applicable taxes.

Additional detail on the capital cost estimates can be referenced in the attached documents.

Recommendations

Due to the multiple deficiencies identified in the existing Knipfel Private Water System and listed in this report, MTE recommends that the water distribution system be replaced entirely. The watermain upgrades should include new 150 mm dia. watermains and all new services from the mains to the buildings complete with curb stops at the property lines. The distribution system should be looped where possible and additional isolation valves and flushing ports provided. It is anticipated that watermain installation within a private easement may be required to facilitate the looping of the system from Redford Dr. to Snyders Rd.

In addition to addressing the identified deficiencies, full replacement of the watermain provides the opportunity to expand the municipal water supply system and bring on new users. The currently

unconnected lots within the subdivision, along Notre Dame Dr. and on Snyders Rd. can be serviced from the new watermain network while providing an improved water system for the current users.

Road semi-urbanization is not directly related to the watermain deficiencies and is presented for consideration only since the watermain upgrades would provide an opportunity to semi-urbanize the roads at a lower cost while the roads are disturbed for the watermain replacement.

Yours truly,

MTE Consultants Inc.

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DJW:zeg
Encl.: Attachment 1 – Knipfel Private Water System Cost Estimate – Scenario 1.a) Watermain Replacement only
Attachment 2 – Knipfel Private Water System Cost Estimate – Scenario 1. b) Urbanization
Attachment 3 – Knipfel Private Water System Cost Estimate – Scenario 2. Watermain Replacement only with Additional Serviced Lots.

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Attachment 1

Knipfel Private Water System Cost Estimate – Scenario 1.a) Watermain Replacement only

Scenario 1 a): Watermain Replacement, Deerfield Subdivision, Petersburg
MTE Project: 55037-100
29-Nov-24

Item#	Item	Unit	Qty	Unit Price	Total
	GENERAL REQUIREMENTS				
GR1	Mobilization	L.S.	1	$ 35,000.00	$ 35,000.00
GR2	Demobilization	L.S.	1	$ 25,000.00	$ 25,000.00
GR3	Bonds	L.S.	1	$ 30,000.00	$ 30,000.00
GR4	Insurance	L.S.	1	$ 15,000.00	$ 15,000.00
GR5	Site Trailer	L.S.	1	$ 12,000.00	$ 12,000.00
GR6	Construction Layout	L.S.	1	$ 10,000.00	$ 10,000.00
GR7	Expose existing utilities/watermain as directed by the Contract Administrator to determine exact elevation/location c/w granular backfill	hrs	16	$ 900.00	$ 14,400.00
GR8	Coordination with Region and Township Forces for signage and traffic management	L.S.	1	$ 7,500.00	$ 7,500.00
GR9	Mobilization setup relocation on site and demobilization of 9085L/ 2400 Gallon Poly tank for the purpose of storing dewatering effluent as per OPSS517	EA.	1	$ 4,500.00	$ 4,500.00
GR10	Traffic Control	L.S.	1	$ 45,000.00	$ 45,000.00
GR11	Supply & Install Light Duty Silt Fence as per OPSD 219.110 including maintenance and removal.	m	500	$ 16.00	$ 8,000.00
GR12	Supply install and maintain tree protection and pedestrian protection fencing including removal on completion of project	m	1000	$ 22.00	$ 22,000.00
GR13	Supply & Install Silt Sac at Existing CB/ CBMH including maintenance and removal at all affected storm structure locations	EA	20	$ 220.00	$ 4,400.00
				Subtotal	**$ 232,800.00**
	REMOVALS				
A1	Road asphalt	m²	7500	$ 6.50	$ 48,750.00
A2	Driveway median and sidewalk asphalt	m²	500	$ 8.00	$ 4,000.00
A3	Curbs all types	L.m.	250	$ 14.00	$ 3,500.00
A4	Concrete median cap, sidewalk, driveway aprons and kill strip	m²	500	$ 16.00	$ 8,000.00
A5	Cold plane asphalt (50mm depth) step joint as per RMW STD DWG 207 (Modified to 1.0m overlap)	m²	250	$ 55.00	$ 13,750.00
A6	Strip topsoil, grubbing	LS	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 128,000.00**
	ROADWORKS				
B1	Onsite cut fill, assuming all road excavation is disposed off site	m³	5000	$ 22.00	$ 110,000.00
B2	Granular 'A' road base, 450mm depth	tonne	10000	$ 20.00	$ 200,000.00
B3	Granular 'A' for temporary driveways pedestrian crossings and transitions.	tonne	500	$ 27.50	$ 13,750.00
B4	Hot Mix Asphalt SP19.0 PGAC 64-28 (120 mm - 2 lifts of 60mm each).	tonne	800	$ 130.00	$ 104,000.00
B5	Hot Mix Asphalt SP12.5F FC-2 PGAC 64-28 (50 mm) Category 'D' to be placed in echelon	tonne	350	$ 165.00	$ 57,750.00
B6	Hot Mix Asphalt HL4 (50 mm)	tonne	700	$ 100.00	$ 70,000.00
B7	Hot Mix Asphalt HL3 (40 mm)	tonne	650	$ 115.00	$ 74,750.00
B8	Hot Mix Asphalt HL3F PGAC 64-28 (40 mm) Including hand placement as required (Driveways)	tonne	200	$ 190.00	$ 38,000.00
B9	Supply and application of Tack Coat emulsion compound.	m²	10000	$ 0.60	$ 6,000.00
B10	OPSD 600.060	m	250	$ 60.00	$ 15,000.00
B11	Additional cost for hand formed curb	m	50	$ 90.00	$ 4,500.00

Scenario 1 a): Watermain Replacement, Deerfield Subdivision, Petersburg
MTE Project: 55037-100
29-Nov-24

Item#	Item	Unit	Qty	Unit Price	Total
B12	150mm depth topsoil	m^2	1000	$ 9.00	$ 9,000.00
B13	Sod	m^2	1000	$ 8.00	$ 8,000.00
B14	Line painting	LS	1	$ 25,000.00	$ 25,000.00
B15	Water (includes water for sod and seed)	m^3	500	$ 16.00	$ 8,000.00
B16	Excavation and disposal of unsuitable subgrade soils	m^3	200	$ 20.00	$ 4,000.00
B17	Clear stone as directed by contract administrator	tonne	250	$ 32.50	$ 8,125.00
B18	Supply place and compact imported Granular 'B' material with Type II gradation as per OPSS 1010 for subgrade backfill and as per OPSS 514 where existing subgrade material is deemed unusable by the Engineer as per RWSSP 1010.10	tonne	450	$ 20.00	$ 9,000.00
B19	Supply install relocate and reconfigure "Fast Fence" on-site as directed by Contract Administrator	m	500	$ 50.00	$ 25,000.00
				Subtotal	**$ 789,875.00**
	WATERMAIN				
D1	Supply and install 150mm watermain	m	2200	$ 250.00	$ 550,000.00
D2	Supply and install 150mm gate valves	EA	14	$ 3,000.00	$ 42,000.00
D3	Supply and install post hydrant for flushing	EA	5	$ 7,500.00	$ 37,500.00
D4	Supply and install 25mm water service including curb stop, main stop and connection into existing house to shut off	EA	64	$ 5,000.00	$ 320,000.00
				Subtotal	**$ 949,500.00**

Subtotal	$	2,100,175.00
Contingency (20%)	$	420,035.00
Subtotal	**$**	**2,520,210.00**
HST	$	327,627.30
TOTAL	**$**	**2,847,837.30**

SUMMARY

Watermain Costs	$ 1,418,001.00	$	644.55 /m + Tax
Surface Works Cost	$ 1,102,209.00	$	501.00 /m + Tax
Total not incl. Tax	**$ 2,520,210.00**		

Notes

1 Estimate includes restoration on both local and Regional roads of disturbed asphalt and road base only
2 All existing serviced lots will have new services up to building. Three currently unserviced subdivision residences will be serviced.

Attachment 2

Knipfel Private Water System Cost Estimate – Scenario 1.b) Urbanization

Scenario 1 b): Road Urbanization, Deerfield Subdivision, Petersburg
MTE Project: 55037-100
8-Oct-24

Item#	Item	Unit	Qty	Unit Price	Total
	GENERAL REQUIREMENTS				
GR1	Mobilization	L.S.	1	$ 0.00	$ 0.00
GR2	Demobilization	L.S.	1	$ 0.00	$ 0.00
GR3	Bonds	L.S.	1	$ 20,000.00	$ 20,000.00
GR4	Insurance	L.S.	1	$ 0.00	$ 0.00
GR5	Site Trailer	L.S.	1	$ 0.00	$ 0.00
GR6	Construction Layout	L.S.	1	$ 0.00	$ 0.00
GR7	Expose existing utilities/watermain as directed by the Contract Administrator to determine exact elevation/location c/w granular backfill	hrs	0	$ 900.00	$ 0.00
GR8	Coordination with Region and Township Forces for signage and traffic management	L.S.	0	$ 7,500.00	$ 0.00
GR9	Mobilization setup relocation on site and demobilization of 9085L/ 2400 Gallon Poly tank for the purpose of storing dewatering effluent as per OPSS517	EA.	0	$ 4,500.00	$ 0.00
GR10	Traffic Control	L.S.	0	$ 45,000.00	$ 0.00
GR11	Supply & Install Light Duty Silt Fence as per OPSD 219.110 including maintenance and removal.	m	0	$ 16.00	$ 0.00
GR12	Supply install and maintain tree protection and pedestrian protection fencing including removal on completion of project	m	0	$ 22.00	$ 0.00
GR13	Supply & Install Silt Sac at Existing CB/ CBMH including maintenance and removal at all affected storm structure locations	EA	0	$ 220.00	$ 0.00
				Subtotal	**$ 20,000.00**
	REMOVALS				
A1	Road asphalt	m²	6000	$ 6.50	$ 39,000.00
A2	Driveway median and sidewalk asphalt	m²	500	$ 8.00	$ 4,000.00
A3	Curbs all types	L.m.	850	$ 14.00	$ 11,900.00
A4	Concrete median cap, sidewalk, driveway aprons and kill strip	m²	0	$ 16.00	$ 0.00
A5	Cold plane asphalt (50mm depth) step joint as per RMW STD DWG 207 (Modified to 1.0m overlap)	m²	0	$ 55.00	$ 0.00
A6	Strip topsoil, grubbing	LS	0	$ 50,000.00	$ 0.00
				Subtotal	**$ 54,900.00**
	ROADWORKS				
B1	Onsite cut fill, assuming all road excavation is disposed off site	m³	3000	$ 22.00	$ 66,000.00
B2	Granular 'A' road base, 450mm depth	tonne	9200	$ 20.00	$ 184,000.00
B3	Granular 'A' for temporary driveways pedestrian crossings and transitions.	tonne	0	$ 27.50	$ 0.00
B4	Hot Mix Asphalt SP19.0 PGAC 64-28 (120 mm - 2 lifts of 60mm each).	tonne	700	$ 130.00	$ 91,000.00
B5	Hot Mix Asphalt SP12.5F FC-2 PGAC 64-28 (50 mm) Category 'D' to be placed in echelon	tonne	300	$ 165.00	$ 49,500.00
B6	Hot Mix Asphalt HL4 (50 mm)	tonne	800	$ 100.00	$ 80,000.00
B7	Hot Mix Asphalt HL3 (40 mm)	tonne	600	$ 115.00	$ 69,000.00
B8	Hot Mix Asphalt HL3F PGAC 64-28 (40 mm) Including hand placement as required (Driveways)	tonne	0	$ 190.00	$ 0.00
B9	Supply and application of Tack Coat emulsion compound.	m²	17000	$ 0.60	$ 10,200.00
B10	OPSD 600.060	m	2250	$ 60.00	$ 135,000.00
B11	Additional cost for hand formed curb	m	50	$ 90.00	$ 4,500.00
B12	150mm depth topsoil	m²	0	$ 9.00	$ 0.00

Scenario 1 b): Road Urbanization, Deerfield Subdivision, Petersburg
MTE Project: 55037-100
8-Oct-24

Item#	Item	Unit	Qty	Unit Price	Total
B13	Sod	m^2	0	$ 8.00	$ 0.00
B14	Line painting	LS	1	$ 25,000.00	$ 25,000.00
B15	Water (includes water for sod and seed)	m^3	0	$ 16.00	$ 0.00
B16	Excavation and disposal of unsuitable subgrade soils	m^3	0	$ 20.00	$ 0.00
B17	Supply and install 300mm storm sewer	m	1000	$ 300.00	$ 300,000.00
B18	Supply and install 250mm storm sewer	m	250	$ 200.00	$ 50,000.00
B19	Supply and install 1200mm storm manhole	each	10	$ 8,600.00	$ 86,000.00
B20	Supply and install 600mm storm catch basin	each	10	$ 2,800.00	$ 28,000.00
B21	clear stone as directed by contract administrator	tonne	0	$ 32.50	$ 0.00
B22	Supply place and compact imported Granular 'B' material with Type II gradation as per OPSS 1010 for subgrade backfill and as per OPSS 514 where existing subgrade material is deemed unusable by the Engineer as per RWSSP 1010.10	tonne	0	$ 20.00	$ 0.00
B23	Supply install relocate and reconfigure "Fast Fence" on-site as directed by Contract Administrator	m	0	$ 50.00	$ 0.00
				Subtotal	**$ 1,178,200.00**

Subtotal	$	1,253,100.00
Contingency (20%)	$	250,620.00
Subtotal	**$**	**1,503,720.00**
HST	$	195,483.60
TOTAL	**$**	**1,699,203.60**

SUMMARY

Surface Works Cost		$	1,381,650.00
	Total not incl. Tax	**$**	**1,381,650.00**

Notes

1 Estimate includes urbanization of local roads not including sidewalk and sanitary sewer.
2 Estimate includes full width asphalt replacement on Regional roads.

Attachment 3

Knipfel Private Water System Cost Estimate – Scenario 2 Watermain Replacement only with Additional Serviced Lots

Scenario 2: Watermain Replacement, Deerfield Subdivision, Petersburg
MTE Project: 55037-100
29-Nov-24

Item#	Item	Unit	Qty	Unit Price	Total
	GENERAL REQUIREMENTS				
GR1	Mobilization	L.S.	1	$ 35,000.00	$ 35,000.00
GR2	Demobilization	L.S.	1	$ 25,000.00	$ 25,000.00
GR3	Bonds	L.S.	1	$ 30,000.00	$ 30,000.00
GR4	Insurance	L.S.	1	$ 15,000.00	$ 15,000.00
GR5	Site Trailer	L.S.	1	$ 12,000.00	$ 12,000.00
GR6	Construction Layout	L.S.	1	$ 10,000.00	$ 10,000.00
GR7	Expose existing utilities/watermain as directed by the Contract Administrator to determine exact elevation/location c/w granular backfill	hrs	16	$ 900.00	$ 14,400.00
GR8	Coordination with Region and Township Forces for signage and traffic management	L.S.	1	$ 7,500.00	$ 7,500.00
GR9	Mobilization setup relocation on site and demobilization of 9085L/ 2400 Gallon Poly tank for the purpose of storing dewatering effluent as per OPSS517	EA.	1	$ 4,500.00	$ 4,500.00
GR10	Traffic Control	L.S.	1	$ 45,000.00	$ 45,000.00
GR11	Supply & Install Light Duty Silt Fence as per OPSD 219.110 including maintenance and removal.	m	500	$ 16.00	$ 8,000.00
GR12	Supply install and maintain tree protection and pedestrian protection fencing including removal on completion of project	m	1000	$ 22.00	$ 22,000.00
GR13	Supply & Install Silt Sac at Existing CB/ CBMH including maintenance and removal at all affected storm structure locations	EA	20	$ 220.00	$ 4,400.00
				Subtotal	**$ 232,800.00**
	REMOVALS				
A1	Road asphalt	m²	7500	$ 6.50	$ 48,750.00
A2	Driveway median and sidewalk asphalt	m²	500	$ 8.00	$ 4,000.00
A3	Curbs all types	L.m.	250	$ 14.00	$ 3,500.00
A4	Concrete median cap, sidewalk, driveway aprons and kill strip	m²	500	$ 16.00	$ 8,000.00
A5	Cold plane asphalt (50mm depth) step joint as per RMW STD DWG 207 (Modified to 1.0m overlap)	m²	250	$ 55.00	$ 13,750.00
A6	Strip topsoil, grubbing	LS	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 128,000.00**
	ROADWORKS				
B1	Onsite cut fill, assuming all road excavation is disposed off site	m³	5000	$ 22.00	$ 110,000.00
B2	Granular 'A' road base, 450mm depth	tonne	10000	$ 20.00	$ 200,000.00
B3	Granular 'A' for temporary driveways pedestrian crossings and transitions.	tonne	500	$ 27.50	$ 13,750.00
B4	Hot Mix Asphalt SP19.0 PGAC 64-28 (120 mm - 2 lifts of 60mm each).	tonne	800	$ 130.00	$ 104,000.00
B5	Hot Mix Asphalt SP12.5F FC-2 PGAC 64-28 (50 mm) Category 'D' to be placed in echelon	tonne	350	$ 165.00	$ 57,750.00
B6	Hot Mix Asphalt HL4 (50 mm)	tonne	700	$ 100.00	$ 70,000.00
B7	Hot Mix Asphalt HL3 (40 mm)	tonne	650	$ 115.00	$ 74,750.00
B8	Hot Mix Asphalt HL3F PGAC 64-28 (40 mm) Including hand placement as required (Driveways)	tonne	200	$ 190.00	$ 38,000.00
B9	Supply and application of Tack Coat emulsion compound.	m²	10000	$ 0.60	$ 6,000.00
B10	OPSD 600.060	m	250	$ 60.00	$ 15,000.00
B11	Additional cost for hand formed curb	m	50	$ 90.00	$ 4,500.00

Scenario 2: Watermain Replacement, Deerfield Subdivision, Petersburg
MTE Project: 55037-100
29-Nov-24

Item#	Item	Unit	Qty	Unit Price	Total
B12	150mm depth topsoil	m^2	1000	$ 9.00	$ 9,000.00
B13	Sod	m^2	1000	$ 8.00	$ 8,000.00
B14	Line painting	LS	1	$ 25,000.00	$ 25,000.00
B15	Water (includes water for sod and seed)	m^3	500	$ 16.00	$ 8,000.00
B16	Excavation and disposal of unsuitable subgrade soils	m^3	200	$ 20.00	$ 4,000.00
B17	Clear stone as directed by contract administrator	tonne	250	$ 32.50	$ 8,125.00
B18	Supply place and compact imported Granular 'B' material with Type II gradation as per OPSS 1010 for subgrade backfill and as per OPSS 514 where existing subgrade material is deemed unusable by the Engineer as per RWSSP 1010.10	tonne	450	$ 20.00	$ 9,000.00
B19	Supply install relocate and reconfigure "Fast Fence" on-site as directed by Contract Administrator	m	500	$ 50.00	$ 25,000.00
				Subtotal	**$ 789,875.00**
	WATERMAIN				
D1	Supply and install 150mm watermain	m	2200	$ 250.00	$ 550,000.00
D2	Supply and install 150mm gate valves	EA	14	$ 3,000.00	$ 42,000.00
D3	Supply and install post hydrant for flushing	EA	5	$ 7,500.00	$ 37,500.00
D4	Supply and install 25mm water service including curb stop, main stop and connection into existing house to shut off	EA	87	$ 5,000.00	$ 435,000.00
				Subtotal	**$ 1,064,500.00**

Subtotal	$	2,215,175.00
Contingency (20%)	$	443,035.00
Subtotal	**$**	**2,658,210.00**
HST	$	345,567.30
TOTAL	**$**	**3,003,777.30**

SUMMARY

Watermain Costs	$ 1,546,801.00	$	703.09	/m + Tax
Surface Works Cost	$ 1,111,409.00	$	505.19	/m + Tax
Total not incl. Tax	**$ 2,658,210.00**			

Notes

1 Estimate includes restoration on both local and Regional roads of disturbed asphalt and road base only
2 All existing serviced lots will have new services up to building. 23 currently unserviced lots will be serviced up to the building.