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MILL RUN EXTENSION – PHASES 7 & 8

Servicing and Stormwater Management Report

Prepared for: Menzie Almonte 2 Inc.

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MILL RUN EXTENSION
PHASES 7 & 8

Municipality of Mississippi Mills

SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

February 10, 2023

Novatech File: 121125
Ref: R-2023-013

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February 10, 2023

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Planning Department
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Municipality of Mississippi Mills
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Attention: **Julie Stewart, RPP, MCIP County Planner**
David Shen, P.Eng., Director of Development Services and Engineering

Reference: **Mill Run Extension Phases 7 & 8**
Servicing and Stormwater Management Report
Our File No.: 121125

Please find enclosed the report entitled "Servicing and Stormwater Management Report" dated February 10, 2023 prepared on behalf of Menzie Almonte 2 Inc. for the Mill Run Extension residential development.

The report outlines the preliminary servicing design for the proposed development with respect to water distribution, sanitary servicing, and storm drainage, as well as a preliminary approach to stormwater management. This report is submitted in support of a Draft Plan of Subdivision application.

If you require any additional information, please contact the undersigned.

Yours truly,

NOVATECH

Drew Blair, P. Eng.
Senior Project Manager

Cc: Stefanie Kaminski, Regional Group

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Appendices

Tables

Figures

1.0 INTRODUCTION

Novatech has been retained by Menzie Almonte 2 Inc. to prepare a servicing and conceptual stormwater management report in support of an application for Draft Plan of Subdivision for Phases 7 & 8 of the proposed Mill Run Extension (the "Subject Lands").

1.1 Purpose

This report outlines the conceptual servicing design for the Subject Lands with respect to water distribution, sanitary servicing, storm drainage, as well as the approach to stormwater management.

1.2 Site Location and Description

The proposed Mill Run Extension is approximately 7.23 hectares in size and located in Almonte, within the Municipality of Mississippi Mills. The Subject Lands are bound by the existing Mill Run Subdivision and Stormwater Management (SWM) pond to the south, and the Hannan Hills Residential Development and undeveloped land to the west, and undeveloped land to the north. To the east, there are two existing residential dwellings. Additionally, the Almonte Municipal Drain runs adjacent to the western property boundary.

Refer to **Figure 1** – Mill Run Extension Phases 7 & 8 Location Plan for the site location of the Subject Lands.

1.3 Existing Conditions and Topography

The Subject Lands are currently undeveloped, grass covered, and sparsely vegetated with bush and small adolescent trees. The topography of the Subject Lands is relatively flat but moderately sloping east to west. There is roughly a 1.5m existing grade elevation change from the west to the east of the proposed development.

Refer to **Figure 2** – Mill Run Extension Phases 7 & 8 Existing Conditions for more details.

1.4 Proposed Development

The proposed development of the Subject Lands consists of a residential subdivision consisting of 25 single units, 18 semi-detached units, and 48 townhomes in phase 7. Phase 8 will be comprised of 22 single units and 12 townhomes.

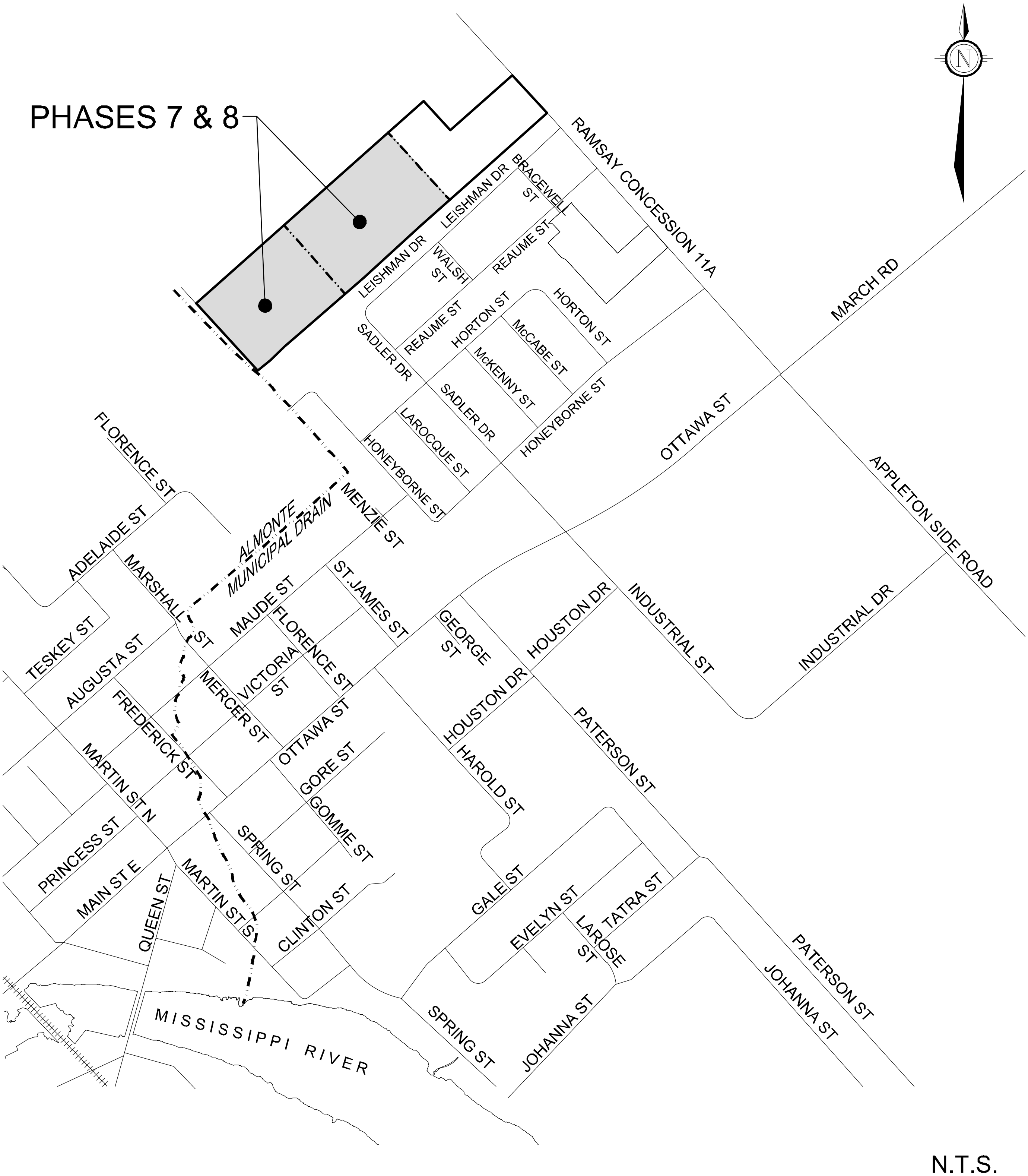
The development will include three (3) new roadways including an extension of the existing Sadler Drive into the Subject Lands.

For the conceptual layout of the Subject Lands, refer to the **Figure 3** – Mill Run Extension Phases 7 & 8 Concept Plan.

The Subject Lands will be serviced from the existing Mill Run Residential Subdivision. Water distribution will be provided from the existing 250mm dia. watermain within Sadler Drive and 250mm dia. watermain within Leishman Drive. The sanitary sewer connection will be made to the existing 250mm sanitary pipe infrastructure within Sadler Drive.

Stormwater from the Subject Lands will be conveyed with gravity sewers to the existing Mill Run SWM facility west of Sadler Drive and north of Honeyborne Street. An expansion of the existing SWM facility is proposed in order to service additional area from the Subject Lands.

Refer to **Figure 4** – Mill Run Extension Lands Phases 7 & 8 Conceptual Servicing for more details.



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MUNICIPALITY OF MISSISSIPPI MILLS

MILL RUN EXTENSION PHASES 7 and 8

LOCATION PLAN

FEB 2023 121125 FIGURE 1

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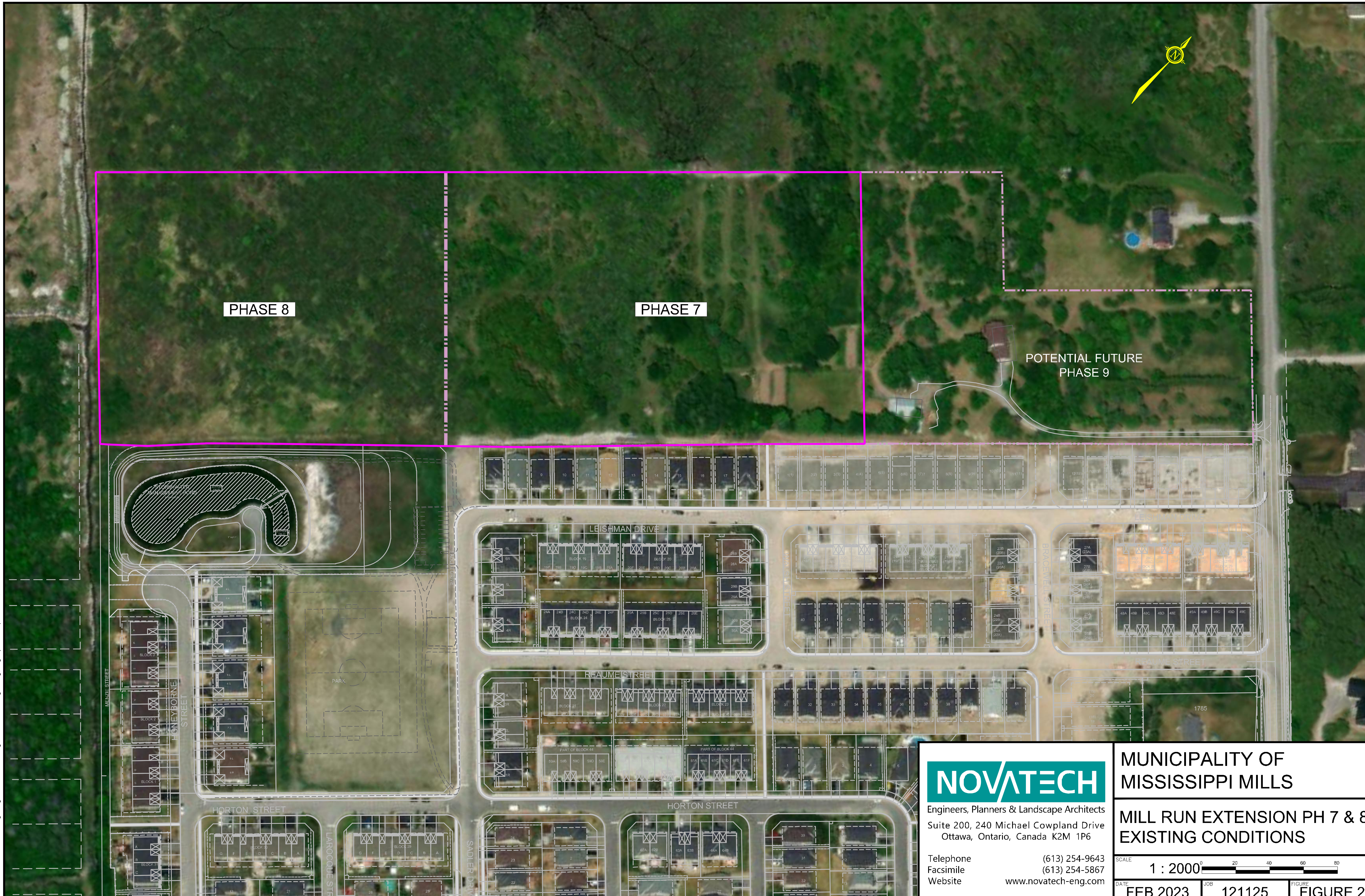

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MILL RUN EXTENSION PH 7 & 8
EXISTING CONDITIONS

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE FEB 2023 | JOB 121125 | FIGURE FIGURE 2

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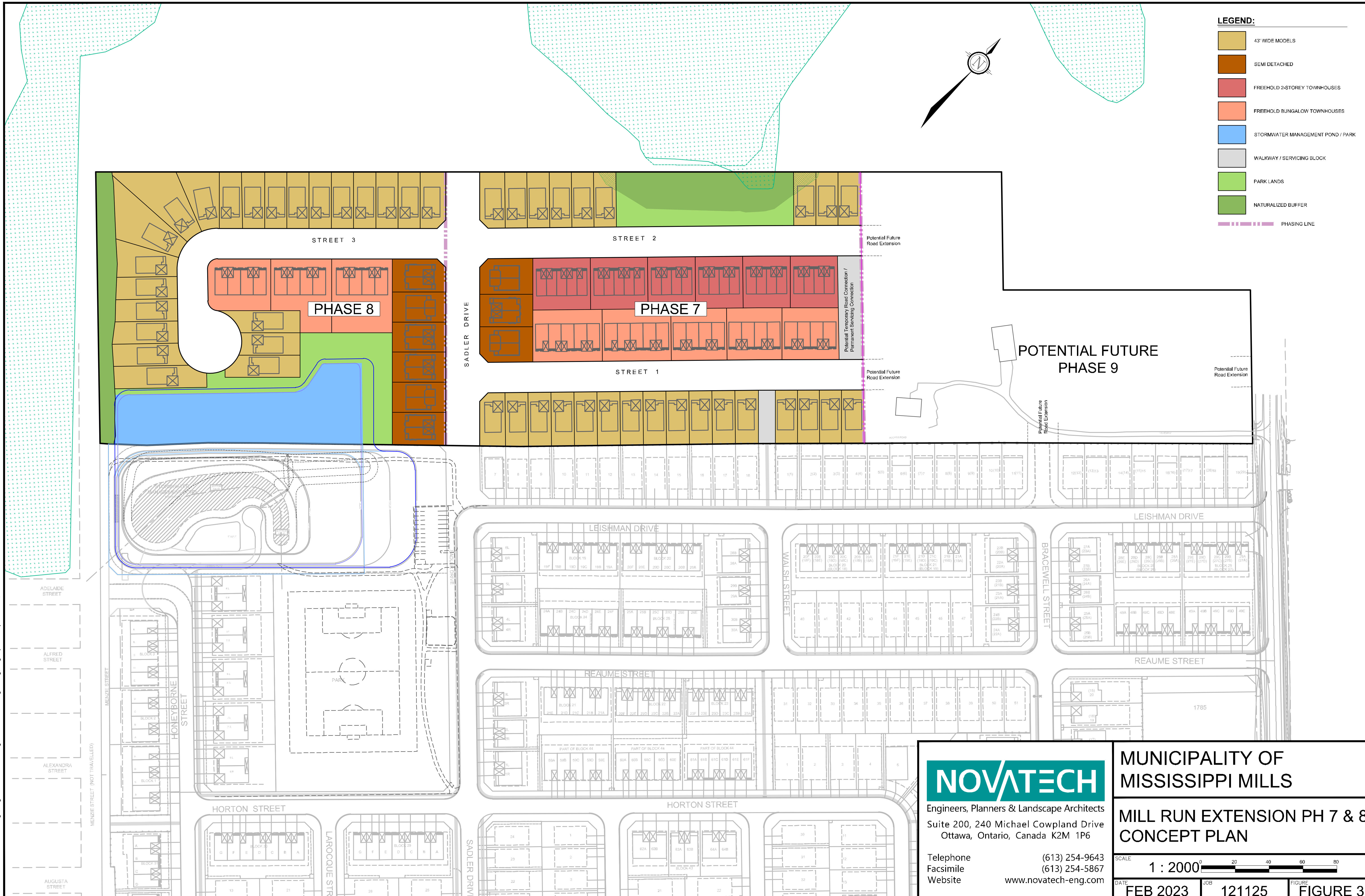

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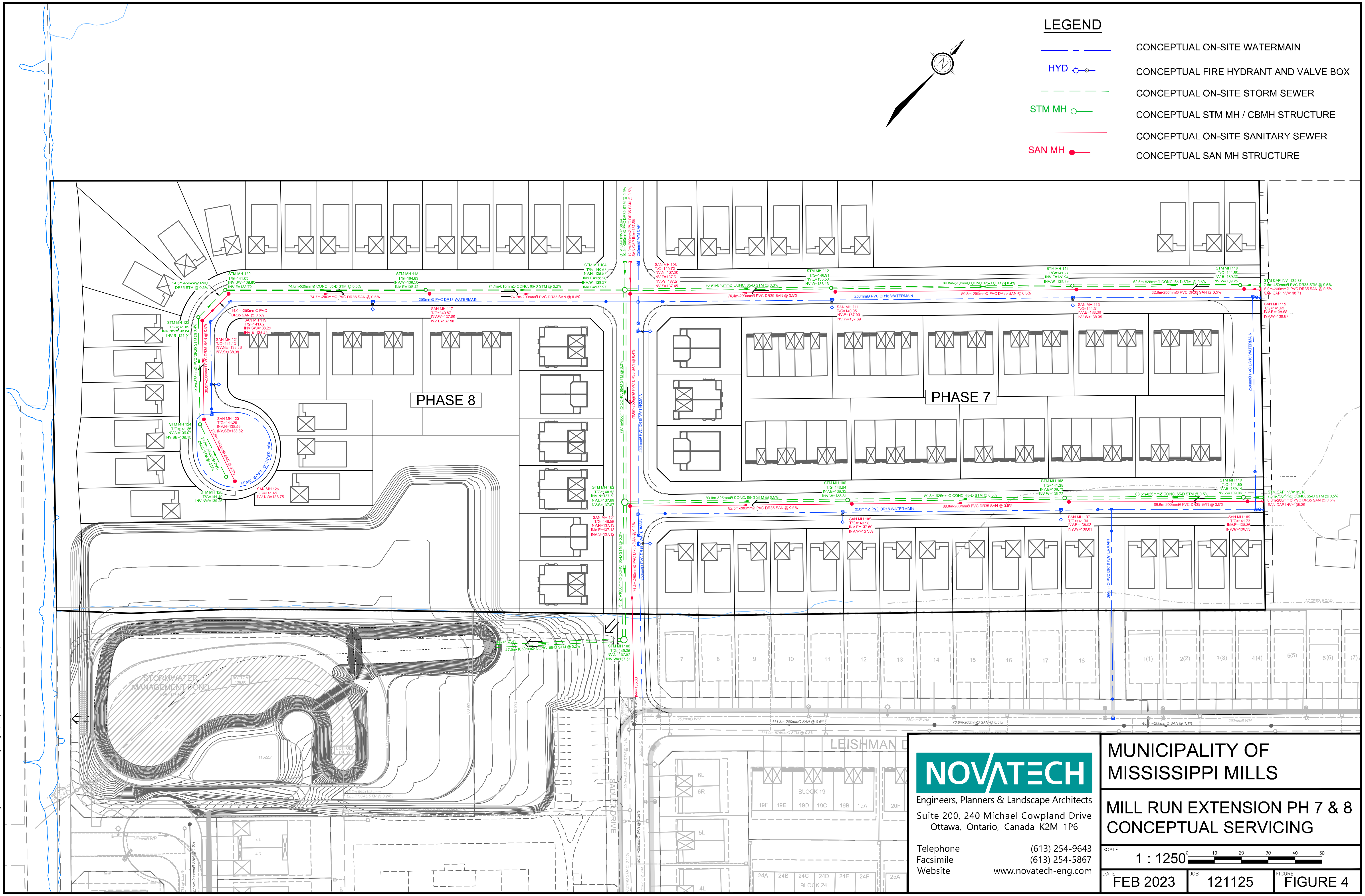
LEGEND
CONCEPTUAL ON-SITE WATERMAIN
HYD
CONCEPTUAL FIRE HYDRANT AND VALVE BOX
CONCEPTUAL ON-SITE STORM SEWER
STM MH
CONCEPTUAL STM MH / CBMH STRUCTURE
CONCEPTUAL ON-SITE SANITARY SEWER
SAN MH
CONCEPTUAL SAN MH STRUCTURE
PHASE 8
PHASE 7
STORMWATER MANAGEMENT POND
LEISHMAN D
SADLER DRIVE
BLOCK 19
BLOCK 24
NOVATECH
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MILL RUN EXTENSION PH 7 & 8
CONCEPTUAL SERVICING
SCALE 1 : 1250
DATE FEB 2023
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FIGURE FIGURE 4
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1.5 Geotechnical Investigation

Paterson Group conducted a geotechnical investigation in support of the Mill Lands Subdivision. To perform this investigation, six (6) test pits were advanced to a maximum depth of 2.6m below existing ground surface in June 2021. In addition, one (1) test pit and fifteen (15) hand augered test holes were advanced to a maximum depth of 2.2m below existing ground surface in November 2021. The principal findings of Paterson Group's geotechnical investigation are as follows:

- The site's existing ground surface level is relatively flat and approximately 1.5m lower than the neighbouring roadways in the Mill Run Subdivison.
- Subsurface conditions on the eastern portion of the site consists of topsoil with high organic content overlying very stiff brown glacial till.
- Subsurface conditions on the western portion of the site consists of an organic peat overlying a firm to soft grey silty clay deposit. Additionally, a layer of marl was encountered below the peat at an approximate depth of 0.75m to 1.6m.
- Practical refusal to excavation on bedrock was encountered in all test pits at approximate depths ranging between 2.2m and 2.6m.
- The site is subjected to grade raise restrictions due to the presence of a sensitive silty clay layer. The recommended permissible grade raise varies from 0.8m along the west edge, to 1.3m in the area of the Sadler Drive extension.
- Refer to the Paterson Group report for complete details and recommendations.

1.6 Additional Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing for the Mill Lands Subdivision. This report should be read in conjunction with the following:

- Supplemental Geotechnical Investigation, Proposed Residential Development, 1825 Ramsay Concession 11A, Mississippi Mills, Ontario, Report: PG5860-1 Revision 1 dated January 12, 2023, prepared by Paterson Group.
- Design Services and Stormwater Management Report, Mill Run Subdivision Phase 2-5, Mississippi Mills, Ontario, Report: R-2015-066 dated May 8, 2015, prepared by Novatech.
- Master Plan Update Report - FINAL, Municipality of Mississippi Mills Almonte Ward, Mississippi Mills, Ontario, Report: 27456-01 dated February 2018, prepared by J.L. Richards & Associates Limited.

2.0 STORMWATER MANAGEMENT

The proposed storm servicing and stormwater management strategy for Phases 7 & 8 of the Mill Run Extension development has been conceptually designed to adhere to the criteria established for the adjacent Mill Run Subdivision and in consultation with the Municipality of Mississippi Mills and the Mississippi Valley Conservation Authority (MVCA).

2.1 Existing Drainage Conditions

Under existing conditions, storm runoff from the proposed development generally flows from east to west towards the Almonte Municipal Drain at the western boundary of the site. Refer to **Figure 2** – Mill Run Extension Phases 7 & 8 Existing Conditions for more details.

Located to the south of the site is the existing Mill Run Subdivision (Phases 1-6). Stormwater quality and quantity control for the Mill Run Subdivision is provided by a stormwater management wet pond located at the north-western corner of the subdivision, which then outlets to the Almonte Municipal Drain.

2.2 Stormwater Management Criteria

The Mill Run Extension lands are located within the jurisdiction of the Mississippi Valley Conservation Authority (MVCA). The stormwater management criteria for the Mill Run Extension have been developed based on the criteria from the Mill Run Subdivision, requirements of the MVCA, and the City of Ottawa Sewer Design Guidelines (October 2012) and associated Technical Bulletins.

2.2.1 Minor System (Storm Sewers)

- Storm sewers are to be designed using the Rational Method and sized for the 5-year storm event;
- Inlet control devices (ICDs) are to be installed in road and rearyard catchbasins to control inflows to the storm sewers;
- Ensure that the 100-year hydraulic grade line in the storm sewer is at least 0.3 m below the underside of footing (USF) elevations for the proposed development.

2.2.2 Major System (Overland Flow)

- Overland flows are to be confined within the right-of-way and/or defined drainage easements for all storms up to and including the 1:100 year event;
- Maximum depth of flow (static + dynamic) on local and collector streets shall not exceed 0.35 m during the 100-year event. The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event;
- Runoff that exceeds the available storage in the right-of-way will be conveyed overland along defined major system flow routes towards the proposed major system outlet to the stormwater management facility. There must be at least 15cm of vertical clearance between the spill elevation on the street and the ground elevation at the front of the building envelope that is in the proximity of the flow route or ponding area;
- The product of the 100-year flow depth (m) and flow velocity (m/s) within the right-of-way shall not exceed 0.60;

- Furthermore, 30cm of vertical clearance between the spill elevation and the ground elevation at the rear of the building envelope.

2.2.3 Water Quality & Quantity Control

- Provide a *'Normal'* (70% long-term total suspended solids removal) level of quality control;
- Post-development peak flows from the site are to be controlled to pre-development levels;
- Implement lot level and conveyance Best Management Practices to promote infiltration and treatment of storm runoff.

2.3 Proposed Storm Servicing Design

Storm servicing for the proposed subdivision will be provided using a dual drainage system: Runoff from frequent storm events will be conveyed by storm sewers (minor system), while flows from larger storm events which exceed the capacity of the storm sewers will be conveyed overland along defined overland flow routes (major system) to the Mill Run stormwater management facility and ultimately the Almonte Municipal Drain.

2.3.1 Storm Sewers (Minor System)

The storm sewers comprising the minor system have been designed in accordance with Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletins PIEDTB-2016-01 (September 2016), ISTB-2018-01 (March 2018), and ISTB-2018-04 (June 2018). The criteria used to design the storm sewers are summarized in **Table 2.1**.

Table 2.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	5 Year Return Period
Storm Sewer Design	Rational Method / PCSWMM
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (T_c)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm
Minimum Pipe Cover	2.0 m (Unless frost protection provided)

Inlet Control Devices

Inlet control devices (ICDs) are to be installed in all catchbasins to limit inflows to the minor system capacity (5-year storm event). Exact ICD sizes and catchbasin locations will be determined during the detailed design stage.

2.3.2 Major System Design

The major system design will conform to the design standards outlined in the Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletins PIEDTB-2016-01 (September 2016), ISTB-2018-01 (March 2018), and ISTB-2018-04 (June 2018). During detailed design, the right-of-way will be graded to contain the major system runoff from storm events exceeding the minor system capacity for all storms up to and including the 100-year design event. The site will be graded to provide an engineered overland flow route for large, infrequent storms, or in the event that the storm sewer system becomes obstructed, with the majority of major system flows routed to the stormwater management facility.

Major System Flow Depths

For events exceeding the minor system design storm and up to the 100-year design storm flow depths in the right of way are to be limited to a maximum of 0.35m at the edge of pavement.

Infiltration Best Management Practices

Infiltration of surface runoff will be accomplished using lot level and conveyance controls. The most suitable practices for groundwater infiltration include:

- Infiltration of runoff captured by rear yard catchbasins;
- Direct roof leaders to rear yard areas;
- Infiltration trenches underlying drainage swales in park areas;
- The use of fine sandy loam topsoil in parks and on residential lawns.

By implementing infiltration Best Management Practices as part of the storm drainage design for the Mill Run Extension, the impacts of development on the hydrologic cycle can be considerably reduced. Infiltration of clean runoff will also have additional benefits for stormwater management; by reducing the volume of "clean" water conveyed to the stormwater management pond, the performance of the pond will be increased.

2.3.3 Stormwater Management Facility

Water quantity and quality control for the site will be provided by the existing stormwater management facility. The existing facility was designed to provide a "Normal" level of water quality control (70% long-term TSS removal) and to control post-development peak flows to pre-development levels for the 5-year and 100-year storm events for the Mill Run Subdivision (Phases 1-6). The existing pond is to be expanded as required to accommodate the additional drainage area and peak flows from the proposed Mill Run Extension (Phases 7-9). A second pond inlet and forebay are to be constructed to receive flows from the Mill Run Extension, and the existing pond outlet structure is to be maintained, if possible.

2.4 Preliminary SWM Modeling

The *City of Ottawa Sewer Design Guidelines* (October 2012) requires hydrologic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the Mill Run Extension was evaluated using the PCSWMM hydrologic/hydraulic model. Note that while this report focuses on the development of Phases 7-8 and Phase 9 is to be developed at a later date, storm runoff from Phase 9 will be routed through Phases 7-8 to the expanded SWM facility. As such, it has been included in both the pre- and post-development PCSWMM models.

Pre-Development Modelling

A pre-development model of the Mill Run Extension (Phases 7-9) was completed using PCSWMM and is based on the existing conditions of the site. The purpose of this model was to determine the pre-development runoff from the site to the Almonte Municipal Drain and determine the allowable release rate from the site.

Post-Development Modelling

A post-development model of the proposed subdivision storm sewers and outlet to the existing stormwater management facility was also developed using PCSWMM. The modelling for the Mill

Run Subdivision was originally completed using AutoDesk Storm and Sanity Analysis (SSA), but has been imported to PCSWMM to allow the Mill Run Extension model to be built into the existing model and ensure runoff from both developments is accounted for in the expanded stormwater management facility.

The post-development PCSWMM model represents both the minor and major system flows from the development. The results of the analysis were used to:

- Simulate major and minor system runoff from the site;
- Determine the storm sewer hydraulic grade line for the 100-year storm event;
- Ensure the expanded stormwater management facility is sufficiently sized to control runoff from the existing and proposed developments and provide a *Normal* level of water quality control.

Model parameters and schematics for both pre- and post-development models have been provided in **Appendix B**.

2.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms and historical storms. The IDF parameters used to generate the Chicago design storms were taken from the *Ottawa Design Guidelines - Sewer* (October 2012).

Chicago Distribution:
25mm-4 hour Event (Water Quality)
5-year 6-hour Event
100-year 6-hour Event

The 6-hour Chicago distribution was originally used to size the Mill Run stormwater management facility as it generated the highest peak flows on a per-subcatchment basis, as well as the highest HGL elevations.

2.4.2 Model Parameters

Storm Drainage Areas

For the pre-development model, the hydrologic parameters for each subcatchment were developed based on **Figure 2** – Mill Run Extension Phases 7 & 8 Existing Conditions. The subcatchments have been divided based on the Phase boundaries for the development. **Table 2.2** provides a summary of the pre-development model parameters, with further detail provided in **Appendix B**.

Table 2.2: Pre-Development Model Parameters

Area ID	Catchment Area (ha)	Flow Length (m)	Time of Concentration (min)	Weighted Curve Number	Weighted IA	Average Slope (%)
PRE-1	3.285	200	23	57	10	0.5%
PRE-2	3.954	250	12	57	10	1.0%
PRE-3	2.662	150	6	59	9	1.5%

For the post-development model, the site has been divided into subcatchments based on both the proposed land use and on a manhole-to-manhole basis. The subcatchments also correspond to the areas used in the Storm Sewer Design Sheet (**Appendix B**). The hydrologic parameters for each subcatchment were developed based on **Figure 3** – Mill Run Extension Phases 7 & 8 Concept Plan. An overview of the modeling parameters is provided in Table 2.3.

Table 2.3: Post-Development Model Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
A-01	0.426	0.45	36%	40%	54.57	78.07	0.5%
A-02	0.235	0.45	36%	40%	67.32	34.91	0.5%
A-03	0.231	0.45	36%	40%	11.86	194.82	0.5%
A-04	0.648	0.52	46%	40%	142.17	45.58	0.5%
A-05	0.501	0.52	46%	40%	102.35	48.95	0.5%
A-06	0.490	0.52	46%	40%	92.37	53.05	0.5%
A-07	0.557	0.52	46%	40%	118.01	47.20	0.5%
A-08	0.454	0.52	46%	40%	101.25	44.84	0.5%
A-09	0.069	0.60	57%	0%	75.58	9.13	0.5%
A-10	0.572	0.60	57%	40%	150.13	38.10	0.5%
A-11	0.582	0.52	46%	40%	128.90	45.15	0.5%
A-12	0.653	0.52	46%	40%	154.45	42.28	0.5%
A-13	0.484	0.52	46%	40%	113.22	42.75	0.5%
A-14	0.198	0.60	57%	40%	3.96	500.00	0.5%
PH9-A	2.347	0.52	46%	40%	44.44	528.08	0.5%
PH9-B	0.312	0.45	36%	40%	44.20	70.59	0.5%
TOTAL:	**8.76**						

Runoff Coefficient/ Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the Runoff Coefficients noted on **Figure 5** – Mill Run Extension Phases 7 & 8 Storm Drainage Areas using the equation:

$$\%IMP = \frac{(C - 0.2)}{0.7}$$

Depression Storage

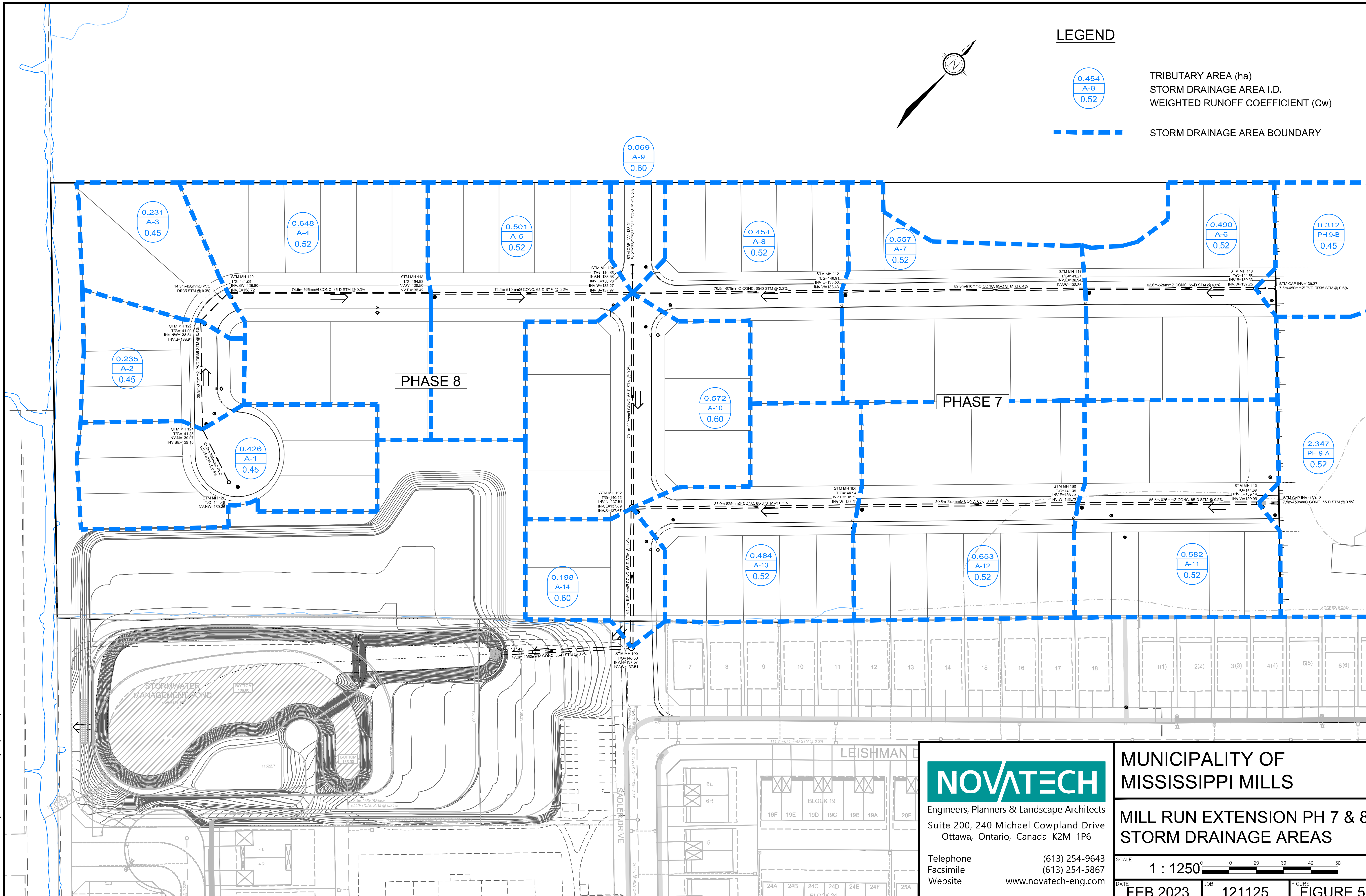
The default values for depression storage in the City of Ottawa were used for all catchments.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Residential rooftops are assumed to provide no depression storage and all rainfall is converted to runoff. The percentage of rooftop area to total impervious area is represented by the ‘No Depression’ column in **Table 2.3**.

Equivalent Width

‘Equivalent Width’ refers to the width of the sub-catchment flow path. This parameter is calculated as described in the *Sewer Design Guidelines, October 2012, Section 5.4.5.6*



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MUNICIPALITY OF MISSISSIPPI MILLS

MILL RUN EXTENSION PH 7 & 8
STORM DRAINAGE AREAS

SCALE 1 : 1250

DATE	JOB	FIGURE
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Major System

Since the major system has not yet been designed, the subcatchment areas are not based on a detailed grading plan. It is anticipated that major system storage can be provided by saw-toothing the roadways and placing catchbasins at low points. As such, some storage within the right-of-ways has been assumed by the post-development model during larger storm events. During events up to and including the 5-year, storm runoff will flow uncontrolled into the minor system. The major system connections to the minor system have been determined based on a pair of City standard sized inlet control devices (ICDs) and sized based on the 5-year approach flow.

As the project is only at the Draft Plan stage, the detailed lot-level grading information is not yet available.

Modeling Files / Schematic

The PCSWMM model schematics are provided in **Appendix B**. Digital copies of the modeling files and model output for all storm events are provided with the digital report submission.

2.4.3 Model Results

The results of the PCSWMM model are summarized in the following sections.

Peak Flows

Under existing conditions, storm runoff from the site flows overland towards the Almonte Municipal Drain. Peak flows from the pre-development PCSWMM model were added to the existing allowable release rates from the existing Mill Run stormwater management facility to determine the new allowable release rate from the expanded facility. Details are outlined in **Table 2.4**:

Table 2.4: Allowable Release Rates (L/s)

Return Period	Phases 1-6 Pond Release Rate (L/s)	Phases 7-9 Pre-Dev. Peak Flow (L/s)	Allowable Release Rate (L/s)
5-year	430	182	612
100-year	1,543	588	2,131

With the addition of runoff from Mill Run Extension Phases 7-9, peak flows leaving the pond have increased slightly, but are still below the allowable release rate. As such, the pond expansion is sufficient to control peak flows without needing to re-configure the existing pond outlet structure. Post-development peak flows are outlined in **Table 2.5**.

Table 2.5: Updated Pond Outflows

Return Period	Allowable Release Rate (L/s)	Total Pond Outflow (L/s)
5-year	612	599
100-year	2,131	1,976

Hydraulic Grade Line

The PCSWMM model was used to evaluate the 100-year hydraulic grade line (HGL) elevations within the proposed storm sewers. As the design is only at the draft plan stage, the underside of footing (USF) elevations have not yet been determined. The HGL analysis will be revised at the detailed design stage to reflect the controlled inflows at each inlet to the storm sewers. As such, the HGL within the sewers during the 100-year event has been compared against the obvert of the outlet pipe and the top of grate elevation for each manhole to ensure any surcharging is at an acceptable level.

Table 2.6: 100-year HGL Elevations

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elevation - 100yr4hr (m)	Min USF (m)	WL Above Obvert (m)	Clearance from T/G (m)
MH100	137.51	140.36	138.43	138.73	-0.13	1.63
MH102	137.67	140.52	138.66	138.96	-0.06	1.56
MH104	137.97	140.68	138.72	139.02	-0.15	1.66
MH106	138.31	140.94	138.88	139.18	-0.25	1.76
MH108	138.72	141.35	139.12	139.42	-0.42	1.93
MH110	139.06	141.69	139.42	139.72	-0.47	1.97
MH112	138.43	140.91	138.82	139.12	-0.29	1.79
MH114	138.86	141.27	139.08	139.38	-0.38	1.89
MH116	139.25	141.58	139.38	139.68	-0.40	1.90
MH118	138.42	140.83	138.89	139.19	0.02	1.64
MH120	138.72	141.05	139.01	139.31	-0.24	1.74
MH122	138.84	141.09	139.09	139.39	-0.20	1.70
MH124	139.07	141.25	139.26	139.56	-0.19	1.69
MH126	139.26	141.49	139.26	139.56	-0.30	1.93

As shown in the above table, the HGL elevations are generally within the pipes at all manhole locations, with the exception of MH118 where there is minor surcharging. Minimum USF elevations have also been determined to aid in the design of individual lots at the detailed design stage.

2.5 Stormwater Management Facility Updates

As noted above, stormwater quantity and quality control for the new Mill Run Extension will be provided through the expansion of the existing Mill Run stormwater management facility. The existing facility is a wet pond, originally designed to control post-development peak flows to pre-development levels for the 5-year and 100-year storm events and to provide a *"Normal"* level of water quality control (70% long-term TSS removal).

The pond is to be expanded along it's northern boundary into the Mill Run Extension lands, with a new forebay and pond inlet structure to be constructed for the proposed development. The existing pond outlet structure is to be maintained.

2.5.1 Design Criteria

The expanded SWM facility has been designed to meet the following criteria:

- Provide a *"Normal"* level of water quality control (70% long-term TSS removal);
- Provide quantity control storage to ensure post-development peak flows for the 5-year and 100-year storm events do not exceed pre-development levels;
- The SWM facility will have side slopes of 3:1 (H:V) or shallower;
- The forebays have been sized to provide sufficient storage for 10 years of sediment accumulation;
- A sediment storage area has been provided within the SWM block to allow for storage and drying of material removed during maintenance/ cleanout.

2.5.2 Pathways/ SWM Facility Access

Access to the existing pond inlet and outlet structures and the sediment management area is provided from Honeybourne Street by pathways constructure of 300mm granular 'B' overlaid with 100mm of granular limestone screenings (stone dust). Access to the newly constructed pond inlet will be provided via Sadler Drive with a similar pathway construction.

2.5.3 Inlet Structures

The existing inlet to the SWM facility consists of a 975mm x 1535mm elliptical storm sewer discharging to the forebay through a concrete headwall constructed to ODSP 804.040 standards. The invert of this pipe is located below the normal water level to prevent erosion.

The new inlet to the SWM facility for Mill Run Extension Phases 7-9 will be constructed in a similar manner, with an inlet pipe consisting of a 1050mm storm sewer. Exact sizing and design details will be provided at the detailed design stage.

2.5.4 Sediment Forebays

The existing sediment forebay has a length of approximately 32m and is separated from the main cell by a submerged riprap berm set 0.10m below the normal water level. The forebay berm is constructed from crushed rock/ riprap.

The new sediment forebay will be constructed in a similar manner, with a length of approximately 50m (minimum of 26m) and top width of approximately 17m (10m minimum)

2.5.5 Permanent Pool

The facility was originally designed with a permanent pool volume of approximately 4,214 m^3 at an elevation of 137.50 m and was designed to provide a *"Normal"* level of protection (70% long-term TSS removal) for a tributary drainage area of 29.75 ha with an average imperviousness of 52%.

Through the development of the 6 Phases of the Mill Run subdivision, the total tributary area has increased slightly to 30.42 ha with an average imperviousness of 52%. The addition of the Mill Run Extension Phases 7-9 will mean an additional 8.76 ha with an average imperviousness of 45 %, for a total of 39.18 ha and 49% on average. To achieve a *"Normal"* level of water quality control, this would require a minimum of 2,519 m^3 of permanent pool volume. The expanded pond design is proposed to provide a permanent pool with a volume of 6,786 m^3, which is sufficient to provide water quality protection at the *"Normal"* level (70% long-term TSS removal).

2.5.6 Extended Detention

Extended detention storage is provided by the first 0.25m of active storage within the pond at an elevation of 137.75m to allow for settling of suspended sediment, and will release over a period of approximately 24 hours. The total volume provided by the original design was approximately 1,297 m^3, with the expanded pond design providing approximately 1,547 m^3, which is in accordance with the Ministry of the Environment requirements of 40m^3/ha for the area to be treated by the pond.

2.5.7 Active Storage

The facility was originally designed with a 100-year active storage volume of approximately 8,620 m^3 at an elevation of 138.52 m. The expanded facility will provide a volume of 11,190 m^3 at an elevation of 138.46 m, which is sufficient to control the additional storm runoff from the Mill

Run Extension Phases 7-9. The stage-storage-discharge table for the expanded SWM facility is provided in **Table 2.7**.

Table 2.7: Stage-Storage-Discharge

Stage	Elevation	Area	Volume		Outflow			
			Stage	Total	ED. Orifice	Weir 1	Weir 2	Total
	(m)	(m^2)	(m^3)	(m^3)	(L/s)	(L/s)	(L/s)	(L/s)
Pond Bottom	136.00	3685	0	0	0	0	0	0
Permanent Pool	137.50	5582	6950	6950	0	0	0	0
	137.60	6252	592	7542	15	0	15	30
Extended Detention	137.75	6545	960	8502	38	0	38	75
	138.00	13959	2563	11065	59	219	277	554
5-year	138.12	14361	1699	12764	66	383	450	899
100-year	138.46	17490	5415	18179	84	944	1461	2490

2.5.8 Outlet Structure

No modifications to the original outlet structure are recommended at this stage in the design process, as the existing outlet structure will continue to provide the requisite water quantity control for both the Mill Run Phases 1-6 and Mill Run Extension Phases 7-9 developments. The outlet structure consists of a concrete box maintenance hole (structure '1500'). The maintenance hole has two pipes entering it. The lowest draws water from the nearby ditch inlet catch basin and the higher one draws water from the bottom of the pond using a negatively sloped pipe. In the middle of the maintenance hole is the concrete control structure.

Extended Detention

As noted above, the expanded SWM facility provides extended detention for the first 1,547 m^3 of active storage to allow for settling of suspended sediment in the pond. Extended detention outflows are conveyed via the 300mm reversed slope pipe and released over a period of 24 hours through two 144mm orifices cast into the SWM facility outlet structure using PVC liners.

Quantity Control

Runoff volumes exceeding the extended detention storage volume are conveyed within the outlet structure via a 0.72m wide rectangular weir formed into the control structure. The invert of this weir is 137.75m.

Overflow Spillway

Outside of the control structure, 20m to the north, is the major system outlet. This outlet is a 16.0m overflow weir with an invert of 138.40 m. It is formed into the pond berm structure and is constructed from earth, is vegetated, and is generally trapezoidal in shape. This structure also forms the overflow spillway for when water levels exceed the 100-year elevation in the pond. This structure conveys water directly into the Almonte Municipal Drain.

2.6 Stormwater Management Facility Planting Design

As the proposed development is anticipated to result in the loss of some of the local wetlands and significant wildlife habitat for breeding wetland amphibians, the proposed naturalized stormwater management pond should be designed and constructed following natural design principles. To meet this objective the following recommendations should be incorporated into future stormwater management pond design with input from the environmental consultant to provide specific recommendations to planting design:

- Native upland vegetation buffer strips should be established between the stormwater management pond and the surrounding vegetation following construction. Upland vegetation buffers will aid in restoration of construction disturbances;

- The periphery of the stormwater management pond disturbed during construction should be re-vegetated and maintained to provide moist-meadow habitat consisting of native grasses and forb species, trees and shrubs;

- The stormwater management pond should be designed and constructed to have relatively flat slopes of 7:1 where possible and irregular shape shorelines and depths within the nearshore areas, while still maintaining a geometry required for hydraulic efficiency;

- Following final excavation and grading, the nearshore zone of each stormwater pond should be lined with an appropriate growing medium and/or seed bank material retained during excavation to allow for establishment of aquatic vegetation plantings;

- Maintain robust vegetation below the normal water level with wet meadow and shallow marsh or deep emergent wetland plants;

- Aquatic plantings should include a mix of emergent aquatic vegetation and wet meadow species, including shrub species, to ensure colonization shorelines under various water levels and to provide sufficient cover to offer amphibians protection from predators;

- Woody bundles and basking logs should be incorporated into the design of the nearshore areas to increase habitat structure and complexity;

- Undertake annual vegetation and amphibian monitoring for a period of three years to document performance against existing breeding amphibian community assemblage and relative abundance;

- The development plan should include lot-side swales and/or roadside ditches designed to promote infiltration.

3.0 SANITARY SERVICING

3.1 Proposed Sanitary Sewer

The proposed sanitary sewer system for Phases 7 & 8 of the Mill Run Extension are to be serviced with a combination of 200mm and 250mm dia. sanitary sewers. The sanitary system for the Subject Lands will be directed by gravity sewers and connect to the existing Mill Run Subdivision 250mm dia. sanitary stub within Sadler Drive. This existing Mill Run sanitary sewer outlets to Ottawa Street and then ultimately outlets to the Gemmill's Bay Pumping Station, which pumps the sewage to the Mississippi Mills Wastewater Treatment Plant.

Within the Subject Lands, it is proposed to extend a 250mm dia. sanitary sewer north on Sadler Drive to service the proposed development. Additionally, 200mm dia. sanitary sewers will extend off Sadler Drive into Streets 1, 2 and 3.

To account for future developments to the east, 250mm dia. sanitary stubs will be installed at the ends of both Street 1 and Street 2. Similarly, a 200mm dia. sanitary stub will be installed north of the Street 1 and Sadler Drive intersection for any potential future development north of the Subject Lands.

Refer to **Figure 4** – Mill Run Extension Phases 7 & 8 Conceptual Servicing for more details.

3.2 Design Criteria

Population and sanitary flow estimates for the proposed development are calculated using design criteria from the *J.L. Richards Master Plan Update Report* (February 2018) and the *City of Ottawa Sewer Design Guidelines* (October 2012). Based on correspondence with the Municipality, some design criteria from the 2018 City of Ottawa guidelines have been followed. Preliminary sanitary flow analysis of the Mill Run Extension has been completed based on the following design criteria:

Demand Values

- Residential Demand = 350 L/cap/day
- Population Density
  - Single Unit = 3.4 persons/unit
  - Semi-detached Unit = 2.7 persons/unit
  - Townhouse Unit = 2.7 persons/unit
- Park Demand = 3700 L/ha/day

Design Parameters

- Max. Residential Peak Factor 'P.F.' = 4.0 (based on Harmon Equation)
- Harmon Correction Factor 'K' = 0.8 (per City of Ottawa, *ISTB-2018-01*)
- Infiltration Flow Rate = 0.28 L/sec/ha
- Min. Sanitary Flow Velocity = 0.6 m/s
- Manning's Roughness Coefficient 'n' = 0.013

3.3 Sanitary Flow Analysis

The peak sanitary flow for the Mill Run Extension Phases 7, 8 and future lands to the east is **9.79 L/s**. Calculated peak flows for the proposed development are summarized below in **Table 3.1**.

Table 3.1: Peak Sanitary Flows Summary

Phase	Development Condition	Population	Area (ha)	Peak Res. / Park Flow (L/s)	Peak Extran. Flow (L/s)	Peak Design Flow (L/s)
Phases 7 & 8	Residential	370	6.66	4.94	1.86	6.80
	Park	-	0.42	0.02	0.12	0.14
Future Phase 9	Residential	145	2.66	2.10	0.75	2.85
	Park	-	-	-	-	-
Totals		515	9.74	7.04	2.73	9.79

Based on the proposed sanitary drainage areas pipe network layout, an estimated peak sanitary design flow has been calculated for the proposed development. Phases 7, 8 and future lands to the east are estimated to produce a total peak design flow of **9.79 L/s**. As the layout for future lands to the east of the Mill Run Extension has yet to be determined, the corresponding population and drainage areas have been estimated based on the population density of Phases 7 and 8.

The existing Mill Run Subdivision had not accounted for the Subject Lands' sanitary flows in its design process. To analyze the downstream flow capacity, flow rates from proposed Mill Run Extension phases 7, 8 and future lands to the east were inputted into the Mill Run Sanitary Design Sheet. This analysis determined a small surcharge occurs downstream within the Mill Run Subdivision. Further investigation of the downstream surcharge and the associated hydraulic grade line (HGL) is elaborated on in the following section.

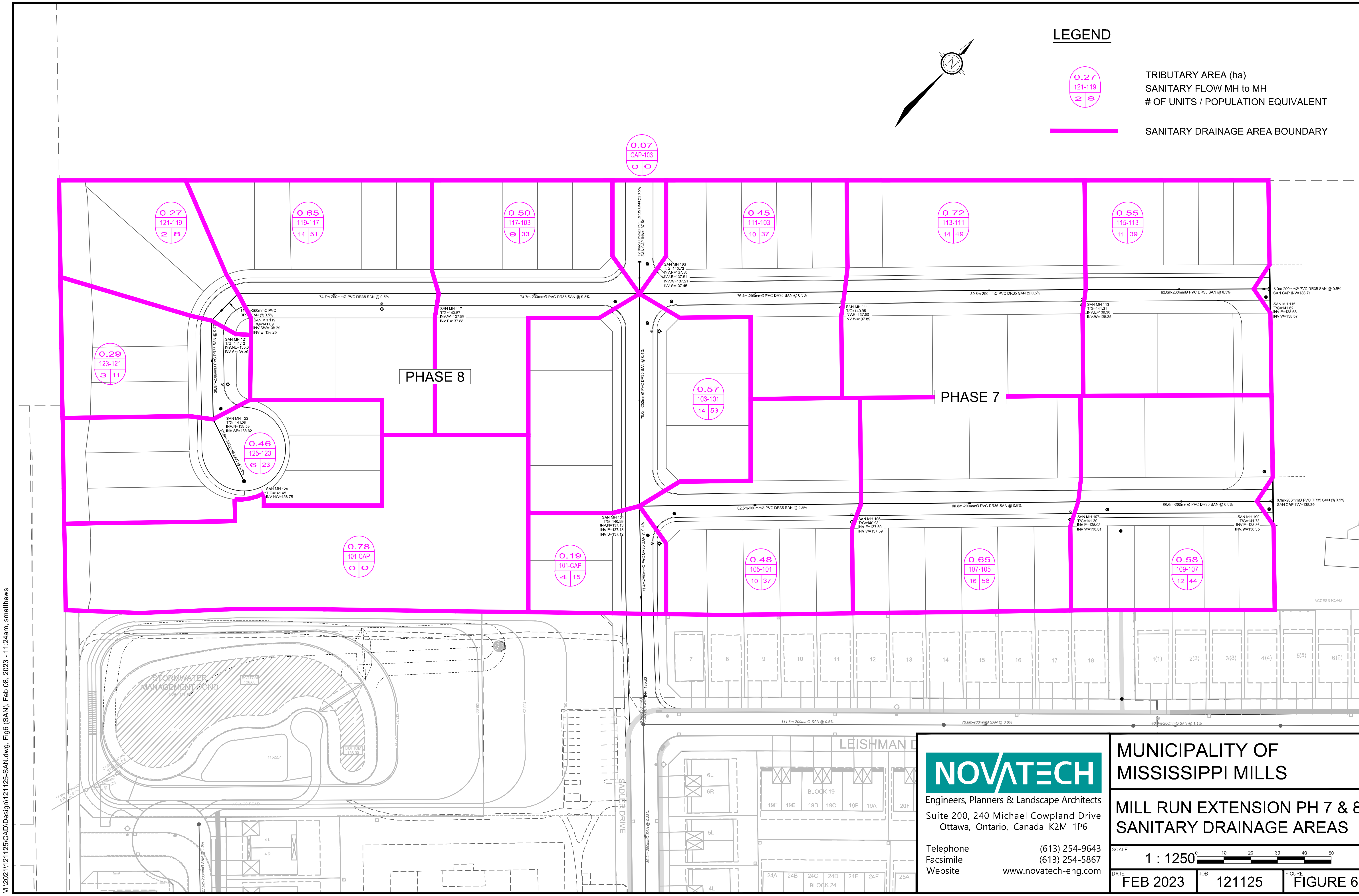
Refer to **Figure 6** - Mill Run Extension Phases 7 & 8 Sanitary Drainage Areas for details on the proposed sanitary drainage areas. Design sheets for the Subject Lands and the Mill Run Subdivision can be found in **Appendix C**.

3.4 Downstream Hydraulic Grade Line (HGL) Analysis

As a result of the added sanitary peak flows from the proposed Mill Run Extension development, a surcharge downstream within the Mill Run Subdivision occurs. To analyse the surcharge, a manual HGL analysis has been completed. Results from the HGL analysis indicate that surcharge only exists downstream within the Mill Run Subdivision and flows remain within the sanitary pipes for the Subject Lands.

HGL analysis determined that the greatest amount of surcharge is within manhole SAN303 of the Mill Run Subdivision and is roughly 0.15m above the existing sanitary sewer's obvert at an elevation of 136.64m. Using the Mill Run Phase 1 as-built drawings, the lowest underside of footing (USF) elevation closest to manhole SAN303 is 137.82m. With over one meter of clearance between the surrounding buildings' USF and the sanitary surcharge elevations, there is limited potential for negative impacts to the existing downstream units in the Mill Run Subdivision. HGL analysis and Mill Rub Subdivision as-built drawings can be found in **Appendix C**.

Flow monitoring of the Mill Run Subdivision will be performed in the near future. From experience on other projects, it is expected that the actual flows are less than the design flows. Based on the results of the flow monitoring, there may be no surcharge flows produced within the downstream system due to additional flows from the proposed Mill Run Extension. Further analysis of the downstream sanitary flows will be investigated during the detailed design stage.


LEGEND
TRIBUTARY AREA (ha)
SANITARY FLOW MH to MH
OF UNITS / POPULATION EQUIVALENT
SANITARY DRAINAGE AREA BOUNDARY
0.27 121-119 2 8
0.65 119-117 14 51
0.50 117-103 9 33
0.07 CAP-103 0 0
0.45 111-103 10 37
0.72 113-111 14 49
0.55 115-113 11 39
0.29 123-121 3 11
0.46 125-123 6 23
0.57 103-101 14 53
0.78 101-CAP 0 0
0.19 101-CAP 4 15
0.48 105-101 10 37
0.65 107-105 16 58
0.58 109-107 12 44
PHASE 8
PHASE 7
STORMWATER MANAGEMENT POND
SADLER DRIVE
LEISHMAN D
NOVATECH
Engineers, Planners & Landscape Architects
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MUNICIPALITY OF MISSISSIPPI MILLS
MILL RUN EXTENSION PH 7 & 8
SANITARY DRAINAGE AREAS
SCALE 1 : 1250
DATE FEB 2023
JOB 121125
FIGURE FIGURE 6
SHT11X17.DWG - 279mmX432mm
M:\2021\121125\CAD\Design\121125-SAN.dwg, Fig6 (SAN), Feb 08, 2023 - 11:24am, smatthews

4.0 WATER SERVICING

4.1 Proposed Watermain System

The proposed watermain system for Phases 7 & 8 of the Mill Run Extension is to be serviced with 50mm, 200mm and 250mm dia. watermains including two (2) connections to the existing Mill Run Subdivision watermain infrastructure. The first connection will be to the existing 250mm dia. watermain stub on Sadler Drive. The second connection will be constructed within a 10m servicing block, connecting Street 1 to the existing 250mm dia. watermain on Leishman Drive.

The 250mm dia. watermain within Sadler Drive will extend north into the Subject Lands. A 250mm dia. watermain will be installed within Street 1 and Street 2 while a 200mm dia. watermain will service Street 3. There will be a 50mm PEX loop at the end of the Street 3 cul-de-sac. Additionally, a 250mm dia. watermain will connect Streets 1 and 2 through a 14m servicing block providing a looped system.

250mm dia. watermain stubs will be installed at the ends of both Street 1 and Street 2 for future development to the east. Similarly, a 250mm dia. watermain stub will be installed north of the Street 1/Street 3 and Sadler Drive intersection for any potential future development north of the Subject Lands. Fire hydrants will be installed along the proposed streets to provide fire protection.

Refer to **Figure 4** – Mill Run Extension Phases 7 & 8 Conceptual Servicing for more details.

As part of the Mill Run Extension development, a 250mm dia. watermain is proposed to be installed from the east end of Honeyborne Street to the east end of Bracewell Street within the Ramsay Concession 11A right-of-way. This proposed connection to the existing Mill Run hydraulic network will provide redundancy for the overall water supply system and provide increased capacity for the current water network within Mill Run and for the proposed Phases 7 & 8 of Mill Run Extension and future development of Phase 9. Refer to **Figure WM** – Mill Run Extension Phases 7 & 8 Watermain Layout in **Appendix D** for more details.

4.2 Design Criteria

Design criteria for the Subject Lands is based on the *Master Plan Update Report* for Mississippi Mills by J.L. Richards (February 2018) and Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Watermain Design Guidelines for Water Distribution. Design criteria including population density has been assumed from the City of Ottawa Water Design Guidelines for Water Distribution. Preliminary watermain analysis of the proposed development was completed based on the following criteria:

Demand Values

- Residential Demand = 350 L/cap/day
- Residential Max. Day = 2.5 x Avg. Day
- Residential Peak Hour = 2.2 x Max. Day
- Population Density (From Table 4.1, City of Ottawa)
  - Single Unit = 3.4 persons/unit
  - Semi-detached Unit = 2.7 persons/unit
  - Townhouse Unit = 2.7 persons/unit

System Pressure Requirements

- Normal Operating Pressure (Avg. Day) 345 kPa (50 psi) – 483 kPa (70 psi)
- Minimum Pressure (Peak Hour) > 276 kPa (40 psi)
- Minimum Pressure (Max. Day + Fire Flow) > 140 kPa (20 psi)

Friction Factors

Watermain Size	C-Factor
• 50 mm	100
• 200-250 mm	110
• 300-400 mm	120

Fire Flow Analysis:

Preliminary fire flow calculations for the Subject Lands have been performed based on two (2) proposed connections to the existing Mill Run watermain infrastructure. The first connection will be to the existing 250mm dia. watermain stub on Sadler Drive. The second connection will be constructed within a 10m servicing block, connecting Street 1 to the existing 250mm dia. watermain on Leishman Drive. A future connection of the existing Mill Run Subdivision to the Hannon Hills residential development to the west on Honeyborne Street is proposed as part of that Hannon Hills development and has been included in the fire flow analysis. The analysis also includes a proposed extension of a 250mm dia. watermain from the east end of Honeyborne Street to Bracewell Street within the Ramsay Concession 11A right-of-way. These connections to the existing Mill Run hydraulic network provide redundancy and more realistic simulation of future conditions. The previous hydraulic boundary conditions from the existing Mill Run Subdivision, the boundary conditions for the Hannon Hills development, and the Honeyborne Street to Bracewell Street connection are combined and utilized to analyse Phases 7 & 8 of the proposed Mill Run Extension development.

Fire flow demands were calculated using the Ontario Building Code (OBC) method and compared to the fire flow values determined using the Fire Underwriters Survey (FUS) method. Using the OBC method, the fire flows range from 45 L/s for single units, 75 L/s for semi-detached units, and 105 L/s for 5-unit townhouses. The FUS calculations for the same units result in a minimum 50% increase in fire flow demands. Following our preliminary hydraulic analysis, it may be possible to achieve some of the FUS fire flow demands, however, it will require changes to the current concept plan such as larger watermains, increased unit separation, fire walls and possible additional watermain looping to avoid dead ends.

As per correspondence with the municipality, the prior phases of Mill Run used the OBC method to calculate fire flows and this Mill Run Extension should follow that OBC methodology to achieve consistency. From a review of other similar new residential developments in the Almonte area, it appears the OBC method is used for fire flow analysis. It must be noted that the design criteria for fire flows where residential unit separation is less than 3m is 100 L/s in Table 10 of the 2018 Master Plan Update Report by J.L. Richards. This is consistent with the maximum 105 L/s calculated OBC fire flows for 5-unit townhouses within the Subject Lands. Correspondence with respect to utilizing the OBC method to determine fire flows has been submitted previously to the municipality for review. Refer to **Appendix D** for correspondence.

Fire flows have been calculated to be 105 L/s for 5-unit townhouse blocks, 75 L/s for semi-detached units, and 45 L/s for single units. Fire flow calculations can be found in **Appendix D**. The fire flow assumptions are to be confirmed and updated boundary conditions are to be obtained as part of detail design for the Mill Run Extension Phases 7 & 8.

4.3 Hydraulic Analysis

The hydraulic model EPANET was used to analyze the performance of the proposed watermain configuration for three (3) theoretical conditions:

- Maximum HGL (Avg. Day)
- Peak Hour
- Maximum Day + Fire Flow Demand

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The proposed development has been modeled as an extension of the Mill Run Subdivision, thus including Mill Run demands in the hydraulic analysis. The future connection to the Hannon Hills development and the proposed connection from Honeyborne Street to Bracewell Street is also included in the model. The hydraulic model is based on the boundary conditions from the existing Mill Run Subdivision and the future Hannon Hills development. Results from the hydraulic model indicate that adequate pressures will exist throughout the proposed watermain system, satisfying each specified design condition. Refer to **Appendix D** for the hydraulic modeling schematic, boundary conditions and modeling results.

The hydraulic requirements and hydraulic model results are summarized in **Table 4.1** below.

Table 4.1: Hydraulic Analysis Summary

Condition	Mill Run Extension Phases 7 & 8 Demand (L/s)	Min/Max Allowable Pressure (kPa/psi)	Min/Max Operating Pressure (kPa/psi)	Max. Age (hrs)
Maximum HGL (Avg. Day)	1.6	689.5/100 (Max)	397.1/57.6 (Max)	35.5
Peak Hour	8.5	275.8/40.0 (Min)	297.9/43.2 (Min)	N/A
Max. Day Demand (& 45L/s Fire Flow)	48.9	137.9/20.0 (Min)	295.1/42.8 (Min)	N/A
Max. Day Demand (& 75L/s Fire Flow)	78.9	137.9/20.0 (Min)	275.6/40.0 (Min)	N/A
Max. Day Demand (& 105L/s Fire Flow)	108.9	137.9/20.0 (Min)	233.7/33.9 (Min)	N/A

Using the fire flows of 45 L/s for single units, 75 L/s for semi-detached units, and 105 L/s for 5-unit townhouses from the OBC, a minimum operating pressure of 233.7 kPa (33.9 psi) is found within watermain network using a maximum fire flow (OBC) of 105 L/s. The table above indicates that the proposed watermain system can service the Mill Run Extension under all operating conditions using a series of 50mm, 200mm and 250mm dia. pipes.

5.0 UTILITY INFRASTRUCTURE

The development will be serviced by hydro, phone, gas and cable, as per the Municipality of Mississippi Mills approved utility standard right-of-way cross-sections.

6.0 PHASING

The Mill Run Extension development will be completed two (2) phases.

7.0 ROADWAYS

The internal subdivision roads will be constructed in accordance with the typical road cross-sections as shown in **Figure 7** – Typical Road Cross Section for 20m R.O.W. and **Figure 8** – Typical Road Cross Section for 18m R.O.W. The existing Sadler Drive within the Mill Run Subdivision has a 20.0m right-of-way and will continue the same cross-section with barrier curbs and sidewalks on both sides of the roadway in the Subject Lands. For the Mill Run Extension Phases 7 & 8, Streets 1, 2 and 3, will be an 18-metre right-of-way with an 8.5-metre asphalt width and barrier curbs with sidewalks on one side of the roadway.

Preliminary grading and the erosion and sediment control plan for the Subject Lands is shown in **Figure 9** – Mill Run Extension Phases 7 & 8 Conceptual Grading and ESC.

8.0 EROSION AND SEDIMENT CONTROL

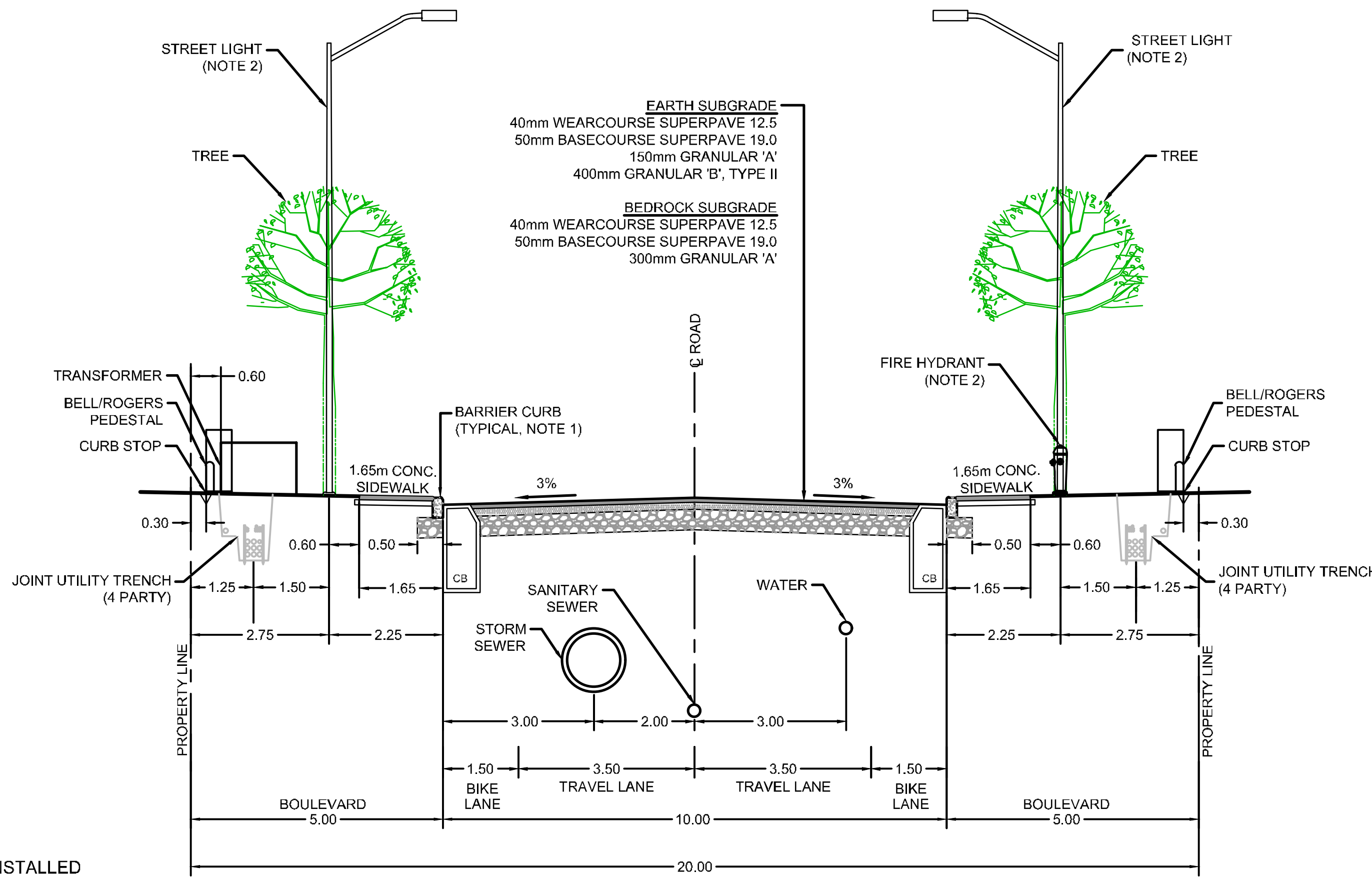
Erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987).

Typical erosion and sediment control measures recommended include, but are not limited to, the use of silt fences around perimeter of site (OPSD 219.110), catch basin inserts under catch basin/maintenance hole lids, heavy duty silt fence barrier (OPSD 219.130), straw bale check dams (OPSD 219.180), rock check dams (219.210 or OPSD 219.211), riprap (OPSS 511), mud mats, silt bags for dewatering operations, topsoil and sod to disturbed areas and natural grassed waterways. Dewatering and sediment control techniques will be developed for the individual situations based on the above guidelines and utilizing typical measures to ensure erosion and sediment control is controlled in an acceptable manner and there is no negative impact to adjacent Lands, water bodies or water treatment/conveyance facilities.

It will be the responsibility of the Contractor to submit a detailed construction schedule and appropriate staging, dewatering and erosion and sediment control plans to the Contract Administrator for review and approval prior to the commencement of work. A copy of the City of Ottawa Special Provision F-1004 will become part of any contract and which outlines the contractual requirements which includes preparation of a detailed erosion and sediment control plan.

General

- All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the Municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.



NOTES:

1. MOUNTABLE CURB TO BE INSTALLED IN FRONT OF TOWNS. TRANSITION LOCATIONS TO BE NOTED ON GRADING PLANS.
2. FIRE HYDRANTS TO BE LOCATED ON WATERMAIN SIDE OF STREET. STREET LIGHTS TO BE ON OPPOSITE SIDE.

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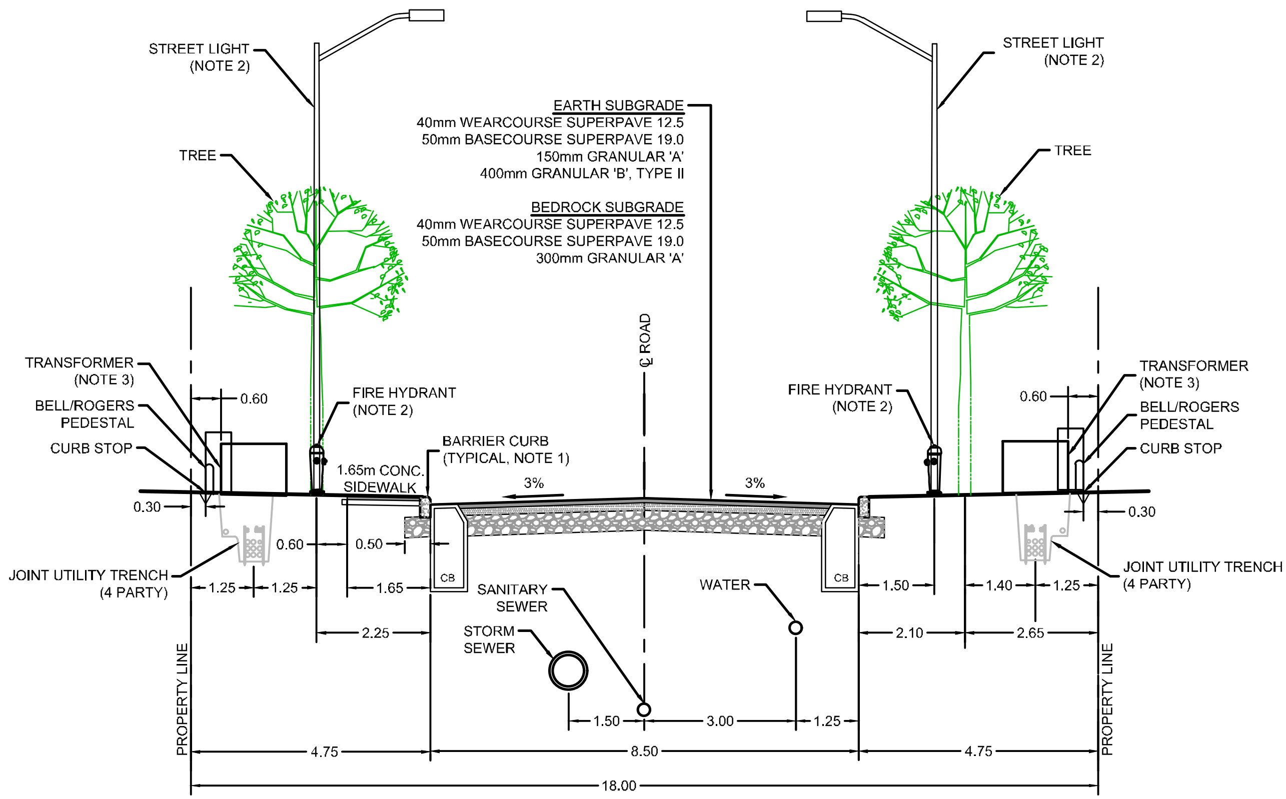
MUNICIPALITY of MISSISSIPPI MILLS
MILL RUN EXTENSION PHASES 7 & 8

TYPICAL ROAD CROSS SECTION FOR 20m R.O.W.

SCALE 1 : 150

DATE FEB 2023 | JOB 121125 | FIGURE FIGURE 7



NOTES:

1. MOUNTABLE CURB TO BE INSTALLED IN FRONT OF TOWNS. TRANSITION LOCATIONS TO BE NOTED ON GRADING PLANS.
2. FIRE HYDRANTS TO BE LOCATED ON WATERMAIN SIDE OF STREET. STREET LIGHTS TO BE ON OPPOSITE SIDE.
3. TRANSFORMERS TO BE LOCATED ON THE OPPOSITE SIDE OF THE SIDEWALK WHEREVER POSSIBLE.

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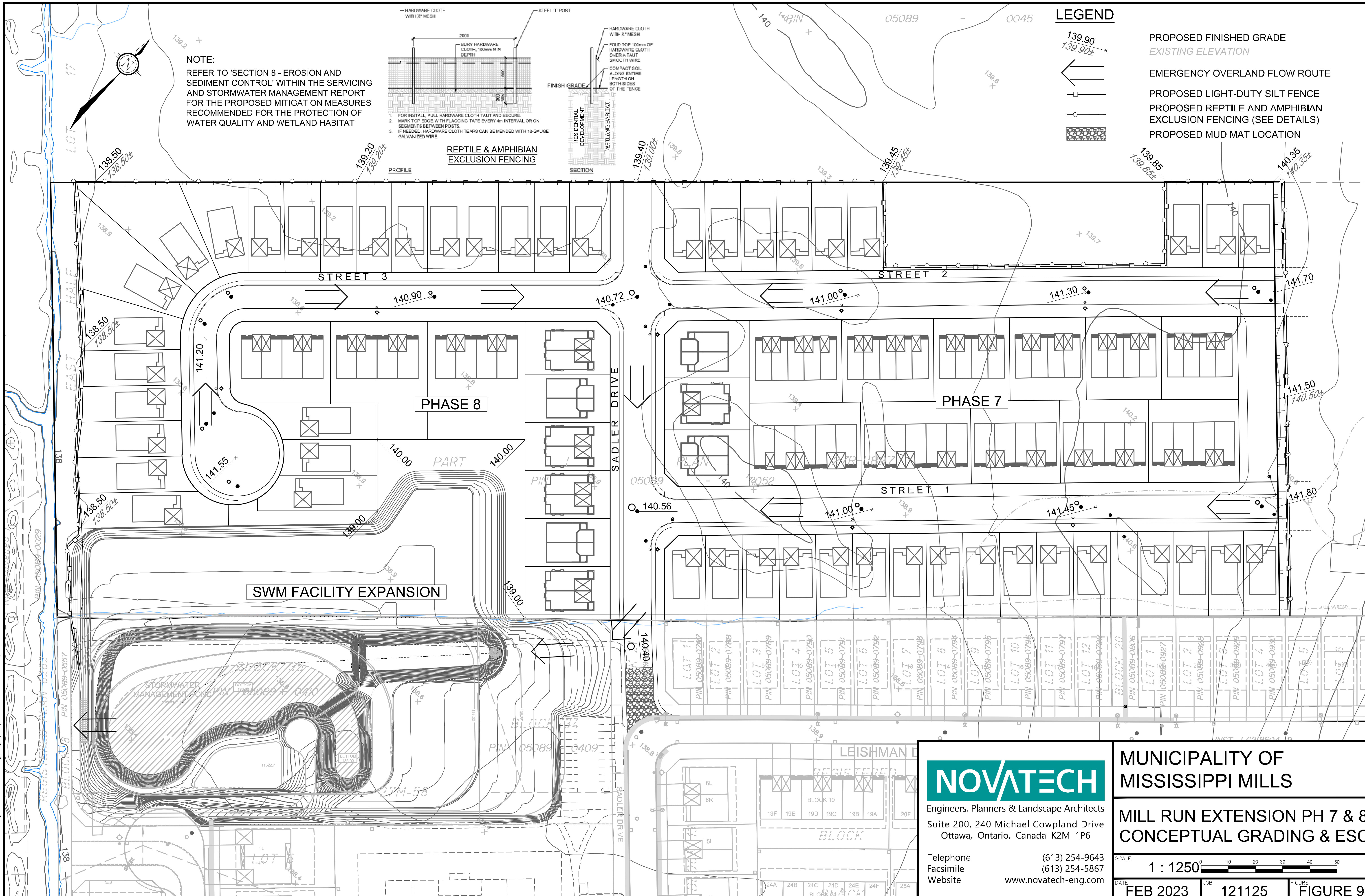
MUNICIPALITY of MISSISSIPPI MILLS
MILL RUN EXTENSION PHASES 7 & 8

TYPICAL ROAD CROSS SECTION FOR 18m R.O.W.

SCALE 1 : 150 (0 2 4 6)

DATE FEB 2023 | JOB 121125 | FIGURE FIGURE 8



NOTE:
REFER TO 'SECTION 8 - EROSION AND SEDIMENT CONTROL' WITHIN THE SERVICING AND STORMWATER MANAGEMENT REPORT FOR THE PROPOSED MITIGATION MEASURES RECOMMENDED FOR THE PROTECTION OF WATER QUALITY AND WETLAND HABITAT
REPTILE & AMPHIBIAN EXCLUSION FENCING
PROFILE
SECTION
LEGEND
PROPOSED FINISHED GRADE
EXISTING ELEVATION
EMERGENCY OVERLAND FLOW ROUTE
PROPOSED LIGHT-DUTY SILT FENCE
PROPOSED REPTILE AND AMPHIBIAN EXCLUSION FENCING (SEE DETAILS)
PROPOSED MUD MAT LOCATION
STREET 3
STREET 2
STREET 1
SADLER DRIVE
PHASE 8
PHASE 7
SWM FACILITY EXPANSION
LEISHMAN
NOVATECH
Engineers, Planners & Landscape Architects
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Facsimile (613) 254-5867
Website www.novatech-eng.com
MUNICIPALITY OF MISSISSIPPI MILLS
MILL RUN EXTENSION PH 7 & 8
CONCEPTUAL GRADING & ESC
SCALE 1 : 1250
DATE FEB 2023
JOB 121125
FIGURE FIGURE 9
M:\2021\121125\CAD\Design\121125-GR.dwg, Fig9(GR), Feb 09, 2023 - 3:26pm, smatthews
SHT11X17.DWG - 279mmX432mm

- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accordance with the design drawings and that mitigation measures are being implemented as specified.
  - A light duty silt fence barrier is to be installed in the locations shown on the Erosion and Sediment Control Plan.
  - Straw bale barriers are to be installed in drainage ditches.
  - Catch basin inserts are to be placed under the grates of all proposed and existing catch basins and structures.
  - After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.
- The contractor shall ensure that proper dust control is provided with the application of water (and if required, calcium chloride) during dry periods.
- The contractor shall immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch or sewer system. Appropriate response measures shall be carried out by the contractor without delay.

The contractor acknowledges that failure to implement erosion and sediment control measures may result in penalties imposed by any applicable regulatory agency.

Site Specific Details

Mitigation measures recommended for the protection of water quality and wetland habitat include:

- To offset the loss of wetland and wetland buffer, compensation of wetland function should be considered through naturalized stormwater design completed in conjunction with progressive rehabilitation of the buffer to the Spring Creek Municipal Drain.
  - Progressive rehabilitation should include re-establishing tree and shrub vegetation and herbaceous wet meadow vegetation enhanced through retention of seed bank material excavated as part of the development.
- All future development and construction activities within the study area, including ditching, culvert installation, erosion and sediment control and storm water management should be completed in accordance with Ontario Provincial Standard Specification 182 and OPSS 805.
- No in-water work should occur between March 15 and June 30 of any year to protect spawning fish habitat adjacent to the development area. All in-water habitat features, including aquatic vegetation, natural woody debris and boulders should be left in their current locations.
- Silt fencing should be installed along all setbacks to provide visual demarcation of the setbacks to prevent machinery encroachment and sediment transport.
- When native soil is exposed, sediment and erosion control work in the form of heavy-duty sediment fencing shall be positioned along the down gradient edge of any construction envelopes adjacent to waterbodies.

- In order to protect fish and Blanding's turtles aquatic habitat from contamination, it is recommended that all machinery be maintained in good working condition and that all machinery be fueled a minimum of 30 m from the high water mark.

- Any temporary storage of aggregate material shall be set back from the water's edge by no less than 40 m and be contained by heavy-duty silt fencing.

- Schedule work to avoid wet, windy and rainy periods.

The following mitigation measures are expected to be implemented to avoid contravention of the Endangered Species Act (ESA):

- To protect migratory Blanding's turtles, vegetation clearing should be undertaken outside of the MECP identified turtle active season (April 1 – October 31).

- To provide protection to eastern ribbonsnake during construction, installation of silt fence barriers along the proposed 15 m and 30 m setbacks, including completion of daily sweeps of the construction areas, is recommended.

- Prior to any site work, reptile and amphibian exclusion fencing should be installed around the entire perimeter of the property to prevent the migration of Blanding's Turtles and other wildlife into the construction zone. The temporary exclusion fencing will also provide a visual demarcation of the property for workers during construction. Exclusion fencing should follow the protocols outlined in the Species at Risk Branch: Best Practices Technical Note: Reptile and Amphibian Exclusion Fencing Version 1.1 (MNRF, July 2013).

- Installation of silt fence barriers around the entire construction envelope of each future residential dwelling is recommended to prohibit the migration of snapping turtles into the construction area.

- Each day of construction a daily pre-work sweep of the construction area should occur to ensure no SAR are present and to remove any wildlife from inside the construction area.

- All staff working on-site should be provided Species at Risk training to identify species at risk which a potential to occur on-site including: Blanding's turtle. Training will also outline the stop work procedures and MECP reporting/consultation prior to resuming work.

- During construction if any SAR is identified on-site all work should stop and a qualified professional and the MECP should be contacted for next steps. SAR sightings should be reported to the MECP and the NHIC.

- Heavy-duty silt fencing should be installed and maintained during construction and whenever soil is exposed; the incorporation of lot-side swales and gravel laneways are intended to promote infiltration and direct stormwater runoff to road side ditches instead of towards adjacent waterbodies.

- Cover all stockpiled material with a geotextile to prevent turtles from nesting in the material between May 1 and August 1 of any year.

9.0 CONCLUSIONS

This Servicing and Stormwater Management Report has evaluated the servicing (storm, sanitary and water) for the Mill Run Extension Phases 7 & 8. The principal findings and conclusions of this study are as follows:

General

- The Mill Run Extension Phases 7 & 8 reflected in this Servicing Report and Stormwater Management Report can be adequately serviced by extending existing Mill Run Subdivision water and sanitary infrastructure. Stormwater will be conveyed to the existing Mill Run Stormwater Management (SWM) Pond.

Storm Drainage and Stormwater Management

- To service the Subject Lands, a series of gravity storm sewers will be constructed. Stormwater flows will be conveyed to the existing Mill Run SWM Pond southwest of the proposed development.
- An expansion of the existing SWM pond is proposed to account for added flows from the Subject Lands.
- PCSWMM modeling results indicate a total pond outflow of 599 L/s which is lower than the allowable release rate of 612 L/s for a 5-year storm event. Similarly, a 100-year storm event results in a total pong outflow of 1,976 L/s which is also under the allowable release rate of 2,131 L/s.
- The expanded SWM pond will provide sufficient volumes within the permanent pool and extended detention to provide the required *Normal* (70% long term TSS removal) level of water quality control. The expanded SWM pond will likely provide an *Enhanced* (80% long term TSS removal) level of water quality control but will be confirmed during detail design.

Sanitary Collection

- Sanitary flows will be conveyed through the Mill Run Subdivision to Ottawa Street which connects to the Gemmill's Bay Pumping Station.
- Servicing for the Subject Lands will consist of 200mm and 250mm gravity sewers. The total sanitary flow from the Mill Run Extension Phases 7, 8 and future developments to the east is calculated to be 9.79 L/s.
- The sanitary flows from the proposed development have produced a small surcharge within the existing Mill Run Subdivision. After hydraulic grade line (HGL) analysis, it is determined that the surcharge remains a minimum 1.0m below the existing USF elevations of buildings in the area.
- No further upgrades to the existing sanitary system are anticipated to accommodate the Subject Lands.

Water Distribution

- The existing Mill Run Subdivision 250mm dia. watermain within Sadler Drive will be extended north to service the Subject Lands. A secondary 250mm dia. watermain connection through a 10m servicing block in the existing Mill Run Subdivision will connect to Leishman Drive providing a looped system for the proposed development.
- Hydraulic Analysis has shown that the proposed development can be serviced with a combination of 50mm, 200mm and 250mm dia. watermains. The network will function

normally under all operating conditions including fire flows based off the Ontario Building Code (OBC) and the Master Plan Update Report - FINAL, Municipality of Mississippi Mills Almonte Ward, Mississippi Mills.

Utility Infrastructure

- The development will be serviced by hydro, phone, gas and cable, as per Municipality of Mississippi Mills approved utility standard right-of-way cross-sections.

Roadways

- The roadways will conform to Typical 18.0m and 20.0m cross sections developed for the Mill Run Extension Phases 7 & 8.
- Site grading will match to existing grades at the perimeter of the site.

10.0 CLOSURE

Novatech respectfully requests the Municipality of Mississippi Mills accept the findings of this Servicing and Stormwater Management Report and provide approval for the draft plan of subdivision for the Mill Run Extension – Phases 7 & 8.

NOVATECH

Prepared by:

Billy McEwen, EIT.

Prepared by:

LICENSED PROFESSIONAL ENGINEER
K. J. AULD
100187063
February 10, 2023
PROVINCE OF ONTARIO

Kallie Auld, P.Eng.
Project Manager

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Feb 10 2023
PROVINCE OF ONTARIO

Drew Blair, P. Eng.
Senior Project Manager

Appendix A: Correspondence

Pre-Consultation Meeting Notes
Virtual zoom meeting – November 2, 2022
Prepared By: Julie Stewart

In Attendance
Stefanie Kaminski – Regional Group
Melanie Riddell – Novatech
Greg Winters - Planner, Novatech
James Ireland - Planner, Novatech
Drew Paulusse – Gemtec
Taylor Warrington - Gemtec
Diane Reid – Planner, MVCA
Ken Kelly – CAO, Mississippi Mills
David Shen – Director of Development Services and Engineering
Jeffrey Ren – Planner, Mississippi Mills
Julie Stewart – County Planner, County of Lanark

A brief background was provided, the subject lands were considered as Area 4 as part of OPA 22 and brought into the Settlement Area of Almonte. The proposed subdivision will be an extension to the existing Mill Run subdivision.

129 residential dwelling units are proposed.

There may be a future proposed subdivision on the lands containing the existing home.

Gemtec provided a summary of the EIS. There is an area on adjacent land with Blanding's Turtle Habitat.
The conceptual plan shows the habitat and wetland areas.

MVCA
Diane Reid noted there is a wetland to the North and a wetland to the West. Both of these are on adjacent lands but the regulation limits are on the subject lands.

We note that (2) MVCA regulated wetlands exist on the adjacent lands, (1) N and (1) W of the subject lands. MVCA regulates these wetlands, including their 30 m adjacent lands (i.e. Regulation Limit). The subject property is within the Regulation Limit. As per MVCA Regulation Policies, a minimum setback of 30 m is generally required for any new development or site alteration in and within the Regulation Limit of these wetlands. Melanie Riddell noted that the setback to the west is proposed at 15m.

Diane Reid reiterated that the wetland is regulated. The minimum setback is 30 m not 15m from the wetland. CA policy does not permit development.

Geotechnical Report required to address organic soils in the west.

Stormwater Management – Diane asked Novatech if this will be tying in the existing.

Jeffrey Ren, asked a few questions related to the Category 2 habitat and the proposed park areas.

LANARK COUNTY

PLANS OF SUBDIVISION

PRE-CONSULTATION - checklist

Report	Comments	Required Yes/No
Planning Rationale	Include justification Must have regard for PPS Lanark County Official Plan compatibility Local Official Plan compatibility	Yes
Hydrogeological Study, Terrain Analysis	Availability and suitability of water and waste water MOE – D-5-4 Guidelines MOE – D-5-5 Guidelines ODWSOG Checklist Summary & Sign-off	
Environment Impact Study	SAR & Significant Habitat Wetlands Organic Soils Natural Heritage Features & Systems Significant Wetlands Significant Woodlands Significant Valleylands Significant Wildlife ANSI Fish Habitat	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Servicing Options Statement	Guidelines – MOE D-5-3	Yes
Stormwater Drainage Plan	Guidelines - MOE-2003 / MNR-2001 Checklist Summary & Sign-off	Yes
Grading Plan	Sloping land within lot to direct flow of surface water away from foundations & abutting properties.	Yes

PLANS OF SUBDIVISION

PRE-CONSULTATION - checklist

Report	Comments	Required Yes/No
Sediment and Erosion Control Hazardous Sites	Flooding, erosion hazard Slope and Soil Stability Organic Soils Karst Topography	 Yes
Archeological Investigation	Standards & Guidelines 2011	Yes
Tree Preservation Plan or Tree Conservation Plan	Check with local municipality	
Other	Geotechnical Report	Yes
Draft Plan	To include: Planning Act 50(17) Ont. Reg. 544/06 Lot and block configuration Compatibility with adjacent uses Road access, street layout & Pedestrian amenities Parks & Open Space amenities Easement and right-of-way requirements	

CORPORATION OF THE MUNICIPALITY OF MISSISSIPPI MILLS
3131 OLD PERTH ROAD · PO BOX 400 · RR 2 · ALMONTE ON · K0A 1A0

PHONE: 613-256-2064
FAX:613-256-4887
WEBSITE: www.mississippimills.ca

November 23, 2022

Julie Stewart
County Planner
jstewart@lanarkcounty.ca

Dear Ms. Stewart:

RE: MILL RUN – PHASES 7 AND 8
PRECONSULTATION
FILE: TBD

Please see attached the Planning and Engineering comments regarding the proposed Mill Run Phases 7 and 8 Plan of Subdivision.

Planning

1. Parkland
    a. Staff will consult further with internal departments regarding the proposed 3400 m² of parkland proposed adjacent to the SWM pond. Generally, the Municipality is reluctant to take land such as this that is surrounded on all three sides by private property. Typically, this arrangement creates maintenance issues for the Municipality and generates privacy and other by-law complaints by future landowners.

    b. Staff suggest that this area be reduced in depth (between the SWM and the rear lot lines of proposed lots) and that the area be limited to a multi-use pathway and associated landscaping to provide connectivity between the existing parkland and this expansion area.

2. Midblock Connection
    a. As confirmed in the pre-consultation meeting, the Municipality will require that the completed mid-block connection be sodded, and sidewalks installed.

3. Temporary Road Connection
    a. Please see below further technical comments (engineering) on the temporary road connection in lieu of the turning circles.

    b. Be advised that as a condition of approval, the temporary road connection will need to be appropriately signed for future property owners to be advised that the road connection is temporary in nature only.

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4. Category 2 Habitats

    a. Further internal departmental discussion is required to determine if the Municipality is willing to accept any of the Category 2 Habitat areas as conveyance of land. It is noted that the 15-metre area is deficient in the standard, minimum 30-metre area typically required for this type of habitat protection.

    b. If a pathway is proposed in this area, further review will need to be undertaken to determine if the Municipality is willing to accept a pathway in this area as it would be deemed to be protected habitat and may also present some long-term maintenance issues for the Municipality.

    c. It is also noted that the unopened right-of-way only extends partially along the south easterly lot line and as a result, this may further restrict the ability for a pathway in this area as the pathway will not have any connectivity to the north.

Engineering

1. Site Servicing
    a. A water/wastewater servicing report is required to determine potable water demands, fire flow demands and wastewater discharge, as well as proposed connection/looping points to the municipal system.

2. Stormwater management
    a. A stormwater management report is required to illustrate catchment area, drainage pattern, pre- and post- conditions, hydrologic and hydraulic calculations, quality and quantity treatment. Flow discharge location and requirement will need a consultation with, and obtain approval, from MVCA. For the proposed stormwater management pond expansion, the Municipality will need be involved to discuss operation and maintenance.

    b. A drainage and grading plan is required.

    c. A sediment and erosion control plan is required.

3. Roads and Traffic
    a. A standard urban road design is required. Applicant is expected to contact the Municipality for the requirement of turning circles.

I trust the above will assist you. If you have any further questions regarding this matter, please feel free to contact me at your convenience.

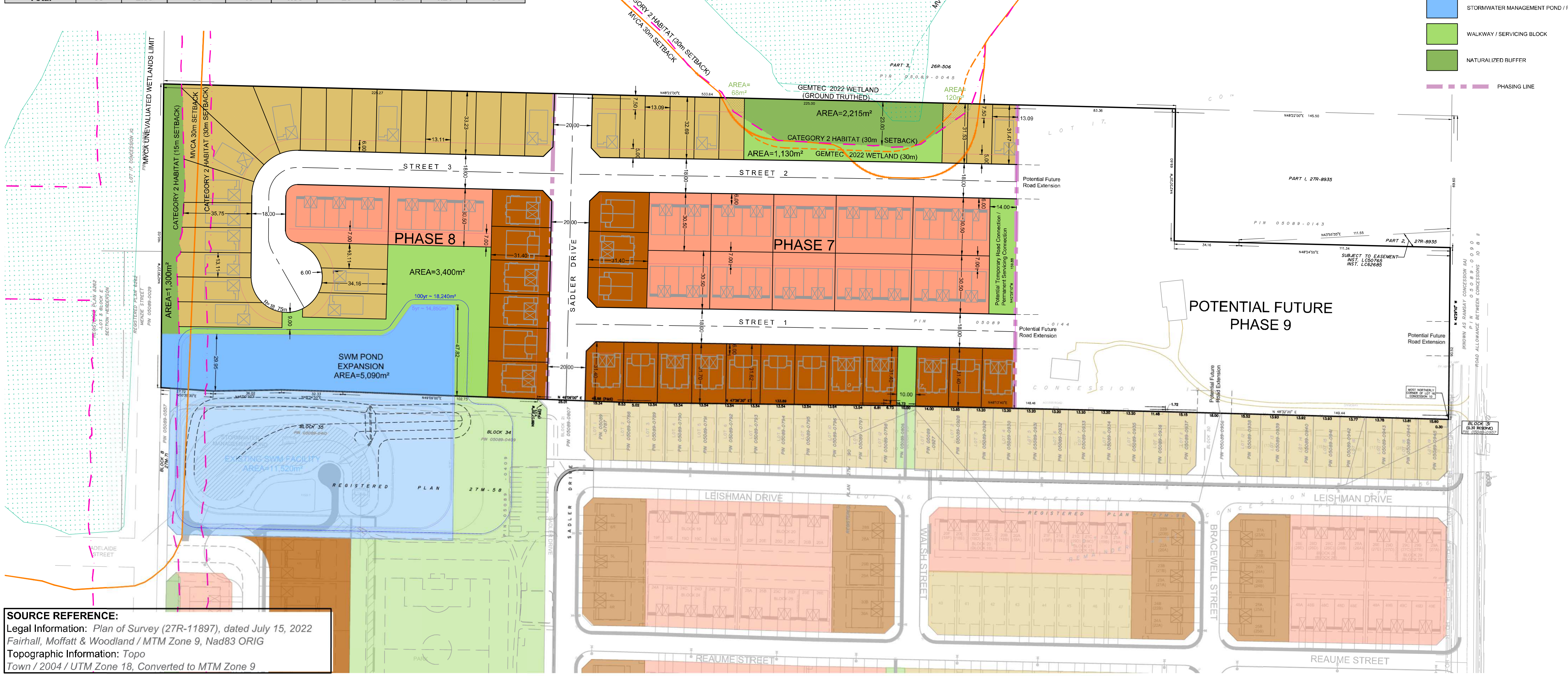
Respectfully yours,

Melanie Knight, MCIP, RPP
Senior Planner
Municipality of Mississippi Mills

Phases	Single Lots							Semi-Detached Lots			2-Storey Townhouse Lots						
	43' Lots		50' Lots		Subtotal		Target Mix	Semi-Detached		Target Mix	Townhouses		Target Mix	Total Units		Road length	Saleable Frontage
	Units	%	Units	%	Units	%	%	Units	%	%	Units	%	%	Units	%	m	m
PHASE 7																	
Sub-Total	9	11%	0	0%	9	11%	20%	30	36%	20%	44	53%	60%	83	100%	623.5	749.3
PHASE 8																	
Sub-Total	22	48%	0	0%	22	48%	20%	12	26%	20%	12	26%	60%	46	100%	227.7	520.1
Total	31	24%	0	0%	31	24%	20%	42	33%	20%	56	43%	60%	129	100%	851.2	1269.4

Dwelling Type	Phase 7			Phase 8			Overall Site		
	# Units	Area (ha)	Net Density (units/ha)	# Units	Area (ha)	Net Density (units/ha)	# Units	Area (ha)	Net Density (units/ha)
PHASE 7 & 8									
Detached	9	0.39	23	22	1.18	19	31	1.57	20
Semi-Detached	30	0.87	34	12	0.34	35	42	1.21	35
Townhouse	44	1.10	40	12	0.33	36	56	1.43	39
Total	83	2.36	35	46	1.85	25	129	4.21	31

Phases	Overall Site				
	# Units	% Mix	OP Target Mix	Net Density (units/ha)	OP Target (units/net ha)
PHASE 7 & 8					
Low Density	73	57%	60%	26	15 - 30
Medium Density	56	43%	40%	39	30 - 40
High Density	-	-	-	-	-



SOURCE REFERENCE:
Legal Information: *Plan of Survey (27R-11897), dated July 15, 2022*
Fairhall, Moffatt & Woodland / MTM Zone 9, Nad83 ORIG
Topographic Information: *Topo*
Town / 2004 / UTM Zone 18, Converted to MTM Zone 9

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

SITE INFORMATION:

Proposed Zoning Setbacks: Typical: **6.0m Front; 7.5m Rear; 1.2m Interior; 3.0m Exterior**
Exceptions: **[Phase 7 singles - 5.0m Front Yards]**
[Phase 7 & 8 Townhouses - 7.0m Rear Yards]

No.	REVISION	DATE	BY
1	ISSUED FOR PRE-CONSULTATION	OCT 31/22	DDB

SCALE: 1:1000 (A1) / 1:2000 (11x17)
1:1000 — 0 10 20 30 40

DESIGN: DDB
CHECKED: MER
DRAWN: SM
CHECKED: MER
APPROVED: DDB

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

MISSISSIPPI MILLS
MILLS PROPERTY

DRAWING NAME
CONCEPT PLAN 6

PROJECT No. 121125-00
REV: REV # 1
DRAWING No. 121125-CP6

M:\2021\121125\CAD\Planning\Concept Plans\121125-CP6.dwg, CP6, Oct 31, 2022 - 2:30pm, smatthews

PLAN24x36.DWG - 914.4mmx609.6mm

Appendix B: Storm Drainage and Stormwater Management

Mill Run Extension

Project No.: 121125

STORM SEWER DESIGN SHEET
MILL RUN EXTENSION - PHASE 7, 8 and FUTURE LANDS TO EAST
FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
MILLS LANDS PHASE 7, 8 & 9 OUTLET TO SWM FACILITY																							
					0.00	0.000	0.000	10.00															
A-1	STM 126	STM 124	0.43	0.45	0.19	0.538	0.538	10.00		104.19			56	56	0.305	300	PVC	0.50	21.8	71.3	0.98	0.37	79%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.37															
A-2	STM 124	STM 122	0.24	0.45	0.11	0.300	0.838	10.37		102.27			86	86	0.381	375	PVC	0.40	39.9	115.6	1.01	0.66	74%
					0.00	0.000	0.000	10.37															
					0.00	0.000	0.000	10.37															
					0.00	0.000	0.000	11.03															
A-3	STM 122	STM 120	0.23	0.45	0.10	0.288	1.126	11.03		99.06			112	112	0.457	450	Conc	0.30	14.3	162.8	0.99	0.24	69%
					0.00	0.000	0.000	11.03															
					0.00	0.000	0.000	11.03															
					0.00	0.000	0.000	11.27															
A-4	STM 120	STM 118	0.65	0.52	0.34	0.940	2.066	11.27		97.94			202	202	0.533	525	Conc	0.30	74.6	245.6	1.10	1.13	82%
					0.00	0.000	0.000	11.27															
					0.00	0.000	0.000	11.27															
					0.00	0.000	0.000	12.40															
A-5	STM 118	STM 104	0.50	0.52	0.26	0.723	2.788	12.40		93.02			259	259	0.610	600	Conc	0.20	74.1	286.3	0.98	1.26	91%
					0.00	0.000	0.000	12.40															
					0.00	0.000	0.000	12.40															
								13.66															
					0.00	0.000	0.000	10.00															
A-9	STM CAP	STM 104	0.07	0.60	0.04	0.117	0.117	10.00		104.19			12.2	12	0.305	300	PVC	0.50	10.5	71.3	0.98	0.18	17%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
								10.18															
					0.00	0.000	0.000	10.00															
PH9-B	PH9-B	STM 116	0.31	0.45	0.14	0.388	0.388	10.00		104.19			40	40	0.457	450	Conc	0.50	20.0	210.2	1.28	0.26	19%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.26															
A-6	STM 116	STM 114	0.49	0.52	0.25	0.708	1.096	10.26		102.84			113	113	0.533	525	Conc	0.50	62.6	317.0	1.42	0.74	36%
					0.00	0.000	0.000	10.26															
					0.00	0.000	0.000	10.26															
					0.00	0.000	0.000	11.00															
A-7	STM 114	STM 112	0.56	0.52	0.29	0.810	1.906	11.00		99.21			189	201	0.610	600	Conc	0.40	89.8	404.9	1.39	1.08	50%
					0.00	0.000	0.000	11.00															
					0.00	0.000	0.000	11.00															
					0.00	0.000	0.000	12.07															
A-8	STM 112	STM 104	0.45	0.52	0.23	0.651	2.556	12.07		94.38			241	241	0.686	675	Conc	0.30	76.9	480.0	1.30	0.99	50%
					0.00	0.000	0.000	12.07															
					0.00	0.000	0.000	12.07															
								13.06															

STORM SEWER DESIGN SHEET
MILL RUN EXTENSION - PHASE 7, 8 and FUTURE LANDS TO EAST
FLOW RATES BASED ON RATIONAL METHOD

Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
					0.00	0.000	0.000	13.66															
A-10	STM 104	STM 102	0.57	0.60	0.34	0.951	6.412	13.66		88.16			565	565	0.914	900	Conc	0.20	79.1	844.2	1.29	1.03	67%
					0.00	0.000	0.000	13.66															
					0.00	0.000	0.000	13.66															
								14.68															
					0.00	0.000	0.000	10.00															
PH9-A	PH9-A	STM 110	2.35	0.52	1.22	3.397	3.397	10.00		104.19			354	354	0.762	750	Conc	0.50	200.0	820.8	1.80	1.85	43%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	11.85															
A-11	STM 110	STM 108	0.58	0.52	0.30	0.838	4.236	11.85		95.33			404	404	0.838	825	Conc	0.50	66.5	1,058.3	1.92	0.58	38%
					0.00	0.000	0.000	11.85															
					0.00	0.000	0.000	11.85															
					0.00	0.000	0.000	12.43															
A-12	STM 108	STM 106	0.65	0.52	0.34	0.940	5.175	12.43		92.90			481	481	0.838	825	Conc	0.50	80.8	1,058.3	1.92	0.70	45%
					0.00	0.000	0.000	12.43															
					0.00	0.000	0.000	12.43															
					0.00	0.000	0.000	13.13															
A-13	STM 106	STM 102	0.48	0.52	0.25	0.694	5.869	13.13		90.12			529	529	0.838	825	Conc	0.50	83.0	1,058.3	1.92	0.72	50%
					0.00	0.000	0.000	13.13															
					0.00	0.000	0.000	13.13															
								13.85															
					0.00	0.000	0.000	14.68															
A-14	STM 102	STM 100	0.20	0.60	0.12	0.334	12.615	14.68		84.59			1,067	1,067	1.067	1050	Conc	0.20	51.2	1,273.5	1.42	0.60	84%
					0.00	0.000	0.000	14.68															
					0.00	0.000	0.000	14.68															
					0.00	0.000	0.000	15.28															
SWM FACILITY	STM 100	HEADWALL	0.00	0.00	0.00	0.000	12.615	15.28		82.65			1,043	1,043	1.067	1050	Conc	0.20	47.9	1,273.5	1.42	0.56	82%
					0.00	0.000	0.000	15.28															
					0.00	0.000	0.000	15.28															
								15.84															

Q = 2.78 AIC, where
Q = Peak Flow in Litres per Second (L/s)
A = Area in hectares (ha)
I = Rainfall Intensity (mm/hr), 5 year storm
C = Runoff Coefficient

Consultant:	**Novatech**
Issued Date:	February 3, 2023
Review Date:	
Design By:	BM

Client:	**Dwg. Reference:**	**Checked By:**
Regional Group	Figure 5	DDB

Legend:

10.00	Storm sewers designed to the 2 year event (without ponding) for local roads
10.00	Storm sewers designed to the 5 year event (without ponding) for collector roads
10.00	Storm sewers designed to the 10 year event (without ponding) for arterial roads
10.00	Storm sewers designed to the 100 year event (without ponding)

Mill Run Extension Draft Plan
Post-Development Model Parameters

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Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
A-01	0.426	0.45	36%	40%	54.57	78.07	0.5%
A-02	0.235	0.45	36%	40%	67.32	34.91	0.5%
A-03	0.231	0.45	36%	40%	11.86	194.82	0.5%
A-04	0.648	0.52	46%	40%	142.17	45.58	0.5%
A-05	0.501	0.52	46%	40%	102.35	48.95	0.5%
A-06	0.490	0.52	46%	40%	92.37	53.05	0.5%
A-07	0.557	0.52	46%	40%	118.01	47.20	0.5%
A-08	0.454	0.52	46%	40%	101.25	44.84	0.5%
A-09	0.069	0.60	57%	0%	75.58	9.13	0.5%
A-10	0.572	0.60	57%	40%	150.13	38.10	0.5%
A-11	0.582	0.52	46%	40%	128.90	45.15	0.5%
A-12	0.653	0.52	46%	40%	154.45	42.28	0.5%
A-13	0.484	0.52	46%	40%	113.22	42.75	0.5%
A-14	0.198	0.60	57%	40%	3.96	500.00	0.5%
PH9-A	2.347	0.52	46%	40%	44.44	528.08	0.5%
PH9-B	0.312	0.45	36%	40%	44.20	70.59	0.5%
TOTAL:	**8.76**						

Mill Run Extension Draft Plan
Pre-Development Model Parameters

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Time to Peak Calculations
(Uplands Overland Flow Method)
Existing Conditions

Area ID	Area (ha)	Overland Flow				Concentrated Overland Flow				Overall			
		Length (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)	Time to Peak (min)	Time to Peak (hrs)
PRE-1	3.285	50	0.5%	0.055	15.15	150	0.5%	0.33	7.58	23	15	15	0.25
PRE-2	3.954	50	1.0%	0.160	5.21	200	1.0%	0.47	7.09	12	8	10	0.17
PRE-3	2.662	50	1.5%	0.260	3.21	100	1.5%	0.55	3.03	6	4	10	0.17

Weighted Curve Number Calculations
Soil type 'B'

Area ID	Land Use 1	Area	CN	Land Use 2	Area	CN	Land Use 3	Area	CN	Weighted CN
PRE-1	Woods	50%	55	Meadow	50%	58	Open Space	0%	61	57
PRE-2	Woods	50%	55	Meadow	25%	58	Open Space	25%	61	57
PRE-3	Woods	40%	55	Meadow	0%	58	Open Space	60%	61	59

Weighted IA Calculations

Area ID	Land Use 1	Area	IA	Land Use 2	Area	IA	Land Use 3	Area	IA	Weighted IA
PRE-1	Woods	50%	10.2	Meadow	50%	10.2	Open Space	0%	7.6	10
PRE-2	Woods	50%	10.2	Meadow	25%	10.2	Open Space	25%	7.6	10
PRE-3	Woods	40%	10.2	Meadow	0%	10.2	Open Space	60%	7.6	9

Mill Run Extension - Draft Plan
Pre-Development Model Schematic

NOVATECH
Engineers, Planners & Landscape Architects

1/31/2023
PREPARED BY: NOVATECH

M:\2021\121125\DATA\Calculations\Sewer Calcs\SWM\Draft Plan\121125-ModelParams.xlsx

Mill Run Extension - Draft Plan
Post-Development Model Schematic

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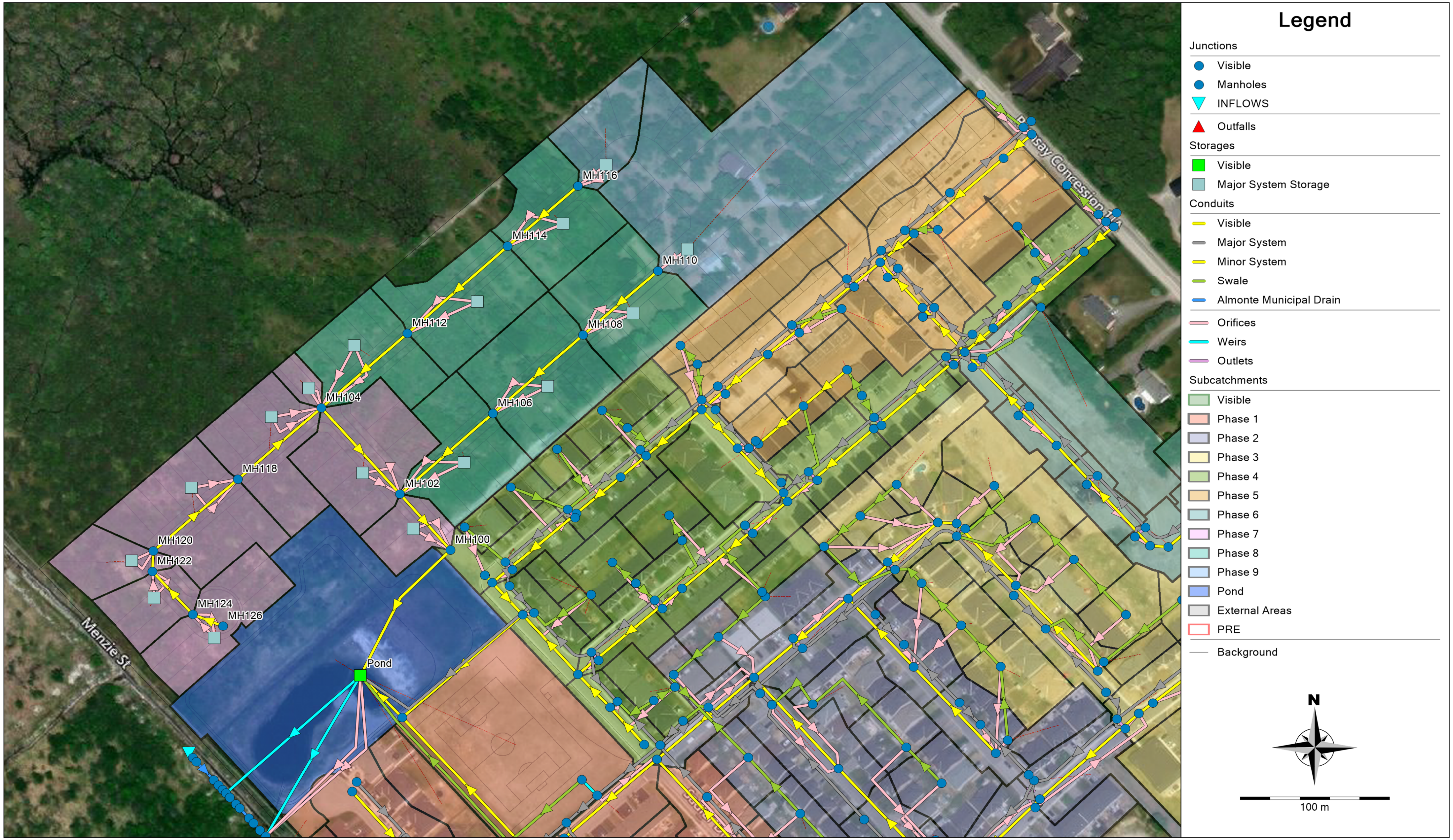

1/31/2023
PREPARED BY: NOVATECH

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Mill Run Extension Draft Plan
Design Storm Time Series Data
4-hour Chicago Design Storm

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C25mm-4.stm	
Duration	Intensity
min	mm/hr
0:00	0
0:10	1.51
0:20	1.75
0:30	2.07
0:40	2.58
0:50	3.46
1:00	5.39
1:10	13.44
1:20	56.67
1:30	17.77
1:40	9.12
1:50	6.14
2:00	4.65
2:10	3.76
2:20	3.17
2:30	2.74
2:40	2.43
2:50	2.18
3:00	1.98
3:10	1.81
3:20	1.68
3:30	1.56
3:40	1.47
3:50	1.38
4:00	1.31

Mill Run Extension Draft Plan
Design Storm Time Series Data
6-hour Chicago Design Storms

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C5yr-6hr.stm			C100yr-6hr.stm	
Duration min	Intensity mm/hr		Duration min	Intensity mm/hr
0:00	0.00		0:00	0.00
0:10	1.78		0:10	2.90
0:20	1.94		0:20	3.16
0:30	2.13		0:30	3.48
0:40	2.37		0:40	3.88
0:50	2.68		0:50	4.39
1:00	3.10		1:00	5.07
1:10	3.68		1:10	6.05
1:20	4.58		1:20	7.54
1:30	6.15		1:30	10.16
1:40	9.61		1:40	15.97
1:50	24.17		1:50	40.65
2:00	104.19		2:00	178.56
2:10	32.04		2:10	54.05
2:20	16.34		2:20	27.32
2:30	10.96		2:30	18.24
2:40	8.29		2:40	13.74
2:50	6.69		2:50	11.06
3:00	5.63		3:00	9.29
3:10	4.87		3:10	8.02
3:20	4.30		3:20	7.08
3:30	3.86		3:30	6.35
3:40	3.51		3:40	5.76
3:50	3.22		3:50	5.28
4:00	2.98		4:00	4.88
4:10	2.77		4:10	4.54
4:20	2.60		4:20	4.25
4:30	2.44		4:30	3.99
4:40	2.31		4:40	3.77
4:50	2.19		4:50	3.57
5:00	2.08		5:00	3.40
5:10	1.99		5:10	3.24
5:20	1.90		5:20	3.10
5:30	1.82		5:30	2.97
5:40	1.75		5:40	2.85
5:50	1.68		5:50	2.74
6:00	1.62		6:00	2.64

Appendix C: Sanitary Collection

NOVATECH
Engineers, Planners & Landscape Architects

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Feb 10 2023
PROVINCE OF ONTARIO

SANITARY SEWER DESIGN SHEET
MILL RUN EXTENSION - PHASE 7, 8 and FUTURE LANDS TO EAST

PROJECT # : 121125
DESIGNED BY : BM
CHECKED BY : DDB
DATE PREPARED : 3-Feb-23
DATE REVISED :

LOCATION					RESIDENTIAL										COMMERCIAL / INSTITUTIONAL / PARK							INFILTRATION			FLOW	PROPOSED SEWER								
					INDIVIDUAL						CUMULATIVE				COMM		INST		PARK															
STREET	FROM MH	TO MH	Area ID	Total Area (ha.)	Single Units	Semi Units	Townhouse Units	Multi-Unit Apartment	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	PEAK FACTOR P.F.	PEAK POPULATION FLOW Qr(p) (L/s)	AREA (ha.)	Accu. AREA (ha.)	AREA (ha.)	Accu. AREA (ha.)	AREA (ha.)	Accu. AREA (ha.)	PEAK COMM/INST/PARK FLOW Qc(p) (L/s)	Total Area (ha.)	Accu. Total AREA (ha.)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	d/ D_{full}
SADLER STREET OUTLET																																		
Street 3	125	123		0.43	6	0	0		0.020	0.43	0.020	0.43	3.7	0.31		0.00		0.00		0.00	0.00	0.43	0.43	0.12	0.43	25..8	200	203.20	DR 35	0.50	24.2	0.75	1.8%	
	123	121		0.23	3	0	0		0.010	0.23	0.031	0.66	3.7	0.46		0.00		0.00		0.00	0.00	0.23	0.66	0.18	0.64	36.8	200	203.20	DR 35	0.50	24.2	0.75	2.7%	
	121	119		0.23	2	0	0		0.007	0.23	0.037	0.89	3.7	0.56		0.00		0.00		0.00	0.00	0.23	0.89	0.25	0.81	14.0	200	203.20	DR 35	0.50	24.2	0.75	3.3%	
	119	117		0.65	6	0	8		0.042	0.65	0.079	1.54	3.6	1.16		0.00		0.00		0.00	0.00	0.65	1.54	0.43	1.59	74.7	200	203.20	DR 35	0.50	24.2	0.75	6.6%	
	117	103		0.50	5	0	4		0.028	0.50	0.107	2.04	3.6	1.56		0.00		0.00		0.00	0.00	0.50	2.04	0.57	2.13	74.7	200	203.20	DR 35	0.50	24.2	0.75	8.8%	
Street 2	FUT 9-B *	115		0.31	4	0	0		0.014	0.31	0.014	0.31	3.7	0.20		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.29	6.0	200	203.20	DR 35	0.50	24.2	0.75	1.2%	
	115	113		0.55	3	0	8		0.032	0.43	0.045	0.74	3.7	0.67		0.00		0.00	0.12	0.12	0.01	0.55	0.86	0.24	0.92	62.6	200	203.20	DR 35	0.50	24.2	0.75	3.8%	
	113	111		0.72	1	0	13		0.039	0.48	0.084	1.22	3.6	1.23		0.00		0.00	0.24	0.36	0.02	0.72	1.58	0.44	1.69	89.8	200	203.20	DR 35	0.50	24.2	0.75	7.0%	
	111	103		0.45	5	0	5		0.031	0.45	0.114	1.67	3.6	1.66		0.00		0.00		0.36	0.02	0.45	2.03	0.57	2.24	76.4	200	203.20	DR 35	0.50	24.2	0.75	9.3%	
Sadler Drive	PROP. SAN CAP	103		0.07	0	0	0		0.000	0.07	0.000	0.07	3.8	0.00		0.00		0.00		0.00	0.00	0.07	0.07	0.02	0.02	12.0	200	203.20	DR 35	0.50	24.2	0.75	0.1%	
Sadler Drive	103	101		0.57	0	14	0		0.038	0.57	0.259	4.35	3.5	3.66		0.00		0.00		0.36	0.02	0.57	4.71	1.32	4.99	79.0	250	254.00	DR 35	0.40	39.2	0.77	12.7%	
Street 1	FUT 9-A **	109		2.35	18	6	20		0.131	2.35	0.131	2.35	3.6	1.90		0.00		0.00		0.00	0.00	2.35	2.35	0.66	2.56	6.0	200	203.20	DR 35	0.50	24.2	0.75	10.6%	
	109	107		0.58	5	0	7		0.036	0.52	0.167	2.87	3.5	2.40		0.00		0.00	0.06	0.06	0.00	0.58	2.93	0.82	3.22	66.6	200	203.20	DR 35	0.50	24.2	0.75	13.3%	
	107	105		0.65	6	0	10		0.047	0.65	0.215	3.52	3.5	3.05		0.00		0.00		0.06	0.00	0.65	3.58	1.00	4.06	80.8	200	203.20	DR 35	0.50	24.2	0.75	16.8%	
	105	101		0.48	5	0	5		0.031	0.48	0.245	4.00	3.5	3.47		0.00		0.00		0.06	0.00	0.48	4.06	1.14	4.61	82.5	200	203.20	DR 35	0.50	24.2	0.75	19.0%	
SWM POND	101	EX SAN CAP		0.78	0	0	0		0.000	0.78	0.000	0.78	3.8	0.00		0.00		0.00		0.00	0.00	0.78	0.78	0.22	0.22	71.4	250	254.00	DR 35	0.40	39.2	0.77	0.6%	
Sadler Drive	101	EX SAN CAP		0.19	0	4	0		0.011	0.19	0.515	9.32	3.4	7.04		0.00		0.00		0.42	0.02	0.19	9.74	2.73	9.79	71.4	250	254.00	DR 35	0.40	39.2	0.77	24.9%	
Total Flows					**69**	**24**	**80**							**7.04**						**0.42**	**0.02**		**9.74**	**2.73**	**9.79**									
			Phase 7 Only	5.04	25	18	48																											
			Phase 7 & 8 Only	7.08	47	18	60																											

Notes:
1. Q(d) = Qr(p) + Q(i) + Qc(p)
2. Q(i) = 0.28 L/sec/ha
3. Qr(p) = (PxqxM/86,400)
3. Qc(p) = (A*q*Pf)/86,400

Definitions:
Q(d) = Design Flow (L/sec)
Qr(p) = Population Flow (L/sec), Residential
Q(i) = Extraneous Flow (L/sec)
Qc(p) = Population Flow (L/sec), Commercial/Institutional/Park

P = Population (3.4 persons per single unit, 2.7 persons per semi-detached unit, 2.7 townhouse unit, 1.8 persons per multi-unit apartment)
q = Average per capita flow = 350 L/cap/day - Residential
q = Average per gross ha. flow = 35000 L/gross ha/day - Light industrial
q = Average per gross ha. flow = 28000 L/gross ha/day - Commercial/Institutional
q = Average per gross ha. flow = 3700 L/gross ha/day - Park (20L/day/person, 185 persons/ha - as per Appendix 4-A of the City of Ottawa Sewer Design Guidelines)
P.F. = Harmon Equation (maximum of 4.0), K = Correction Factor = 0.8
Min pipe size 200mm @ min. slope 0.32%
Mannings n = 0.013

*Assumes Phase 9-B to service four (4) single unit dwellings
**Assumes Phase 9-A to service 18 single unit dwellings, 6 semi-detached units, and 20 townhouse units

SANITARY SEWER DESIGN SHEET

PROJECT #: 110046
DESIGNED BY: Chris Visser
CHECKED BY: Melanie Riddell
DATE: February 22, 2021
REVISED: May 16, 2022

PROJECT: Mill Run at Almonte - Phase 6
DEVELOPER: Menzie Almonte Inc c/o Regional Group

Proposed changes

MOE Approved Phases
Current Phase
As-Built Information
Not As-built yet -on srvy request to be done
New Manhole 119A added

NOVATECH
Engineers, Planners & Landscape Architects

AREA ID	STREET	MANHOLE		UNITS			INDIVIDUAL		CUMULATIVE		PEAK	POPULATION FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER								
	NAME	FROM	TO	SINGLES/ SEMI	APARTMENT	TOWNS	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	FACTOR M	Q (p) (L/s)	FLOW Q(i) (L/s)	FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	% OF CAPACITY (q_{full}/Q_{actual})	% OF VELOCITY (v_{full}/V_{actual})	ACUTAL VELOCITY (m/s)
4-J	LEISHMAN	909	907	2	0	2	0.0	0.2	0.0	0.2	4.0	0.2	0.1	0.3	***20.2***	200	PVC	***1.09***	35.7	1.1	1%	0%	0.00
4-I	LEISHMAN	907	1001	6	0	8	0.1	0.7	0.1	0.9	4.0	1.1	0.3	1.3	***101.3***	200	PVC	***0.51***	24.4	0.8	5%	54%	0.41
4-H	BRACEWELL	FUT	1001	0	0	0	0.0	0.1	0.0	0.1	4.0	0.0	0.0	0.0	***9.9***	200	PVC	***0.40***	21.6	0.7	0%	0%	0.00
5-M	BRACEWELL	1003	1001	12	0	0	0.0	0.6	0.0	0.6	4.0	0.7	0.2	0.9	***86.1***	200	PVC	***0.32***	19.4	0.6	5%	45%	0.27
4-G (4-I+4-H+5-M)	LEISHMAN	1001	905	7	0	7	0.1	0.7	0.2	2.3	4.0	2.6	0.6	3.3	***103.2***	200	PVC	***0.50***	24.2	0.7	13%	70%	0.52
4-F	LEISHMAN	905	903	4	0	5	0.0	0.4	0.2	2.7	4.0	3.2	0.8	3.9	***54.8***	200	PVC	***1.04***	34.9	1.1	11%	67%	0.72
4-E	LEISHMAN	903	901	5	0	3	0.030	0.471	0.224	3.164	4.0	3.63	0.89	**4.52**	***70.6***	200	PVC	***0.68***	**28.22**	0.87	16%	73%	0.64
4-D	LEISHMAN	901	501	7	0	9	0.058	0.758	0.282	3.922	4.0	4.58	1.10	**5.67**	***111.8***	200	PVC	***0.50***	**24.19**	0.75	23%	78%	0.58
4-C	SADLER DR	CAP	501	0	0	0	0.000	0.076	0.000	0.076	4.0	0.00	0.02	**0.02**	***9.90***	250	PVC	***0.81***	**55.83**	1.10	0%	0%	0.00
4-B (4C+4D)	SADLER DR	501	503	6	0	0	0.023	0.391	0.305	4.389	4.0	4.95	1.23	**6.17**	***86.2***	250	PVC	***0.29***	**33.41**	0.66	18%	76%	0.50
5-A	BRACEWELL	1013	1011	2	0	2	0.015	0.218	0.015	0.218	4.0	0.24	0.06	**0.30**	17.8	200	PVC	0.65	**27.59**	0.85	1%	33%	0.28
5-B	BRACEWELL	1011	1009	8	0	12	0.072	0.898	0.087	1.116	4.0	1.41	0.31	**1.72**	93.5	200	PVC	0.32	**19.36**	0.60	9%	60%	0.36
5-C	BRACEWELL	1009	1007	1	0	1	0.007	0.181	0.094	1.297	4.0	1.53	0.36	**1.89**	11.0	200	PVC	0.32	**19.36**	0.60	10%	64%	0.38
5-D	BRACEWELL	1007	1005	10	0	0	0.038	0.710	0.132	2.007	4.0	2.14	0.56	**2.71**	92.8	200	PVC	0.32	**19.36**	0.60	14%	70%	0.42
5-E	BRACEWELL	1005	1003	9	0	0	0.034	0.786	0.129	2.793	4.0	2.08	0.78	**2.86**	92.8	200	PVC	0.32	**19.36**	0.60	15%	73%	0.44
5-F	REAUME	809	807	0	0	2	0.007	0.122	0.007	0.122	4.0	0.11	0.03	**0.15**	***19.3***	200	PVC	***0.73***	29.23	0.90	1%	33%	0.30
5-G	REAUME	807	1003	0	0	8	0.028	0.427	0.035	0.549	4.0	0.57	0.15	**0.72**	***102.3***	200	PVC	***0.32***	19.36	0.60	4%	45%	0.27
5-H (5-E+5-G)	REAUME	1003	805	8	0	0	0.030	0.492	0.194	3.834	4.0	3.14	1.07	**4.22**	***81.2***	200	PVC	***0.33***	**19.66**	0.61	21%	78%	0.47
5-I	REAUME	805	803	11	0	0	0.042	0.637	0.236	4.471	4.0	3.82	1.25	**5.07**	***62.5***	200	PVC	***2.50***	**54.10**	1.67	9%	60%	1.00
4-K	WALSH	903	803	6	0	0	0.023	0.360	0.023	0.360	4.0	0.37	0.10	**0.47**	***86.1***	200	PVC	***0.65***	**27.59**	0.85	2%	33%	0.28
5-J (5-I +4-K)	REAUME	803	801	0	0	17	0.060	0.603	0.318	5.434	4.0	5.15	1.52	**6.67**	***91.3***	200	PVC	***0.39***	**21.37**	0.66	31%	88%	0.58
5-K	REAUME	801	503	0	0	12	0.042	0.502	0.360	5.936	4.0	5.90	1.66	**7.56**	***91.2***	200	PVC	***0.41***	**21.91**	0.68	35%	92%	0.62
4-A (5-K+4-B)	SADLER DR	503	303	6	0	0	0.023	0.385	0.688	10.710	3.9	10.87	3.00	**13.87**	***86.2***	250	PVC	***0.29***	**33.41**	0.66	42%	96%	0.63
3-G	HONEYBORNE	131	129	0	24	1	0.076	0.342	0.076	0.342	4.0	1.22	0.10	**1.32**	***19.4***	200	PVC	***0.98***	**33.87**	1.04	4%		
3-F	HONEYBORNE	129	127	5	48	8	0.191	1.432	0.267	1.774	4.0	4.32	0.50	**4.82**	***120.0***	200	PVC	***0.48***	**23.71**	0.73	20%		
3-E	HONEYBORNE	127	125	5	0	0	0.019	0.691	0.286	2.465	4.0	4.63	0.69	**5.32**	***66.3***	200	PVC	***0.50***	**24.19**	0.75	22%		
2-I	HONEYBORNE	125	123	6	24	6	0.116	0.854	0.401	3.319	4.0	6.54	0.93	**7.47**	***85.2***	200	PVC	***1.68***	**44.35**	1.37	17%		
2-H	HONEYBORNE	123	121	6	0	10	0.058	0.655	0.459	3.974	4.0	7.43	1.11	**8.54**	***85.2***	200	PVC	***1.00***	**34.22**	1.06	25%		
2-G	HONEYBORNE	121	119A	0	0	5	0.018	0.285	0.477	4.259	4.0	7.69	1.19	**8.89**	***73.0***	200	PVC	***1.00***	**34.22**	1.06	26%		
2-G	HONEYBORNE	119A	119	0	0	0	0.000	1.285	0.477	5.544	4.0	7.69	1.55	**9.25**	***10.0***	200	PVC	***1.00***	**34.22**	1.06	27%		
3-D	HORTON	315	313	6	0	10	0.058	0.706	0.058	0.706	4.0	0.94	0.20	**1.13**	***72.6***	200	PVC	***1.02***	**34.56**	1.07	3%		
3-C	HORTON	313	311	9	0	0	0.034	0.556	0.092	1.262	4.0	1.49	0.35	**1.84**	***59.9***	200	PVC	***1.17***	**37.01**	1.14	5%		
3-B	HORTON	311	309	2	0	0	0.008	0.240	0.100	1.502	4.0	1.61	0.42	**2.03**	***12.2***	200	PVC	***1.64***	**43.82**	1.35	5%		
3-A	HORTON	309	307	4	0	0	0.015	0.379	0.115	1.881	4.0	1.86	0.53	**2.39**	***77.5***	200	PVC	***1.97***	**48.03**	1.48	5%		
2-F	McCABE	703	701	7	0	0	0.027	0.462	0.027	0.462	4.0	0.43	0.13	**0.56**	***38.2***	200	PVC	***0.97***	**33.70**	1.04	2%		
2-D	McCABE	701	307	11	0	0	0.042	0.666	0.068	1.128	4.0	1.11	0.32	**1.42**	***100.7***	200	PVC	***0.50***	**24.19**	0.75	6%		

SANITARY SEWER DESIGN SHEET

PROJECT #: 110046
DESIGNED BY: Chris Visser
CHECKED BY: Melanie Riddell
DATE: February 22, 2021
REVISED: May 16, 2022

PROJECT: Mill Run at Almonte - Phase 6
DEVELOPER: Menzie Almonte Inc c/o Regional Group

Proposed changes

MOE Approved Phases
Current Phase
As-Built Information
Not As-built yet -on srvy request to be done
New Manhole 119A added

NOVATECH
Engineers, Planners & Landscape Architects

AREA ID	STREET	MANHOLE		UNITS			INDIVIDUAL		CUMULATIVE		PEAK	POPULATION FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER								
	NAME	FROM	TO	SINGLES/ SEMI	APARTMENT	TOWNS	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	FACTOR M	Q (p) (L/s)	FLOW Q(i) (L/s)	FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	% OF CAPACITY (q_{full}/Q_{actual})	% OF VELOCITY (v_{full}/V_{actual})	ACUTAL VELOCITY (m/s)
2-B (3-A+2-D)	HORTON	307	305	6	0	11	0.061	0.648	0.245	3.657	4.0	3.96	1.02	**4.99**	***85.4***	200	PVC	***1.09***	**35.72**	1.10	14%		
2-E	McKENNY	603	601	7	0	0	0.027	0.437	0.027	0.437	4.0	0.43	0.12	**0.55**	***62.8***	200	PVC	***0.99***	**34.05**	1.05	2%		
2-C	McKENNY	601	305	14	0	0	0.053	0.813	0.080	1.250	4.0	1.29	0.35	**1.64**	***115.8***	200	PVC	***0.52***	**24.67**	0.76	7%		
2-A (2-B+2-C)	HORTON	305	303	0	0	5	0.018	0.276	0.342	5.183	4.0	5.54	1.45	**6.99**	***84.0***	200	PVC	***0.65***	**27.59**	**0.85**	**0.25**		
1-A	SWM POND	101	103	0	0	0	0.000	1.152	0.000	1.152	4.0	0.00	0.32	**0.32**									
1C-A	HONEYBORNE	101	103	0	0	0	0.000	0.078	0.000	0.078	4.0	0.00	0.02	**0.02**									
1C-B	HONEYBORNE	101	103	3	0	1	0.015	0.262	0.015	0.340	4.0	0.24	0.10	**0.34**	***27.6***	200	PVC	***3.50***	**64.01**	1.97	1%		
1C-C	HONEYBORNE	103	107	7	0	13	0.072	1.010	0.087	1.350	4.0	1.41	0.38	**1.79**	***107.1***	200	PVC	***0.44***	**22.70**	0.70	8%		
1-D	HONEYBORNE	111	109	5	0	6	0.040	0.564	0.040	0.564	4.0	0.65	0.16	**0.81**	***68.0***	200	PVC	***0.41***	**21.91**	0.68	4%		
1-C	HONEYBORNE	109	107	2	0	7	0.032	0.418	0.072	0.982	4.0	1.17	0.27	**1.44**	***69.7***	200	PVC	***0.47***	**23.46**	0.72	6%		
1-L (1C-C+1C)	HORTON	107	301	0	0	7	0.025	0.357	0.184	2.689	4.0	2.98	0.75	**3.73**	***83.2***	200	PVC	***0.44***	**22.70**	0.70	16%		
1-J	LAROCQUE	403	401	8	0	0	0.030	0.547	0.030	0.547	4.0	0.49	0.15	**0.65**	***55.7***	200	PVC	***0.52***	**24.67**	0.76	3%		
1-K	LAROCQUE	401	301	7	0	0	0.027	0.487	0.057	1.034	4.0	0.92	0.29	**1.21**	***97.0***	200	PVC	***0.44***	22.70	0.70	5%		
1-B	PARK	CAP	301	0	0	0	0.000	1.686	0.000	1.686	4.0	0.00	0.47	**0.47**									
1-M (1K+1L+1B)	HORTON	301	303	0	0	7	0.025	0.349	0.265	5.758	4.0	4.30	1.61	**5.91**	***84.9***	200	PVC	***0.33***	**19.66**	0.61	30%		
1-F	HONEYBORNE	111	113	5	0	0	0.019	0.350	0.019	0.350	4.0	0.31	0.10	**0.41**	***53.8***	200	PVC	***0.50***	**24.19**	0.75	2%		
1-G	HONEYBORNE	113	115	2	0	0	0.008	0.180	0.027	0.530	4.0	0.43	0.15	**0.58**	***9.3***	200	PVC	***0.22***	**16.05**	0.49	4%		
1-H	HONEYBORNE	115	117	7	0	6	0.048	0.636	0.074	1.166	4.0	1.20	0.33	**1.53**	***76.4***	200	PVC	***0.37***	**20.81**	0.64	7%		
1-I	HONEYBORNE	117	119	3	0	6	0.032	0.489	0.107	1.655	4.0	1.73	0.46	**2.19**	***83.2***	200	PVC	***0.43***	**22.44**	0.69	10%		
1-N (4-A+2A+1-M)	SADLER DR	303	505	10	0	0	0.038	0.648	1.333	22.299	3.7	20.06	6.24	**26.31**	***97.3***	250	PVC	***0.31***	**34.54**	0.68	76%		
1-O	SADLER DR	505	119	10	0	0	0.038	0.640	1.371	22.939	3.7	20.59	6.42	**27.01**	***97.8***	250	PVC	***0.27***	**32.24**	0.64	84%		
1-P (1-I+1-O+2-G)	SADLER DR	119	507	4	0	0	0.015	0.359	1.969	29.212	3.6	28.65	8.18	**36.83**	***40.7***	300	PVC	***0.25***	**50.44**	0.69	73%		
1-Q	SADLER DR	507	EX6	0	0	0	0.000	0.160	1.969	29.372	3.6	28.65	8.22	**36.87**	***55.6***	300	PVC	***0.22***	**47.32**	0.65	78%		

Notes:
1. Residential Average Flow of 350L/cap/day
2. Population Density (People/unit): Singles = 3.8, Semis = 3.8, Towns =3.5, Apartments = 3.0
3. Peaking Factor (M) = Harmon Formula (4.0 max) = 1+(14/4+(Population/1000)^(1/2))
4. Population Flow = Q(p) = (Population X 350L/day/person X Peaking Factor) ÷ 86,400s/day
5. Infiltration Inflow = Q(i) = 0.28 L/sec/ha
6. Peak Flow = Q(d) = Q(p) + Q(i)

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
2.	ISSUED FOR ECA APPLICATION	APR 30/21	MER
1.	ISSUED FOR MUNICIPAL REVIEW	DEC 23/20	MER

SCALE 1:1000

1:1000
0 10 20 30 40

DESIGN CV
CHECKED MSP
DRAWN CV
CHECKED MSP
APPROVED MER

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
MUNICIPALITY OF MISSISSIPPI MILLS
MILL RUN AT ALMONTE

DRAWING NAME
PHASE 6
SANITARY DRAINAGE AREA PLAN

PROJECT No. 110046-00
REV REV # 2
DRAWING No. 110046-SAN-PH6

SANITARY SEWER DESIGN SHEET

PROJECT #: 110046
DESIGNED BY: Chris Visser
CHECKED BY: Melanie Riddell
DATE: February 22, 2021

PROJECT: Mill Run at Almonte - Phase 6
DEVELOPER: Menzie Almonte Inc c/o Regional Group

MOE Approved Phases
Current Phase
As-Built Information
Not As-built yet -on srvy request to be done
New Manhole 119A added

NOVATECH
Engineers, Planners & Landscape Architects

AREA ID	STREET	MANHOLE		UNITS			INDIVIDUAL		CUMULATIVE		PEAK	POPULATION FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER								
	NAME	FROM	TO	SINGLES/ SEMI	APARTMENT	TOWNS	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	FACTOR M	Q (p) (L/s)	FLOW Q(i) (L/s)	FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	% OF CAPACITY (q_{full}/Q_{actual})	% OF VELOCITY (v_{full}/V_{actual})	ACUTAL VELOCITY (m/s)
4-J	LEISHMAN	909	907	2	0	2	0.0	0.2	0.0	0.2	4.0	0.2	0.1	0.3	***20.2***	200	PVC	***1.09***	35.7	1.1	1%	0%	0.00
4-I	LEISHMAN	907	1001	6	0	8	0.1	0.7	0.1	0.9	4.0	1.1	0.3	1.3	***101.3***	200	PVC	***0.51***	24.4	0.8	5%	54%	0.41
4-H	BRACEWELL	FUT	1001	0	0	0	0.0	0.1	0.0	0.1	4.0	0.0	0.0	0.0	***9.9***	200	PVC	***0.40***	21.6	0.7	0%	0%	0.00
5-M	BRACEWELL	1003	1001	12	0	0	0.0	0.6	0.0	0.6	4.0	0.7	0.2	0.9	***86.1***	200	PVC	***0.40***	21.6	0.7	4%	45%	0.30
4-G (4-I+4-H+5-M)	LEISHMAN	1001	905	7	0	7	0.1	0.7	0.2	2.3	4.0	2.6	0.6	3.3	***103.2***	200	PVC	***0.50***	24.2	0.7	13%	70%	0.52
4-F	LEISHMAN	905	903	4	0	5	0.0	0.4	0.2	2.7	4.0	3.2	0.8	3.9	***54.8***	200	PVC	***1.04***	34.9	1.1	11%	67%	0.72
4-E	LEISHMAN	903	901	5	0	3	0.030	0.471	0.224	3.164	4.0	3.63	0.89	**4.52**	***70.6***	200	PVC	***0.68***	**28.22**	0.87	16%	73%	0.64
4-D	LEISHMAN	901	501	7	0	9	0.058	0.758	0.282	3.922	4.0	4.58	1.10	**5.67**	***111.8***	200	PVC	***0.50***	**24.19**	0.75	23%	78%	0.58
				single	semi																		
FUT PHASE 7, 8 & 9	SADLER DR	CAP	501	69	24	80	0.436	9.740	0.436	9.740	4.0	7.07	2.73	**9.80**	***9.90***	250	PVC	***0.81***	**55.83**	1.10	18%	76%	0.84
4-B (4C+4D)	SADLER DR	501	503	6	0	0	0.023	0.391	0.741	14.053	3.9	11.65	3.93	**15.59**	***86.2***	250	PVC	***0.29***	**33.41**	0.66	47%	98%	0.65
5-A	BRACEWELL	1013	1011	2	0	2	0.015	0.218	0.015	0.218	4.0	0.24	0.06	**0.30**	17.8	200	PVC	1.00	**34.22**	1.06	1%	33%	0.35
5-B	BRACEWELL	1011	1009	8	0	12	0.072	0.898	0.087	1.116	4.0	1.41	0.31	**1.72**	93.5	200	PVC	0.35	**20.24**	0.62	9%	60%	0.37
5-C	BRACEWELL	1009	1007	1	0	1	0.007	0.181	0.094	1.297	4.0	1.53	0.36	**1.89**	11.0	200	PVC	0.50	**24.19**	0.75	8%	60%	0.45
5-D	BRACEWELL	1007	1005	10	0	0	0.038	0.710	0.132	2.007	4.0	2.14	0.56	**2.71**	92.8	200	PVC	0.35	**20.24**	0.62	13%	70%	0.44
5-E	BRACEWELL	1005	1003	9	0	0	0.034	0.786	0.129	2.793	4.0	2.08	0.78	**2.86**	92.8	200	PVC	0.40	**21.64**	0.67	13%	70%	0.47
5-F	REAUME	809	807	0	0	2	0.007	0.122	0.007	0.122	4.0	0.11	0.03	**0.15**	***19.3***	200	PVC	***0.73***	**29.23**	0.90	1%	33%	0.30
5-G	REAUME	807	1003	0	0	8	0.028	0.427	0.035	0.549	4.0	0.57	0.15	**0.72**	***102.3***	200	PVC	***0.32***	**19.36**	0.60	4%	45%	0.27
5-H (5-E+5-G)	REAUME	1003	805	8	0	0	0.030	0.492	0.194	3.834	4.0	3.14	1.07	**4.22**	***81.2***	200	PVC	***0.33***	**19.66**	0.61	21%	78%	0.47
5-I	REAUME	805	803	11	0	0	0.042	0.637	0.236	4.471	4.0	3.82	1.25	**5.07**	***62.5***	200	PVC	***2.50***	**54.10**	1.67	9%	60%	1.00
4-K	WALSH	903	803	6	0	0	0.023	0.360	0.023	0.360	4.0	0.37	0.10	**0.47**	***86.1***	200	PVC	***0.65***	**27.59**	0.85	2%	33%	0.28
5-J (5-I +4-K)	REAUME	803	801	0	0	17	0.060	0.603	0.318	5.434	4.0	5.15	1.52	**6.67**	***91.3***	200	PVC	***0.39***	**21.37**	0.66	31%	88%	0.58
5-K	REAUME	801	503	0	0	12	0.042	0.502	0.360	5.936	4.0	5.90	1.66	**7.56**	***91.2***	200	PVC	***0.41***	**21.91**	0.68	35%	92%	0.62
4-A (5-K+4-B)	SADLER DR	503	303	6	0	0	0.023	0.385	1.124	20.374	3.8	17.15	5.70	**22.86**	***86.2***	250	PVC	***0.29***	**33.41**	0.66	68%	106%	0.70
3-G	HONEYBORNE	131	129	0	24	1	0.076	0.342	0.076	0.342	4.0	1.22	0.10	**1.32**	***19.4***	200	PVC	***0.98***	**33.87**	1.04	4%		
3-F	HONEYBORNE	129	127	5	48	8	0.191	1.432	0.267	1.774	4.0	4.32	0.50	**4.82**	***120.0***	200	PVC	***0.48***	**23.71**	0.73	20%		
3-E	HONEYBORNE	127	125	5	0	0	0.019	0.691	0.286	2.465	4.0	4.63	0.69	**5.32**	***66.3***	200	PVC	***0.50***	**24.19**	0.75	22%		
2-I	HONEYBORNE	125	123	6	24	6	0.116	0.854	0.401	3.319	4.0	6.54	0.93	**7.47**	***85.2***	200	PVC	***1.68***	**44.35**	1.37	17%		
2-H	HONEYBORNE	123	121	6	0	10	0.058	0.655	0.459	3.974	4.0	7.43	1.11	**8.54**	***85.2***	200	PVC	***1.00***	**34.22**	1.06	25%		
2-G	HONEYBORNE	121	119A	0	0	5	0.018	0.285	0.477	4.259	4.0	7.69	1.19	**8.89**	***73.0***	200	PVC	***1.00***	**34.22**	1.06	26%		
2-G	HONEYBORNE	119A	119	0	0	0	0.000	1.285	0.477	5.544	4.0	7.69	1.55	**9.25**	***10.0***	200	PVC	***1.00***	**34.22**	1.06	27%		
3-D	HORTON	315	313	6	0	10	0.058	0.706	0.058	0.706	4.0	0.94	0.20	**1.13**	***72.6***	200	PVC	***1.02***	**34.56**	1.07	3%		
3-C	HORTON	313	311	9	0	0	0.034	0.556	0.092	1.262	4.0	1.49	0.35	**1.84**	***59.9***	200	PVC	***1.17***	**37.01**	1.14	5%		
3-B	HORTON	311	309	2	0	0	0.008	0.240	0.100	1.502	4.0	1.61	0.42	**2.03**	***12.2***	200	PVC	***1.64***	**43.82**	1.35	5%		
3-A	HORTON	309	307	4	0	0	0.015	0.379	0.115	1.881	4.0	1.86	0.53	**2.39**	***77.5***	200	PVC	***1.97***	**48.03**	1.48	5%		
2-F	McCABE	703	701	7	0	0	0.027	0.462	0.027	0.462	4.0	0.43	0.13	**0.56**	***38.2***	200	PVC	***0.97***	**33.70**	1.04	2%		
2-D	McCABE	701	307	11	0	0	0.042	0.666	0.068	1.128	4.0	1.11	0.32	**1.42**	***100.7***	200	PVC	***0.50***	**24.19**	0.75	6%		

SANITARY SEWER DESIGN SHEET

PROJECT #: 110046
DESIGNED BY: Chris Visser
CHECKED BY: Melanie Riddell
DATE: February 22, 2021

PROJECT: Mill Run at Almonte - Phase 6
DEVELOPER: Menzie Almonte Inc c/o Regional Group

MOE Approved Phases
Current Phase
As-Built Information
Not As-built yet -on srvy request to be done
New Manhole 119A added

NOVATECH
Engineers, Planners & Landscape Architects

AREA ID	STREET	MANHOLE		UNITS			INDIVIDUAL		CUMULATIVE		PEAK	POPULATION FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER								
	NAME	FROM	TO	SINGLES/ SEMI	APARTMENT	TOWNS	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	FACTOR M	Q (p) (L/s)	FLOW Q(i) (L/s)	FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	% OF CAPACITY (q_{full}/Q_{actual})	% OF VELOCITY (v_{full}/V_{actual})	ACUTAL VELOCITY (m/s)
2-B (3-A+2-D)	HORTON	307	305	6	0	11	0.061	0.648	0.245	3.657	4.0	3.96	1.02	**4.99**	***85.4***	200	PVC	***1.09***	**35.72**	1.10	14%		
2-E	McKENNY	603	601	7	0	0	0.027	0.437	0.027	0.437	4.0	0.43	0.12	**0.55**	***62.8***	200	PVC	***0.99***	**34.05**	1.05	2%		
2-C	McKENNY	601	305	14	0	0	0.053	0.813	0.080	1.250	4.0	1.29	0.35	**1.64**	***115.8***	200	PVC	***0.52***	**24.67**	0.76	7%		
2-A (2-B+2-C)	HORTON	305	303	0	0	5	0.018	0.276	0.342	5.183	4.0	5.54	1.45	**6.99**	***84.0***	200	PVC	***0.65***	**27.59**	**0.85**	**0.25**		
1-A	SWM POND	101	103	0	0	0	0.000	1.152	0.000	1.152	4.0	0.00	0.32	**0.32**									
1C-A	HONEYBORNE	101	103	0	0	0	0.000	0.078	0.000	0.078	4.0	0.00	0.02	**0.02**									
1C-B	HONEYBORNE	101	103	3	0	1	0.015	0.262	0.015	0.340	4.0	0.24	0.10	**0.34**	***27.6***	200	PVC	***3.50***	**64.01**	1.97	1%		
1C-C	HONEYBORNE	103	107	7	0	13	0.072	1.010	0.087	1.350	4.0	1.41	0.38	**1.79**	***107.1***	200	PVC	***0.44***	**22.70**	0.70	8%		
1-D	HONEYBORNE	111	109	5	0	6	0.040	0.564	0.040	0.564	4.0	0.65	0.16	**0.81**	***68.0***	200	PVC	***0.41***	**21.91**	0.68	4%		
1-C	HONEYBORNE	109	107	2	0	7	0.032	0.418	0.072	0.982	4.0	1.17	0.27	**1.44**	***69.7***	200	PVC	***0.47***	**23.46**	0.72	6%		
1-L (1C-C+1C)	HORTON	107	301	0	0	7	0.025	0.357	0.184	2.689	4.0	2.98	0.75	**3.73**	***83.2***	200	PVC	***0.44***	**22.70**	0.70	16%		
1-J	LAROCQUE	403	401	8	0	0	0.030	0.547	0.030	0.547	4.0	0.49	0.15	**0.65**	***55.7***	200	PVC	***0.52***	**24.67**	0.76	3%		
1-K	LAROCQUE	401	301	7	0	0	0.027	0.487	0.057	1.034	4.0	0.92	0.29	**1.21**	***97.0***	200	PVC	***0.44***	22.70	0.70	5%		
1-B	PARK	CAP	301	0	0	0	0.000	1.686	0.000	1.686	4.0	0.00	0.47	**0.47**									
1-M (1K+1L+1B)	HORTON	301	303	0	0	7	0.025	0.349	0.265	5.758	4.0	4.30	1.61	**5.91**	***84.9***	200	PVC	***0.33***	**19.66**	0.61	30%		
1-F	HONEYBORNE	111	113	5	0	0	0.019	0.350	0.019	0.350	4.0	0.31	0.10	**0.41**	***53.8***	200	PVC	***0.50***	**24.19**	0.75	2%		
1-G	HONEYBORNE	113	115	2	0	0	0.008	0.180	0.027	0.530	4.0	0.43	0.15	**0.58**	***9.3***	200	PVC	***0.22***	**16.05**	0.49	4%		
1-H	HONEYBORNE	115	117	7	0	6	0.048	0.636	0.074	1.166	4.0	1.20	0.33	**1.53**	***76.4***	200	PVC	***0.37***	**20.81**	0.64	7%		
1-I	HONEYBORNE	117	119	3	0	6	0.032	0.489	0.107	1.655	4.0	1.73	0.46	**2.19**	***83.2***	200	PVC	***0.43***	**22.44**	0.69	10%		
1-N (4-A+2A+1-M)	SADLER DR	303	505	10	0	0	0.038	0.648	1.769	31.963	3.6	25.99	8.95	**34.94**	***97.3***	250	PVC	***0.31***	**34.54**	0.68	101%		
1-O	SADLER DR	505	119	10	0	0	0.038	0.640	1.807	32.603	3.6	26.49	9.13	**35.62**	***97.8***	250	PVC	***0.27***	**32.24**	0.64	111%		
1-P (1-I+1-O+2-G)	SADLER DR	119	507	4	0	0	0.015	0.359	2.405	38.876	3.5	34.32	10.89	**45.20**	***40.7***	300	PVC	***0.25***	**50.44**	0.69	90%		
1-Q	SADLER DR	507	EX6	0	0	0	0.000	0.160	2.405	39.036	3.5	34.32	10.93	**45.25**	***55.6***	300	PVC	***0.22***	**47.32**	0.65	96%		

Notes:
1. Residential Average Flow of 350L/cap/day
2. Population Density (People/unit): Singles = 3.8, Semis = 3.8, Towns =3.5, Apartments = 3.0
3. Peaking Factor (M) = Harmon Formula (4.0 max) = 1+(14/4+(Population/1000)^(1/2))
4. Population Flow = Q(p) = (Population X 350L/day/person X Peaking Factor) ÷ 86,400s/day
5. Infiltration Inflow = Q(i) = 0.28 L/sec/ha
6. Peak Flow = Q(d) = Q(p) + Q(i)

MILL RUN EXTENSION - SANITARY SEWER
HYDRAULIC GRADE LINE ANALYSIS - 2023

Bend Coefficients

0	45	90	<----Bend (in degrees)
0.00	0.29	1.02	900 mm pipe or greater (benching)
0.00	0.40	1.32	825 mm pipe or smaller (300 mm sump)

ANALYSIS OF MILLS LANDS SANITARY SEWER - DESIGN YEAR = 2023

LOCATION	MANHOLE Upstream	MANHOLE Downstream	INVERT ELEVATION U/S (m)	INVERT ELEVATION D/S (m)	GROUND ELEVATION Upstream (m)	COVER Upstream (m)	PIPE PARAMETERS Dia (mm)	PIPE PARAMETERS Length (m)	PIPE PARAMETERS 'n'	TOTAL FLOW (m^3/s)	Q_{cap} (m^3/s)	Q_{in}/Q_{cap}	COMPUTATIONAL COLUMNS Pipe Area (m^2)	L/D	Friction Factor (f)	Velocity V (m/s)	$V^2/2g$	HEAD LOSS HL (m)	SURCHARGE Upstream (m)	HGL Upstream (m)	HGL Downstream (m)	MIN USF (m)	SLOPE (%)
MILLS LANDS SUBDIVISION SANITARY SEWER																				135.81	<- OUTLET		
	SAN 507	EX6	135.56	135.44	140.29	4.430	300	55.60	0.013	0.0453	0.047	0.97	0.073	185	0.03145	0.62	0.02	0.12	0.00	135.86	135.81	136.16	0.22
	SAN 119	SAN 507	135.67	135.57	140.28	4.310	300	40.70	0.013	0.0452	0.050	0.90	0.073	136	0.03145	0.62	0.02	0.10	0.00	135.97	135.87	136.27	0.25
Mill Run Phase 1-6	SAN 505	SAN 119	135.95	135.69	140.19	3.990	250	97.80	0.013	0.0356	0.032	1.11	0.051	391	0.03342	0.70	0.03	0.34	0.11	136.31	135.97	136.61	0.27
	SAN 303	SAN 505	136.26	135.96	140.03	3.520	250	97.30	0.013	0.0349	0.034	1.01	0.051	389	0.03342	0.69	0.02	0.33	0.13	136.64	136.31	136.94	0.31
	SAN 503	SAN 303	136.49	136.30	139.94	3.200	250	70.70	0.013	0.0229	0.032	0.71	0.051	283	0.03342	0.45	0.01	0.10	0.00	136.74	136.64	137.04	0.27
	SAN 501	SAN 503	136.75	136.50	139.75	2.750	250	86.20	0.013	0.0156	0.033	0.47	0.051	345	0.03342	0.31	0.00	0.06	0.00	137.00	136.75	137.30	0.29
Mills Lands Phase 7-9	SAN 101	SAN 501	137.12	136.75	140.56	3.190	250	81.30	0.013	0.0098	0.042	0.23	0.051	325	0.03342	0.19	0.00	0.02	0.00	137.37	137.00	137.67	0.46
	SAN 103	SAN 101	137.45	137.13	140.72	3.020	250	79.00	0.013	0.0050	0.039	0.13	0.051	316	0.03342	0.10	0.00	0.01	0.00	137.70	137.38	138.00	0.41
Future Lands	FUT SAN	SAN 103	137.85	137.50	141.00	2.950	200	70.00	0.013	0.0000	0.024	0.00	0.032	350	0.03600	0.00	0.00	0.00	0.00	138.05	137.70	138.35	0.50

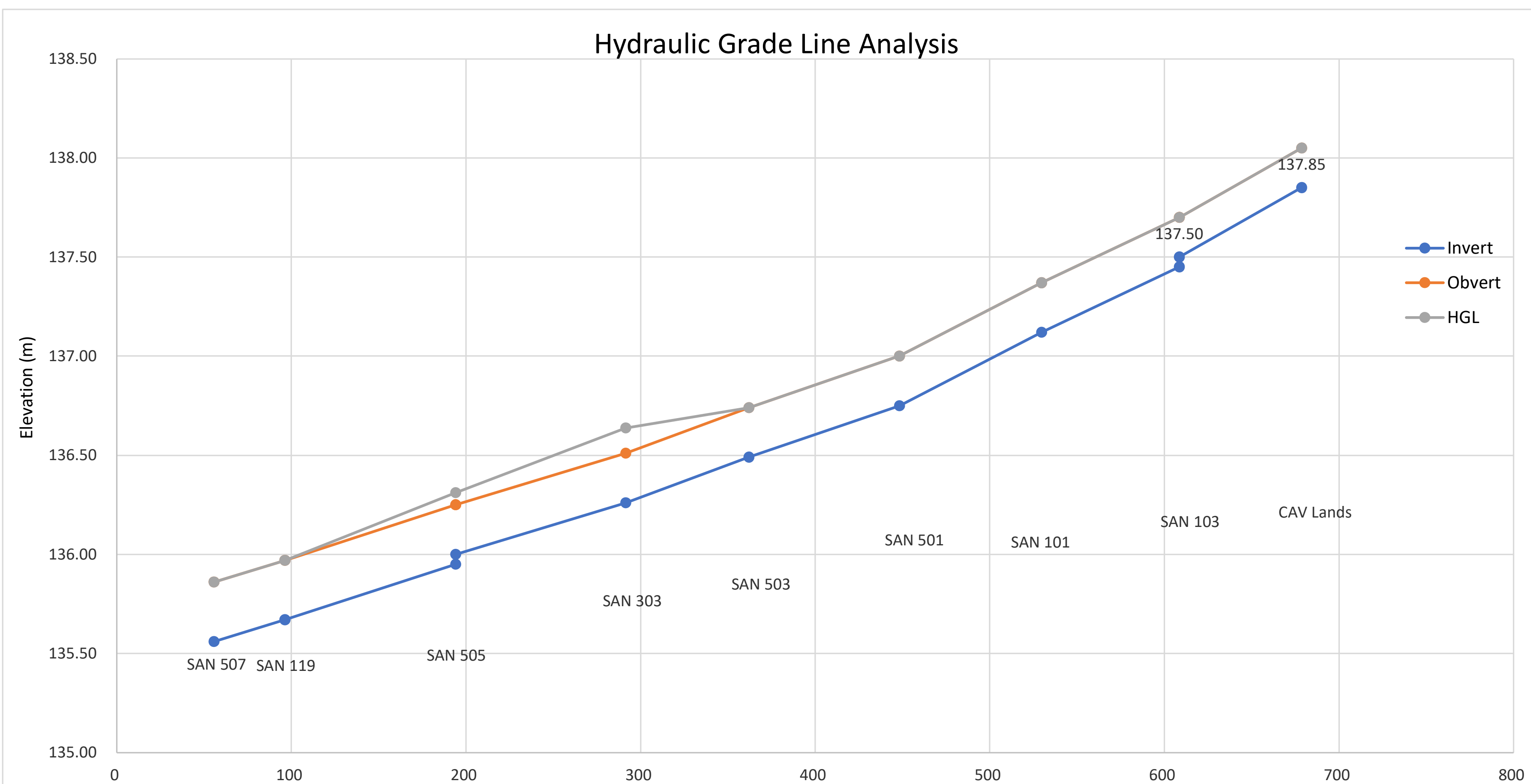
Manhole Loss

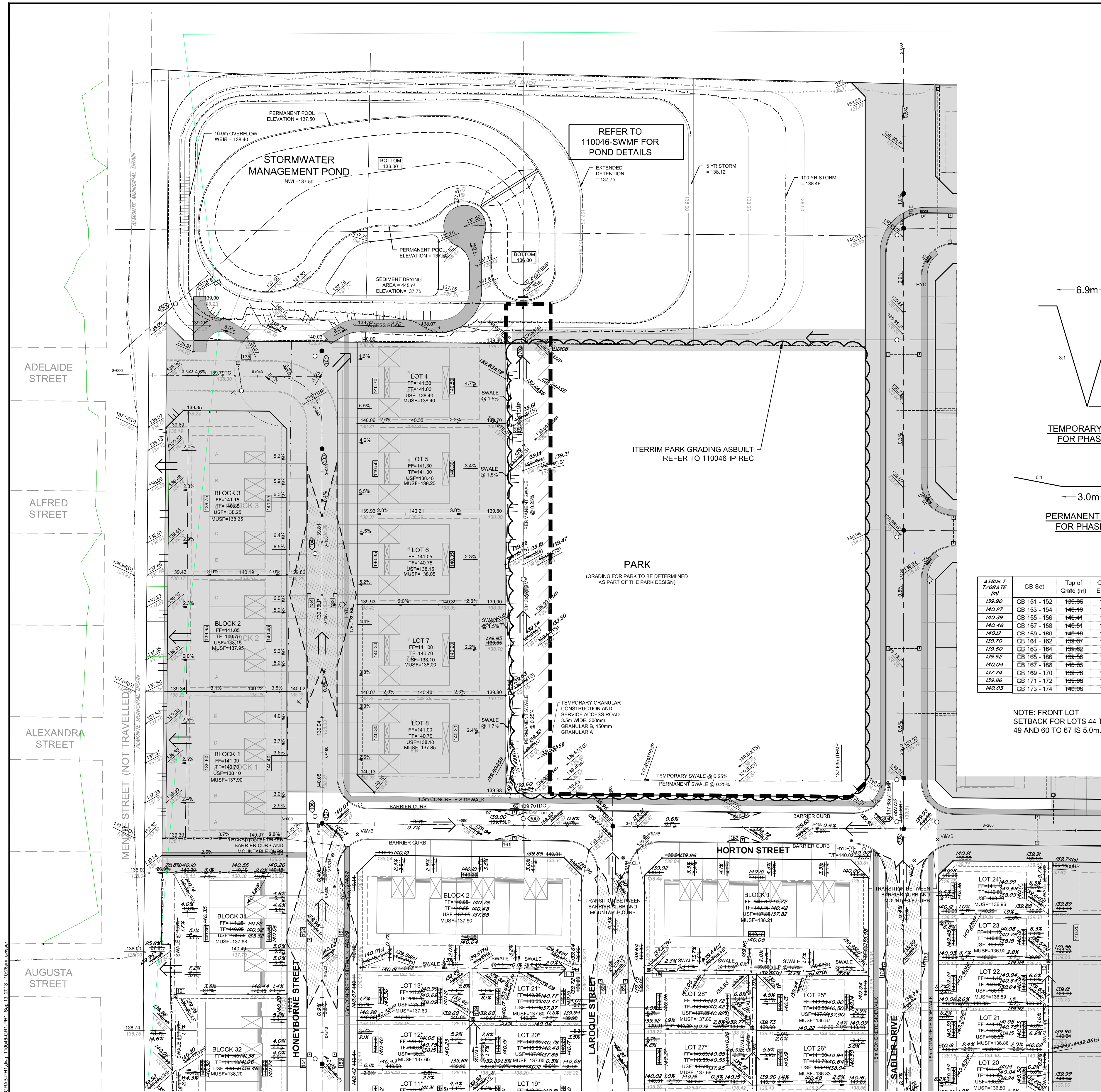
Diameters (mm) U/S MH	Pipe In	Pipe Out	Bend Angle	K_O	C_D	K_b	K_{tot}	HL_{MH} (m)
1200	300	300	0	0.400	1.00	0	**0.400**	0.008
1200	250	300	0	0.400	1.73	0	**0.691**	0.014
1200	250	250	0	0.480	1.00	0	**0.480**	0.012
1200	250	250	0	0.480	1.00	0	**0.480**	0.012
1200	250	250	0	0.480	1.00	0	**0.480**	0.005
1200	250	250	0	0.480	1.00	0	**0.480**	0.002
1200	250	250	0	0.480	1.00	0	**0.480**	0.001
1200	200	250	0	0.480	1.95	0	**0.938**	0.000
1200	200	200	0	0.600	1.00	0	**0.600**	0.000

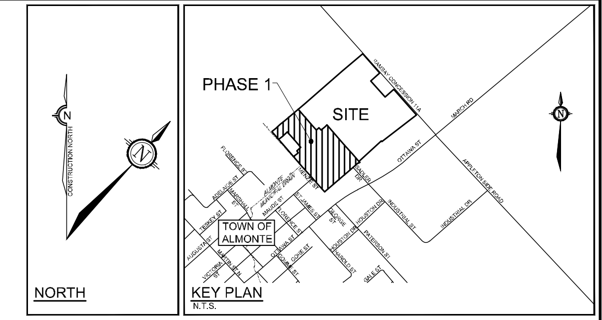
DESIGN PARAMETERS

Average Daily Flow=	350 L/cap/day	Industrial Peak Factor= per MOE graph	HGL=Major + Minor Losses
Comm/Inst Flow=	50000 L/ha/day	Extraneous Flow= 0.28 L/s/ha	Major Loss= Pipe Friction (Darcy-Weisbach)
Industrial Flow=	35000 L/ha/day	Minimum Velocity= 0.60 m/s	Minor Loss= Head loss correction for flow through MH, changes in pipe size, and pipe bends
Max Res Peak Factor=	4.00	Manning's n= 0.013	Friction Factor= 8g/c^2, where c=(1/n)*(D/4)^1/6
Comm Peak Factor=	1.50		
Industrial Peak Factor=	1.50	Design Year = 2023	

Designed: BM	PROJECT: Mill Run Extension
Checked: DDB	CLIENT: Regional Group
Dwg. Reference:	Date: February 10, 2023

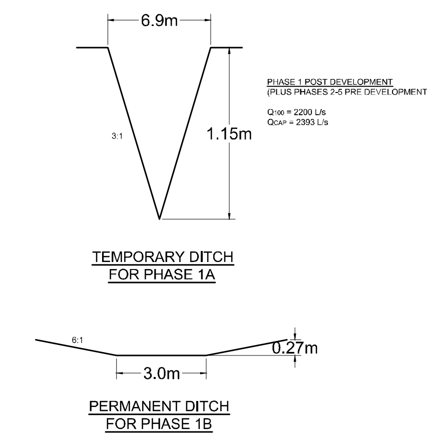






LEGEND: GRADING PLAN

139.58 / 139.51	PROPOSED ELEVATION / EXISTING ELEVATION
139.59 TW / 138.89 BW	PROPOSED TOP OF WALL ELEVATION / PROPOSED BOTTOM OF WALL ELEVATION
139.23 (s)	PROPOSED SWALE ELEVATION
139.23 LP	PROPOSED LOW POINT
139.23 HP	PROPOSED HIGH POINT
127.55	PROPOSED TERRACE ELEVATION
3.2%	PROPOSED SLOPE
FF=140.65	FINISHED FLOOR ELEVATION
TF=140.30	TOP OF FOUNDATION ELEVATION
USF=137.75	UNDERSIDE OF FOOTING ELEVATION
	MAXIMUM 3: 1 SIDESLOPE
SWALE @ 2.0%	℄ SWALE C/W DIRECTION OF FLOW AND GRADE
	PROPOSED 150mmØ SUBDRAIN
	MAJOR OVERLAND FLOW
	MAXIMUM PONDING AREA
90.31 / ~~90.35~~ / 89.39	ASBUILT ELEVATION
3.5% / ~~2.0%~~	ASBUILT SLOPE



ASBUILT T/GRATE (m)	CB Set	Top of Grate (m)	Overflow Elevation	Max Ponding Elevation (m)	Max Ponding Depth (m)
139.90	CB 151 - 152	~~139.86~~	140.06	140.14	0.28
140.27	CB 153 - 154	~~140.19~~	140.19	140.28	0.09
140.39	CB 155 - 156	~~140.41~~	140.61	140.58	0.17
140.48	CB 157 - 158	~~140.51~~	140.71	140.71	0.20
140.12	CB 159 - 160	~~140.10~~	140.30	140.37	0.27
139.70	CB 161 - 162	~~139.67~~	139.70	139.70	0.03
139.60	CB 163 - 164	~~139.62~~	139.65	139.65	0.03
139.62	CB 165 - 166	~~139.58~~	139.78	139.78	0.20
140.04	CB 167 - 168	~~140.03~~	140.03	140.03	0.00
137.74	CB 169 - 170	~~139.76~~	139.96	140.06	0.30
139.86	CB 171 - 172	~~139.90~~	140.10	140.19	0.29
140.03	CB 173 - 174	~~140.06~~	140.26	140.36	0.30

NOTE: FRONT LOT SETBACK FOR LOTS 44 TO 49 AND 60 TO 67 IS 5.0m.

NOTES: GRADING

1. REMOVE ALL ORGANIC MATTER AND TOPSOIL FROM AREAS THAT ARE TO BE PAVED.
2. ALL EXCESS EXCAVATED MATERIAL TO BE STOCKPILED OR SPREAD ON-SITE AS DIRECTED BY THE ENGINEER. ALL ORGANIC MATERIAL AND DEBRIS TO BE USED OR STOCKPILED ON SITE AS INSTRUCTED BY ENGINEER.
3. GRADE AND/OR FILL WHERE REQUIRED.
4. MATCH EXISTING ELEVATIONS AT ALL PROPERTY LINES.
5. ENSURE POSITIVE DRAINAGE WHETHER INDICATED OR NOT.
6. PROVIDE POSITIVE DRAINAGE ALONG ALL DITCHES AFTER REINSTATEMENT.
7. MINIMUM OF 2% AND MAXIMUM OF 7% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
8. MAXIMUM TERRACING GRADE IS 3:1.
9. ALL DRIVEWAY SLOPES ARE TO BE BETWEEN 2% AND 8%.
10. SIDEWALK CROSSFALL IS TO BE BETWEEN 2% AND 4%.
11. MINIMUM REARYARD SWALE GRADE IS 1.5%.
12. MUSF IS BASED ON 0.5m ABOVE THE TOP OF THE SANITARY SEWER.
13. LOTS 24 TO 28, LOTS 44 TO 51 AND LOTS 58 TO 70 - BEARING SURFACE INSPECTION TO DETERMINE FOUNDATION RECOMMENDATIONS REQUIRED. SEE GEOTECHNICAL CONSIDERATIONS-GRADING PLAN REVIEW AND SWMP DESIGN RECOMMENDATIONS DATED APRIL 20, 2012 FROM THE PATERSON GROUP.

NOTES: ROADS

1. PAVEMENT STRUCTURE, AS PER GEOTECHNICAL RECOMMENDATIONS

- LOCAL ROADWAYS
  40mm HL3 OR SUPERPAVE 12.5
  50mm HL8 OR SUPERPAVE 19.0
  150mm GRANULAR 'A'
  400mm GRANULAR 'B', TYPE II
  640mm

- LOCAL ROADWAYS (Bearing on Bedrock)
  40mm HL3 OR SUPERPAVE 12.5
  50mm HL8 OR SUPERPAVE 19.0
  300mm GRANULAR 'A'
  390mm

2. REMOVE ANY TOPSOIL/ ORGANICS AND ANY SOFT, WET, OR DELETERIOUS MATERIAL IN PREPARATION OF THE SUBGRADE.
3. ALL ASPHALT TO BE SUPERPAVE MIX DESIGNS.
4. GRANULAR BASE AND SUBGRADE TO BE COMPACTED TO AT LEAST 98% STANDARD PROCTOR MAXIMUM DRY DENSITY.
5. ASPHALTIC CONCRETE TO BE COMPACTED TO AT LEAST 97% OF MARSHALL DENSITY.
6. ALL ROADWAYS TO HAVE 2% CROSSFALL INCLUDING SUBGRADE AND GRANULAR BASE.
7. ROADWAY SUBGRADE TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER AT THE TIME OF CONSTRUCTION TO REVIEW THE GRANULAR 'B' DEPTH AND FOR THE NECESSITY OF A WOVEN GEOTEXTILE BELOW THE GRANULAR MATERIALS.
8. PRIOR TO THE PLACEMENT OF TOPLIFT (SUPERPAVE 12.5), CONTRACTOR IS TO ADJUST ALL STRUCTURES AS PER OPSD 704.010.
9. CONNECT TO EXISTING ROADS AS DETAILED, INCLUDING ALL RESTORATION WORK NECESSARY TO REINSTATE SURFACES TO EXISTING CONDITIONS OR BETTER.
10. AS NOTED ON THE PLAN, CURBS ARE TO BE MOUNTABLE CURB AS PER CITY OF OTTAWA SC 1.3 OR BARRIER CURB AS PER OPSD 600.110.
11. CONCRETE SIDEWALKS ARE TO BE 1.5m WIDE AND 125mm THICK AS PER OPSD 310.010. INTERSECTIONS ARE TO BE AS PER OPSD 310.030.
12. ALL BOULEVARD TO BE LANDSCAPED WITH 125mm TOPSOIL AND SOD.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

AS-BUILT

No.	REVISION	DATE	BY
11.	AS-BUILT		MER
10.	REISSUED FOR CONSTRUCTION (PHASE 1B ONLY)	APR 28/14	MER
9.	ISSUED FOR SUBDIVSION REGISTRATION - PHASE 1B	FEB 21/14	MER
8.	REVISED SADLER DRIVE CROSS SECTION	NOV 12/13	MER
7.	ISSUED FOR CONSTRUCTION (PHASE 1B ONLY)	APR 26/13	MER
6.	ISSUED FOR CONSTRUCTION	SEPT 10/12	JGR
5.	ISSUED FOR LIMITED CONSTRUCTION	JULY 11/12	MER
4.	ISSUED FOR MOE APPROVAL	JUNE 26/12	MER
3.	ISSUED FOR TENDER	MAY 14/12	MER
2.	ISSUED FOR TOWN APPROVAL	APR 30/12	MER
1.	ISSUED FOR TOWN REVIEW	JAN 31/12	MER

SCALE 1:500

DESIGN CV
CHECKED MER
DRAWN CV
CHECKED MER
APPROVED JGR

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Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
TOWN OF MISSISSIPPI MILLS
MILL RUN AT ALMONTE

DRAWING NAME
PHASE 1 - GRADING PLAN

PROJECT No. 110046
REV: REV # 11
DRAWING No. 110046-GR1-REC

Billy McEwen

From: Drew Blair
Sent: Monday, February 6, 2023 4:13 PM
To: Billy McEwen
Subject: FW: Water and Wastewater Calculation Factors

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 236

From: David Shen <dshen@mississippimills.ca>
Sent: Tuesday, January 31, 2023 11:34 AM
To: Drew Blair <D.Blair@novatech-eng.com>
Cc: Trevor McKay <t.mcKay@novatech-eng.com>; Melanie Riddell <m.riddell@novatech-eng.com>; Mark Bowen <M.Bowen@novatech-eng.com>
Subject: RE: Water and Wastewater Calculation Factors

See my response highlighted below.

Hello David,

We are currently working on a few projects in Mississippi Mills and would like to confirm some items for our water and wastewater calculations moving forward:

1. What are the accepted population density values for different types of dwelling units to be used for water and wastewater calculations? For Mill Run, the densities utilized were: 3.8 persons/unit for singles, 3.8 persons/unit for semi's, 3.5 persons/unit for towns and 3.0 persons/unit for apartments but this project was started in 2010. The City of Ottawa uses 3.4 persons/unit for singles and 2.7 persons/unit for semis/towns and 2-bedroom apartment average at 2.1 persons/unit. Would these lower population densities be acceptable to use?

Yes use the City of Ottawa Table 4.2, your numbers above are good.

2. From the 2018 Water and Wastewater Master Plan Update Report for MM, the average residential daily flow was set to 350 L/capita/day. Does this value still apply and for both water and wastewater calculations?

Yes 350 l/cap/d

3. The correction factor (K) for the Harmon Formula Peaking Factor is assumed to be 1.0 however the City of Ottawa has revised the residential correction factor to be 0.8 in 2018. Will the municipality consider using this correction factor?

Yes you can see k=0.8, please attach the COO 2018 guideline addendum for reference since some of our staff might not be aware of the change.

4. Under a separate submission (attached), we have recommended using OBC calculations to determine the water demand for fire flows versus using the FUS method. The OBC calculations provided fire flow demands that appear in-line with the 2018 Master Plan Update values. Can you please confirm that using OBC for fire flows is acceptable.

Answered in an early email.

Please let us know. We're happy to discuss further.

Thanks,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 236 | Fax: 613.254.5867

Appendix D: Water Distribution

Chris Visser

From: Mark Buchanan <mbuchanan@jlrichards.ca>
Sent: April-22-15 9:46 AM
To: Chris Visser
Cc: tdunlop@mississippimills.ca
Subject: 25363-06 Mill Run Subdivision - Hydraulic Boundary Conditions
Attachments: 20120430-Design Brief Phase 1.pdf; FW: Mill Run - Request for boundary Conditions - Watermain analysis - Phase 2 -5; Water Model Results.pdf

Hello Chris,

The proposed development located north east of Sadler Drive and Honeyborne Street intersection was simulated using the Town of Mississippi's existing hydraulic water model based on theoretical water demands provided by the Developer's Engineer. The attached email outlines the theoretical water demands for the existing Phase 1 of development. The water demands for Phase 2 to 5 were calculated by subtracting the Phase 1 demands from Table 9 of the attached *Design Services and Stormwater Management Report Mill Run at Almonte – Phase 1* provided by the Developer's Engineer. The fire flow requirement for Phases 2 to 5 of 171.5 L/s was calculated by subtracting the values shown in Table 9 under the Maximum Daily Demand and Fire Flow condition (i.e., 191 – 19.5 L/s). The following theoretical water demands were included in the model:

Demand (L/s)	Mill Run Phase 1	Mill Run Phases 2 to 5
Average Day	1.76	7.94
Maximum Day	3.52	15.98
Peak Hour	7.72	35.18

Phase 1 water demands were split in half and applied at junction nodes J-381 and J-527. Phase 2 to 5 demands and the fire flow requirement were applied at junction node J-527. Hydraulic boundary conditions have been generated at the nearest junction node J-527 along the existing 250 mm diameter watermain and are summarized in the following table (refer to attached WaterCAD outputs).

Scenario	Mill Run Phases 2 to 5 (J-527)	
	Pressure (kPa)	HGL (m)
Average Day (7.94 L/s)	385	180.346
Peak Hour Demand (35.18 L/s)	348	176.564
Max Day (15.98 L/s) + Fire Flow 171.5 L/s	110	152.263
Max Day (15.98 L/s) + Fire Flow 160 L/s	140	155.316
Max Day (15.98 L/s) + Fire Flow 130 L/s	208	162.268
Max Day (15.98 L/s) + Fire Flow 100 L/s	266	168.198

Based on the water model the required fire flow of 171.5 L/s is not available from the existing water distribution system at the proposed connection location (J-527). An additional automated fire flow scenario was simulated in the model, which expects a maximum fire flow of 160 L/s available at junction node J-527, while maintaining a system pressure of 140 kPa. For the Developer's consideration we have prepared boundary conditions at fire flows of 130 L/s and 100 L/s.

Note that the foregoing model results are for current conditions and are based on computer model simulation. We have not reviewed the adequacy of the domestic demand nor fire flow requirements for the propose development, which remains the responsibility of the Developer's Engineer.

Disclaimer: The model results are based on current operation of the Town's water distribution system. The computer model simulation is based on the best information available at this time. The operation of the water distribution system can change on a regular basis, resulting in a variation in the boundary conditions. It is further noted that the operational characteristics of the water supply system and physical properties of the watermains can change and/or deteriorate over time. These changes may affect the supply characteristics of the system and the assumptions made in developing the model, which in turn could lead to variations in the simulation results. This should be considered by any third party undertaking simulation of system upgrades.

Mark Bowen

From: Annie Williams <awilliams@jlrichards.ca>
Sent: Thursday, May 20, 2021 4:14 PM
To: Cory Smith
Cc: Mark Buchanan; Alex McAuley; Susan Gordon; John Riddell
Subject: Hydraulic Boundary Conditions for 277 Florence Street
Attachments: 277 Florence Street - Compiled Model Results.pdf; FW: 277 Florence St, Almonte - boundary conditions

Hello Cory,
The proposed Development ("277 Florence Street"), located in between Adelaide Street and Honeyborne Street in the Municipality of Mississippi Mills (Municipality), was simulated using the Municipality's existing hydraulic water model (2017) to determine hydraulic boundary conditions based on theoretical water demands and fire flows provided by the Developer's Engineer (refer to attached). The recent 300 mm diameter watermain upgrade on Victoria Street between Martin Street North and Menzie Street was included in the model as shown on the engineering plans provided by the Municipality. Two (2) sets of hydraulic boundary conditions were requested: one for a single watermain connection at the intersection of Adelaide Street and Finner Court, and another for a looped watermain connection extending from Adelaide Street to Honeyborne Street. Table 1 summarizes the theoretical water demands that were included in the model at junction node J-212 (1 connection to the existing system) or junction node J-494 (2 connections to the existing system). Table 2 summarizes the various required fire flows as calculated by the Developer's Engineer.

Table 1: Theoretical Water Demands

Scenario	Demand (L/s)
Average Day	1.29
Maximum Day	3.23
Peak Hour	7.11

Table 2: Fire Flow Calculations

OBC (L/s) 1		
45.00	60.00	105.00

The hydraulic boundary conditions have been generated at the connection locations labelled as junction nodes J-212 and J-542 in the model and are summarized in Tables 3 and 4 (refer to attached WaterCAD model outputs). The average day scenario assumes the maximum elevated tank level of 180.84 m with all well pumps off. The maximum day plus fire flow and peak hour scenarios assume an elevated tank level of 180.00 m with all well pumps on. A 200 mm diameter watermain was assumed for the looped connection between Adelaide Street and Honeyborne Street. From these parameters, it is anticipated that **with only the single connection at Adelaide St / Finner Court, the maximum available fire flow is limited to 46.8 L/s** based on the minimum pressure requirement of 140 kPa. When the second connection is made at Honeyborne St, the targeted fire flow of 105.00 L/s is achievable.

Table 3: 277 Florence Street Boundary Conditions – 1 Connection to Existing System

Demand Scenario	Connection 1 – Adelaide St / Finner Ct Junction Node J-212 (Elev 140.89 m)	
	Pressure (kPa)	HGL (m)
Average Day (1.29 L/s)	388	180.50
Max Day (3.23 L/s) + OBC Fire Flow (45.00 L/s)	156	156.79
Max Day (3.23 L/s) + OBC Fire Flow (60.00 L/s)	N/A	N/A
Max Day (3.23 L/s) + OBC Fire Flow (105.00 L/s)	N/A	N/A
Peak Hour (7.11 L/s)	364	178.03

Table 4: 277 Florence Street Boundary Conditions – 2 Connections to Existing System (200mm dia. Watermain Loop)

Demand Scenario	Connection 1 – Adelaide St / Finner Ct Junction Node J-212 (Elev 140.89 m)		Connection 2 – Honeyborne St Junction Node J-542 (Elev 137.00 m)	
	Pressure (kPa)	HGL (m)	Pressure (kPa)	HGL (m)
Average Day (1.29 L/s)	388	180.58	427	180.60

Max Day (3.23 L/s) + OBC Fire Flow (45.00 L/s)	345	176.10	392	177.05
Max Day (3.23 L/s) + OBC Fire Flow (60.00 L/s)	322	173.81	375	175.34
Max Day (3.23 L/s) + OBC Fire Flow (105.00 L/s)	227	164.08	304	168.11
Peak Hour (7.11 L/s)	373	179.02	412	179.11

Note that the foregoing model results are for current conditions and are based on computer model simulation. We have not reviewed the adequacy of the domestic demand nor the fire flow requirements for the proposed development, which remains the responsibility of the Developer's Engineer.

Disclaimer: The model results are based on current simulated operation of the Municipality's water distribution system. The computer model simulation is based on the best information available at this time. The operation of the water distribution system can change on a regular basis, resulting in a variation in the boundary conditions. It is further noted that the operational characteristics of the water supply system and physical properties of the watermains can change and/or deteriorate over time. These changes may affect the supply characteristics of the system and the assumptions made in developing the model, which in turn could lead to variations in the simulation results. This should be considered by any third party undertaking simulation of system upgrades.

Please do not hesitate to contact me should you have any questions regarding the foregoing.

Regards,

Annie

Annie Williams, P.Eng.
Civil Engineer

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Direct: 343-803-4523

J.L. Richards & Associates Limited
ENGINEERS • ARCHITECTS • PLANNERS

Regards,

Mark Buchanan, P. Eng.
Civil Engineer
J.L. Richards & Associates Limited
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OBC Water Supply for Firefighting Calculation

Based on OBC 2012 (Div. B, Article 3.2.5.7)

References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121125
Project Name: Mill Run Extension Phase 7 & 8
Date: 2/3/2023
Input By: Drew Blair
Reviewed By:

Building Description: Typical Semi (2 Storey with basement)

Unsprinklered

Step		Calculation Inputs	Calculation Notes	Value
	Minimum Fire Protection Water Supply Volume			
1	**Water Supply Coefficient**			
	Building Classification =	C	From Table 3.1.2.1	
	Water Supply Coefficient - K =		From Table 1 (A3.2.5.7)	**23**
2	**Total Building Volume**			
	Building Width - W	14.70 m		
	Building Length - L	17.90 m	Area (W * L) = 263 m	
	Building Height - H	12.2 m		
	Total Building Volume - V =		W * L * H	**3210 m³**
3	**Spatial Coefficient Value**			
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)		**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	1.20 m	Sside 1 = **0.50**	
	East	15.00 m	Sside 2 = **0.00**	
	South	1.20 m	Sside 3 = **0.50**	
	West	7.50 m	Sside 4 = **0.25**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =		1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**2.00**
4	**Minimum Fire Protection Water Supply Volume**			
	Q =		$K * V * S_{Tot}$	**147,669 L**
	Required Minimum Water Supply Flow Rate			
5	**Minimum Water Supply Flow Rate =**		From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**4,500 L/min** or **75 L/s**
	Minimum Fire Protection Water Supply Volume for 30 minutes			
6	**Q =**		= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**135,000 L**
	Required Fire Protection Water Supply Volume			
7	**Q =**		Highest volume out of (4) and (6)	**147,669 L**
Notes				

OBC Water Supply for Firefighting Calculation

Based on OBC 2012 (Div. B, Article 3.2.5.7)

References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121125
Project Name: Mill Run Extension Phase 7 & 8
Date: 2/3/2023
Input By: Drew Blair
Reviewed By: Drew Blair

Building Description: Typical Single (Bungalow with basement)

Unsprinklered

Step		Calculation Inputs	Calculation Notes	Value
	Minimum Fire Protection Water Supply Volume			
1	**Water Supply Coefficient**			
	Building Classification =	C	From Table 3.1.2.1	
	Water Supply Coefficient - K =		From Table 1 (A3.2.5.7)	**23**
2	**Total Building Volume**			
	Building Width - W	10.60 m		
	Building Length - L	18.30 m	Area (W * L) = 194 m	
	Building Height - H	8.7 m		
	Total Building Volume - V =		W * L * H	**1688 m³**
3	**Spatial Coefficient Value**			
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)		**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	7.50 m	Sside 1 = **0.25**	
	East	1.20 m	Sside 2 = **0.50**	
	South	15.00 m	Sside 3 = **0.00**	
	West	1.20 m	Sside 4 = **0.50**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =		1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**2.00**
4	**Minimum Fire Protection Water Supply Volume**			
	Q =		$K * V * S_{Tot}$	**77,631 L**
	Required Minimum Water Supply Flow Rate			
5	**Minimum Water Supply Flow Rate =**		From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**2,700 L/min** or **45 L/s**
	Minimum Fire Protection Water Supply Volume for 30 minutes			
6	**Q =**		= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**81,000 L**
	Required Fire Protection Water Supply Volume			
7	**Q =**		Highest volume out of (4) and (6)	**81,000 L**
Notes				

OBC Water Supply for Firefighting Calculation

Based on OBC 2012 (Div. B, Article 3.2.5.7)

References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121125
Project Name: Mill Run Extension Phase 7 & 8
Date: 2/3/2023
Input By: Drew Blair
Reviewed By: Drew Blair

Building Description: Typical Single (2 Storey with basement)

Unsprinklered

Step		Calculation Inputs		Calculation Notes	Value
	Minimum Fire Protection Water Supply Volume				
1	**Water Supply Coefficient**				
	Building Classification =	C		From Table 3.1.2.1	
	Water Supply Coefficient - K =			From Table 1 (A3.2.5.7)	**23**
2	**Total Building Volume**				
	Building Width - W	9.80	m		
	Building Length - L	16.00	m	Area (W * L) = 157 m	
	Building Height - H	10.7	m		
	Total Building Volume - V =			W * L * H	**1678 m³**
3	**Spatial Coefficient Value**				
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)			**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	7.50	m	Sside 1 = **0.25**	
	East	1.20	m	Sside 2 = **0.50**	
	South	15.00	m	Sside 3 = **0.00**	
	West	1.20	m	Sside 4 = **0.50**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =			1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**2.00**
4	**Minimum Fire Protection Water Supply Volume**				
	Q =			$K * V * S_{Tot}$	**77,177 L**
	Required Minimum Water Supply Flow Rate				
5	**Minimum Water Supply Flow Rate =**			From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**2,700 L/min** or **45 L/s**
	Minimum Fire Protection Water Supply Volume for 30 minutes				
6	**Q =**			= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**81,000 L**
	Required Fire Protection Water Supply Volume				
7	**Q =**			Highest volume out of (4) and (6)	**81,000 L**
Notes					

OBC Water Supply for Firefighting Calculation

Based on OBC 2012 (Div. B, Article 3.2.5.7)

References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

Engineers, Planners & Landscape Architects

Novatech Project #: 121125
Project Name: Mill Run Extension Phase 7 & 8
Date: 1/31/2023
Input By: Drew Blair
Reviewed By: Drew Blair

Building Description: 5-Unit Townhouse 1- Storey Block in the middle

Unsprinklered

Step		Calculation Inputs		Calculation Notes	Value
Minimum Fire Protection Water Supply Volume					
1	**Water Supply Coefficient**				
	Building Classification =	C		From Table 3.1.2.1	
	Water Supply Coefficient - K =			From Table 1 (A3.2.5.7)	**23**
2	**Total Building Volume**				
	Building Width - W	38.00	m		
	Building Length - L	16.60	m	Area (W * L) = 631 m	
	Building Height - H	8.7	m		
	Total Building Volume - V =			W * L * H	**5488 m³**
3	**Spatial Coefficient Value**				
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)			**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	7.50	m	Sside 1 = **0.25**	
	East	1.20	m	Sside 2 = **0.50**	
	South	15.00	m	Sside 3 = **0.00**	
	West	1.20	m	Sside 4 = **0.50**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =			1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**2.00**
4	**Minimum Fire Protection Water Supply Volume**				
	Q =			$K * V * S_{Tot}$	**252,446 L**
Required Minimum Water Supply Flow Rate					
5	**Minimum Water Supply Flow Rate =**			From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**6,300 L/min** or **105 L/s**
Minimum Fire Protection Water Supply Volume for 30 minutes					
6	**Q =**			= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**189,000 L**
Required Fire Protection Water Supply Volume					
7	**Q =**			Highest volume out of (4) and (6)	**252,446 L**
Notes					

OBC Water Supply for Firefighting Calculation

NOVATECH
Engineers, Planners & Landscape Architects

Based on OBC 2012 (Div. B, Article 3.2.5.7)

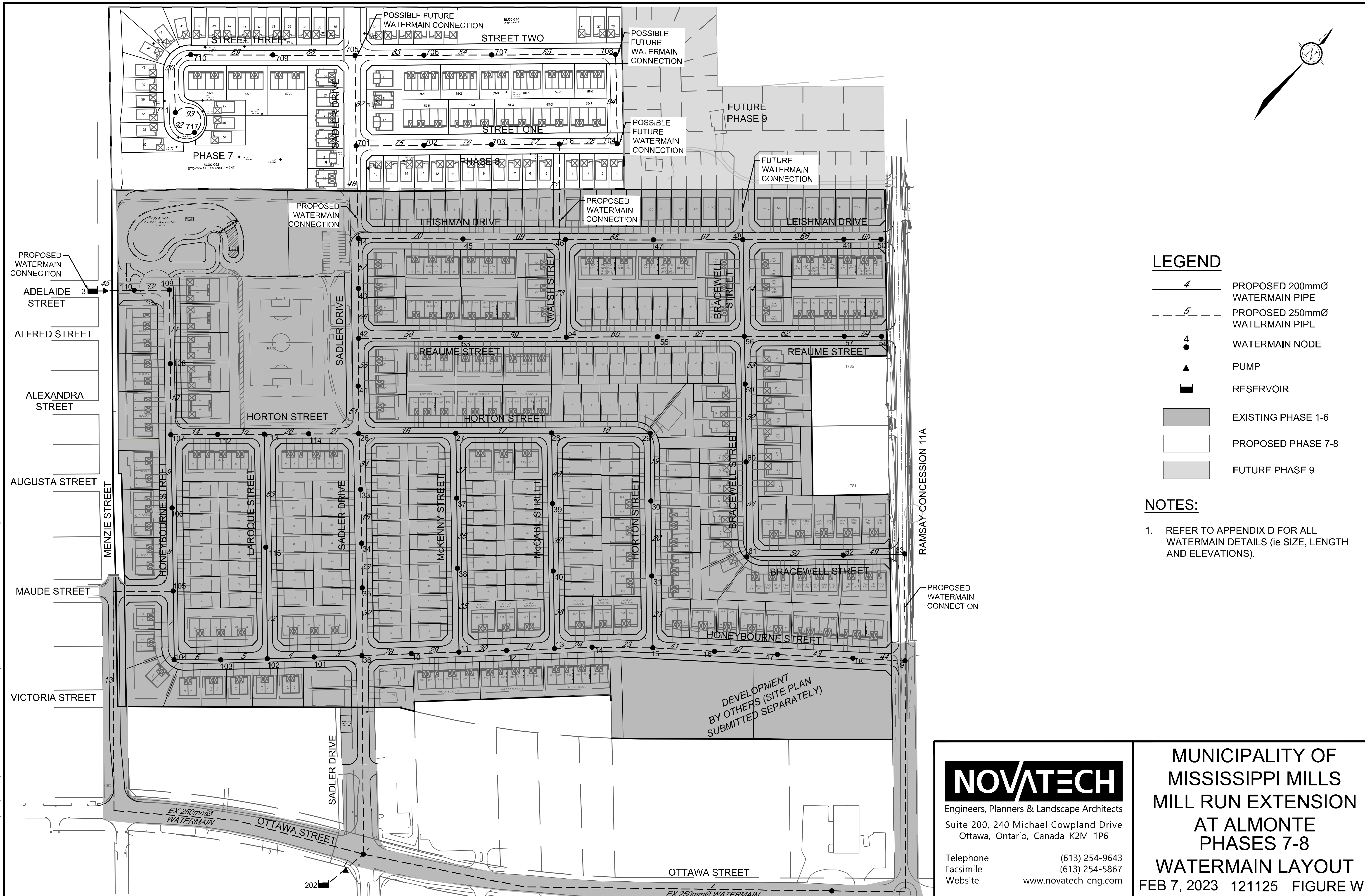
References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

Novatech Project #: 121125
Project Name: Mill Run Extension Phase 7 & 8
Date: 1/31/2023
Input By: Drew Blair
Reviewed By: Drew Blair

Building Description: 5-Unit Townhouse 2- Storey Block in the middle

Unsprinklered

Step		Calculation Inputs		Calculation Notes	Value
	Minimum Fire Protection Water Supply Volume				
1	**Water Supply Coefficient**				
	Building Classification =	C		From Table 3.1.2.1	
	Water Supply Coefficient - K =			From Table 1 (A3.2.5.7)	**23**
2	**Total Building Volume**				
	Building Width - W	30.00	m		
	Building Length - L	16.00	m	Area (W * L) = 480 m	
	Building Height - H	11.6	m		
	Total Building Volume - V =			W * L * H	**5568 m³**
3	**Spatial Coefficient Value**				
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)			**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	7.50	m	Sside 1 = **0.25**	
	East	1.20	m	Sside 2 = **0.50**	
	South	15.00	m	Sside 3 = **0.00**	
	West	1.20	m	Sside 4 = **0.50**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =			1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**2.00**
4	**Minimum Fire Protection Water Supply Volume**				
	Q =			$K * V * S_{Tot}$	**256,128 L**
	Required Minimum Water Supply Flow Rate				
5	**Minimum Water Supply Flow Rate =**			From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**6,300 L/min** or **105 L/s**
	Minimum Fire Protection Water Supply Volume for 30 minutes				
6	**Q =**			= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**189,000 L**
	Required Fire Protection Water Supply Volume				
7	**Q =**			Highest volume out of (4) and (6)	**256,128 L**
Notes					



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SHT11X17.DWG - 279mmX432mm

Table D1
Calculated Water Demand
Mill Lands (Phases 1-8)
Almonte, ON
JOB NO. 121125

Created: Feb. 6/23

Mills Extenstion (Mill Run Phases 7-8)									
Location	Node	Elev. (m)	Unit Type			Pop	Demand (L/s)		
			Semis Singles	Towns	Apart		High Pressure	Max Daily	Peak Hour
Street 1	701	140.6	12	0	0	41	0.17	0.42	0.91
	702	141.0	6	10	0	47	0.19	0.48	1.05
	703	141.5	4	8	0	35	0.14	0.35	0.78
	704	141.7	4	4	0	24	0.10	0.24	0.53
	716	141.6	0	0	0	0	0.00	0.00	0.00
Street 2	705	140.7	12	0	0	41	0.17	0.42	0.91
	706	141.0	4	10	0	41	0.17	0.42	0.91
	707	141.2	0	12	0	32	0.13	0.32	0.71
	708	141.3	3	4	0	21	0.09	0.21	0.47
Street 3	709	141.0	6	6	0	37	0.15	0.37	0.82
	710	141.1	8	6	0	43	0.17	0.44	0.96
	711	141.6	0	0	0	0	0.00	0.00	0.00
	717	141.6	6	0	0	20	0.08	0.20	0.45
Mills Ext. Total			65	60	0	382	1.55	3.87	8.51

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Table D1
Calculated Water Demand
Mill Lands (Phases 1-8)
Almonte, ON
JOB NO. 121125

Created: Feb. 6/23

Mills Extenstion (Mill Run Phases 7-8)									
Location	Node	Elev. (m)	Unit Type			Pop	Demand (L/s)		
			Semis Singles	Towns	Apart		High Pressure	Max Daily	Peak Hour
HONEYBOURNE ST	101	140.5	0	6	0	21	0.11	0.22	0.48
	102	140.7	4	0	0	15	0.08	0.16	0.34
	103	140.5	6	6	0	44	0.23	0.46	1.01
	104	140.7	4	0	0	15	0.08	0.16	0.34
	105	140.7	6	4	0	37	0.19	0.39	0.85
	106	140.1	4	7	0	40	0.21	0.42	0.92
	107	140.1	2	7	0	32	0.17	0.33	0.73
	108	139.8	4	6	0	36	0.19	0.38	0.83
	109	139.9	4	3	0	26	0.14	0.27	0.60
	110	139.8	0	0	0	0	0.00	0.00	0.00
	10	140.5	0	0	0	0	0.00	0.00	0.00
	11	140.9	4	7	0	40	0.21	0.42	0.92
	12	140.9	4	7	0	40	0.21	0.42	0.92
	13	142.3	2	4	0	22	0.11	0.23	0.50
	14	143.4	4	3	0	26	0.14	0.27	0.60
	15	145.1	2	0	24	80	0.42	0.83	1.83
	16	146.6	4	0	24	87	0.45	0.91	1.99
	17	146.3	6	0	24	95	0.49	0.99	2.18
	18	145.9	6	0	24	95	0.49	0.99	2.18
	19	145.0	0	0	0	0	0.00	0.00	0.00
HORTON ST	112	139.8	0	7	0	25	0.13	0.26	0.57
	113	140.0	0	0	0	0	0.00	0.00	0.00
	114	139.7	0	7	0	25	0.13	0.26	0.57
	26	140.0	0	0	0	0	0.00	0.00	0.00
	27	140.5	0	14	0	49	0.26	0.51	1.12
	28	141.9	2	8	0	36	0.19	0.38	0.83
	29	143.7	9	0	0	34	0.18	0.35	0.78
	30	144.8	9	0	0	34	0.18	0.35	0.78
	31	144.9	8	0	0	30	0.16	0.31	0.69
LAROCQUE	115	140.0	15	0	0	57	0.30	0.59	1.31
SADLER DR	33	139.9	7	0	0	27	0.14	0.28	0.62
	34	140.2	6	0	0	23	0.12	0.24	0.53
	35	140.0	5	0	0	19	0.10	0.20	0.44
	36	140.3	6	0	0	23	0.12	0.24	0.53
MCKENNY	37	140.2	9	0	0	34	0.18	0.35	0.78
	38	140.5	9	0	0	34	0.18	0.35	0.78
MCCABE	39	139.1	8	0	0	30	0.16	0.31	0.69
	40	142.2	8	0	0	30	0.16	0.31	0.69

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Engineers, Planners & Landscape Architects

Table D1
Calculated Water Demand
Mill Lands (Phases 1-8)
Almonte, ON
JOB NO. 121125

Created: Feb. 6/23

Mills Extenstion (Mill Run Phases 7-8)									
Location	Node	Elev. (m)	Unit Type			Pop	Demand (L/s)		
			Semis Singles	Towns	Apart		High Pressure	Max Daily	Peak Hour
SADLER DR	41	139.8	6	0	0	23	0.12	0.24	0.53
	42	140.0	0	0	0	0	0.00	0.00	0.00
	43	139.7	6	0	0	23	0.12	0.24	0.53
	44	140.0	3	0	0	11	0.06	0.11	0.25
LEISHMAN DR	45	140.2	6	12	0	65	0.34	0.68	1.49
	46	140.1	9	2	0	41	0.21	0.43	0.94
	47	143.4	7	10	0	62	0.32	0.65	1.42
	48	144.7	8	0	0	30	0.16	0.31	0.69
	49	143.6	3	5	0	29	0.15	0.30	0.66
	50	142.8	3	5	0	29	0.15	0.30	0.66
REAUME ST	53	140.1	8	10	0	65	0.34	0.68	1.49
	54	141.3	5	5	0	37	0.19	0.39	0.85
	55	144.0	14	0	0	53	0.28	0.55	1.21
	56	146.5	10	0	0	38	0.20	0.40	0.87
	57	144.7	0	5	0	18	0.09	0.19	0.41
	58	143.7	0	5	0	18	0.09	0.19	0.41
BRACEWELL ST	59	146.5	8	0	0	30	0.16	0.31	0.69
	60	146.6	7	0	0	27	0.14	0.28	0.62
	61	146.8	6	5	0	40	0.21	0.42	0.92
	62	146.4	4	5	0	33	0.17	0.34	0.76
	63	145.6	4	5	0	33	0.17	0.34	0.76
Existing Total			**284**	**170**	**96**	**1966**	**10.24**	**20.48**	**45.05**

Proposed Mill Run Phases 7-8 Nodes | **Existing Mill Run Phases 1-6 Nodes**

Notes:

1. Population density:

	Phases 1-6	Phases 7-9
Single	3.8 people/unit	3.4 people/unit
Semi	3.8 people/unit	2.7 people/unit
Towns	3.5 people/unit	2.7 people/unit
Apart	3.0 people/unit	2.7 people/unit

2. Total Population at each node rounded to nearest whole number.
3. Population demand (Phases 1-6) = 450L/s/d/c (Average Demand)
4. Population demand (Phases 7-9) = 350L/s/d/c (Average Demand)
5. Water Demand: AVG=Average Demand, M.D=Maximum Day (2.5*AVG), P.H.=Peak Hour Rate (2.2*M.D)

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Table D2
Pipe Data
Mill Lands (Phases 1-8)
Almonte, ON
JOB NO. 121125

Created: Feb. 6/23

Table D2 Mill Run Phase 1 -8 Pipe Data			
Pipe	**Length** (m)	**Diameter** (mm)	**Roughness Coefficient**
Pipe 3	42.0	200	110
Pipe 4	41.0	200	110
Pipe 5	41.0	200	110
Pipe 6	40.0	200	110
Pipe 7	60.4	200	110
Pipe 8	72.8	200	110
Pipe 9	64.2	200	110
Pipe 10	62.0	250	110
Pipe 11	64.9	250	110
Pipe 12	30.9	250	110
Pipe 13	110.0	1000	130
Pipe 14	42.0	200	110
Pipe 15	42.0	200	110
Pipe 16	85.1	200	110
Pipe 17	84.0	200	110
Pipe 18	86.8	200	110
Pipe 19	160.0	250	102
Pipe 20	59.4	200	110
Pipe 21	65.8	200	110
Pipe 22	63.1	200	110
Pipe 23	53.1	250	110
Pipe 24	33.0	250	110
Pipe 26	42.0	200	110
Pipe 27	42.0	200	110
Pipe 28	43.2	250	110
Pipe 29	43.2	250	110
Pipe 30	42.0	250	110
Pipe 31	42.0	250	110
Pipe 32	59.8	250	110
Pipe 33	33.9	250	110
Pipe 34	49.0	250	110
Pipe 35	73.5	200	110
Pipe 36	61.5	200	110
Pipe 37	57.0	200	110
Pipe 38	68.0	200	110
Pipe 39	59.2	200	110

Table D2
Pipe Data
Mill Lands (Phases 1-8)
Almonte, ON
JOB NO. 121125

Created: Feb. 6/23

Table D2
Mill Run Phase 1 -8
Pipe Data

Pipe	Length (m)	Diameter (mm)	Roughness Coefficient
Pipe 40	62.2	200	110
Pipe 41	54.0	250	110
Pipe 42	55.0	250	110
Pipe 43	67.0	250	110
Pipe 44	48.2	250	110
Pipe 45	93.7	200	110
Pipe 46	47.0	250	110
Pipe 45	48.2	250	110
Pipe 48	83.0	250	110
Pipe 49	55.4	250	110
Pipe 50	85.0	250	110
Pipe 51	83.1	250	110
Pipe 52	68.4	250	110
Pipe 53	41.8	250	110
Pipe 54	41.8	250	110
Pipe 55	42.0	250	110
Pipe 56	43.5	250	110
Pipe 57	45.0	250	110
Pipe 58	89.4	250	110
Pipe 59	93.0	250	110
Pipe 60	80.0	250	110
Pipe 61	76.5	250	110
Pipe 62	87.6	250	110
Pipe 63	99.0	200	110
Pipe 64	52.1	250	110
Pipe 65	51.2	250	110
Pipe 66	43.0	250	110
Pipe 67	79.0	250	110
Pipe 68	78.0	250	110
Pipe 69	90.0	250	110

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Table D2
Pipe Data
Mill Lands (Phases 1-8)
Almonte, ON
JOB NO. 121125

Created: Feb. 6/23

Table D2
Mill Run Phase 1 -8
Pipe Data

Pipe	Length (m)	Diameter (mm)	Roughness Coefficient
Pipe 70	92.0	250	110
Pipe 71	83.0	250	110
Pipe 72	98.0	200	110
Pipe 73	85.8	200	110
Pipe 74	85.0	250	110
Pipe 75	76.0	250	110
Pipe 76	74.0	250	110
Pipe 77	24.0	250	110
Pipe 78	53.0	250	110
Pipe 82	83.0	250	110
Pipe 83	66.0	250	110
Pipe 84	80.0	250	110
Pipe 85	79.0	250	110
Pipe 88	68.0	200	110
Pipe 89	83.0	200	110
Pipe 90	43.0	200	110
Pipe 92	40.0	50	100
Pipe 93	40.0	50	100
Pipe 94	83.0	250	110

Table D3
High Pressure
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D3
Phase 1-8 High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (Hrs)
Junc 36	140.3	0.12	180.2	39.9	56.8	0.4
Junc 26	140.0	0.00	180.2	40.2	57.1	2.6
Junc 27	140.5	0.26	180.2	39.7	56.5	5.2
Junc 28	141.9	0.19	180.2	38.3	54.5	6.8
Junc 29	143.7	0.18	180.2	36.5	51.9	7.9
Junc 30	144.8	0.18	180.2	35.4	50.4	6.7
Junc 31	144.9	0.16	180.2	35.4	50.3	5.8
Junc 15	145.1	0.42	180.2	35.1	49.9	5.1
Junc 14	143.4	0.14	180.2	36.8	52.4	12.4
Junc 13	142.3	0.11	180.2	37.9	53.9	2.0
Junc 11	140.9	0.21	180.2	39.3	55.9	0.9
Junc 38	140.5	0.18	180.2	39.7	56.5	1.5
Junc 37	140.2	0.18	180.2	40.0	56.9	2.1
Junc 39	139.1	0.16	180.2	41.1	58.4	3.5
Junc 40	142.2	0.16	180.2	38.1	54.1	2.7
Junc 33	139.9	0.14	180.2	40.3	57.3	1.1
Junc 35	140.0	0.10	180.2	40.2	57.1	0.7
Junc 16	146.6	0.45	180.2	33.6	47.8	4.6
Junc 17	146.3	0.49	180.2	33.9	48.2	4.1
Junc 18	145.9	0.49	180.2	34.3	48.8	3.7
Junc 19	145.0	0.00	180.2	35.3	50.2	3.5
Junc 63	145.2	0.11	180.2	35.0	49.8	16.1
Junc 61	147.2	0.21	180.2	33.0	46.9	9.6
Junc 60	147.0	0.14	180.2	33.2	47.2	8.2
Junc 59	146.5	0.16	180.2	33.7	48.0	7.4
Junc 56	146.0	0.20	180.2	34.2	48.6	6.9
Junc 41	139.8	0.12	180.2	40.4	57.4	2.7
Junc 42	140.0	0.00	180.2	40.2	57.2	2.8
Junc 43	139.7	0.12	180.2	40.5	57.6	3.0
Junc 44	140.0	0.06	180.2	40.2	57.2	3.2

Table D3
High Pressure
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D3
Phase 1-8 High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (Hrs)
Junc 53	140.1	0.34	180.2	40.1	57.0	3.3
Junc 54	141.3	0.39	180.2	38.9	55.3	3.9
Junc 55	144.0	0.28	180.2	36.2	51.5	4.8
Junc 57	145.5	0.09	180.2	34.7	49.3	13.6
Junc 58	144.0	0.09	180.2	36.2	51.5	21.5
Junc 50	143.0	0.15	180.2	37.2	52.9	14.7
Junc 49	145.0	0.15	180.2	35.2	50.1	10.1
Junc 48	145.3	0.16	180.2	34.9	49.6	8.1
Junc 47	144.0	0.32	180.2	36.2	51.5	6.6
Junc 46	141.3	0.21	180.2	38.9	55.3	5.6
Junc 45	140.2	0.34	180.2	40.0	56.9	4.2
Junc 62	146.4	0.23	180.2	33.8	48.0	11.7
Junc 34	140.2	0.12	180.2	40.0	56.9	0.9
Junc 10	140.5	0.00	180.2	39.8	56.5	0.6
Junc 12	140.9	0.21	180.2	39.3	55.9	1.4
Junc 102	140.7	0.08	180.2	39.5	56.2	3.6
Junc 103	140.5	0.23	180.2	39.7	56.4	2.9
Junc 104	140.7	0.08	180.2	39.6	56.3	2.4
Junc 105	140.7	0.19	180.2	39.5	56.2	1.7
Junc 106	140.1	0.21	180.2	40.1	57.0	1.1
Junc 107	140.1	0.17	180.2	40.1	57.0	0.6
Junc 108	139.8	0.19	180.2	40.5	57.5	0.4
Junc 109	139.9	0.14	180.2	40.3	57.3	0.1
Junc 110	139.8	0.00	180.2	40.4	57.5	0.0
Junc 112	139.8	0.13	180.2	40.4	57.4	0.8
Junc 113	140.0	0.00	180.2	40.3	57.3	2.0
Junc 114	139.7	0.13	180.2	40.5	**57.6**	2.1
Junc 115	140.0	0.30	180.2	40.2	57.2	5.0
Junc 101	140.5	0.11	180.2	39.8	56.5	1.6
Junc 1	140.0	0.00	180.2	40.2	57.2	0.0
Junc 2	140.0	0.00	180.2	40.2	57.2	2.2
Junc 701	140.6	0.17	180.2	39.6	56.3	4.0
Junc 702	141.0	0.19	180.2	39.2	55.7	5.8
Junc 703	141.5	0.14	180.2	38.7	55.0	8.4
Junc 716	141.6	0.00	180.2	38.6	54.9	12.7

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Table D3
High Pressure
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D3
Phase 1-8 High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (Hrs)
Junc 704	141.7	0.10	180.2	38.5	54.7	15.0
Junc 705	140.7	0.17	180.2	39.5	56.2	5.4
Junc 706	141.0	0.17	180.2	39.2	55.7	10.3
Junc 707	141.2	0.13	180.2	39.0	55.5	**35.5**
Junc 708	141.3	0.09	180.2	38.9	55.3	20.6
Junc 709	141.0	0.15	180.2	39.2	55.7	6.9
Junc 710	141.1	0.17	180.2	39.1	55.6	9.8
Junc 711	141.6	0.00	180.2	38.6	54.9	14.5
Junc 717	141.6	0.08	180.2	38.6	54.9	15.1
Resvr 202*		-8.37				
Resvr 3*		-3.67				

Maximum Pressure
Maximum Age
*** Boundary Condition**

Table D4
Peak Hour
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table A4
Phase 1-8 Peak Hour Check

Node	Elevation	Demand	Head	Pressure	
	(m)	(LPS)	(m)	(m)	(PSI)
Junc 36	140.28	0.53	177.0	36.7	52.2
Junc 26	140.03	0.00	177.0	36.9	52.5
Junc 27	140.48	1.12	177.0	36.5	51.9
Junc 28	141.91	1.08	177.0	35.1	49.8
Junc 29	143.70	0.78	177.0	33.3	47.3
Junc 30	144.77	0.78	177.0	32.2	45.8
Junc 31	144.85	0.69	177.0	32.1	45.6
Junc 15	145.14	1.01	177.0	31.8	45.2
Junc 14	143.40	0.60	177.0	33.6	47.7
Junc 13	142.31	0.50	177.0	34.7	49.3
Junc 11	140.88	0.92	177.0	36.1	51.3
Junc 38	140.74	0.78	177.0	36.2	51.5
Junc 37	140.14	0.78	177.0	36.8	52.4
Junc 39	142.10	0.69	177.0	34.9	49.6
Junc 40	142.15	0.69	177.0	34.8	49.5
Junc 33	139.92	0.62	177.0	37.1	52.7
Junc 35	140.03	0.44	177.0	37.0	52.6
Junc 16	146.57	1.99	177.0	30.4	43.2
Junc 17	146.32	1.35	177.0	30.6	43.6
Junc 18	145.90	2.18	177.0	31.1	44.2
Junc 19	144.95	0.00	177.0	32.0	45.5
Junc 63	145.60	0.00	177.0	31.4	44.6
Junc 61	146.76	0.87	177.0	30.2	42.9
Junc 60	146.56	1.05	176.9	30.4	43.2
Junc 59	146.46	0.69	176.9	30.5	43.3
Junc 56	146.48	0.66	176.9	30.5	43.3
Junc 41	139.82	0.53	177.0	37.1	52.8
Junc 42	139.98	0.00	176.9	37.0	52.6
Junc 43	139.69	0.53	176.9	37.3	53.0
Junc 44	140.00	0.25	176.9	36.9	52.5

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Table D4
Peak Hour
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table A4
Phase 1-8 Peak Hour Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 53	140.11	1.70	176.9	36.8	52.4
Junc 54	141.33	1.24	176.9	35.6	50.6
Junc 55	144.01	1.05	176.9	32.9	46.8
Junc 57	144.65	0.00	176.9	32.3	45.9
Junc 58	143.65	0.73	176.9	33.3	47.3
Junc 50	142.80	1.44	176.9	34.1	48.5
Junc 49	143.55	0.00	176.9	33.4	47.5
Junc 48	144.68	0.99	176.9	32.3	45.9
Junc 47	143.39	1.05	176.9	33.5	47.7
Junc 46	140.10	1.05	176.9	36.8	52.4
Junc 45	140.17	1.40	176.9	36.8	52.3
Junc 62	146.44	1.05	177.0	30.5	43.4
Junc 34	140.20	0.53	177.0	36.8	52.3
Junc 10	140.47	0.00	177.0	36.5	51.9
Junc 12	141.08	0.92	177.0	35.9	51.0
Junc 102	140.72	0.34	177.0	36.3	51.6
Junc 103	140.54	1.01	177.0	36.5	51.9
Junc 104	140.66	0.34	177.1	36.4	51.7
Junc 105	140.69	0.85	177.1	36.4	51.7
Junc 106	140.14	0.92	177.0	36.9	52.5
Junc 107	140.10	0.73	177.0	36.9	52.5
Junc 108	139.75	0.83	177.0	37.3	53.0
Junc 109	139.92	0.60	177.0	37.1	52.7
Junc 110	139.85	0.00	177.0	37.2	52.8
Junc 112	139.83	0.57	177.0	37.2	52.9
Junc 113	139.95	0.00	177.0	37.1	52.7
Junc 114	139.70	0.57	177.0	37.3	53.0
Junc 115	140.00	1.31	177.0	37.0	52.6
Junc 101	140.46	0.48	177.0	36.6	52.0
Junc 1	140.00	0.00	177.2	37.2	52.8
Junc 2	140.00	0.00	177.0	37.0	52.7

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Table D4
Peak Hour
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table A4
Phase 1-8 Peak Hour Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 701	140.72	0.34	177.0	36.3	51.6
Junc 702	140.54	1.01	177.0	36.5	51.9
Junc 703	140.66	0.34	177.1	36.4	51.7
Junc 716	140.69	0.85	177.1	36.4	51.7
Junc 704	140.14	0.92	177.0	36.9	52.5
Junc 705	140.10	0.73	177.0	36.9	52.5
Junc 706	139.75	0.83	177.0	37.3	53.0
Junc 707	139.92	0.60	177.0	37.1	52.7
Junc 708	139.85	0.00	177.0	37.2	52.8
Junc 709	139.83	0.57	177.0	37.2	52.9
Junc 710	139.95	0.00	177.0	37.1	52.7
Junc 711	139.70	0.57	177.0	37.3	53.0
Junc 717	140.00	1.31	177.0	37.0	52.6
Resvr 202*		-24.57			
Resvr 3*		-27.31			
		-43.81			

*** Boundary Condition**

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5A
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 701

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 36	140.3	0.24	175.8	35.6	50.6
Junc 26	140.0	0.00	175.6	35.6	50.6
Junc 27	140.5	0.51	175.7	35.3	50.1
Junc 28	141.9	0.38	175.8	33.9	48.2
Junc 29	143.7	0.35	175.8	32.1	45.6
Junc 30	144.8	0.35	175.8	31.0	44.1
Junc 31	144.9	0.31	175.8	31.0	44.0
Junc 15	145.1	0.83	175.8	30.7	43.6
Junc 14	143.4	0.27	175.8	32.5	46.1
Junc 13	142.3	0.23	175.8	33.5	47.7
Junc 11	140.9	0.42	175.8	34.9	49.7
Junc 38	140.5	0.35	175.8	35.3	50.2
Junc 37	140.2	0.35	175.8	35.6	50.6
Junc 39	139.1	0.31	175.8	36.7	52.1
Junc 40	142.2	0.31	175.8	33.7	47.8
Junc 33	139.9	0.28	175.7	35.8	50.8
Junc 35	140.0	0.20	175.8	35.7	50.8
Junc 16	146.6	0.91	175.8	29.3	41.6
Junc 17	146.3	0.99	175.9	29.5	42.0
Junc 18	145.9	0.99	175.9	30.0	42.6
Junc 19	145.0	0.00	175.9	31.0	44.0
Junc 63	145.2	0.23	175.7	30.5	43.3
Junc 61	147.2	0.42	175.4	28.2	40.0
Junc 60	147.0	0.28	175.2	28.2	40.1

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5A
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 701

	Elevation	Demand	Head	Pressure	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 59	146.5	0.31	175.0	28.6	40.6
Junc 56	146.0	0.40	175.0	29.0	41.2
Junc 41	139.8	0.24	175.3	35.5	50.5
Junc 42	140.0	0.00	175.0	35.1	49.8
Junc 43	139.7	0.24	174.8	35.2	50.0
Junc 44	140.0	0.11	174.7	34.7	49.3
Junc 53	140.1	0.68	175.0	34.9	49.6
Junc 54	141.3	0.39	174.9	33.6	47.8
Junc 55	144.0	0.55	174.9	30.9	44.0
Junc 57	145.5	0.19	175.0	29.5	41.9
Junc 58	144.0	0.19	175.0	31.0	44.0
Junc 50	143.0	0.30	174.8	31.8	45.3
Junc 49	145.0	0.30	174.8	29.8	42.4
Junc 48	145.3	0.31	174.8	29.5	42.0
Junc 47	144.0	0.65	174.8	30.8	43.7
Junc 46	141.3	0.43	174.7	33.4	47.5
Junc 45	140.2	0.68	174.7	34.5	49.1
Junc 34	140.2	0.24	175.7	35.5	50.5
Junc 10	140.5	0.00	175.8	35.4	50.3
Junc 12	140.9	0.42	175.8	34.9	49.6
Junc 102	140.7	0.16	176.0	35.3	50.2
Junc 103	140.5	0.46	176.1	35.5	50.5
Junc 104	140.7	0.16	176.1	35.5	50.4
Junc 105	140.7	0.39	176.2	35.5	50.5
Junc 106	140.1	0.42	176.4	36.2	51.5
Junc 107	140.1	0.33	176.5	36.4	51.7
Junc 108	139.8	0.38	176.8	37.0	52.6
Junc 109	139.9	0.27	177.0	37.1	52.8

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5A
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 701

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	(PSI)
Junc 110	139.8	0.00	177.2	37.4	53.2
Junc 112	139.8	0.26	176.3	36.4	51.8
Junc 113	140.0	0.00	176.0	36.1	51.3
Junc 114	139.7	0.26	175.8	36.1	51.4
Junc 115	140.0	0.59	176.0	36.0	51.2
Junc 101	140.5	0.22	175.9	35.5	50.4
Junc 1	140.0	0.00	175.9	35.9	51.1
Junc 2	140.0	0.00	175.9	35.9	51.1
Junc 701	140.6	75.42	174.3	33.7	47.8
Junc 702	141.0	0.48	174.3	33.3	47.4
Junc 703	141.5	0.35	174.4	32.9	46.8
Junc 716	141.6	0.00	174.4	32.8	46.7
Junc 705	140.7	0.42	174.3	33.6	47.7
Junc 704	141.7	0.24	174.4	32.7	46.5
Junc 706	141.0	0.42	174.3	33.3	47.4
Junc 707	141.2	0.32	174.3	33.1	47.1
Junc 708	141.3	0.21	174.4	33.1	47.0
Junc 709	141.0	0.37	174.3	33.3	47.3
Junc 710	141.1	0.44	174.3	33.2	47.2
Junc 711	141.6	0.00	174.3	32.7	46.5
Junc 717	141.6	0.20	174.3	32.7	46.5
Resvr 202*		-56.1			
Resvr 3*		-43.3			
Minimum Pressure					

M:\2021\121125\DATA\Calculations\Sewer Calcs\Water\Runs\Draft Analysis\Ultimate MD + FF.xlsx

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5B Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 702					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

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Table D5B
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 702

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	(PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.2
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.3
Junc 57	145.5	0.19	172.3	26.8	38.2
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5B
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 702

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	**Pressure** (PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.2	30.6	43.6
Junc 702	141.0	105.48	170.7	29.7	42.2
Junc 703	141.5	0.35	171.1	29.6	42.1
Junc 716	141.6	0.00	171.3	29.7	42.2
Junc 705	140.7	0.42	171.2	30.5	43.4
Junc 704	141.7	0.24	171.3	29.6	42.0
Junc 706	141.0	0.42	171.3	30.3	43.0
Junc 707	141.2	0.32	171.3	30.1	42.7
Junc 708	141.3	0.21	171.3	30.0	42.6
Junc 709	141.0	0.37	171.2	30.2	43.0
Junc 710	141.1	0.44	171.2	30.1	42.9
Junc 711	141.6	0.00	171.2	29.6	42.1
Junc 717	141.6	0.20	171.2	29.6	42.1
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5C
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 703

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

Table D5C Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 703					
Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	(PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.3
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.2
Junc 57	145.5	0.19	172.3	26.8	38.1
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
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Table D5C
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 703

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.4	30.8	43.7
Junc 702	141.0	0.48	171.1	30.1	42.8
Junc 703	141.5	105.35	170.9	29.4	41.8
Junc 716	141.6	0.00	171.2	29.6	42.0
Junc 705	140.7	0.42	171.3	30.6	43.5
Junc 704	141.7	0.24	171.2	29.5	41.9
Junc 706	141.0	0.42	171.3	30.3	43.0
Junc 707	141.2	0.32	171.2	30.0	42.7
Junc 708	141.3	0.21	171.2	29.9	42.5
Junc 709	141.0	0.37	171.3	30.3	43.1
Junc 710	141.1	0.44	171.3	30.2	42.9
Junc 711	141.6	0.00	171.3	29.7	42.2
Junc 717	141.6	0.20	171.3	29.7	42.2
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

Table D5D Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 704					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
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Table D5D
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 704

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.3
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.3
Junc 57	145.5	0.19	172.3	26.8	38.1
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

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Table D5D Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 704					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.3	30.7	43.7
Junc 702	141.0	0.48	171.3	30.3	43.0
Junc 703	141.5	0.35	171.2	29.7	42.2
Junc 716	141.6	0.00	171.2	29.6	42.0
Junc 705	140.7	0.42	171.1	30.4	43.3
Junc 704	141.7	105.24	170.5	28.8	40.9
Junc 706	141.0	0.42	171.0	30.0	42.6
Junc 707	141.2	0.32	170.8	29.6	42.1
Junc 708	141.3	0.21	170.7	29.4	41.7
Junc 709	141.0	0.37	171.1	30.1	42.8
Junc 710	141.1	0.44	171.1	30.0	42.7
Junc 711	141.6	0.00	171.1	29.5	42.0
Junc 717	141.6	0.20	171.1	29.5	42.0
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

Table D5E
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 705

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 36	140.3	0.24	175.8	35.6	50.6
Junc 26	140.0	0.00	175.6	35.6	50.6
Junc 27	140.5	0.51	175.7	35.3	50.1
Junc 28	141.9	0.38	175.8	33.9	48.2
Junc 29	143.7	0.35	175.8	32.1	45.6
Junc 30	144.8	0.35	175.8	31.0	44.1
Junc 31	144.9	0.31	175.8	31.0	44.0
Junc 15	145.1	0.83	175.8	30.7	43.6
Junc 14	143.4	0.27	175.8	32.5	46.1
Junc 13	142.3	0.23	175.8	33.5	47.7
Junc 11	140.9	0.42	175.8	34.9	49.7
Junc 38	140.5	0.35	175.8	35.3	50.2
Junc 37	140.2	0.35	175.8	35.6	50.6
Junc 39	139.1	0.31	175.8	36.7	52.1
Junc 40	142.2	0.31	175.8	33.7	47.8
Junc 33	139.9	0.28	175.7	35.8	50.8
Junc 35	140.0	0.20	175.8	35.7	50.8
Junc 16	146.6	0.91	175.8	29.3	41.6
Junc 17	146.3	0.99	175.9	29.5	42.0
Junc 18	145.9	0.99	175.9	30.0	42.6
Junc 19	145.0	0.00	175.9	31.0	44.0
Junc 63	145.2	0.23	175.7	30.5	43.3
Junc 61	147.2	0.42	175.4	28.2	40.0
Junc 60	147.0	0.28	175.2	28.2	40.1

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
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Table D5E
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 705

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	**Pressure** (PSI)
Junc 59	146.5	0.31	175.0	28.6	40.6
Junc 56	146.0	0.40	174.9	28.9	41.2
Junc 41	139.8	0.24	175.3	35.5	50.5
Junc 42	140.0	0.00	175.0	35.1	49.8
Junc 43	139.7	0.24	174.9	35.2	50.0
Junc 44	140.0	0.11	174.7	34.7	49.3
Junc 53	140.1	0.68	175.0	34.9	49.6
Junc 54	141.3	0.39	174.9	33.6	47.8
Junc 55	144.0	0.55	174.9	30.9	44.0
Junc 57	145.5	0.19	174.9	29.4	41.9
Junc 58	144.0	0.19	174.9	30.9	44.0
Junc 50	143.0	0.30	174.8	31.8	45.3
Junc 49	145.0	0.30	174.8	29.8	42.4
Junc 48	145.3	0.31	174.8	29.5	42.0
Junc 47	144.0	0.65	174.8	30.8	43.7
Junc 46	141.3	0.43	174.7	33.4	47.5
Junc 45	140.2	0.68	174.7	34.5	49.1
Junc 34	140.2	0.24	175.7	35.5	50.5
Junc 10	140.5	0.00	175.8	35.4	50.3
Junc 12	140.9	0.42	175.8	34.9	49.6
Junc 102	140.7	0.16	176.0	35.3	50.2
Junc 103	140.5	0.46	176.1	35.5	50.5
Junc 104	140.7	0.16	176.1	35.5	50.4
Junc 105	140.7	0.39	176.2	35.5	50.5
Junc 106	140.1	0.42	176.4	36.2	51.5
Junc 107	140.1	0.33	176.5	36.4	51.7
Junc 108	139.8	0.38	176.8	37.0	52.6
Junc 109	139.9	0.27	177.0	37.1	52.8

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5E
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 705

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 110	139.8	0.00	177.2	37.4	53.2
Junc 112	139.8	0.26	176.3	36.4	51.8
Junc 113	140.0	0.00	176.0	36.1	51.3
Junc 114	139.7	0.26	175.8	36.1	51.4
Junc 115	140.0	0.59	176.0	36.0	51.2
Junc 101	140.5	0.22	175.9	35.5	50.4
Junc 1	140.0	0.00	175.9	35.9	51.1
Junc 2	140.0	0.00	175.9	35.9	51.1
Junc 701	140.6	0.42	174.3	33.7	47.9
Junc 702	141.0	0.48	174.3	33.3	47.4
Junc 703	141.5	0.35	174.4	32.9	46.7
Junc 716	141.6	0.00	174.4	32.8	46.6
Junc 705	140.7	75.42	173.8	33.1	47.1
Junc 704	141.7	0.24	174.3	32.6	46.3
Junc 706	141.0	0.42	173.9	32.9	46.8
Junc 707	141.2	0.32	174.0	32.8	46.7
Junc 708	141.3	0.21	174.2	32.9	46.7
Junc 709	141.0	0.37	173.8	32.8	46.6
Junc 710	141.1	0.44	173.8	32.7	46.5
Junc 711	141.6	0.00	173.8	32.2	45.8
Junc 717	141.6	0.20	173.8	32.2	45.8
Resvr 202*		-56.1			
Resvr 3*		-43.3			
Minimum Pressure					

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5F Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 706					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

Engineers, Planners & Landscape Architects

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5F
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 706

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	(PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.2
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.3
Junc 57	145.5	0.19	172.3	26.8	38.2
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5F
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 706

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.2	30.6	43.6
Junc 702	141.0	0.48	171.3	30.3	43.0
Junc 703	141.5	0.35	171.3	29.8	42.3
Junc 716	141.6	0.00	171.3	29.7	42.2
Junc 705	140.7	0.42	170.5	29.8	42.3
Junc 704	141.7	0.24	171.0	29.3	41.7
Junc 706	141.0	105.42	169.9	28.9	41.1
Junc 707	141.2	0.32	170.3	29.1	41.3
Junc 708	141.3	0.21	170.6	29.3	41.7
Junc 709	141.0	0.37	170.5	29.5	41.9
Junc 710	141.1	0.44	170.5	29.4	41.8
Junc 711	141.6	0.00	170.5	28.9	41.1
Junc 717	141.6	0.20	170.5	28.9	41.1
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5G
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 707

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

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Table D5G
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 707

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.2
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.3
Junc 57	145.5	0.19	172.3	26.8	38.2
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5G
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 707

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	(PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.3	30.7	43.6
Junc 702	141.0	0.48	171.3	30.3	43.0
Junc 703	141.5	0.35	171.3	29.8	42.3
Junc 716	141.6	0.00	171.3	29.7	42.2
Junc 705	140.7	0.42	170.7	30.0	42.7
Junc 704	141.7	0.24	170.9	29.2	41.5
Junc 706	141.0	0.42	170.3	29.3	41.6
Junc 707	141.2	105.32	169.8	28.6	40.7
Junc 708	141.3	0.21	170.3	29.0	41.3
Junc 709	141.0	0.37	170.7	29.7	42.2
Junc 710	141.1	0.44	170.7	29.6	42.1
Junc 711	141.6	0.00	170.7	29.1	41.4
Junc 717	141.6	0.20	170.7	29.1	41.4
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5H
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 708

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

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Table D5H Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 708					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.3
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.3
Junc 57	145.5	0.19	172.3	26.8	38.2
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5H
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 708

Node ID	**Elevation** (m)	**Demand** (LPS)	**Head** (m)	**Pressure** (m)	(PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.3	30.7	43.6
Junc 702	141.0	0.48	171.3	30.3	43.0
Junc 703	141.5	0.35	171.2	29.7	42.3
Junc 716	141.6	0.00	171.2	29.6	42.1
Junc 705	140.7	0.42	170.9	30.2	42.9
Junc 704	141.7	0.24	170.7	29.0	41.3
Junc 706	141.0	0.42	170.6	29.6	42.1
Junc 707	141.2	0.32	170.3	29.1	41.4
Junc 708	141.3	105.21	170.0	28.7	40.8
Junc 709	141.0	0.37	170.9	29.9	42.5
Junc 710	141.1	0.44	170.9	29.8	42.4
Junc 711	141.6	0.00	170.9	29.3	41.7
Junc 717	141.6	0.20	170.9	29.3	41.6
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5I
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 709

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 36	140.3	0.24	173.9	33.6	47.8
Junc 26	140.0	0.00	173.5	33.5	47.6
Junc 27	140.5	0.51	173.7	33.3	47.3
Junc 28	141.9	0.38	173.8	31.9	45.3
Junc 29	143.7	0.35	173.8	30.1	42.8
Junc 30	144.8	0.35	173.8	29.1	41.3
Junc 31	144.9	0.31	173.9	29.0	41.2
Junc 15	145.1	0.83	173.9	28.7	40.9
Junc 14	143.4	0.27	173.9	30.5	43.4
Junc 13	142.3	0.23	173.9	31.6	44.9
Junc 11	140.9	0.42	173.9	33.0	46.9
Junc 38	140.5	0.35	173.8	33.3	47.4
Junc 37	140.2	0.35	173.8	33.6	47.7
Junc 39	139.1	0.31	173.8	34.7	49.3
Junc 40	142.2	0.31	173.8	31.7	45.1
Junc 33	139.9	0.28	173.6	33.7	47.9
Junc 35	140.0	0.20	173.8	33.7	48.0
Junc 16	146.6	0.91	173.9	27.3	38.9
Junc 17	146.3	0.99	173.9	27.6	39.3
Junc 18	145.9	0.99	174.0	28.1	39.9
Junc 19	145.0	0.00	174.0	29.1	41.3
Junc 63	145.2	0.23	173.6	28.4	40.4
Junc 61	147.2	0.42	173.1	25.9	36.8
Junc 60	147.0	0.28	172.7	25.7	36.6

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5I
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 709

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 59	146.5	0.31	172.5	26.0	37.0
Junc 56	146.0	0.40	172.3	26.3	37.4
Junc 41	139.8	0.24	173.0	33.2	47.2
Junc 42	140.0	0.00	172.5	32.5	46.2
Junc 43	139.7	0.24	172.2	32.5	46.2
Junc 44	140.0	0.11	171.8	31.8	45.2
Junc 53	140.1	0.68	172.4	32.3	45.9
Junc 54	141.3	0.39	172.3	31.0	44.0
Junc 55	144.0	0.55	172.3	28.3	40.3
Junc 57	145.5	0.19	172.3	26.8	38.2
Junc 58	144.0	0.19	172.3	28.3	40.3
Junc 50	143.0	0.30	172.1	29.1	41.4
Junc 49	145.0	0.30	172.1	27.1	38.6
Junc 48	145.3	0.31	172.1	26.8	38.2
Junc 47	144.0	0.65	172.0	28.0	39.8
Junc 46	141.3	0.43	171.8	30.5	43.4
Junc 45	140.2	0.68	171.8	31.7	45.0
Junc 34	140.2	0.24	173.7	33.5	47.6
Junc 10	140.5	0.00	173.9	33.4	47.5
Junc 12	140.9	0.42	173.9	32.9	46.8
Junc 102	140.7	0.16	174.1	33.4	47.5
Junc 103	140.5	0.46	174.2	33.7	47.9
Junc 104	140.7	0.16	174.3	33.7	47.9
Junc 105	140.7	0.39	174.5	33.8	48.1
Junc 106	140.1	0.42	174.7	34.6	49.1
Junc 107	140.1	0.33	174.9	34.8	49.5
Junc 108	139.8	0.38	175.3	35.6	50.6
Junc 109	139.9	0.27	175.8	35.8	50.9

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5I
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 709

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 110	139.8	0.00	176.0	36.2	51.4
Junc 112	139.8	0.26	174.5	34.7	49.3
Junc 113	140.0	0.00	174.1	34.2	48.6
Junc 114	139.7	0.26	173.8	34.1	48.5
Junc 115	140.0	0.59	174.1	34.1	48.5
Junc 101	140.5	0.22	174.0	33.5	47.7
Junc 1	140.0	0.00	174.0	34.0	48.4
Junc 2	140.0	0.00	174.0	34.0	48.4
Junc 701	140.6	0.42	171.2	30.6	43.5
Junc 702	141.0	0.48	171.2	30.2	43.0
Junc 703	141.5	0.35	171.3	29.8	42.4
Junc 716	141.6	0.00	171.3	29.7	42.2
Junc 705	140.7	0.42	170.2	29.5	42.0
Junc 704	141.7	0.24	171.2	29.5	41.9
Junc 706	141.0	0.42	170.4	29.4	41.8
Junc 707	141.2	0.32	170.7	29.5	41.9
Junc 708	141.3	0.21	170.9	29.6	42.1
Junc 709	141.0	105.37	165.4	24.4	34.8
Junc 710	141.1	0.44	165.4	24.3	34.6
Junc 711	141.6	0.00	165.4	23.8	33.9
Junc 717	141.6	0.20	165.4	23.8	33.9
Resvr 202*		-74.8			
Resvr 3*		-54.5			
Minimum Pressure					

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5J Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 711					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 36	140.3	0.24	177.5	37.3	53.0
Junc 26	140.0	0.00	177.4	37.4	53.2
Junc 27	140.5	0.51	177.5	37.0	52.6
Junc 28	141.9	0.38	177.5	35.6	50.6
Junc 29	143.7	0.35	177.5	33.8	48.1
Junc 30	144.8	0.35	177.5	32.8	46.6
Junc 31	144.9	0.31	177.5	32.7	46.5
Junc 15	145.1	0.83	177.5	32.4	46.1
Junc 14	143.4	0.27	177.5	34.2	48.6
Junc 13	142.3	0.23	177.5	35.2	50.1
Junc 11	140.9	0.42	177.5	36.7	52.1
Junc 38	140.5	0.35	177.5	37.0	52.7
Junc 37	140.2	0.35	177.5	37.3	53.0
Junc 39	139.1	0.31	177.5	38.4	54.6
Junc 40	142.2	0.31	177.5	35.4	50.3
Junc 33	139.9	0.28	177.5	37.6	53.4
Junc 35	140.0	0.20	177.5	37.5	53.3
Junc 16	146.6	0.91	177.5	31.0	44.0
Junc 17	146.3	0.99	177.6	31.2	44.4
Junc 18	145.9	0.99	177.6	31.7	45.0
Junc 19	145.0	0.00	177.6	32.6	46.4
Junc 63	145.2	0.23	177.5	32.3	45.9
Junc 61	147.2	0.42	177.3	30.1	42.8
Junc 60	147.0	0.28	177.2	30.2	43.0

Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5J
Phase 1-8 Maximum Daily Fire Demand
Fire Flow at Node 711

Node ID	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
Junc 59	146.5	0.31	177.2	30.7	43.7
Junc 56	146.0	0.40	177.1	31.1	44.3
Junc 41	139.8	0.24	177.3	37.5	53.3
Junc 42	140.0	0.00	177.2	37.2	52.9
Junc 43	139.7	0.24	177.1	37.4	53.2
Junc 44	140.0	0.11	177.0	37.0	52.6
Junc 53	140.1	0.68	177.2	37.0	52.7
Junc 54	141.3	0.39	177.1	35.8	50.9
Junc 55	144.0	0.55	177.1	33.1	47.1
Junc 57	145.5	0.19	177.1	31.6	45.0
Junc 58	144.0	0.19	177.1	33.1	47.1
Junc 50	143.0	0.30	177.1	34.1	48.5
Junc 49	145.0	0.30	177.1	32.1	45.6
Junc 48	145.3	0.31	177.1	31.8	45.2
Junc 47	144.0	0.65	177.1	33.1	47.0
Junc 46	141.3	0.43	177.0	35.7	50.8
Junc 45	140.2	0.68	177.0	36.9	52.4
Junc 34	140.2	0.24	177.5	37.3	53.0
Junc 10	140.5	0.00	177.5	37.1	52.7
Junc 12	140.9	0.42	177.5	36.6	52.1
Junc 102	140.7	0.16	177.6	36.9	52.5
Junc 103	140.5	0.46	177.6	37.1	52.8
Junc 104	140.7	0.16	177.7	37.0	52.6
Junc 105	140.7	0.39	177.7	37.0	52.7
Junc 106	140.1	0.42	177.8	37.7	53.5
Junc 107	140.1	0.33	177.9	37.8	53.7
Junc 108	139.8	0.38	178.0	38.2	54.4
Junc 109	139.9	0.27	178.1	38.2	54.3

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Table D5A
Max Daily Demand OBC Fire Flow
Mill Lands (Phases 1-8)
Almonte, ON
Job. No. 121125

Created: Feb. 6/23

Table D5J Phase 1-8 Maximum Daily Fire Demand Fire Flow at Node 711					
	Elevation	**Demand**	**Head**	**Pressure**	
Node ID	(m)	(LPS)	(m)	(m)	(PSI)
Junc 110	139.8	0.00	178.2	38.4	54.6
Junc 112	139.8	0.26	177.7	37.9	53.9
Junc 113	140.0	0.00	177.6	37.7	53.6
Junc 114	139.7	0.26	177.5	37.8	53.8
Junc 115	140.0	0.59	177.6	37.6	53.5
Junc 101	140.5	0.22	177.6	37.1	52.8
Junc 1	140.0	0.00	177.6	37.6	53.4
Junc 2	140.0	0.00	177.6	37.6	53.4
Junc 701	140.6	0.42	176.9	36.3	51.6
Junc 702	141.0	0.48	176.9	35.9	51.0
Junc 703	141.5	0.35	176.9	35.4	50.3
Junc 716	141.6	0.00	176.9	35.3	50.2
Junc 705	140.7	0.42	176.7	36.0	51.1
Junc 704	141.7	0.24	176.9	35.2	50.0
Junc 706	141.0	0.42	176.7	35.7	50.8
Junc 707	141.2	0.32	176.8	35.6	50.6
Junc 708	141.3	0.21	176.8	35.5	50.5
Junc 709	141.0	0.37	175.7	34.7	49.3
Junc 710	141.1	0.44	174.4	33.3	47.4
Junc 711	141.6	45.00	173.8	32.2	45.8
Junc 717	141.6	0.20	173.8	32.2	45.8
Resvr 202*		-39.4			
Resvr 3*		-30.0			
Minimum Pressure					

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NOVATECH
Engineers, Planners & Landscape Architects

January 3, 2023

Municipality of Mississippi Mills
3131 Old Perth Rd
Almonte ON, K0A 1A0

Attention: **David Shen, P. Eng.**

Reference: **Mills Lands (Phase 7, 8, & Future Phase 9)**
Fire Flow Comparison: OBC vs FUS
Our File No.: 121125

This letter presents the calculated fire flows for a proposed 5 unit townhouse block in the Mills Lands Development for use in providing the boundary conditions. The proposed watermain in Mills Lands will be an extension of the Mill Run Subdivision watermain system. The townhouse block reviewed was chosen because it's located between several other townhouse blocks with less than 3m separation between units. Refer to Figure 1 for the townhouse block location and proposed connections to the existing Mill Run Subdivision watermain. Two (2) fire flows were considered: the Ontario Building Code (OBC) and the Fire Underwriter's Survey (FUS). The OBC calculated the fire flow of 90L/s. The FUS resulted in a fire flow of 400L/s.

Novatech recommends using the OBC calculated fire flow for the following reasons:

1. All previous phases of the Mill Run Subdivision used the OBC fire flow calculations. Those fire flows ranged from 45L/s for singles to 75L/s for towns. The proposed OBC fire flow is 90L/s for the towns. The proposed OBC fire flow for the Mills Lands is consistent with all previous work in Mill Run.

2. Most new residential development surrounding the Mill Run Subdivision used the OBC fire flow calculation.

3. The Municipality of Mississippi Mills Almonte Ward Water and Wastewater Infrastructure Master Plan Updated Report, from 2018, utilized a design criteria fire flow of 100L/s for residential units separated by less than 3m. This is consistent with the OBC calculated fire flow of 90L/s for Mills Lands.

We trust this clarifies Novatech's position to use the OBC methodology to calculate the fire flows for the Mills Lands development and that the municipality supports this approach.

Attached: Figure 1, OBC Fire Flow Calculation, FUS Fire Flow Calculation, and Table 10 from the 2018 Water Master Servicing Study.

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

Yours truly,

NOVATECH

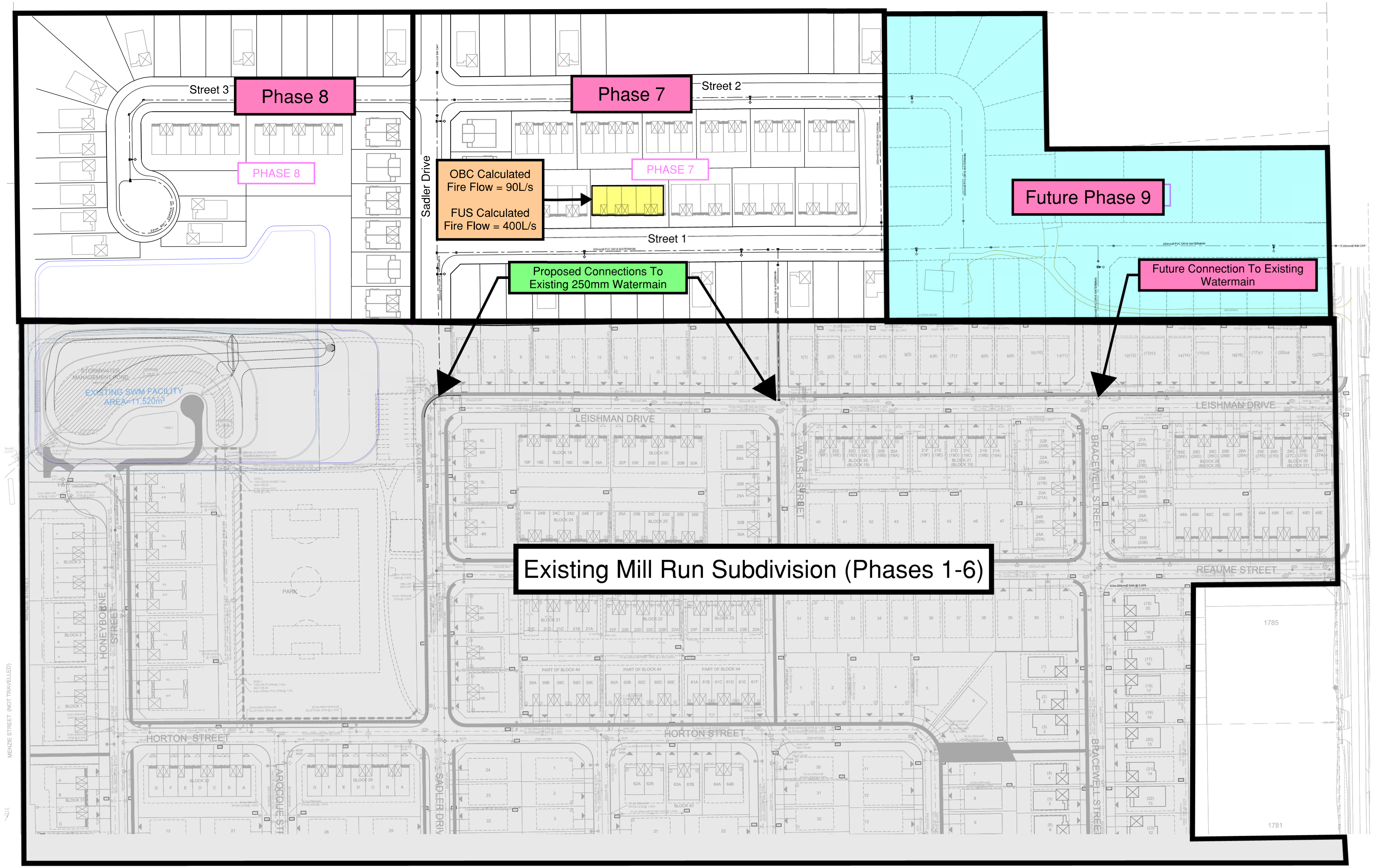
Drew Blair, P. Eng.
Senior Project Manager – Land Development Engineering

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

Figure 1

Watermain Network Layout
Phases 7, 8 and 9

Scale 1:750



Billy McEwen

From: David Shen <dshen@mississippimills.ca>
Sent: Tuesday, January 31, 2023 8:40 AM
To: Mark Bowen
Cc: Drew Blair; Billy McEwen; Robert Smith; Melanie Riddell
Subject: RE: Mills Extension Watermain Boundary Condition Request

Sorry for the delay.

Again, to me it is a question of being consistent vs considering history. Within the Municipality, we have had some debates as well.

For consistence, we will treat your FUS calculation result as an official calculation result of fire flow in your submission, because it is what the guideline says so (you know we mostly follow the City of Ottawa) and what other consultants use.

However, when we ask J.L.Richards (our water/wastewater models keeper) to do modelling check, we will consider a loose criterion (such as using OBC method) regarding any engineering judgement on capacity constraints and capital project requirement.

I used to do infrastructure planning and design. I believe this is an appropriate decision. If you have question, please let me know.

Thanks!
David Shen

From: Mark Bowen <M.Bowen@novatech-eng.com>
Sent: January 12, 2023 9:57 AM
To: David Shen <dshen@mississippimills.ca>
Cc: Drew Blair <D.Blair@novatech-eng.com>; Billy McEwen <b.mcewen@novatech-eng.com>; Robert Smith <smithr@mississippimills.ca>; Melanie Riddell <m.riddell@novatech-eng.com>
Subject: RE: Mills Extension Watermain Boundary Condition Request

Hi David,

Did you have any questions or concerns about the memo included in the previous email? Do you know when do you expect to complete your review? We are early in the process so there is no rush; we are just following up.

Mark Bowen, B. Eng
Project Manager – Land Development Engineering

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Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 231 | Fax: 613.254.5867

From: Mark Bowen
Sent: Wednesday, January 4, 2023 8:41 AM
To: David Shen <dshen@mississippimills.ca>
Cc: Drew Blair <D.Blair@novatech-eng.com>; Billy McEwen <b.mcewen@novatech-eng.com>; Robert Smith <smithr@mississippimills.ca>; Melanie Riddell <m.riddell@novatech-eng.com>
Subject: RE: Mills Extension Watermain Boundary Condition Request

Hi David,

Happy new year. Attached is a memo outlining Novatech's option to consider the OBC fire flow calculations.

Mark Bowen, B. Eng
Project Manager – Land Development Engineering

NOVATECH
Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 231 | Fax: 613.254.5867

From: David Shen <dshen@mississippimills.ca>
Sent: Monday, December 19, 2022 10:21 AM
To: Mark Bowen <M.Bowen@novatech-eng.com>
Cc: Drew Blair <D.Blair@novatech-eng.com>; Billy McEwen <b.mcewen@novatech-eng.com>; Robert Smith <smithr@mississippimills.ca>
Subject: RE: Mills Extension Watermain Boundary Condition Request

This is a tricky question to me because I need balance the history and correctness.

Other consultants, nowadays dealing with Mississippi Mills, use Fire Underwriters Survey (FUS) method, which is a sounder method, what I prefer, and what I will request down the road.

The OBC method is allowed sometimes, for infill/intensification cases. But your case is a "greenfield" one.

I would suggest, if the results between FUS method and OBC method are somewhat close, why not use FUS method. The tricky thing is that if the result of the OBC method is significantly lower than that of FUS method, you need let me know. We may have to do a deep dive.

Thanks!
David Shen, P.Eng.
Director, Development Services and Engineering
Municipality of Mississippi Mills
dshen@mississippimills.ca
613-880-5996
Website: www.mississippimills.ca

From: Mark Bowen <M.Bowen@novatech-eng.com>
Sent: December 19, 2022 9:48 AM
To: David Shen <dshen@mississippimills.ca>
Cc: Drew Blair <D.Blair@novatech-eng.com>; Billy McEwen <b.mcewen@novatech-eng.com>; Cory Smith <csmith@mississippimills.ca>
Subject: RE: Mills Extension Watermain Boundary Condition Request

Hi David,

Can you please confirm if the Ontario Building Code (OBC) should be used to confirm the required fire flows in the next phase of the Mill Run development. The OBC was used to calculate fire flows in all previous phases. We are preparing the requested information and will provide once confirmed.

Mark Bowen, B. Eng
Project Manager – Land Development Engineering

NOVATECH
Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 231 | Fax: 613.254.5867

From: David Shen <dshen@mississippimills.ca>
Sent: Friday, December 16, 2022 11:25 AM
To: Mark Bowen <M.Bowen@novatech-eng.com>
Cc: Drew Blair <D.Blair@novatech-eng.com>; Billy McEwen <b.mcewen@novatech-eng.com>; Cory Smith <csmith@mississippimills.ca>
Subject: RE: Mills Extension Watermain Boundary Condition Request

Good morning,

I attended the pre-consultation meeting regarding this development. Assuming you already knew our regular practice, I may repeat here if you don't mind.

Step 1, you submit calculations to me. Water/Wastewater only:

For water, ADD, MDD, PHD, FF calculations, proposed connection description, proposed looping consideration.
For wastewater, Peak flow, proposed connection description, connection elevation.
Using City of Ottawa design parameters.
You will need submit your calculation sheets.

Note that your proposed units and density number are at very conceptual level. If you change these numbers in your planning application, I reserve a right to ask you redo the calculation if I deem there is noticeable flow impact .

Step 2, Once I review/approve the calculations, we can do the second step. The second step is using the approved calculation results as inputs to check the system capacity and performance in the Municipal water/wastewater models. Since J.L.Richards helps the Municipality keep/maintain/update the models, you will pay J.L.Richards to do this step.

I will also review stormwater and traffic reports either at this stage or at application stage.

Also for this Mill Run development, how many further phases in the future? (I can see potential future 9 on your figure). I understand it will depend on development plans and land purchase. However for infrastructure planning purpose, I need see your overall development plan with phasing and capacity in a systematic way, not requesting servicing capacities piece by piece, as it may mess up our potential capital project scoping and looping redundancy consideration.

Thanks!

David Shen, P.Eng.
Director, Development Services and Engineering
Municipality of Mississippi Mills
dshen@mississippimills.ca
613-880-5996
Website: www.mississippimills.ca

Mississippi Mills

From: Mark Bowen <M.Bowen@novatech-eng.com>
Sent: December 16, 2022 10:04 AM
To: Cory Smith <csmith@mississippimills.ca>
Cc: Drew Blair <D.Blair@novatech-eng.com>; Billy McEwen <b.mcewen@novatech-eng.com>
Subject: Mills Extension Watermain Boundary Condition Request

Hi Cory,

Can you please forward watermain boundary conditions for the attached development. The site is located immediately above the existing Mill Run subdivision. The connection to the Mill Run existing watermain is node 44 on the attached. The water demands for the site are:

1. High Pressures Condition = 2.4L/s
2. Peak Hour Condition = 10.5L/s
3. Max Daily and Fire Flow = 49.8L/s (4.8L/s demand plus 45L/s fire flow) and 79.8L/s (4.8L/s demand plus 75L/s fire flow).

Mark Bowen, B. Eng
Project Manager – Land Development Engineering

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Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 231 | Fax: 613.254.5867