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39 Years

Proposed Residential Development (Phase 1)
1500 Merivale Road

Servicing and Stormwater Management Report

Prepared for: Claridge Homes

Engineering excellence. Planning progress. Liveable landscapes.

Proposed Residential Development
(Phase 1)
1500 Merivale Road

Servicing and Stormwater Management Report

Prepared By:

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

October / 27/ 2023
Revised: March 21, 2024

Novatech File: 121009
Ref: R-2023-152

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March 21, 2024

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning and Infrastructure Approvals Branch
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: **Lisa Stern, Planner**

Reference: **1500 Merivale Road (Phase 1)**
Servicing and Stormwater Management Report
Our File No.: 121009

Please find enclosed the revised 'Servicing Report' for the above noted project. This report is submitted in support of the site plan application and outlines how the site will be serviced with public infrastructure.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

Yours truly,

NOVATECH

Greg MacDonald, P. Eng.
Director, Land Development and Public Sector Infrastructure

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

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Appendices

Tables

Figures

List of Drawings

1.0 INTRODUCTION

Novatech has been retained by Claridge Homes to prepare a Serviceability and Stormwater Management Report for the proposed development located at 1500 Merivale Road within the City of Ottawa. The proposed site is denoted as Part of Lots 18,19, 20, and 21, Registered Plan 30, City of Ottawa. This report is prepared in support of the site plan application for Phase 1 of the development. **Figure 1 Key Plan** shows the site location.

1.1 Existing Conditions

The subject property has an approximate area of 6.06 hectares (ha). Presently the site contains a Midas auto shop, and a restaurant named Green Papaya fronting Baseline Road. Fronting Merivale Road the site contains the existing Kimway Crescent, and remnants of various commercial buildings that have since been demolished. Due to the previous developments, there are various concrete and asphalt rubble piles throughout the site, along with abandoned building foundations and services. Towards the north property line behind the existing commercial buildings fronting Baseline Road, there is an undeveloped area of approximately 1.0ha containing trees and shrubs. The site has a grade variance of approximately 7.7m (102.00 – 94.30m) from Baseline Road to Merivale Road. The site drains primarily from the north-west to the south-east.

The site is bound by an existing Tim Hortons, and Baseline Road to the north, existing retail (Loblaws, Dollar Tree, Starbucks) to the east, Astral Media Radio Gp Ottawa, Hi Fresh Foods, The Sea Food Grill, and Merivale Road to the south, and Existing Commercial (Suya Joint/ African Grill, Frisby Tire Co, and Motor Sports World), existing asphalt parking and Clyde Avenue to the west. The existing asphalt parking area to the west near the intersection of Clyde and Baseline Road is currently planned to be developed with a Dymon storage facility and has an active City of Ottawa development number of D07-12-17-0131. **Figure 2** shows the existing site conditions.

The Overall Site Servicing Report was designed by Novatech and design information is provided in the following report:

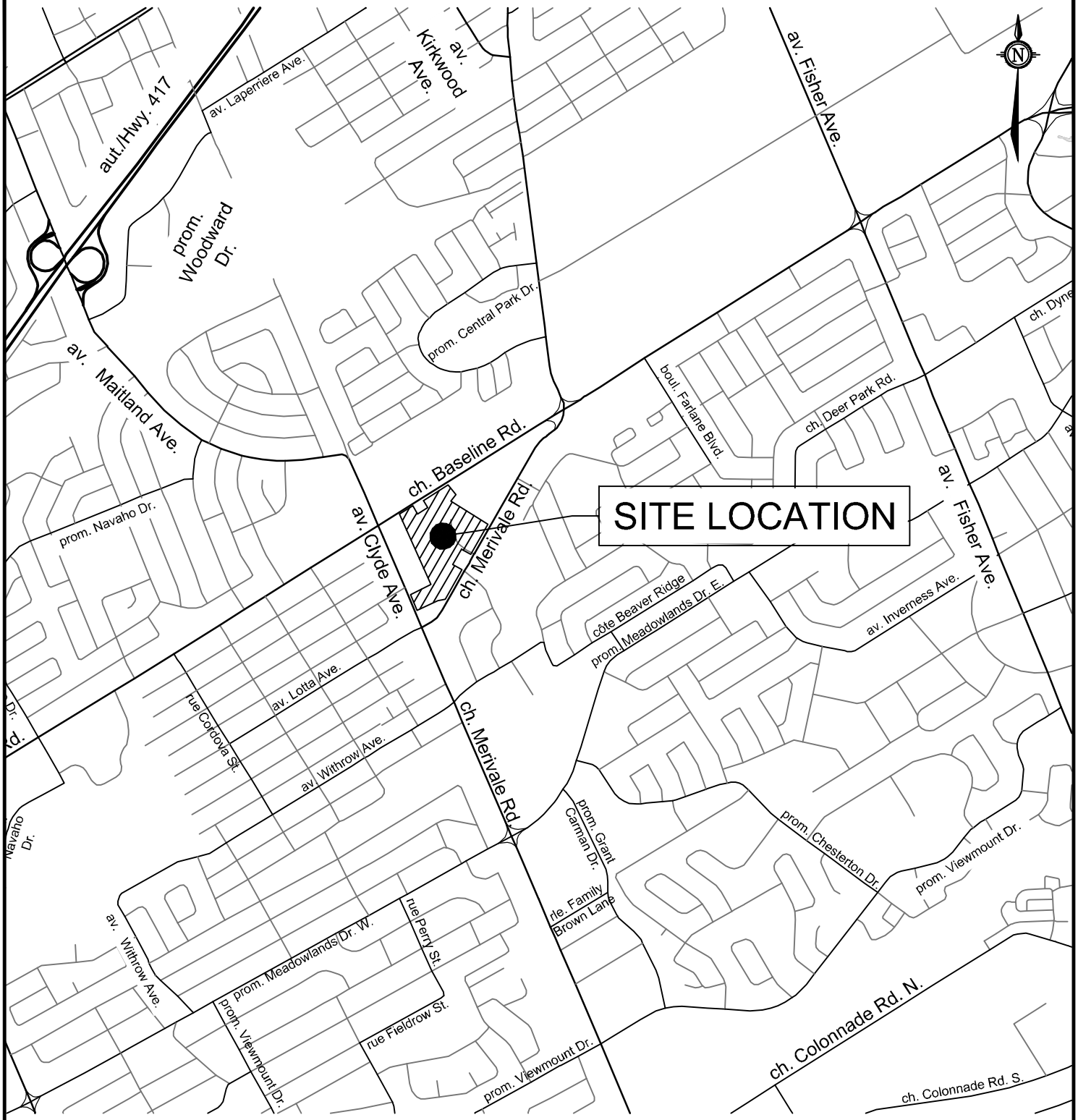
- 'Serviceability and Stormwater Master Plan, 1500 Merivale Road prepared By Novatech dated December 09, 2022, Report Number R-2021-121 (Referenced as **Master Plan**).

1.2 Proposed Development

The subject site is designated as 'General Urban Area' on Schedule B of the City of Ottawa's Official Plan, with frontage onto Baseline Road, Clyde Avenue, and Merivale Road, all of which have an Arterial Mainstreet designation. The property is zoned 'Arterial Mainstreet' (AM10[2217] H(34)).

This report focuses on the detailed design of the Phase 1 development located in the northeast corner of the site. The remaining phases will be designed in detail at the time of site plan application of each future phase.

The proposed Phase 1 development will include a public road, and one (1) apartment building, ten (10) stories in height, complete with 118 units, and approximately 153m^2 of commercial dedication. The proposed street is presently named Street 1, and upon full build-out will provide



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CITY OF OTTAWA
1500 MERIVALE RD

KEYPLAN

SCALE		
N.T.S		
DATE	JOB	FIGURE
DEC 2022	121009	FIGURE-1

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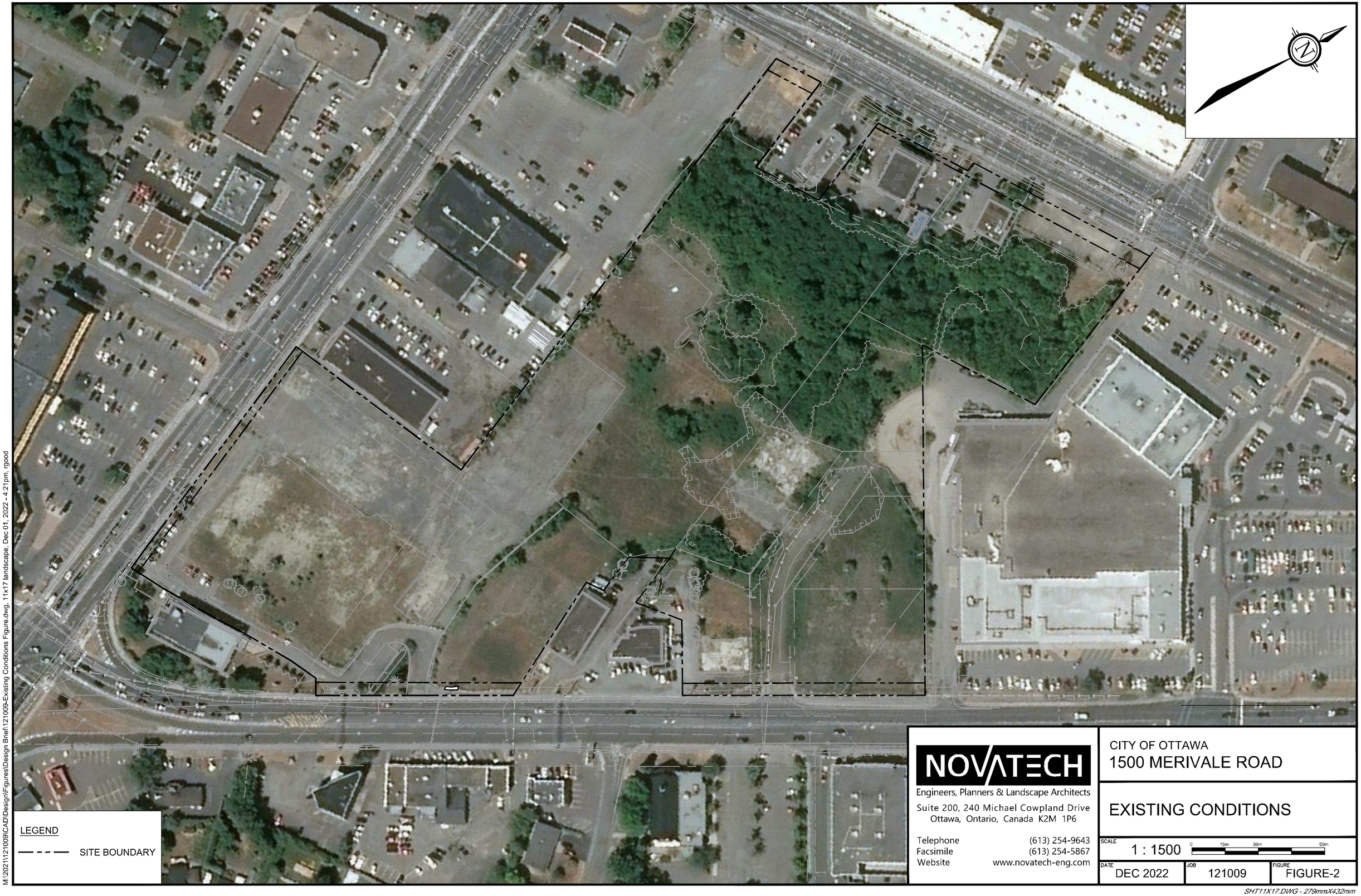

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CITY OF OTTAWA
1500 MERIVALE ROAD

EXISTING CONDITIONS

SCALE 1 : 1500 (0, 15m, 30m, 60m)
DATE DEC 2022
JOB 121009
FIGURE FIGURE-2

SHT11X17.DWG - 279mmX432mm

a connection from Merivale to Baseline. In the interim condition it is proposed to terminate the proposed Street 1 just past the proposed Phase 1 property limit. A temporary hammerhead is proposed at the interim Street 1 termination to permit vehicular movement, and to facilitate access by emergency and snow clearing vehicles. Refer to **Figure 3: Site Plan** for details.

2.0 SITE CONSTRAINTS

A geotechnical investigation was completed by Paterson Group Inc. and a report prepared entitled 'Geotechnical Investigation, Proposed Multi-Storey Building Complex, 1500 Merivale Road' dated February 23, 2021. The report included the following findings:

- Generally, the subsurface profile across the site consists of an approximate 0.8 to 2.6 m thickness of fill underlain by bedrock.

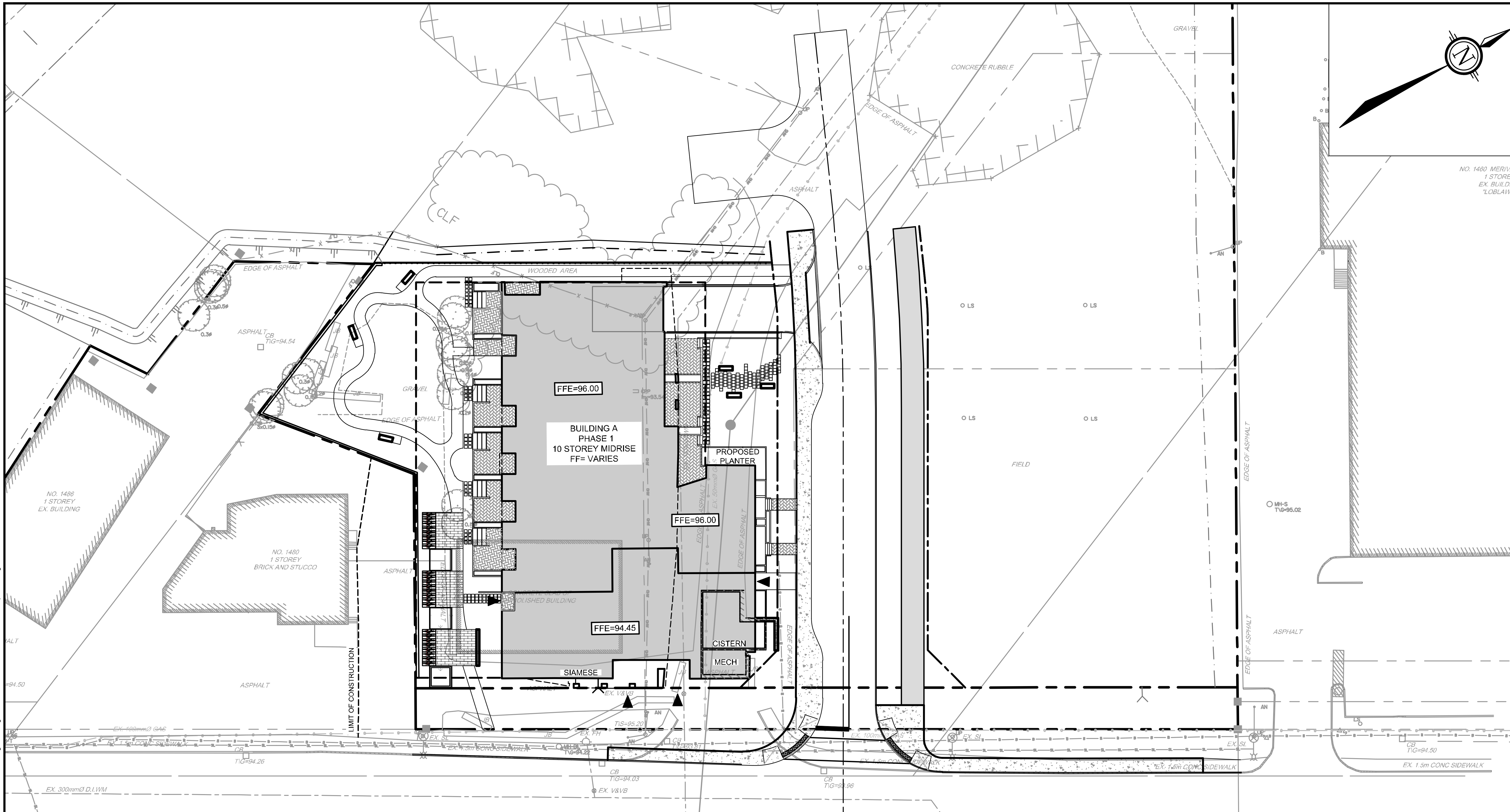
- the long-term groundwater table can be expected at approximate depths of 2.5 to 3.5 m below the existing ground surface. However, it should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater level could vary at the time of construction.

- Existing foundation walls and other construction debris should be entirely removed from within the perimeters of the proposed buildings. Under paved areas, existing construction remnants, such as foundation walls, should be excavated to a minimum of 1 m below final grade.

- The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be excavated at 1H:1V or shallower. The shallower slope is required for excavation below groundwater level. The subsurface soils are considered to be a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

- A temporary Ministry of Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required if more than 400,000 L/day of ground and/or surface water are to be pumped during the construction phase. At least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP.

- For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.



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CITY OF OTTAWA
1500 MERIVALE RD

SITE PLAN - PHASE 1

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE MARCH 2024 | JOB 121009 | FIGURE FIGURE-3

SHT11X17.DWG - 279mmX432mm

3.0 WATER SERVICING

The Phase 1 property is within the City of Ottawa pressure Zone ME. There is an existing 300mm diameter ductile Iron watermain within the Merivale Road right-of-way along the frontage of the Phase 1 site. The proposed development will also include a 200mm public watermain within the proposed Street 1.

Water demands have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code. The required fire demands have been calculated using the Fire Underwriters Survey (FUS) Guidelines. The water demand and fire flow calculations are provided in **Appendix B** for reference. A summary of the water demand and fire flows are provided in **Table 3.1,** below.

Table 3.1: Merivale Road Domestic Water Demand Summary

Phase	Population	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Phase 1	216	0.714	1.770	3.885	67

As per the City of Ottawa Technical Bulletin ISDTB-2014-02, proposed building service will consist of twin 200mm watermains separated by an isolation valve in the right-of-way. As Phase 1 is located at the intersection of Street 1 and Merivale Road it is proposed to achieve the required redundancy by providing one service from the proposed Street 1 watermain, and the second from the existing watermain within Merivale Road. The proposed building will be sprinkled and equipped with Siamese connections. The proposed Siamese connection has been placed to be within 45m of a fire hydrant.

Refer to the General Plan of Services drawing (121009-GP1), and the Coverage plan included in **Appendix B** for details.

Table 3.2: Maximum Flow to be considered from a given hydrant.

Hydrant Class	Distance to building (m)	Contribution to Fire Flow	
		(L/min)	(L/s)
AA	≤75	5700	95
	>75and ≥150	3800	63.33
A	≤75	3800	63.33
	>75and ≥150	2850	47.50
B	≤75	1900	31.67
	>75and ≥150	1500	25.00
C	≤75	800	13.33
	>75and ≥150	800	13.33

For the purpose of the model, and in light of the available pressures, it was assumed that all proposed onsite and offsite Hydrants would be rated as class AA.

The above boundary conditions were used for analyzing the performance of the proposed and existing watermain systems for three theoretical conditions:

1) High Pressure check under Average Day conditions
2) Peak Hour demand

Maximum Day + Fire Flow demand.

The following **Table 3.3** provides a summary of the results from the hydraulic water model.

Table 3.3: Water Boundary Conditions and Hydraulic Analysis Summary for Phase 1

Criteria	Head (m)	Pressure[1] (psi)	Pressure Requirements (psi)
Connection 1 (Merivale Road) – Zone ME [Phase 1]			
Max HGL	157.9	88.02	< 80psi
Min HGL	144.7	69.25	> 40psi
Max Day + Fire Flow	152.8	80.77	> 20psi

[1]Pressure based on a Finished Floor elevation of 96.00

The hydraulic analysis indicates that the system can provide adequate pressures and flow to meet the domestic and fire flow requirements for the site. Due to pressures being above 80psi pressure reducing valves will be required on the proposed services.

To mitigate potential water stagnation issues a water valve is proposed just past the proposed Hydrant which will provide fire flows to Phase 1. It is proposed to keep this valve closed and the remainder of the water main system installed in Phase 1 unpressurized until such time that the future looping and building services are installed. Refer to **Appendix B** for detailed water demand calculations, and City of Ottawa boundary conditions.

4.0 SANITARY SERVICING

There is an existing 200mm diameter sanitary sewer within Merivale Road right-of-way along the phase 1 frontage. There is also an existing 200mm diameter sanitary service entering the subject property along the frontage from the existing Merivale Sewer.

4.1 Design Criteria

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and the Ontario Building Code as follows:

- Residential Average Flow = 280 L/capita/day
- Townhome unit = 2.7 Person/unit
- Studio Apartment = 1.4 Person/unit
- 1 Bed apartment = 1.4 Person/unit
- 2 Bed apartment = 2.1 Person/unit

- 3 Bed apartment = 3.1 Person/unit
- Commercial flow = 75 L/9.3m^2/day
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.0
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

4.2 Merivale System (Phase 1)

The Phase One (1) portion of the site will be serviced by utilizing an existing 200mm diameter service on the site which connects to the Merivale Road sanitary sewer along the eastern property boundary. Based on the data available the existing sewer was installed in 1961 and is composed of asbestos cement. The sewer flows to the south-east down Gilbey Drive and is nearly at capacity.

The peak sanitary flow including infiltration for the Phase One (1) development was calculated to be **2.57 L/s**. Through correspondence with the City of Ottawa Senior Water Resources Engineer it is understood that the Merivale/Gilbey system has capacity for the Phase One (1) development.

Detailed sanitary flow calculations, and correspondence are provided in **Appendix C** for reference.

5.0 STORM SERVICING

Storm servicing for the 1500 Merivale development will be provided using a dual drainage system: Runoff will be stored and conveyed by an underground storm sewers and storage cisterns (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). Runoff from the Phase 1 site is tributary the Parkwood Hills sub watershed via the storm sewers on Merivale Road.

There are existing 900-1050mm diameter storm sewers within the Merivale Road right-of-way. In the present condition Phase 1 site sheet drains to the Merivale Road and Clyde Avenue rights-of-way.

It is proposed to service the proposed Phase 1 site with one (1) connection to the existing Merivale Road storm sewer system. The proposed building will have 2 building services, one (1) uncontrolled outlet for foundation drains, and one (1) controlled outlet to provide quantity control. Refer to the General Plan of Services (drawings 121009-GP1) for details.

5.1 Stormwater Management Criteria

The stormwater management criteria used in the design of the proposed development have been based on the *City of Ottawa Sewer Design Guidelines* (City of Ottawa, dated October 2012), and Technical Bulletins PIEDTB-2016-01, ISTB-2018-01, ISTB-2018-02, and ISTB-2018-03.

5.1.1 Minor System (Storm Sewers)

- Storm sewers are to be designed using the Rational Method for a 2-year return period;
- Cisterns are to be provided to store runoff and attenuate peak flows which exceed the following allowable release rates:
    - Peak flows are not to exceed the pre-development peak flow calculated using either the pre-development runoff coefficient or a coefficient of C=0.5, whichever is lower, for a 2-year storm event with a 10-minute time of concentration;

5.1.2 Major System

- Provide on-site storage for storm runoff which exceeds the allowable minor system release rate from the site up to and including the 100-year design event;
- Ponding depths are not to exceed 0.35m (static + dynamic) and are not to be within 0.30m (vertical) to the nearest building opening;
- No surface ponding for storms up to and including the 2-year event.

5.2 Water Quality Control

- A minimum depth of 300mm amended soil shall be provided below all landscaped areas;
- Where possible, implement lot-level and conveyance best management practices to maximize the potential for water quality treatment.

5.3 Storm Sewer Design (Minor System)

The proposed storm sewers have been designed using the Rational Method to convey peak flows associated with a 2-year return period. The storm sewer design sheet is provided in **Appendix D**. The corresponding Storm Drainage Area Plan (**121009-STM**) is provided at the back of this report.

The design criteria used in sizing the storm sewers are summarized below in **Table 5.1.**

Table 5.1:Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

5.3.1 Allowable Release Rate

As Detailed within the **Master Plan** the allowable flow for all areas to tributary to the Parkwood Hills catchment is 513.1 L/s. To determine a per-hectare release rate which could be applied to each of the development Phases tributary to the Merivale outlets, the total flow from the future ROWs and park area were determined by modelling the site without any inflows from the various blocks. The flow from the ROWs and park alone accounted for approximately 413L/s, leaving 100L/s to be split between Phases 1-3, and 7-11. The Alllowable release rate for Phase 1 is outlined in **Table 5.2**, below.

Total area from Phases 1-3 & 7-11 = 2.896 ha
Allowable per-phase release rate = 100L/s / 2.896ha
= 35 L/s/ha

Table 5.2: Allowable Release Rates

Phase ID	Area (ha)	Allowable Release Rate (L/s)
PH1	0.287	10

5.3.2 Water Quality Controls

For outflows tributary to the sewer on Merivale Road, water quality treatment will be provided by OGS units installed upstream of the final outlet to the Merivale Road storm sewer. A Stormceptor EFO6 is proposed in place of MH101 and a Stormceptor EFO8 is proposed in place of MH301. Details of the proposed OGS units have been provided in **Appendix D**.

5.3.3 Orifice Controls

The overall road network, and future development phases were modelled within the **Master Plan**. Inflows to the storm sewer were modeled based on the characteristics of each inlet. Inflows to the storm sewer are based on the orifice specified for the inlet and the maximum depth of ponding. Orifices have been sized to limit the outlet peak flows. A summary of the required orifice controls required within the Phase 1 limits are summarized in **Table 5.3**.

Table 5.3: Orifice Parameters

Structure	ICD Size & Inlet Rate				Approach Flow* (L/s)
	Diameter (mm)	Max Head (m)	Calculated 2-yr Capture Rate (L/s)	2-yr Capture Rate* (L/s)	
CB01	152	1.22	55.13	19.04	19.11
CB02	178	1.11	72.03	19.55	19.60
CB03	83	1.17	16.06	8.18	12.22
CB04	83	1.17	16.06	11.10	18.43

**From PCSWMM model Chicago 3-hour 2-year storm event*

5.3.4 Hydraulic Grade Line

A summary of the Hydraulic grade line analysis of the subject site detailed within the **Master Plan** is provided below.

The downstream boundary conditions during the 100-year event are at the manhole T/G already and buildings are to have underground parking areas, HGL elevations were analyzed on the clearance from the T/G and not clearance to the USF. There will be no habitable basements within the development, and backwater valves will be placed on the storm outlets for the foundation drains and cisterns, which will both be pumped into the receiving storm sewers.

The **Table 5.4** provides a summary of the 100-year HGL elevation at each storm manhole within the proposed Phase 1 development, as well as a summary of the HGL elevations for a 20% increase (rainfall intensity and total precipitation) in the 100-year design event.

Table 5.4: Storm Sewer Hydraulic Grade Line

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elevation 100yr-3hr (m)	HGL Elevation 100yr-3hr +20% (m)	Clearance from T/G (100yr) (m)	Clearance from T/G (100yr+20%) (m)
MH101	92.23	94.06	94.09	94.11	-0.03	-0.05
MH102	92.27	94.08	94.10	94.13	-0.02	-0.05
MH103	92.42	94.06	94.14	94.19	-0.08	-0.13
MH104	92.58	94.68	94.26	94.35	0.42	0.33

5.3.5 Phase 1 Cistern

As noted within the **Master Plan** the allowable release rate for the Phase 1 Cistern is 10L/s. For the Phase One (1) cistern it is proposed to pump in combination with a backwater valve to eliminate the effects of the high HGL. The cistern was sized to be 160.36m^3 based on the modified rational method and a summary of the Phase One (1) Cistern is provided in **Table 5.5** below.

Table 5.5: Phase 1 Cistern Summary

Design Event	Flow (L/s)	Depth (m)	Storage Required (m^3)
1:2	10.0	0.64	31.11
1:5	10.0	0.99	48.34
1:100	10.0	2.40	116.55
1:100+20%	10.0	3.05	148.33

Detailed Rational method calculations are provided in **Appendix E**.

5.4 Major System Design and Analysis

The major system network was evaluated within the **Master Plan** using the PCSWMM model to ensure that the ponding depths conform to City standards. A summary of ponding depths and volumes for the 100-year event is provided in **Table 5.6**.

Table 5.6: Ponding Depths at Catchbasins (100yr Event)

Structure	T/G (m)	Max. Static Ponding (Spill Depth)		2-yr Event (3hr)			
		Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)
CB01	93.97	94.07	0.10	92.89	0.00	N	0.00
CB02	93.97	94.07	0.10	92.94	0.00	N	0.00

6.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- Strawbale or rock check dams will be installed in swales and ditches;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (drawing 121009-ESC1) for additional information.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the existing and proposed watermain network confirms the following:

- The proposed 200mm diameter water main proposed under Street 1 connecting to the existing watermain within the Merivale Road right-of-way has capacity to service the development.
- There are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- There is adequate flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the existing and proposed sanitary system confirms the following:

- It is proposed to service the development with an existing 200mm service along the Phase 1 frontage, which discharges into existing sewers within the Merivale Road right-of-way. It is anticipated there is adequate capacity within the existing sanitary infrastructure to service.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- The proposed storm sewer systems are to connect to the 900mm and 1050mm diameter storm sewers in the Merivale Road right-of-way. The sewer systems will provide storm conveyance for Phases 1-3, and 7-11
- Orifices are proposed within the proposed roadway Catchbasins to control inflows to the proposed storm sewers
- Stormwater control for Phase 1 will be provided by cisterns within the P1 parking levels.
- As per the proposed grading plans, major overland flow routes have been provided to the surrounding rights-of-way.

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

8.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

Anthony Mestwarp, P.Eng
Project Manager
Land Development Engineering

Reviewed by:

Greg MacDonald, P.Eng
Director, Land Development and Public Sector Infrastructure

Appendix A
Pre - Consultation Meeting Minutes

File No.: PC2021-0089
Date: April 15, 2021

ADDRESS 1500 Merivale Road
Pre-Consultation Meeting Minutes
Meeting Date: March 25, 2021

Attendee	Role	Organization
Lisa Stern	File Lead	City of Ottawa
Mark Young	Urban Designer	
Santosh Kuruvilla	Infrastructure Project Manager	
Mike Giampa	Transportation Project Manager	
Louise Cerveny	Parks Planner	
Kersten Nitsche	Planner	Fotenn
Brian Casagrande	Planner	
Vincent Denomme	Landowner	Claridge Homes
Neil Malhotra	Landowner	
Nathan Godlovitch	Architect	Evoq Architecture
Sayeh Jolan		
Etienne Forget		
Brad Byvelds		Novatech
Jennifer Luong		
Doug Yonson	Community Association Representative	Fisher Heights Area Community Association
Tony Sroka	Community Association Representative	

Comments from the Applicant:

1. Have proposed a built form that meets the zoning.
2. Have proposed a mainly a mid-rise residential built form with approximately 2000 units.
3. A public park is proposed at the south end of the site.
4. The build out of the site will occur over time. Build out may take 20 years.

Planning Comments:

1. The application will require a complex site plan application. The application form, timeline and fees can be found here.
2. The subject lands are designated Arterial Mainstreet in the City's Official Plan and are zoned Zoning: AM10[2217] H(34)
    a. Exception: - for lots greater in area than 1250 m^2, 2% of the total lot area must be provided as outdoor communal space located at grade anywhere on the lot and such area can also be used towards complying with any amenity area requirements
3. The site is within the boundaries of the Merivale Road Secondary Plan.
4. Please keep apprised of the direction in the draft Official Plan.
5. Guidelines for Arterial Mainstreets, TOD development, Bird Friendly Design Guidelines apply.
6. There was a motion made at Council to *"add the completion of an urban design analysis of the Merivale Triangle to the Planning, Infrastructure and Economic Development Department's multi-year workplan, and direct staff to undertake this analysis as soon as feasible"*.

7. Please provide a Planning Rationale which discusses how the proposal meets the intent of policy and guidelines. A high quality built form and pedestrian oriented public realm is expected.
8. In light of the amenity space requirements of the site specific zoning exception and the requirement to provide parkland on site, please discuss the objectives/rationale for the open space network provided in the Planning Rationale report and how it meets the intent of the Secondary Plan and relevant guidelines.
9. While it is recognized that the proposal conforms to the Zoning of the site, staff strongly recommend consideration of varying building typologies and heights to visually break up the site, provide opportunities for placemaking and to provide increased densities in proximity to Rapid Transit.
10. Both the Arterial Mainstreet designation and the Secondary Plan speak to providing a mix of uses a mix of uses that is compact in urban form, and pedestrian-oriented and transit friendly places. Please examine providing commercial/retail uses at grade to animate roadway frontages and public space.
11. The secondary plan recognizes that this property is very complex and are subject to a number of development constraints arising from the existing development pattern and the complexity of the land ownership. The secondary plan states that as a result, proposals to develop this area may be considered on a staged basis to accommodate a transition to a more coordinated and integrated built form. It is not clear that the proposed plan considers transitions to surrounding properties.
    - Please provide a concept and phasing plan for the entire triangle area to ensure that non-participatory properties can be developed in a logical and cohesive fashion.
    - Provide a concept plan to show how surrounding properties will develop and be integrated with park uses and illustrate how loading and access on adjacent sites can be integrated/buffered.
12. Connectivity through the site to BRT is important to provide for active transportation connections and to meet the objectives of the OP, Secondary Plan and applicable guidelines. The Secondary Plan specifically contemplates a roadway and cycling access through the site. Public access should be provided through the site. Public Roadway would be preferable to provide public frontage on Park, consolidate accesses between sites and provide public access to BRT.
13. Please consider building placement and orientation to frame public/private roadways to compliment the configuration of adjacent buildings. Please consider orienting buildings so that the massing reinforces the street/private way edge.
14. Please consider breaking up the long buildings provide opportunities for physical and visual connections. Connections should be provided to create pedestrian and cycling links and overall site permeability. Connections to/from surrounding properties to the park/open space and BRT should be considered in design.
15. Staff appreciates the provision of underground parking. Please ensure that the extent of underground parking structures will not inhibit the provision of large tree planting on the site.
16. Staff would appreciate the opportunity for further consultation/discussion as the proposal is refined in order provide more detailed comments regarding public space, infrastructure and access.
17. Please consult with the Ward Councillor and Community Association prior to submission.

Urban Design:

1. Please ensure that the proposed applications conform to the Merivale Road Secondary Plan.

2. Please consult and address the Design Guidelines prepared for the Secondary Planning area by the Planning Partnership in 1998. These guidelines provide additional guidance that should be considered and addressed based on Secondary Plan policy 5.2:

   5.2 The Urban Design Guidelines developed as part of the Secondary Plan process are instrumental in the formulation and achievement of the land use and design vision for the Merivale Road Corridor. Although some of the policies of this Plan derived difficulty from the Urban Design Guidelines and are intended to assist in the achievement of this vision, it must be demonstrated to the satisfaction of the City that development proposals comply with their specific direction and general intent.

3. A site of this size requires a Neighbourhood Approach to Planning vs. a Site Planning Approach.
4. The current approach appears to be rooted in a Campus approach and does not appear to consider a higher-level approach to neighbourhood building.
5. There is a need to look at the entire picture and the surrounding context of this site and use this to inform the design. This should consider how abutting sites can be integrated into the new neighbourhood fabric if and when they redevelop. Many of the adjacency relationships shown are not appropriate. This is considered in the Secondary Plan policies and should be provided as part of a design brief submission.

   3.1.1.2 1.a. viii. Lands within the triangle formed by Merivale Road, Clyde Avenue and Baseline Road are subject to a number of development constraints arising from the existing development pattern and the complexity of the land ownership. As a result, proposals to develop this area may be considered on a staged basis to accommodate a transition to a more coordinated and integrated built room.

6. Additional Connectivity and permeability should be sought, in the form of additional publicly accessible connections, including public streets as indicated in the Secondary Plan.

   3.1.4.1.1.a.ii Road systems should be introduced within large blocks, particularly those on the east side of Merivale Road and the Clyde Avenue/Merivale Road/Baseline Road "triangle", to increase their permeability and to distribute traffic more evenly while minimizing the number of driveways on Merivale Road and Clyde Avenue.

   3.1.3.1.1.a.i. Council shall require that new roads be incorporated in proposals for development and redevelopment along Merivale Road. Conceptual corridors for some of these roads have been identified on Schedule 2 while others, such as in the area of the triangle of lands formed by Merivale Road, Clyde Avenue and Baseline Road will be identified during the review of development applications.

   3.1.3.1.1.a.ii. New roads required by Council are not necessarily intended to be in public ownership in all cases but may be privately-built roads designed to public road standards.

7. Creation of a meaningful public realm both internal and external to the site is key to the success of the project. Need to consider which elements will make that public realm a success. Elements should include:

a. At grade activation and animation both internal and external to the site. Secondary Plan 3.1.1.2.1.a.vii
b. Enhancements in the treatment of the public realm along all three arterial road frontages. Secondary Plan 3.1.1.3
c. Active transportation connections through the site for pedestrians and cyclists. Secondary Plan 3.1.2.2
d. Provision of an urban tree canopy in the neighbourhood.
e. The incorporation of a public park as a focal point for the neighbourhood.
f. Built form relationships to the public realm.
g. Shadowing and Wind – impacts on the public realm.
h. The provision of grade related units.
i. Ensuring that parking and "functional" (loading, refuse collection etc.) elements to the project are not prominent in the public realm.

8. The proposal will be subject to Urban Design Review Panel. A pre-consultation with the Panel is recommended as a first step in the design process.
9. A Design Brief will be required in support of the application. A Terms of Reference is attached.
10. PRUD staff support the concept of a green passage and pedestrian connectivity in a north/south orientation across the site. There is a serious concern that this grand design gesture will be pinched at north end in the vicinity of the Tim Horton's Site. The connection point to Baseline Road needs to be strengthened.
11. PRUD staff appreciate the applicants desire to locate as much parking below grade as possible.
12. PRUD are concerned with a lack of mixed uses on-site. The approach to solely residential is not appropriate in the planning of a site/neighbourhood of this size. Secondary Plan Policy 3.2.1.2 requires the following:

    Residential uses located adjacent to Merivale Road shall only be permitted to be located above ground level retail or office uses. Stand alone residential uses may not be permitted at locations fronting onto Merivale Road or Clyde Avenue.

13. PRUD staff are concerned with the lack of consideration and setbacks to abutting sites, and the proposed orientation of dwelling units.
14. PRUD staff question the use of only a Bar built form for the entire site. Consideration should be given to a combination of built forms, and buildings including the use of high-rise typologies.
15. Please consider buffering from existing and proposed loading areas/back of house functions early in the design process. Secondary Plan 3.1.3.3.
16. Please be aware of the recent Council adopted motion related to the design of these lands.

Parks

1. Further Parks conditions and requirements for parkland dedication will apply upon review of formal development submission.
2. Maximum Parkland dedication will be taken on the development site, based on the total amount of land developed or the number of units per hectare, which ever is greatest.
3. In the event that there is a change in the proposed use, block area, residential product and/or number of dwelling units within the Final Plan, the required parkland dedication will also be subject to change.
4. The surrounding streets of Baseline, Clyde and Merivale are busy, often congested and do not provide the necessary and safe frontage for a park. One large and centrally located park parcel is required to provide maximum benefit to the new community and surrounding neighbourhoods.

5. Small parkettes on remnant, undevelopable land will not be considered.
6. A facility fit plan for the park is required. The overall plan shall include park layout, proposed amenities, grading plan and tree planting plan.
7. No encumbrances on the park land are permitted including utilities, stormwater management facilities, or overland drainage from the development.
8. Park servicing is required.
9. Pedestrian linkages (as registered easements) from the surrounding roads offering access to the park and circulation through the site are required. As indicated in the, "useable and clearly identifiable network of open space" as indicated in the Merivale Road Secondary Plan (P.9).
10. Consider impact of north wind/tunnel effect through the development and to the park location and open spaces.

Transportation:

1. Proceed to TIA step2, scoping. The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
2. Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
3. Synchro files are required at Step 4.
4. Please note that all new applications (pre-consultation meetings dated after March 3, 2021) must use the NEW TRANS Trip Generation Manual when forecasting site generated trips using this manual. The TRANS committee (a joint transportation planning committee serving the National Capital region) finalized a new manual early in March 2021. The document will be available in French and English on the TRANS website http://www.ncr-trans-rcn.ca/surveys/2009-trip-generation.
5. Any access to Baseline Road must be coordinated with the Baseline BRT reconstruction and will be right in right out only due to the ultimate center median. Full movement access may be provided on Merivale Road subject to the TIA analysis and enough spacing from any existing traffic control. All road modifications are at the applicant's cost.
6. ROW protection on Baseline and Merivale is 44.5 m and 37.5m.
7. Corner sight triangles: 5m x 5m minimum.
8. A Road Noise Impact Study is required
9. ROW protections are:
   - Baseline is 30 m, protected for 44.5 m
   - Clyde is 30 m, protection is 34 m
   - Merivale is 30 m, protection is 44.5 m

Infrastructure:

1. The Servicing Study Guidelines for Development Applications are available at the following link: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
2. Record drawings and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at informationcentre@ottawa.ca or by phone at (613) 580-2424 x44455
3. Stormwater quantity control criteria:

a. Discharge to the north (baseline) will have to follow the very strict Pinecrest creek criteria (full retention/infiltation of first 10 mm and then control the remainder of the flow to 34.5 L/s/ha).
b. Discharge to Merivale, will go into Parkwood hills, which only has 2 year capacity. Will need to control to the 2 year using C=0.5, but we will also need to enter their flow into our flood risk model to see what the downstream impact is. Most of the site already drains there, so we will just confirm the impact of their flows in the model.

4. Potential outlets and allowable sanitary discharge - Please see attached email from Eric Tousignant, dated March 19, 2021.
5. Existing sanitary sewers are available on Merivale Road (200 mm dia.), Clyde Ave. (200 mm dia.), and Baseline Road (300 mm dia.).
6. Existing storm sewers are available on Merivale Road (900 mm dia.), Clyde Ave. (375 mm dia.), and Baseline Rd. (300 mm dia.).
7. Existing watermains are available on Merivale Road (203 mm dia., 305 mm dia.), Clyde Ave. (305 mm dia.), and Baseline Road (406 mm dia.).
8. Looping is required for water.
9. Stormwater quality control – Consult with the Conservation Authority (RVCA) for their requirements. Include the correspondence with RVCA in the stormwater/site servicing report.
10. Please note that as per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14) there shall be no surface ponding on private parking areas during the 2-year storm rainfall event. Depending on the SWM strategy proposed underground or additional underground storage may be required to satisfy this requirement.

11. Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.
12. Please provide an Existing Conditions/Removals Plan as part of the engineering drawing set. Any existing services are to be removed or abandoned in accordance with City standards.
13. As per the City of Ottawa Slope Stability Guidelines for Development Applications an engineering report is required for any retaining walls proposed 1.0 m or greater in height within the subject site that addresses the global stability of the wall and provides structural details. A Retaining Wall Stability Analysis Report and Retaining Wall Structural Details are required to be provided from a Professional Engineer licensed in the Province of Ontario that demonstrates the proposed retaining wall structure has been assessed for global instability as per City standards. Please ensure the analysis and required documentation are provided as part of the submission to address this comment.
14. Emergency routes will need to be satisfactory to Fire Services. Please show fire routes on the site plan. For information regarding fire route provisions, please consult with Kevin Heiss at kevin.heiss@ottawa.ca.
15. Clearly show and label the property lines on all sides of the property.
16. Clearly show and label all the easements (if any) on the property, on all plans.
17. When calculating the post development composite runoff coefficient (C), please provide a drawing showing the individual drainage area and its runoff coefficient.
18. When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1:100-year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.
19. Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
20. Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
21. Provide the following information for water main boundary conditions:
    a. Location map with water service connection location(s).
    b. Average daily demand (l/s).
    c. Maximum daily demand (l/s).
    d. Maximum hourly demand (l/s).
    e. Fire flow demand (provide detailed fire flow calculations based on Fire Underwriters survey (FUS) Water Supply for Public Fire Protection). Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).
22. Hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.
23. If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a

table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

24. As per Ottawa Sewer Design Guideline section 4.4.4.7, a monitoring maintenance hole shall be required just inside the property line for all non-residential and multi residential buildings connections from a private sewer to a public sewer. See the sewer use By-law 2003-514(14) monitoring devices for details.

Forestry

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
2. As of January 1 2021, any removal of privately or publicly (City) owned trees 10cm or larger in diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site by species, diameter and health condition
5. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
6. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
7. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a. securities may be required for retained trees
    b. the location of tree protection fencing must be shown on a plan
    c. show the critical root zone of the retained trees if they are in/near disturbance areas
    d. if excavation will occur within the critical root zone, please indicate the limits of excavation
8. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
9. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact Adam.Palmer@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Fisher Heights Area Community Association:

1. Please see attached letters from D. Yonson and T. Sroka representing the interests of the CA.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission

requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.
Please contact me at Lisa.Stern@ottawa.ca or at 613-580-2424 extension 21108 if you have any questions.

Appendix B
Water Servicing

Proposed Development Conditions - Merivale Connection

	Building A Phase 1
Studio	1
1 Bed Apartment	71
2 Bed Apartment	25
3 Bed Apartment	14
Townhome	7
Park Area (ha)	n/a
Number of units	118
Population	215.6
Total Res Daily Volume	60368.00
Commercial area (m2)	168.52
Total Com Daily Volume	1359.03
Total Daily Volume (Liters)	61727.0
Avg Day Demand (L/s)	0.714
Max Day Demand (L/s)	1.770
Peak Hour Demand (L/s)	3.885

Design Parameters

Use	Daily Demand Volume		Source
Studio	1.4	Person/unit	City of Ottawa Sewer Design Guidelines
1 Bed Apartment	1.4	Person/unit	
2 Bed Apartment	2.1	Person/unit	
3 Bed Apartment	3.1	Person/unit	
Townhome Unit	2.7	Person/unit	
Average Residential Flow	280	L/c/day	
Park	1	unit/ha	Flow assumed to be equivelent to a single unit per park hectare
Commerical:	75	L/9.3m2/day	Daily Demands from OBC Table 8.2.1.3

Residential Peaking Factors City of Ottawa Water Distrubution Guidelines:

Conditions	Peaking Factor		Units
Maximum Day	2.5	x avg day	L/c/day
Peak Hour	2.2	x max day	L/c/day

Commercial Peaking Factors City of Ottawa Water Distribution Guidelines

Conditions	Peaking Factor		Units
Maximum Day	1.5	x avg day	L/c/day
Peak Hour	1.8	x max day	L/c/day

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

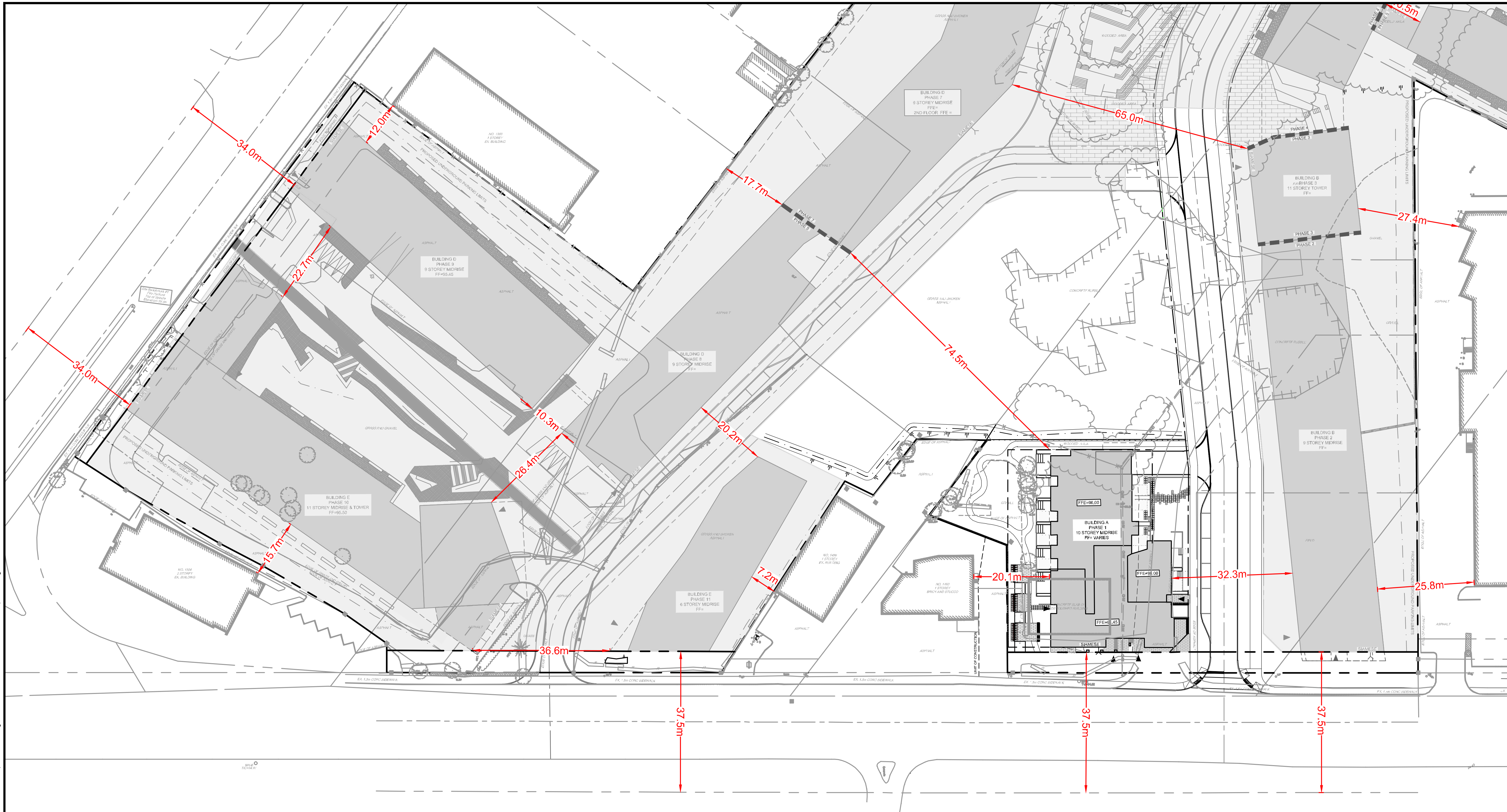
NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121009
Project Name: 1500 Merivale Road
Date: 11/22/2022
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng

Legend: Input by User; No Information or Input Required

Building Description: Phase 1 - 10 Storey Building
Type I - Fire resistive construction (2 hrs)

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1395			
		Number of Floors/Storeys	10			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**2,093**	
	F	**Base fire flow without reductions**				**6,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,100**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-1,919**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	10500	75%		
				Cumulative Total	**-38%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**510**
		East Side	>30m		0%	
		South Side	20.1 - 30 m		10%	
		West Side	>30m		0%	
				Cumulative Total	**10%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057



M:\2021\121009\CAD\Design\Figures\Hydraulic\121009 - FUS Seperation.dwg, FUS SEP-1, Nov 25, 2022 - 2:28pm, cferguson

LEGEND

- PROPERTY LINE
- PROPOSED TACTILE INDICATOR
- PROPOSED ENTRANCE
- DC — PROPOSED DEPRESSED CURB

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

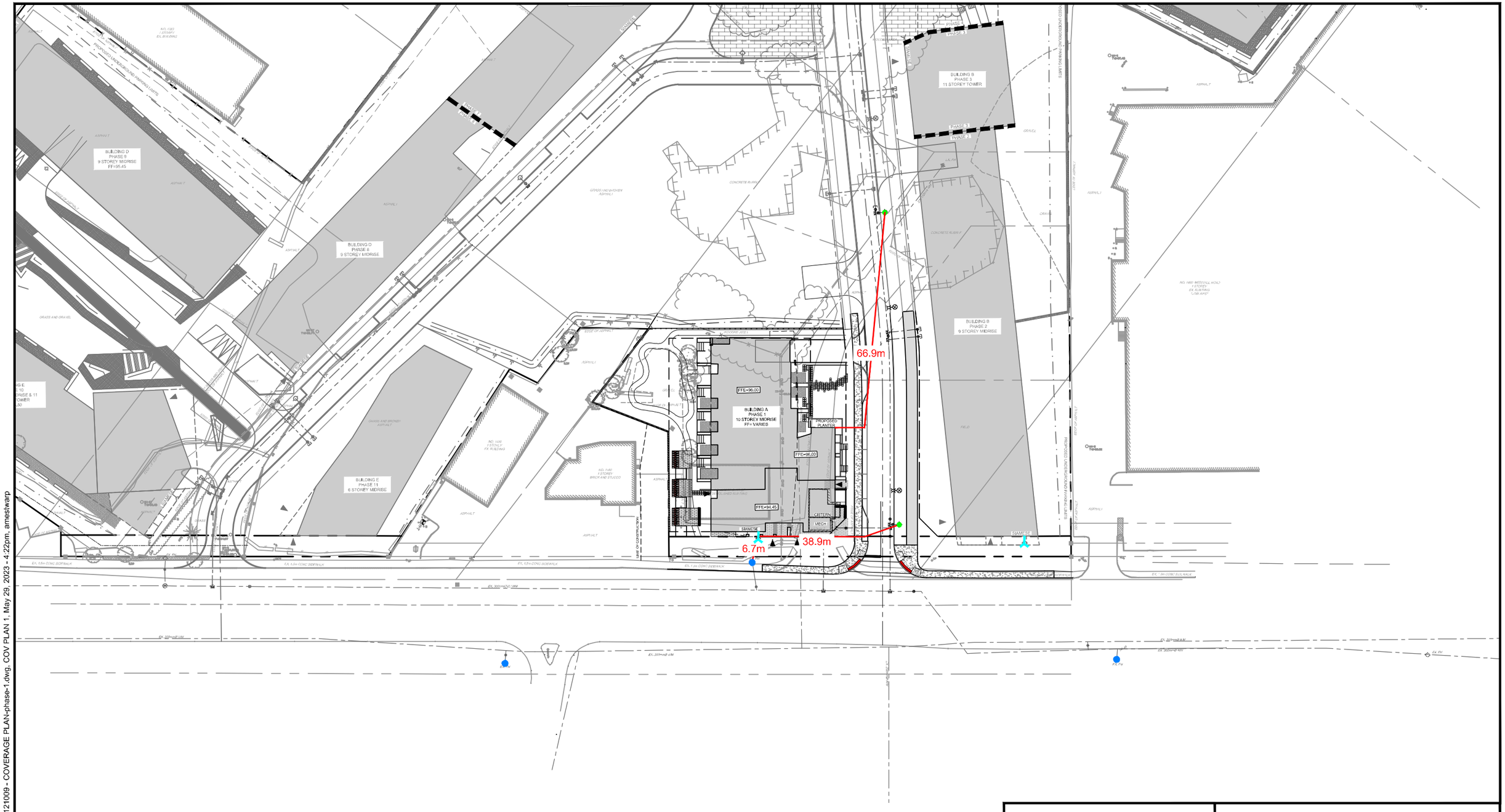
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
1500 MERIVALE ROAD

FUS SEPARATION

SCALE		
1 : 1000 (0 10 20 30 40)		
DATE NOV 2022	JOB 121009	FIGURE FUS-1

SHT11X17.DWG - 279mmX432mm



LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE

NORTH

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

CITY OF OTTAWA
1500 MERIVALE ROAD

COVERAGE PLAN

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE MAR 2024 | JOB 121009 | FIGURE COV1

From: Nathan Godlovitch <ngodlovitch@evoqarchitecture.com>
Sent: Wednesday, May 11, 2022 2:03 PM
To: Curtis Ferguson <c.ferguson@novatech-eng.com>; Sayeh Jolan <sjolan@evoqarchitecture.com>; Christine Hannouche <channouche@evoqarchitecture.com>
Cc: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 121009 - 1500 Merivale Rd - Detail Confirmation

Hi Curtis

Poured concrete construction, Modified Fire Resistive (2h).

There will be firewalls between adjacent phases with horizontal exits. I will check parking extent… I think we are awaiting an understanding with the city before finalizing but I will verify.

Regards,

Nathan

Nathan Godlovitch, Arch OAQ

ARCHITECTE, COLLABORATEUR
ARCHITECT, ASSOCIATE

1435, RUE ST-ALEXANDRE, BUREAU 1000
MONTRÉAL, QC H3A 2G4
T. 514.393.9490 / 477
C. 514.270.3071

EVOQ ARCHITECTURE
ANCIENNEMENT / FORMERLY FGMDA

From: Curtis Ferguson <c.ferguson@novatech-eng.com>
Sent: May 11, 2022 1:45 PM
To: Nathan Godlovitch <ngodlovitch@evoqarchitecture.com>; Sayeh Jolan <sjolan@evoqarchitecture.com>; Christine Hannouche <channouche@evoqarchitecture.com>
Cc: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 121009 - 1500 Merivale Rd - Detail Confirmation

Nathan,

Please ignore questions about Occupancy Hazard Reduction or Surcharge below.

Instead please confirm;

- Construction Material
    - Modified Fire Resistive Construction (2 hrs) or
    - Fire Resistive Construction (>3hrs)

Apologizes for the confusion.

Curtis Ferguson, B.A.Sc., E.I.T. | Land Development
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331 | Fax: 613.254.5867

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From: Nathan Godlovitch <ngodlovitch@evoqarchitecture.com>
Sent: Wednesday, November 30, 2022 11:36 AM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Sayeh Jolan <sjolan@evoqarchitecture.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 121009 - 1500 Merivale - FUS Email Confirmation

Hi Anthony

Responses below:

I do not have the Criteria by which the water supply is considered 'standard'. Building is fully sprinklered an has 121 residential units and 153 m2 commercial. No
Pool anticipated.

Regards,

Nathan

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: November 30, 2022 11:04 AM
To: Nathan Godlovitch <ngodlovitch@evoqarchitecture.com>
Cc: Sayeh Jolan <sjolan@evoqarchitecture.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 121009 - 1500 Merivale - FUS Email Confirmation

Hi Nathan,

I was unable to find your response to the below email. Can you please reconfirm regarding the updated design if the below sprinkler criteria applies to the revised site.

Thanks,

Anthony Mestwarp, **P.Eng.**, Project Engineer | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216 | Fax: 613.254.5867

From: Curtis Ferguson <c.ferguson@novatech-eng.com>
Sent: Monday, July 18, 2022 10:28 AM
To: Nathan Godlovitch <ngodlovitch@evoqarchitecture.com>
Cc: Sayeh Jolan <sjolan@evoqarchitecture.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: 121009 - 1500 Merivale - FUS Email Confirmation

Nathan,

I'm aware we've had this conversation over the phone previously but we need email records confirming the following;

Please clarify below for fire flow calculations:

- Sprinkler Reduction;
    - Adequately Designed System (NFPA 13) – **Y OR N YES**
    - Standard Water Supply – **Y OR N NOT IN OUR FIELD OF EXPERTISE. What would constitute a standard water supply? It will be whatever is necessary to service a 121 unit residential building fully sprinklered.**
    - Fully Supervised System – **Y OR N YES**

Curtis Ferguson, B.A.Sc., E.I.T. | Land Development
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331 | Fax: 613.254.5867

AVIS DE CONFIDENTIALITÉ : Le présent courriel en provenance d'EVOQ Architecture peut contenir des renseignements confidentiels ou privilégiés. Si vous avez vous reçu ce message par erreur, nous vous prions d'en aviser immédiatement l'expéditeur, de supprimer ce courriel et d'en détruire toute copie.
CONFIDENTIALITY NOTICE: The present email communication from EVOQ Architecture may contain information that is confidential or privileged. If you have received this email in error, please notify the sender and destroy this email immediately as well as any copies you may have of it.

Montreal, March 21, 2024

Curtis Ferguson
Novatech
240 Michael Cowpland Dr., Suite 200
OTTAWA, ON, K2M 1P6

RE: 1500 Merivale – Phase 1
EVOQ Project Ref : 9426-20-00

Curtis,

This letter is to certify that the project 1500 Merivale, Phase 1 and all subsequent phases as currently anticipated, will be built as *Fire-resistive construction (Type 1)* with structural elements being built of 2-hour rated poured-in-place concrete and minor elements in protected structural steel satisfying the conditions below:

As per the FUS, a building is considered to be of Fire-resistive construction (Type I) when all structural elements, walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating, and all materials used in the construction of the structural elements, walls, arches, floors, and roofs are constructed with non-combustible materials.

Yours truly,
EVOQ ARCHITECTURE INC.

Nathan Godlovitch, OAQ

Cc: Greg MacDonald, *Novatech*
Anthony Mertwarp, *Novatech*
Vincent Denomme, *Claridge Homes*

From: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Sent: Tuesday, January 10, 2023 8:53 AM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Subject: Fw: 1500 Merivale Water Boundary Conditions

Hello Anthony,

The following are boundary conditions, HGL, for hydraulic analysis at 1500 Merivale Road (zone ME) assumed to be connected to the 406 mm on Baseline Road (Zone 2W2C), as well as a 203 mm internal loop connected to the 305 mm on Merivale Road (see attached PDF for location).

	Merivale Road (Zone ME)		Baseline Road (Zone 2W2C)		
	Connection 1	Connection 2	Connection 3	Connection 4	Connection 5
	HGL (m)	HGL (m)	HGL (m)	HGL (m)	HGL (m)
Min HGL	144.7	144.7	124.9	124.9	124.9
Max HGL	157.9	157.9	133.0	133.0	133.0
Max Day + FF (117 L/s)	152.8	152.8	N/A	N/A	N/A
Max Day + FF (133 L/s)	N/A	N/A	127.5	127.4	127.2

The maximum pressure is estimated to be more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thanks

Eric Surprenant, CET
Sr, Project Manager, Infrastructure Projects, West
Planning, Real Estate & Economic Development
613 580-2424 ext.: 27794

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: December 6, 2022 13:21
To: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Subject: RE: 1500 Merivale Water Boundary Conditions

Hi Eric,

Presently phases 4-6 each are shown with individual connections to Baseline.
Phases 1-3 and 7-11 will be serviced by a proposed watermain on-site which will connect to Merivale in two locations as noted on the attached watermain connection figure.
Presently we are planning for a detailed submission of phase 1 and a serviceability level for the remaining phases.
Please let me know if you have any questions.

Regards,

Anthony Mestwarp, **P.Eng.**, Project Engineer | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216 | Fax: 613.254.5867

From: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Sent: Tuesday, December 6, 2022 12:22 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Subject: Fw: 1500 Merivale Water Boundary Conditions

Hello Anthony,
I just wanted to advise you that Abi will be taking over the review of this application. I have forwarded the Boundary Conditions request and wanted to confirm the approach we would like to take.

Proposed Development Conditions - Baseline Connections

	Building B Phase 4	Building C Phase 5	Building D Phase 6	Totals
Studio	8	10	20	38
1 Bed Apartment	181	170	120	471
2 Bed Apartment	28	65	33	126
3 Bed Apartment	10	12	23	45
Townhome	0	0	0	0
Number of units	227	257	196	680
Population	354.4	425.7	336.6	1116.7
Total Res Daily Volume	99232.00	119196.00	94248.00	312676.00
Commercial area (m2)	118.11	101.95	56.99	277.05
Total Com Daily Volume	952.5	822.18	459.60	2234.27
Total Daily Volume (Liters	100184.5	120018.2	94707.60	314910.3
Avg Day Demand (L/s)	1.160	1.389	1.096	3.64
Max Day Demand (L/s)	2.888	3.463	2.735	9.09
Peak Hour Demand (L/s)	6.347	7.613	6.014	19.974

Proposed Development Conditions - Merivale Connection

	Building A Phase 1	Building B Phase 2	Building B Phase 3	Building D Phase 7	Building D Phase 8	Building D Phase 9	Building E Phase 10	Building E Phase 11	Park	Totals
Studio	1	9	0	0	16	0	0	1		27
1 Bed Apartment	71	218	21	119	153	170	190	43		985
2 Bed Apartment	25	27	46	35	23	42	89	14		301
3 Bed Apartment	14	14	0	0	0	0	8	22		58
Townhome	7	8	0	8	6	0	0	5		34
Park Area (ha)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.56	0.56
Number of units	118	276	67	162	198	212	287	85	n/a	1405
Population	215.6	439.5	126	261.7	301.1	326.2	477.7	172.7	n/a	2320.5
Total Res Daily Volume	60368.00	123060.00	35280.00	73276.00	84308.00	91336.00	133756.00	48356.00	156.8	649896.80
Commercial area (m2)	168.52	135.26	n/a	n/a	n/a	156.36	412.3	170	n/a	1042.44

The Boundary conditions would be provided as 3 sets of Boundary Conditons given their connection points, instead of for every single phase.
So 1st would include Phases 1, 2, 3
2nd would include Phases 4, 5, 6
and 3rd would include Phases 7 through 11.
Please confirm what the plans are for looping internally and at what Phases.
Please also let me know if you have any questions or concerns with this approach.
Thanks
Eric Surprenant, CET
Sr, Project Manager, Infrastructure Projects, West
Planning, Real Estate & Economic Development
613 580-2424 ext.: 27794

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: November 30, 2022 3:34 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Greg MacDonald <g.Macdonald@novatech-eng.com>
Subject: RE: 1500 Merivale Water Boundary Conditions

Hi Santhosh,

I hope you are doing well.
Please find attached the updated water calculations for the 1500 Merivale site per the revised site plan.

They are also summarized below:

Merivale:

Phase 1: Avg day = 0.714, Max day = 1.77, Peak hour = 3.885, FUS= 67
Phase 2: Avg day = 1.437, Max day = 3.580, Peak hour = 7.868, FUS= 83
Phase 3: Avg day = 0.408, Max day = 1.021, Peak hour = 2.246, FUS= 33
Phase 7: Avg day = 0.848, Max day = 2.120, Peak hour = 4.665, FUS= 83
Phase 8: Avg day = 0.976, Max day = 2.439, Peak hour = 5.367, FUS= 100
Phase 9: Avg day = 1.072, Max day = 2.665, Peak hour = 5.854, FUS= 100
Phase 10: Avg day = 1.587, Max day = 3.928, Peak hour = 8.618, FUS= 117
Phase 11: Avg day = 0.576, Max day = 1.423, Peak hour = 3.121, FUS= 67
Park : Avg day = 0.002, Max day = 0.005, Peak hour = 0.010, FUS= N/A

Total : Avg day = 7.62, Max day = 18.95, Peak hour = 41.63 FUS (highest 117L/s)

Baseline Avenue:

Phase 4: Avg day = 1.160, Max day = 2.888, Peak hour = 6.347, FUS= 83
Phase 5: Avg day = 1.389, Max day = 3.463, Peak hour = 7.613, FUS= 133
Phase 6: Avg day = 1.096, Max day = 2.735, Peak hour = 6.014, FUS= 100

Total : Avg day = 3.64, Max day = 9.09, Peak hour = 19.974 FUS (highest 133L/s)

As you are aware the site will be developed over a number of years.

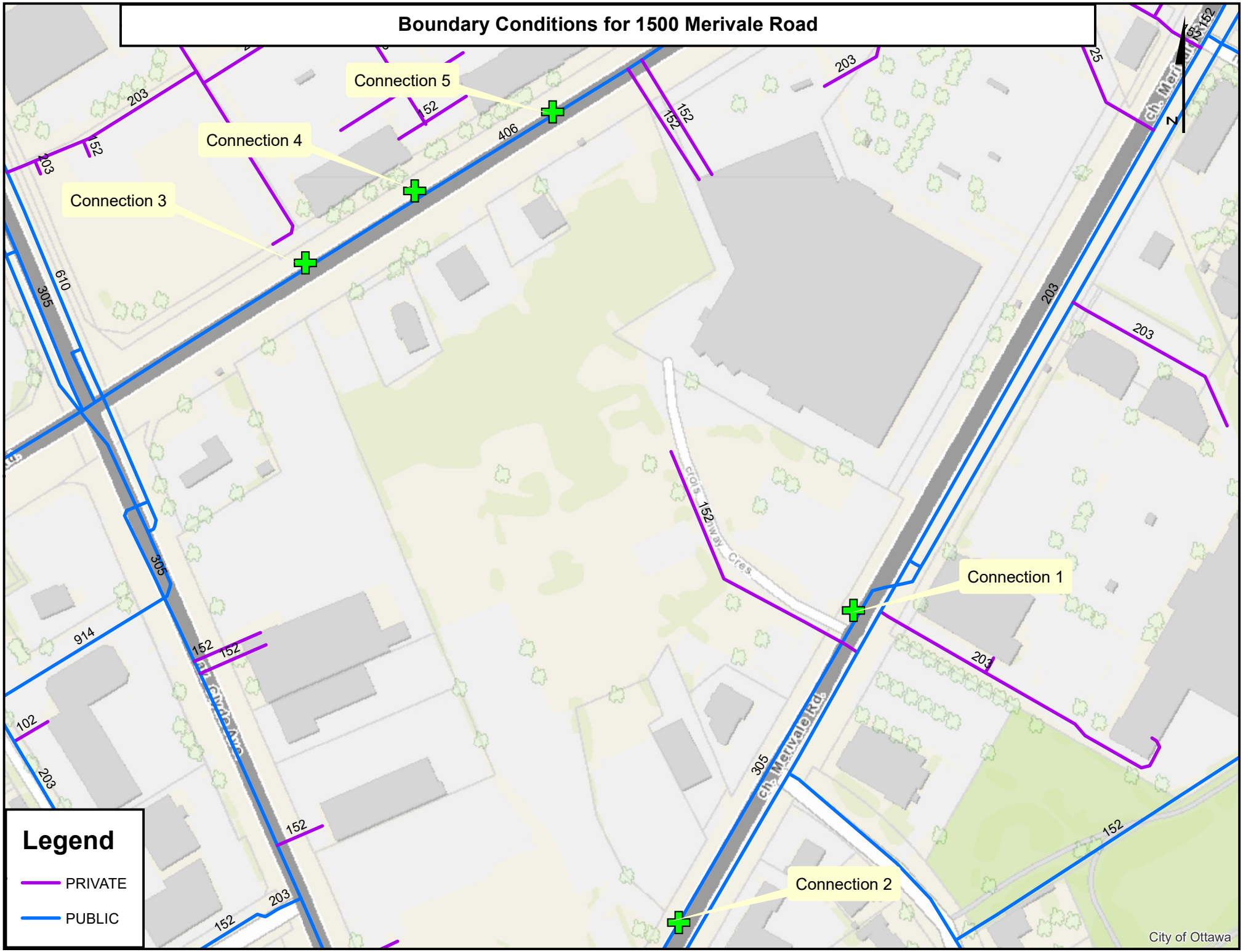
Calculations and figures are attached for your referance.

Please let us know if you require anything further.

Thanks,

Anthony Mestwarp, **P.Eng.**, Project Engineer | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216 | Fax: 613.254.5867

Boundary Conditions for 1500 Merivale Road



CALCULATED WATER DEMNADS

Connection 1 - (Merivale Road) [Phase 1]

Water Demands

Average Day (Maximum HGL)=	0.71	L/s
Maximum Day =	1.77	L/s
Peak Hour (Minimum HGL) =	3.89	L/s
Fire Flow (FUS) =	67.00	L/s

City of Ottawa Boundary Conditions:

Bounday conditions based on connection to 300mm dia. Watermain in Merivale Road

Average Day (Maximum HGL)=	157.9	m
Peak Hour (Minimum HGL) =	144.7	m
Max Day + Fire =	152.8	m

Watermain Analysis

Finished Floor Elevation = 96.00 m

High Pressure Test = Max. HGL -Finished Floor Elevation x 1.42197 PSI/m < 80 PSI

High Pressure = 88.02 PSI

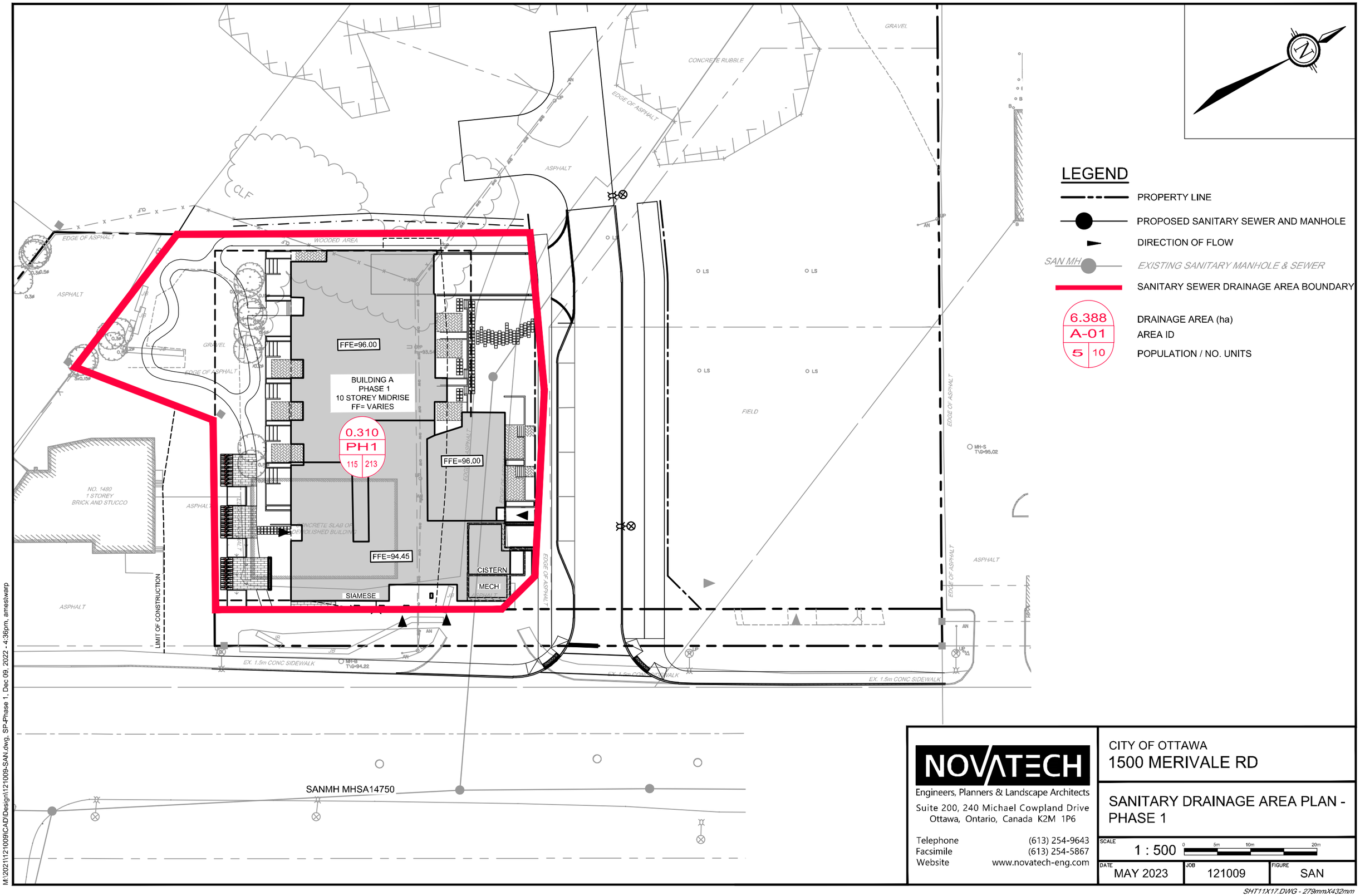
Low Pressure Test = Min. HGL - Finished Floor Elevation x 1.42197 PSI/m > 40 PSI

Low Pressure = 69.25 PSI

Max Day + Fire Test = Max Day + Fire Flow - Finished Floor Elevation x 1.42197 PSI/m > 20 PSI

Max Day + Fire = 80.77 PSI

Appendix C
Sanitary Servicing



LEGEND

- PROPERTY LINE
- PROPOSED SANITARY SEWER AND MANHOLE
- DIRECTION OF FLOW
- SAN MH — EXISTING SANITARY MANHOLE & SEWER
- SANITARY SEWER DRAINAGE AREA BOUNDARY
- 6.388 / A-01 / 5 | 10 — DRAINAGE AREA (ha) / AREA ID / POPULATION / NO. UNITS

M:\2021\121009\CAD\Design\121009-SAN.dwg, SP-Phase 1, Dec 09, 2022 - 4:36pm, amestwarp

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

CITY OF OTTAWA

1500 MERIVALE RD

SANITARY DRAINAGE AREA PLAN - PHASE 1

SCALE	DATE	JOB	FIGURE
1 : 500 (0, 5m, 10m, 20m)	MAY 2023	121009	SAN

SHT11X17.DWG - 279mmX432mm

SANITARY SEWER DESIGN SHEET

Novatech Project #: 121009
Project Name: 1500 Merivale Rd
Date Prepared: 5/29/2023
Date Revised:
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 121009 - SAN

PROJECT SPECIFIC INFO
USER DESIGN INPUT
CUMILATIVE CELL
CALCULATED DESIGN CELL OUTPUT

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				DEMAND																		DESIGN CAPACITY							
				RESIDENTIAL FLOW													COMMERCIAL FLOW					EXTRAN. FLOW	TOTAL DESIGN FLOW	PROPOSED SEWER PIPE SIZING / DESIGN							
STREET	AREA	FROM MH	TO MH	STUDIO	1 BED	2 BED	3 BED	TOWN HOME	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW Q(q) (L/s)	PEAKED DESIGN POP FLOW Q(p) (L/s)	DRAINAGE AREA (ha.)	CUMULATIVE RES DRAINAGE AREA (ha.)	COMMERICAL AREA (m)	CUMULATIVE COMMERICAL AREA (m)	AVG DESIGN COMMERICAL FLOW Q (c) (L/s)	COMMERICAL PEAK FACTOR	PEAKED DESIGN ICI FLOW Q (C) (L/s)	DESIGN EXTRAN. FLOW Q(e) (L/s)	TOTAL DESIGN FLOW Q(D) (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
MERIVALE ROAD - PHASE 1																													
Phase 1	PH1	STUB	EX.14750	1	71	25	14	7	0.216	0.216	3.51	0.70	2.45	0.310	0.310	153.000	153.000	0.01	1.00	0.01	0.10	2.57	27.6	200 PVC	0.203	0.013	0.95	33.4	1.03	7.7%

DEMAND EQUATION

Design Parameters:

1. Q(D)= Q(p) + Q(c) + Q(e)
2. Q(p) = (P x q x M x K / 86,400)
3. q Avg capita 280 L/per/day
4. M = Harmon Formula (maximum of 4.0)
5. K = 0.8
6. Park flow is considered equivalent to a single unit / ha
   Park Demand = 1 Single Unit Equivalent / Park ha
7. Q(e) = 0.33 L/sec/ha

Definitions:

Q(D) = Peak Design Flow (L/sec)
Q(e) = Extraneous Flow (L/sec)
Q(p) = Population Flow (L/sec)
K = Harmon Correction Factor
P = Residential Population

Studio	1 Bed	2 Bed	3 Bed	Townhome
1.4	1.4	2.1	3.1	2.7

Q(c) = Industrial / Commercial / Institutional Flow (L/sec)

	Commercial	Commercial	
Design =		75	L/9.3m2/day
ICI Peak *			
Design =	1.0	1.5	* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)

CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2)

Where : Q full = Capacity (L/s)

n = Manning coefficient of roughness (0.013)
A = Flow area (m^2)
R = Wetter perimenter (m)
So = Pipe Slope/gradient

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Thursday, August 11, 2022 10:03 AM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 121009 - 1500 Merivale

Hi Anthony

I don't have concerns with the proposed 2.6 L/s for phase 1 going to the existing Merivale Road outlet.

Regards
Eric

Eric Tousignant, P.Eng.
Senior Water Resources Engineer/ Ingénieur principal en resources hydriques
Infrastructure and Water Services / *services d'infrastructure et d'eau*
613-580-2424 ext 25129
Vacation Notice : Note that I will be away on vacation from July 25th to August 12, but will be checking emails periodically to forward them to appropriate staff.
From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: August 08, 2022 11:56 AM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: 121009 - 1500 Merivale

Hi Eric,

Following up after our meeting, the Phase 1 statistics are as follows:
68 – 1 Bedroom Units
25 – 2 Bedroom Units
15 – 3 Bedroom Units
7 – Ground floor townhome units
168.62m2 of commercial area
0.48ha of drainage area

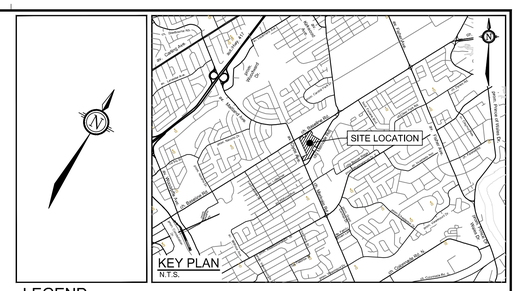
- Total population of **213** people
- Total design flow of **2.6L/s**

Please let us know if you require any further information to review the phase 1 flows.

Thanks,

Anthony Mestwarp, **P.Eng.**, Project Engineer | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216 | Fax: 613.254.5867

Appendix D
Storm Servicing



LEGEND

- PROPERTY LINE
- PROPOSED STORM SEWER AND MANHOLE
- DIRECTION OF FLOW
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- STM MH — EXISTING STORM MANHOLE & SEWER
- CB 1 — EXISTING CATCHBASIN
- STORM SEWER DRAINAGE AREA BOUNDARY
- 0.085 / A-16 / 0.78 — DRAINAGE AREA (ha) / DRAINAGE AREA ID / RUNOFF COEFFICIENT

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.

CLARIDGE HOMES

CLARIDGE HOMES
505 PRESTON STREET,
2ND FLOOR
OTTAWA , ONTARIO
K1S 4N7

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
2	REVISED AND ISSUED FOR CITY APPROVAL	DEC 09/2022	GJM
1.	ISSUED FOR SITE PLAN SUBMISSION	SEPT 03/2021	JAG

SCALE 1:750
1:750
0 10 20 30

DESIGN ARM
CHECKED GJM
DRAWN CJF/ARM
CHECKED ARM
APPROVED GJM

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
1500 MERIVALE
1500 MERIVALE, CITY OF OTTAWA

DRAWING NAME
STORM DRAINAGE AREA PLAN

PROJECT No. 121009
REV REV #1
DRAWING No. SWM

CITY FILE No.D07-12-21-0152
CITY PLAN No. 18612

M:\2021\121009\CAD\Dataset\121009-STM Area_SWM_Dec 09, 2022 - 1:43pm, simeshwarp

STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121009
Project Name: 15000 Merivale Road - Claridge Inc.
Date Prepared: 12/21/2021
Date Revised: 11/18/2022
Date Revised: 3/21/2024
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 121009-STM

Legend:
- PROJECT SPECIFIC INFO
- USER DESIGN INPUT
- CUMILATIVE CELL
- CALCULATED DESIGN CELL OUTPUT
- USER AS-BUILT INPUT

LOCATION		DEMAND													CAPACITY							
		AREA									FLOW					PROPOSED SEWER PIPE SIZING / DESIGN							
From MH	To MH	Area ID	Hardscape	Landscaping	Parkland	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr) 2yr	5yr	100yr	Peak Flow	TOTAL UNRESTRICTED PEAK FLOW (QDesign)	PIPE PROPERTIES LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
			0.90	0.20	0.40	(ha)				(min.)				(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
STREET 1 - PUBLIC SEWER RUN (100 SERIES)																								
109	108	A-06A	0.033	0.009		0.042	0.74	0.09																
			0.000					0.00																
			0.000					0.00																
		A-06B	0.030	0.010		0.039	0.73	0.08																
			0.000					0.00																
			0.000					0.00																
		A-05A	0.063	0.015		0.078	0.77	0.17																
			0.000					0.00																
			0.000					0.00																
		A-05B	0.054	0.015		0.068	0.75	0.14	0.47	10.00	76.81			36.43										
			0.000					0.00	0.00	10.00				0.00	**36.4**	78.1	300 PVC	0.3048	0.013	3.00	174.7	2.39	0.54	20.8%
			0.000					0.00	0.00	10.00				0.00										
108	107		0.000	0.000		0.000		0.00	0.47	10.54	74.78			35.47										
			0.000					0.00	0.00	10.54				0.00	**35.5**	13.7	300 PVC	0.3048	0.013	3.00	174.7	2.39	0.10	20.3%
			0.000					0.00	0.00	10.54				0.00										
107	106	A-04A	0.067	0.015		0.082	0.77	0.18																
			0.000					0.00																
			0.000					0.00																
		A-04B	0.051	0.015		0.066	0.74	0.14	0.79	10.64	74.44			58.60										
			0.000					0.00	0.00	10.64				0.00	**58.6**	17.3	300 PVC	0.3048	0.013	3.00	174.7	2.39	0.12	33.5%
			0.000					0.00	0.00	10.64				0.00										
106	105		0.000	0.000		0.000		0.00	0.79	10.76	74.01			58.26										
			0.000					0.00	0.00	10.76				0.00	**58.3**	13.0	300 PVC	0.3048	0.013	3.00	174.7	2.39	0.09	33.3%
			0.000					0.00	0.00	10.76				0.00										
BLDG3	105	BLDG3	0.076	0.000		0.076	0.90	0.19																
			0.000					0.00																
			0.000					0.00																
		P3-1	0.000	0.065		0.065	0.20	0.04	0.23	10.00	76.81			17.40										
			0.000					0.00	0.00	10.00				0.00	**15.9**	12.5	250 PVC	0.254	0.013	1.00	62.0	1.22	0.17	25.6%
			0.000					0.00	0.00	10.00				0.00										
105	104	A-03a	0.028	0.005		0.033	0.80	0.07																
			0.000					0.00																
			0.000					0.00																
		A-03b	0.036	0.010		0.046	0.75	0.10																
			0.000					0.00																
			0.000					0.00																
		A-02a	0.028	0.015		0.043	0.65	0.08																
			0.000					0.00																
			0.000					0.00																
		A-02b	0.053	0.015		0.068	0.74	0.14	1.40	10.85	73.69			103.11										
			0.000					0.00	0.00	10.85				0.00	**103.1**	57.6	375 PVC	0.381	0.013	2.00	258.7	2.27	0.42	39.9%
			0.000					0.00	0.00	10.85				0.00										
PARK	104	PARK1	0.000	0.000	0.521	0.521	0.40	0.58	0.58	10.00	76.81			44.46										
			0.000					0.00	0.00	10.00				0.00	**44.5**	8.1	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.10	44.1%
			0.000					0.00	0.00	10.00				0.00										
104	103		0.000	0.000		0.000		0.00	1.98	11.27	72.24			142.90										
			0.000					0.00	0.00	11.27				0.00	**142.9**	29.9	525 CONC	0.5334	0.013	0.30	245.7	1.10	0.45	58.1%
			0.000					0.00	0.00	11.27				0.00										
103	102	A-01a	0.070	0.009		0.079	0.82	0.18						0.00										
			0.000					0.00						0.00										
			0.000					0.00						0.00										
		A-01b	0.057	0.057		0.114	0.55	0.17	2.33	11.73	70.76			165.02										
			0.000					0.00	0.00	11.73				0.00	**165.0**	22.4	600 CONC	0.6096	0.013	0.30	350.8	1.20	0.31	47.0%
			0.000					0.00	0.00	11.73				0.00										

STORM SEWER DESIGN SHEET

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LOCATION		DEMAND													CAPACITY							
		AREA								FLOW					PROPOSED SEWER PIPE SIZING / DESIGN							
From MH	To MH	Area ID	Hardscape	Landscaping	Parkland	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr) 2yr	5yr	100yr	Peak Flow	TOTAL UNRESTRICTED PEAK FLOW (QDesign)	PIPE PROPERTIES LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
			0.90	0.20	0.40	(ha)				(min.)				(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
BLDG1	103	BLDG1	0.151	0.000		0.151	0.90	0.38																
			0.000					0.00																
			0.000					0.00																
		P1-1	0.068	0.068		0.136	0.55	0.21	0.21	10.00	76.81			15.99										
			0.000					0.00	0.00	10.00				0.00	**16.0**	6.8	250 PVC	0.254	0.013	1.00	62.0	1.22	0.09	25.8%
			0.000					0.00	0.00	10.00				0.00										
BLDG2	102	BLDG2	0.243	0.000		0.243	0.90	0.61																
			0.000					0.00																
			0.000					0.00																
		P2-1	0.000	0.163		0.163	0.20	0.09	0.70	10.00	76.81			53.59										
			0.000					0.00	0.00	10.00				0.00	**53.6**	13.3	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.16	53.1%
			0.000					0.00	0.00	10.00				0.00										
102	101		0.000	0.000		0.000		0.00	3.24	12.04	69.78			225.95										
			0.000					0.00	0.00	12.04				0.00	**225.9**	11.3	675 CONC	0.6858	0.013	0.30	480.3	1.30	0.14	47.0%
			0.000					0.00	0.00	12.04				0.00										
101	100		0.000	0.000		0.000		0.00	3.24	12.18	69.33			224.51										
			0.000					0.00	0.00	12.18				0.00	**224.5**	17.1	675 CONC	0.6858	0.013	0.30	480.3	1.30	0.22	46.7%
			0.000					0.00	0.00	12.18				0.00										
Private Road (300 SERIES)																								
311	310	B-04a	0.007	0.000		0.007	0.90	0.02																
			0.000					0.00																
			0.000					0.00																
		B-04b	0.007	0.004		0.011	0.65	0.02																
			0.000					0.00																
			0.000					0.00																
		B-05	0.123	0.007		0.130	0.86	0.31	0.35	10.00	76.81			26.79										
			0.000					0.00	0.00	10.00				0.00	**26.8**	38.5	300 PVC	0.3048	0.013	1.83	136.5	1.87	0.34	19.6%
			0.000					0.00	0.00	10.00				0.00										
310	309		0.000	0.000		0.000		0.00	0.35	10.34	75.51			26.34										
			0.000					0.00	0.00	10.34				0.00	**26.3**	10.5	300 PVC	0.3048	0.013	2.00	142.7	1.96	0.09	18.5%
			0.000					0.00	0.00	10.34				0.00										
309	308		0.000	0.000		0.000		0.00	0.35	10.43	75.18			26.22										
			0.000					0.00	0.00	10.43				0.00	**26.2**	22.1	375 PVC	0.381	0.013	1.50	224.0	1.96	0.19	11.7%
			0.000					0.00	0.00	10.43				0.00										
BLDG 7	308	BLDG7	0.192	0.000		0.192	0.90	0.48																
			0.000					0.00																
			0.000					0.00																
		P7-1	0.020	0.095		0.115	0.32	0.10	0.58	10.00	76.81			44.71										
			0.000					0.00	0.00	10.00				0.00	**44.7**	10.3	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.12	44.3%
			0.000					0.00	0.00	10.00				0.00										
308	307	B-03a	0.128	0.010		0.138	0.85	0.32																
			0.000					0.00																
			0.000					0.00																
		B-03b	0.035	0.019		0.054	0.66	0.10	1.35	10.62	74.50			100.87										
			0.000					0.00	0.00	10.62				0.00	**100.9**	60.9	450 PVC	0.4572	0.013	0.30	162.9	0.99	1.02	61.9%
			0.000					0.00	0.00	10.62				0.00										
307	306	B-02a	0.027	0.002		0.029	0.84	0.07																
			0.000					0.00																
			0.000					0.00																
		B-02b	0.015	0.003		0.018	0.77	0.04	1.46	11.64	71.02			103.73										
			0.000					0.00	0.00	11.64				0.00	**103.7**	25.7	525 CONC	0.5334	0.013	0.20	200.6	0.90	0.48	51.7%
			0.000					0.00	0.00	11.64				0.00										
BLDG8	306	BLDG8	0.191	0.000		0.191	0.90	0.48																
			0.000					0.00																
			0.000					0.00																
		P8-1	0.027	0.107		0.134	0.34	0.13	0.60	10.00	76.81			46.46										
			0.000					0.00	0.00	10.00				0.00	**46.5**	10.3	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.12	46.1%
			0.000					0.00	0.00	10.00				0.00										
306	305		0.000	0.000		0.000		0.00	2.07	12.12	69.52			143.59										
			0.000					0.00	0.00	12.12				0.00	**143.6**	22.9	525 CONC	0.5334	0.013	0.20	200.6	0.90	0.43	71.6%
			0.000					0.00	0.00	12.12				0.00										
305	304		0.000	0.000		0.000		0.00	2.07	12.54	68.24			140.95										
			0.000					0.00	0.00	12.54				0.00	**140.9**	6.0	525 CONC	0.5334	0.013	0.20	200.6	0.90	0.11	70.2%
			0.000					0.00	0.00	12.54				0.00										

STORM SEWER DESIGN SHEET

NOVATECH
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LOCATION			DEMAND													CAPACITY						
			AREA					FLOW								PROPOSED SEWER PIPE SIZING / DESIGN						
From MH	To MH	Area ID	Hardscape	Landscaping	Parkland	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr) 2yr	5yr	100yr	Peak Flow	TOTAL UNRESTRICTED PEAK FLOW (QDesign)	PIPE PROPERTIES LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
			0.90	0.20	0.40	(ha)				(min.)				(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
BLDG 9	304	BLDG9	0.202	0.000		0.202	0.90	0.51																
			0.000					0.00																
			0.000					0.00																
		P9-2	0.023	0.103		0.126	0.33	0.11																
			0.000					0.00																
			0.000					0.00																
		P9-1	0.237	0.036		0.273	0.81	0.61	1.23	10.00	76.81			94.83										
			0.000					0.00	0.00	10.00				0.00	**94.8**	10.4	375 PVC	0.381	0.013	1.00	182.9	1.60	0.11	51.8%
			0.000					0.00	0.00	10.00				0.00										
BLDG 11	304	BLDG11	0.111	0.000		0.111	0.90	0.28																
			0.000					0.00																
			0.000					0.00																
		P11-1	0.040	0.000		0.040	0.90	0.10																
			0.000					0.00																
			0.000					0.00																
		P11-2	0.000	0.049		0.049	0.20	0.03	0.41	10.00	76.81			31.12										
			0.000					0.00	0.00	10.00				0.00	**31.1**	3.7	250 PVC	0.254	0.013	1.00	62.0	1.22	0.05	50.2%
			0.000					0.00	0.00	10.00				0.00										
304	303	B-01a	0.088	0.011		0.099	0.82	0.23																
			0.000					0.00																
			0.000					0.00																
		B-02b	0.043	0.007		0.050	0.80	0.11	4.04	12.66	67.92			274.56										
			0.000					0.00	0.00	12.66				0.00	**274.6**	12.0	675 CONC	0.6858	0.013	0.20	392.2	1.06	0.19	70.0%
			0.000					0.00	0.00	12.66				0.00										
303	302		0.000	0.000		0.000		0.00	4.04	12.84	67.37			272.36										
			0.000					0.00	0.00	12.84				0.00	**272.4**	9.9	675 CONC	0.6858	0.013	0.20	392.2	1.06	0.16	69.4%
			0.000					0.00	0.00	12.84				0.00										
302	301		0.000	0.000		0.000		0.00	4.04	13.00	66.93			270.57										
			0.000					0.00	0.00	13.00				0.00	**270.6**	3.9	675 CONC	0.6858	0.013	0.20	392.2	1.06	0.06	69.0%
			0.000					0.00	0.00	13.00				0.00										
BLDG 10	301	BLDG 10	0.326	0.000		0.326	0.90	0.82																
			0.000					0.00																
			0.000					0.00																
		P10-1	0.055	0.098		0.154	0.45	0.19																
			0.000					0.00																
			0.000					0.00																
		P10-2	0.017	0.044		0.061	0.40	0.07																
			0.000					0.00																
			0.000					0.00																
		P10-3	0.024	0.064		0.088	0.39	0.10	1.17	10.00	76.81			90.08										
			0.000					0.00	0.00	10.00				0.00	**90.1**	13.5	375 PVC	0.381	0.013	1.00	182.9	1.60	0.14	49.2%
			0.000					0.00	0.00	10.00				0.00										
301	300		0.000	0.000		0.000		0.00	5.22	13.06	66.76			348.16										
			0.000					0.00	0.00	13.06				0.00	**348.2**	21.5	750 CONC	0.762	0.013	0.25	580.7	1.27	0.28	60.0%
			0.000					0.00	0.00	13.06				0.00										

STORM SEWER DESIGN SHEET

NOVATECH
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LOCATION			DEMAND													CAPACITY						
			AREA								FLOW					PROPOSED SEWER PIPE SIZING / DESIGN						
From MH	To MH	Area ID	Hardscape	Landscaping	Parkland	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)			Peak Flow	TOTAL UNRESTRICTED PEAK FLOW (QDesign)	PIPE PROPERTIES					CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
											2yr	5yr	100yr			LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE				
			0.90	0.20	0.40	(ha)				(min.)				(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
BASELINE SEWER RUN (PHASE4)																								
BLDG 4	503	BLDG 4	0.242	0.000		0.242	0.90	0.61	0.61	10.00	76.81			46.56	**46.6**	17.3	300 PVC	0.3048	0.013	2.00	142.7	1.96	0.15	32.6%
			0.000					0.00	0.00	10.00				0.00										
			0.000					0.00	0.00	10.00				0.00										
BASELINE SEWER RUN (PHASE5)																								
BLDG5	EX	BLDG5	0.336	0.000		0.336	0.90	0.84																
			0.000					0.00																
			0.000					0.00																
		P5-1	0.130	0.050		0.181	0.70	0.35																
			0.000					0.00																
			0.000					0.00																
		P5-2	0.036	0.065		0.101	0.45	0.13	1.32	10.00	76.81			101.48	**101.5**	17.6	300 PVC	0.3048	0.013	2.00	142.7	1.96	0.15	71.1%
			0.000					0.00	0.00	10.00				0.00										
			0.000					0.00	0.00	10.00				0.00										
BASELINE SEWER RUN (PHASE3)																								
BLDG6	502	BLDG3	0.190	0.000		0.190	0.90	0.48																
			0.000					0.00																
			0.000					0.00																
		P6-1	0.000	0.105		0.105	0.20	0.06																
			-17.000	17.000				0.00																
			0.000					0.00																
		P6-2	0.153	0.037		0.189	0.76	0.40	0.94	10.00	76.81			71.91	**71.9**	17.6	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.21	71.3%
			0.000					0.00	0.00	10.00				0.00										

DEMAND EQUATION
Q = 2.78 AIR

Where : Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
R = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)
Rainfall Intensity (I) is based on City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (Oct. 2012)

CAPACITY EQUATION
Q full= (1/n) A R^(2/3)So^(1/2

Where : Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A = Flow area (m^2)
R = Wetter perimenter (m)
So = Pipe Slope/gradient

Appendix E
Stormwater Management

PROJECT #: 121009
PROJECT NAME: 1500 Merivale Road
LOCATION: 1500 Merivale Road, City of Ottawa

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Engineers, Planners & Landscape Architects

DATE PREPARED: December 2022

TABLE 5A: Post-Development Runoff Coefficient "C" - Phase 1

			5 Year Event		100 Year Event		
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$	
Total	Hard	0.117	0.90		1.00		* Remainder assumed hard due t
0.287	Roof	0.151	0.90	0.85	1.00	0.95	*Roof area based on building foot
	Soft	0.019	0.20		0.25		* Soft area based on parkland de

TABLE 5B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Phase 1

0.287 =Area (ha)
0.85 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	15	61.77	42.03	10.0	32.03	28.83
	20	52.03	35.41	10.0	25.41	30.49
	25	45.17	**30.74**	**10.0**	**20.74**	**31.11**
	30	40.04	27.25	10.0	17.25	31.05
	35	36.06	24.54	10.0	14.54	30.53

TABLE 5C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Phase 1

0.287 =Area (ha)
0.85 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	25	60.90	41.44	10.0	31.44	47.16
	30	53.93	36.70	10.0	26.70	48.06
	35	**48.52**	**33.02**	**10.0**	**23.02**	**48.34**
	40	44.18	30.07	10.0	20.07	48.16
	45	40.63	27.65	10.0	17.65	47.65

TABLE 5D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Phase 1

0.287 =Area (ha)
0.95 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	55	59.62	45.17	10.0	35.17	116.06
	60	55.89	42.35	10.0	32.35	116.44
	65	**52.65**	**39.88**	**10.0**	**29.88**	**116.55**
	70	49.79	37.72	10.0	27.72	116.43
	75	47.26	35.80	10.0	25.80	116.10

TABLE 5E: 100+20 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Phase 1

0.287 =Area (ha)
0.95 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR +20%	70	59.75	45.26	10.0	35.26	148.11
	75	56.71	42.96	10.0	32.96	148.32
	80	**53.99**	**40.90**	**10.0**	**30.90**	**148.33**
	85	51.54	39.05	10.0	29.05	148.16
	90	49.33	37.37	10.0	27.37	147.82

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient

I is the rainfall intensity, City of Ottawa IDF

A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 5F: Structure information - Phase 1

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv IN	Inv OUT
STORAGE TANK	N/A	48.59	90.30	N/A	n/a

TABLE 5G: Storage Provided - Phase 1

Area A-2: Storage Table				
Elevation (m)	System Depth (m)	TANK Volume (m^3)	Underground Volume (m^3)*	
90.350	0.00	0.00	0.00	
90.450	0.10	4.86	4.86	
90.550	0.20	9.72	9.72	
90.650	0.30	14.58	14.58	
90.750	0.40	19.44	19.44	
90.850	0.50	24.29	24.29	
90.950	0.60	29.15	29.15	
91.050	0.70	34.01	34.01	
91.150	0.80	38.87	38.87	
91.250	0.90	43.73	43.73	
91.350	1.00	48.59	48.59	
91.450	1.10	53.45	53.45	
91.550	1.20	58.31	58.31	
91.650	1.30	63.17	63.17	
91.750	1.40	68.03	68.03	
91.850	1.50	72.88	72.88	Tank Storage
91.950	1.60	77.74	77.74	
92.050	1.70	82.60	82.60	
92.150	1.80	87.46	87.46	
92.250	1.90	92.32	92.32	
92.350	2.00	97.18	97.18	
92.450	2.10	102.04	102.04	
92.550	2.20	106.90	106.90	
92.650	2.30	111.76	111.76	
92.750	2.40	116.62	116.62	
92.850	2.50	121.47	121.47	
92.950	2.60	126.33	126.33	
93.050	2.70	131.19	131.19	
93.150	2.80	136.05	136.05	
93.250	2.90	140.91	140.91	
93.350	3.00	145.77	145.77	
93.450	3.10	150.63	150.63	
93.550	3.20	155.49	155.49	
93.650	3.30	160.35	160.35	Top of tank
93.750	3.40	160.46	160.46	
93.800	3.45	160.52	160.52	
93.900	3.55	160.63	160.63	Riser
94.000	3.65	160.74	160.74	
94.100	3.75	160.86	160.86	
94.200	3.85	160.97	160.97	
94.300	3.95	161.08	161.08	Proposed Lid elevation

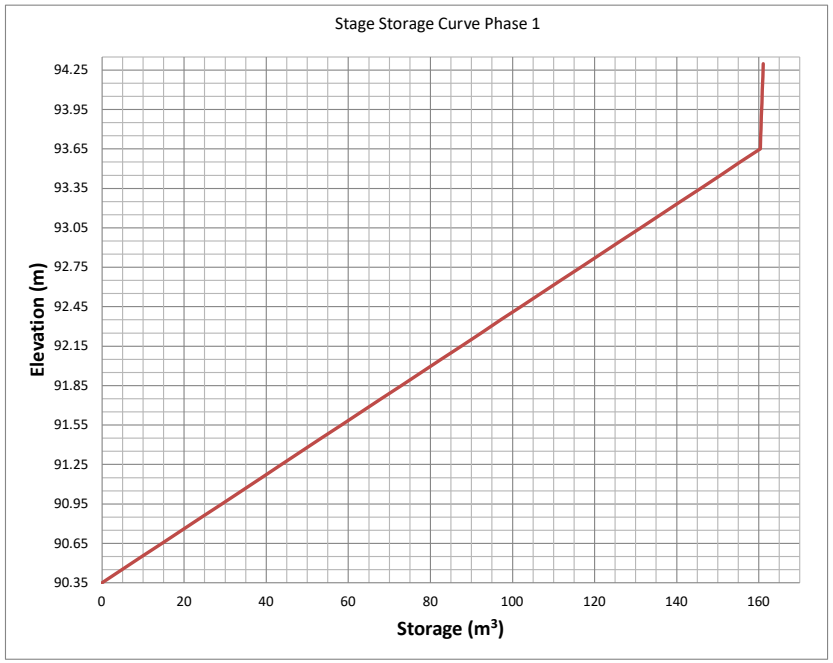

TABLE 5H: Orfice Sizing information- Phase 1

Control Device	PUMP				
Design Event	**Flow (L/S)**	**Depth (m)**	**Elev (m)**	**Outlet dia. (mm)**	**Required Volume (m^3)**
1:2 Year	10.0	0.64	90.99	250.00	31.11
1:5 Year	10.0	0.99	91.34	250.00	48.34
1:100 Year	10.0	2.40	92.75	250.00	116.55
1:100+20% Year	10.0	3.05	93.40	200.00	148.33

Appendix F
Drawings