BAYVIEW WATERIDGE INC.

1000 AND 1050 TAWDINA STREET, RESIDENTIAL DEVELOPMENT, OTTAWA, ON

SERVICING REPORT

JANUARY 16, 2023
2ND SUBMISSION

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SERVICING REPORT

BAYVIEW WATERIDGE INC.

SITE PLAN APPLICATION
2ND SUBMISSION

PROJECT NO.: 221-00473-00
DATE: JANUARY 2023

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1 GENERAL

1.1 EXECUTIVE SUMMARY

WSP was retained by Bayview Wateridge Inc. to provide servicing and grading design services for the proposed new residential development consists of three residential developments sites at 1375 Hemlock Road, 1345 Hemlock Road and 375 Codd's Road, located at the northeast corner of Codd's Road and Hemlock Road within the Wateridge Subdivision developed by Canada Land Company (CLC). The construction of sewers and base course asphalt have been completed on Codd's Road, Hemlock Road and Barielle Snow Street, on which the three properties will front. All services for the three development sites will be available from Codd's Road and Barielle-Snow Street. The subjected developments are bounded by the Phase 1 and Phase 2 of the subdivision development. The future Phase 2A, 2C and 2D subdivision development is proposed north of the site along Tawadina Road which is currently under construction. This report outlines findings and calculations pertaining to the servicing of the proposed development for building 1, 2 and 3 with a gross lot area of 0.519 Ha, 0.374 Ha and 0.374 Ha respectively.

The surrounding neighbourhood is being developed by CLC with the IBI Group providing engineering design services. Information regarding the proposed municipal services was provided by IBI, as described in Design Brief – Wateridge Village at Rockcliffe Phase 1B, Project: 38298-5.2.2, Revised June 16, 2017. And the services have been modified once again during construction of phase 2B, changes have been made on Design Brief – Wateridge Village at Rockcliffe Phase 2B, Project: 118863-5.2.2, revised April 2019. Excerpts from the two Design Briefs are provided in Appendix A of this report.

Currently the land proposed for the residential development is the predeveloped vacant land mainly covered by grass and it is part of the Wateridge Subdivision Development. The total study area for all three sites were considered to be 0.519 Ha, 0.374 Ha and 0.374 Ha in size. The site for Building 1 is bounded by existing residential development to the east, and future residential development to the north, west and south. Building 2 is bounded by future residential development to the north, east and south, and future park to the west. Building 3 is bounded by future residential development to the north, east and west, and future park to the south.

They are blocks 11, 12, 13 from the registered plan 4m-1651, City of Ottawa (refer to Appendix A for the Topographical Survey Plan by Annis, O'Sullivan, Vollebekk Ltd, February 2022). Based on the topographic survey, the ground is sloping from Tawadina Road down to Hemlock Street, temporary swales and ditch inlet catchbasins have been installed to convey the overland runoff to the existing storm sewers along Codd's Road and Hemlock Street. Significant infrastructure has been previously installed around the perimeter of the development lands as part of the development of the Wateridge subdivision. Most of the infrastructure have been designed with enough capacity to accommodate the future development of the subject sites. The existing piped stormwater system within Wateridge subdivision development Phase 2B conveys drainage to the existing eastern SWM facility next to the Sir-George Etienne Cartier then discharges to the existing Ottawa River to the north.

As per the Wateridge Subdivision Development 2B Design Briefs and the Assessment of Revised Block 11 and 12 Storm and Sanitary Servicing Report by IBI Group, the following criteria apply: runoff from all storm events up to and including the 1:100 year event must be restricted to a calculated rate based on the simulated flow of 105 l/s, 95 l/s and 139 l/s for parcel 2, 3 and 5 respectively.

Also, as part of the Wateridge Village low impact development (LID) Demonstration project, this phase will include stormwater management treatment strategies that maximize pervious surfaces and increase infiltration and groundwater recharge through of lot-level (source), conveyance and end-of-pipe stormwater management controls.

From both IBI design briefs and LID check list, the subject sites will need to provide infiltration and active storage to accommodate runoff from the first 15mm rain event to 1:100-year event. Stormwater quality control is not required for these sites.

Design of a drainage and stormwater management system in this development have been prepared in accordance with the following documents:

- Sewer Design Guidelines, City of Ottawa, October 2012;
- Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003; and
- Stormwater Management Facility Design Guidelines, City of Ottawa, April 2012

This report was prepared utilizing servicing design criteria obtained from available sources, and outlines the design for water, sanitary wastewater, and stormwater facilities.

The format of this report matches that of the servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications, November 2009.

The following municipal services are available within Campeau Drive and Cordillera Street to the development as recorded from as-built drawings from City of Ottawa:

Codd's Road:

- 750 mm concrete storm sewer, 250mm PVC sanitary sewer and 406mm PVC watermain.

Bareille-Snow Street:

- 525mm concrete storm sewer, 250mm PVC sanitary and 203mm PVC watermain.

Hemlock Road:

- 1200mm concrete storm sewer, 250mm PVC sanitary and 305mm PVC watermain.

It is proposed that:

- On-site stormwater management systems, employing underground infiltration chamber will be provided to attenuate flow rates leaving the sites as much as possible to achieve the developed flow rate by IBI Group and LID requirements. Existing drainage patterns, previously established controlled flow rates and storm sewers will be maintained. Refer to SWM report for details calculation.

1.2 DATE AND REVISION NUMBER

This version of the report is the second revision, dated January 16, 2023.

1.3 LOCATION MAP AND PLAN

The proposed residential developments at 1000 and 1050 Tawdina Street, in the City of Ottawa at the location shown in Figure 1-1 below.

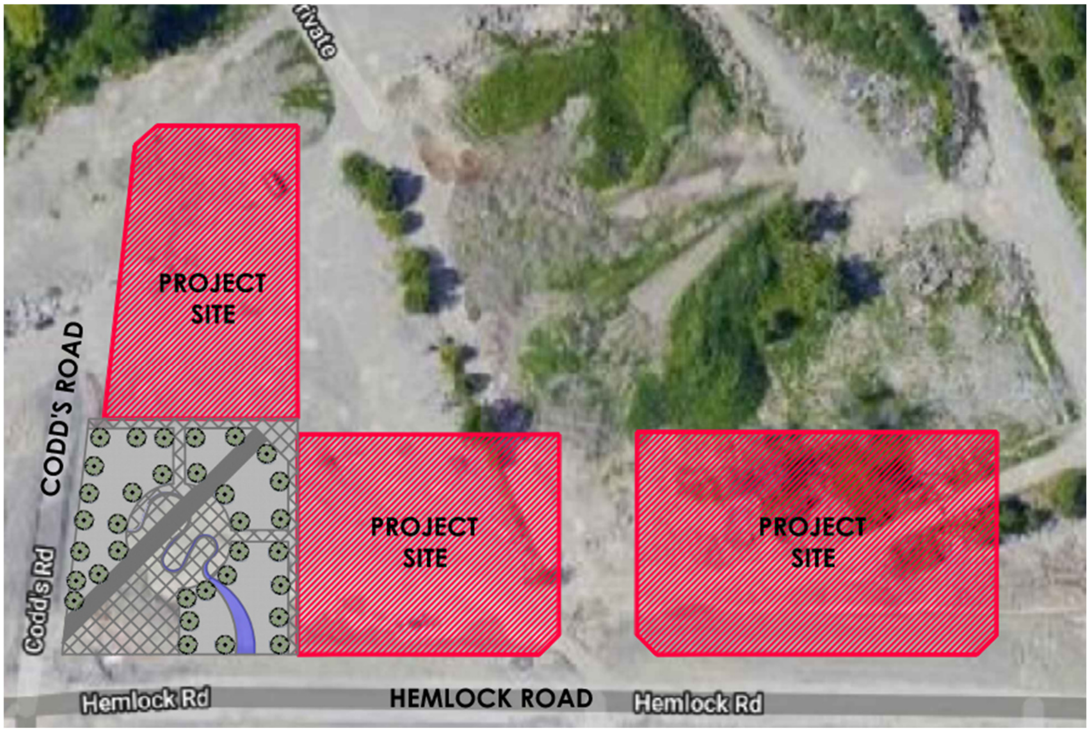


Figure 1-1 Site Location

1.4 PRE-CONSULTATION MEETINGS

A pre-consultation meeting was held with the City of Ottawa on February 3, 2022. Notes from this meeting are provided in Appendix A.

1.5 HIGHER LEVEL STUDIES

The review for servicing has been undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including:
  - Technical Bulletin ISDTB-2012-4 (20 June 2012)
  - Technical Bulletin ISDTB-2014-01 (05 February 2014)
  - Technical Bulletin PIEDTB-2016-01 (September 6, 2018)
  - Technical Bulletin ISDTB-2018-01 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)

- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
    - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
    - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 2022.

1.6 AVAILABLE EXISTING AND PROPOSED INFRASTRUCTURE

A municipal sanitary sewer, a municipal storm sewer and a watermain are located within both Codd's Road and Bareille-Snow Street right of way. A new sanitary sewer, two new storm sewers and a new water service will be connected to the existing sewers along Codd's Road from the proposed development of building 3. A new sanitary sewer, two new storm sewers and a new water service will be connected to the existing sewers along Bareille-Snow Street from both the proposed development of building 1 and 2. Ultimately, the storm flows from Codd's Road and Bareille-Snow Street (servicing the three sites) to the Hemlock Road storm sewer are intended to be directed to a permanent stormwater management pond that will provide quality and quantity treatment for most of the phase 1 and phase 2 development of the Wateridge Subdivision, and including the three subjected sites. Quality control is also not required on the subjected sites. The existing boundary roads at the site will remain open.

1.7 CONCEPT LEVEL MASTER GRADING PLAN

A detailed grading plan for all three sites have been developed, matching the existing overland flow pattern of directing overflow drainage to Hemlock Road. The site topographic survey, included in Appendix A, provides evidence of direction of overland flow of all three sites.

The proposed grading will be reviewed by the geotechnical engineer. The geotechnical investigation was completed in August 2022 by Yuri Mendez Engineering. The grading along the site boundaries bordering Wateridge lands have been coordinated with Wateridge's engineering consultant. The site topographic survey provides evidence of direction of overland flow of the site. Minor grade changes will be made to grades at the development perimeter for the proposed entrances.

Grading will employ smooth transitions from the new work areas to existing grades with less than 4.0% slope. No changes will be made to grades at the development perimeter other than the locations mentioned above.

1.8 GEOTECHNICAL SUTDY

A geotechnical investigation report has been prepared by Yuri Mendez Engineering (Memo No. 44-BHH-R0, May 24, 2022), and its recommendations has been taken into account in developing the engineering specifications. Yuri Mendez Engineering has also prepared a follow up commentary based on a geotechnical review of the proposed grading plan to access the soil amendment at the landscaping area. The letter can be found in Geotechnical report.

2 WATER DISTRIBUTION

2.1 CONSISTENCY WITH MASTER SERVICING STUDY AND AVAILABILITY OF PUBLIC INFRASTRUCTURE

There are an existing 406mm diameter municipal watermain along Codd's Road and 203mm diameter municipal watermain along Bareille-Snow Street providing water to building 1, 2 and 3.

All buildings will be protected with supervised automatic fire protection sprinkler system and will require dual 203mm diameter water services. The fire department connection for Building 1 and 2 are located at the south side of the buildings fronting to Hemlock Road. They are within 45m from the existing municipal fire hydrant on Hemlock Road. The fire department connection for Building 3 is located at the west side of the building fronting to Codd's Road which is within 45m from one of the existing municipal fire hydrants on Codd's Road. No changes are required to the existing City water distribution system to allow servicing for all three properties.

All three buildings will be serviced with dual water services connections and an isolation valve in between will be made to the existing 203mm diameter municipal watermain on Bareille-Snow Street for the proposed Building 1 and 2, and made to the existing 406mm diameter municipal watermain on Codd's Road for Building 3. The Dual 203mm diameter private water services connecting the existing municipal watermain will provide redundancy for the proposed buildings. The dual 203mm dia. water services will be extended 1 meter away from the building mechanical room.

2.2 SYSTEM CONSTRAINTS AND BOUNDARY CONDITIONS

Boundary conditions have been provided by the City of Ottawa at the 406mm diameter watermain on Codd's Road for the Building 3 development and at the 203mm diameter watermain on Bareille-Snow Street and for both Building 1 and 2 developments, and are included in Appendix B. A maximum fire flow of 117 l/s (7,000 l/min) was used for Building 1 development and 67 l/s (400 l/min) was used for both Building 2 and 3 which were calculated in Section 2.4. The boundary conditions were supplied by the City of Ottawa, based on fire flows and domestic demands estimated by WSP for the proposed residential development.

The IBI hydraulic modelling indicated the hydraulic pressure for different scenario conditions were also shown below, based on fire flows and domestic demands estimated by IBI Group for the proposed developments.

Table 2-1: Boundary Conditions

BOUNDARY CONDITIONS			
SCENARIO	Building 1 Bareille-Snow Street	Building 2 Bareille-Snow Street	Building 3 Codd's Road
Maximum HGL	143	143	143
Minimum HGL (Peak Hour)	143	143	143

Max Day + Fire Flow (117 l/s)	141.1	N/A	N/A
Max Day + Fire Flow (67 l/s)	N/A	142.1	142.8

Table 2-2: IBI Hydraulic Modelling Results from Phase 1B

	Hydraulic Modelling Results @ J62	Hydraulic Modelling Results @ J32	Hydraulic Modelling Results @ J64
Basic Day (MAX HGL) at HGL 143.0m	520.6 kPa	537.8 kPa	527.9 kPa
Peak Hour (MIN HGL) at HGL 142.0m	506.9 kPa	524.0 kPa	514.1 kPa
Max Day + Fire Flow at HGL 139.5 – 140.2m	773.2 l/s	872.3 l/s	804.4 l/s

Table 2-3: IBI Hydraulic Modelling Results from Phase 2B

	Hydraulic Modelling Results @ J62	Hydraulic Modelling Results @ I16	Hydraulic Modelling Results @ J64
Basic Day (MAX HGL) at HGL 143.0m	559.5 kPa	560.9 kPa	566.8 kPa
Peak Hour (MIN HGL) at HGL 142.0m	506.7 kPa	508.1 kPa	514.0 kPa
Max Day + Fire Flow at HGL 139.5 – 140.2m	862.9 l/s	469.1 l/s	810.9 l/s

2.3 CONFIRMATION OF ADEQUATE DOMESTIC SUPPLY AND PRESSURE

Water demands are based on Table 4.2 of the Ottawa Design Guidelines – Water Distribution. As previously noted, the development is considered as institutional development, consisting of an Athletics and Recreation Centre providing food service, gymnasium and leisure facilities. A water demand calculation sheet is included in Appendix B, and the total water demands are summarized as follows:

	Building 1	Building 2	Building 3
Average Day	1.32 l/s	0.81 l/s	0.82 l/s
Maximum Day	3.30 l/s	2.01 l/s	2.05 l/s
Peak Hour	7.25 l/s	4.41 l/s	4.51 l/s

The 2010 City of Ottawa Water Distribution Guidelines stated that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

<u>Building 1 at Bareille-Snow Street:</u>

Water pressure at municipal connection check:

Min. HGL @ Building 1 – Pavement elevation = 143.0m – 88.99m = 54.01m = 529.52 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Building 1 – Finished floor elevation = 143.0m – 89.77 = 53.23m = 521.87 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Building 1 – Finished floor elevation = 143.0m-89.77m = 53.23m = 521.87 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 1 - Finished floor elevation = 141.1m-89.77m = 51.33m = 503.25 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 521.87 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

<u>Building 2 at Bareille-Snow Street:</u>

Water pressure at municipal connection check:

Min. HGL @ Building 2 – Pavement elevation = 143.0m – 89.50m = 53.05m = 520.11 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Building 2 – Finished floor elevation = 143.0m – 89.47 = 53.53m = 524.82 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Building 2 – Finished floor elevation = 143.0m-89.47m = 53.53m = 524.82 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 2 - Finished floor elevation = 142.1m-89.47m = 52.63m = 515.99 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 524.82 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

Building 3 at Codd's Road:

Water pressure at municipal connection check:

Min. HGL @ Building 3 – Pavement elevation = 143.0m – 90.19m = 52.81m = 517.76 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Building 3 – Finished floor elevation = 143.0m – 90.85 = 52.15m = 511.29 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Building 3 – Finished floor elevation = 143.0m-90.85m = 52.15m = 511.29 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 3 - Finished floor elevation = 142.80m-90.85m = 51.95m = 509.33 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 511.29 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

2.4 CONFIRMATION OF ADEQUATE FIRE FLOW PROTECTION

The fire flow rate has been calculated using the Fire Underwriters Survey (FUS) method. The method takes into account the type of building construction, the building occupancy, the use of sprinklers and the exposures to adjacent structures. Assuming fire resistive construction and a fully supervised sprinkler system, a fire flow demand of 7000 l/min (117 l/s) for Building 1, 4000 l/min (67 l/s) for Building 2 and Building 3 have been calculated. A copy of the calculation is included in Appendix B.

For Building 1, the demand of 7,000 l/min can be delivered through two existing municipal fire hydrants. One existing municipal fire hydrant is located at the intersection of Bareille-Snow Street and Hemlock Road is within 45 m of the building FDC, and is rated at 5,700 l/min. The other existing municipal fire hydrant is located at Bareille-Snow Street, slightly north of the site, is within 95m of the FDC and is rated at 3,800 l/min. The two hydrants have a combined total of 9,500 l/min.

For Building 2 the demand of 4,000 l/min can be delivered through two existing municipal fire hydrants. One existing municipal fire hydrant is located at Hemlock Road which is within 45 m of the building FDC, and is rated at 5,700 l/min. The other existing municipal fire hydrant is located at the intersection of Bareille-Snow Street and Hemlock Road, is within 85m of the FDC and is rated at 3,800 l/min. The two hydrants have a combined total of 9,500 l/min.

For Building 3 the demand of 4,000 l/min can be delivered through two existing municipal fire hydrants. One existing municipal fire hydrant is located at Codd's Road which is within 45 m of the building FDC, and is rated at 5,700 l/min. The other existing municipal fire hydrant is located at the intersection of Codd's Road and Tawadina Road, is within 80m of the FDC and is rated at 3,800 l/min. The two hydrants have a combined total of 9,500 l/min.

The proposed buildings will be serviced by dual 203 mm services off the existing municipal watermain. The services will run into the water entry room. The proposed buildings will be fully sprinklered and fire protection will be provided with the fire department Siamese connection within 45 m of the existing public fire hydrant from municipal Street.

The boundary condition for Maximum Day and Fire Flow results in a pressure of 503.25 kPa, 515.99 kPa and 509.33 kPa at the ground floor level for Building 1, 2 and 3 respectively. In the guidelines, a minimum residual pressure of 140 kPa must be maintained in the distribution system for a fire flow and maximum day event. As a pressure of approximate 500 kPa is achieved, the fire flow requirement is exceeded.

2.5 CHECK OF HIGH PRESSURE

High pressure is not a concern. The maximum water pressure inside the building at the connection is determined with the maximum HGL condition, resulting in a pressure of 521.87 kPa, 524.82 kPa and 511.29 kPa for Building 1, 2 and 3 which are less than the 552 kPa threshold in the guideline in which pressure control is required. Based on this result, pressure control is not required for all the proposed building.

2.6 RELIABILITY REQUIREMENTS

DMA chamber as per city of Ottawa standard W3 and shot off valve will be provided at the study boundary for all Building 1, 2 and 3 from Bareille-Snow Street and Codd's Road. For both building 1 and 2, water can be supplied to the private watermain from both side of Bareille-Snow Street, north and south, and can be isolated. For building 3, water can be supplied to the private watermain from both side of Codd's Road.

2.7 DESCRIPTION OF PROPOSED WATER DISTRIBUTION NETWORK

A 203 mm private watermain looping is proposed to be provided into the proposed building. The two 203 mm private water services will be merge inside the building before connecting to the water meter. No private hydrant is required for all three sites.

3 WASTEWATER DISPOSAL

3.1 DESIGN CRITERIA

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria have been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design;

• Minimum Velocity	0.6 m/s
• Maximum Velocity	3.0 m/s
• Manning Roughness Coefficient	0.013
• Average sanitary flow for residential use	280 L/cap/day
• Average sanitary flor for commercial use	28,000 L/Ha/day
• Commercial/Institutional Peaking Factor	1.5
• Infiltration Allowance (Total)	0.33 L/s/Ha
• Minimum Sewer Slopes – 200 mm diameter	0.32%

3.2 CONSISTENCY WITH MASTER SERVICING STUDY

For Building 1 and 2, the outlet for the private sanitary sewer network is the 250 mm diameter municipal sewer on Bareille-Snow Street.

For Building 3, the outlet for the private sanitary sewer network is the 250 mm diameter municipal sewer on Codd's Road.

The Ottawa Sewer Design Guidelines provide estimates of sewage flows based on residential development. A sanitary design sheet has been attached to Appendix C for reference.

3.3 DESCRIPTION OF EXISTING SANITARY SEWER

The outlet sanitary sewer for Building 1 and 2 is the existing 250 mm diameter sewer on Bareille-Snow Street. The outlet sanitary sewer for Building 3 is the existing 250 mm diameter sewer on Codd's Road. Both of these local sewers will outlet to 375mm diameter sewer on Codd's Road south of Hemlock Road. The 375mm trunk sewer will outlet to Codd's Road Shaft 2400mm diameter sewer, then discharge to municipal wastewater treatment facility.

3.4 VERIFICATION OF AVAILABLE CAPACITY IN DOWNSTREAM SEWER

For Building 1 and 2, the capacity of the downstream 250 mm diameter sewer on Bareille-Snow Street at 2.05% slope is 85.14 l/s, which is adequate for the flow assumptions from the proposed building 1 and 2, 4.50 l/s and 2.8 l/s, plus the external areas assumed by IBI Group. This existing sewer at Bareille-Snow Street also services approximately 8.825 ha of the future development on the north side of Building 1 and 2. Based on the assumption from Wateridge Subdivision Phase 2B, those future area generates a proportional flow of 22.56 l/s, then the combined existing and anticipated flow estimate is 28.45 l/s.

For Building 3, the capacity of the downstream 250 mm diameter sewer on Codd's Road at 1.50% slope is 72.83 L/s, which is adequate for the flow assumptions from the proposed Building 3, 2.87 l/s. This existing sewer also services approximately 0.60 ha of the future area on the west side of Codd's Road. This existing area generates a proportional flow of 1.58 l/s, then the combined existing and anticipated flow estimate is 4.35 l/s.

3.5 CALCULATIONS FOR NEW SANITARY SEWER

A sanitary sewer design sheet is provided for all three buildings. See Appendix C for details.

3.6 DESCRIPTION OF PROPOSED SEWER NETWORK

The proposed sanitary sewer network on site for all three buildings will consist of a 200 mm diameter building service, and one new 1200 mm diameter manhole for each building.

4 SITE STORM SERVICING

4.1 EXISTING CONDITION

The subjected property is located within the Wateridge Subdivision Development area east of Codd's Road, north of Hemlock Street and South of Tawadina Street. Runoff from the subjected lands is ultimately directed to the existing SWM pond next to Sir-George-Etiene-Cartier Parkway. The existing SWM pond ultimately outlets to the Ottawa River. The available drainage outlet for Building 1 and 2 is the 525 mm diameter concrete storm sewer on Bareille-Snow Street. The available drainage outlet for Building 3 is the 750 mm diameter concrete storm sewer on Codd's Road. Runoff from these sewers will eventually be conveyed to the existing SWM pond via the 3000 mm diameter concrete trunk sewer along Hemlock Road, east of Codd's Road and Hemlock Road intersection.

Based on the IBI Phase 1B and 2B Design Briefs, drainage released from the site to the City storm sewer are show as follow.

Table 4-1: IBI Storm Water Modelling Results from Phase 2B and updated Evaluation 2022

Block	Phase 2B Design Brief				Current Evaluation					
	Drainage Area ID	Minor System Capture		Required On-Site Storage (cu-m)	Parcel	Drainage Area ID	Minor System Capture		Major System	
		Simulated Flow (l/s)	Corresponding Design Storm				Simulated Flow (l/s)	Corresponding Design Storm	Required On-Site Storage (cu-m)	Comment
11	B309	370	Between 5 and 100	None	1	B309_1	195	Between 5 and 100 year	43	Control up to the 100 year event
					2	B309_2	105	5 year	64	Control up to the 100 year event
12	B340	366	Between 5 and 100	None	3	B340_3	95	Between 5 and 100 year	18	Control up to the 100 year event
					4	B340_4	150	Between 5 and 100 year	21	Control up to the 100 year event
					5	B340_5	139	100 year	None	N/A

Since Phase 2B Design Brief is the latest design report, the allowable release rate for each site will be calculated based on the assumption IBI has made on the Phase 2B Design Brief and the updated Evaluation. The total study area for all three sites were considered to be 0.519 Ha, 0.374 Ha and 0.374 Ha in size. Thus, the allowable release rate for each site will be 105 l/s, 150 l/s and 139 l/s for Building 1, 2 and 3 respectively.

4.2 ANALYSIS OF AVAILABLE CAPACITY IN PUBLIC INFRASTRUCTURE

Using the Rational Method, with coefficient of 0.25 for pervious areas, 0.75 for gravel areas, 0.90 for impervious areas, 1.0 for roof areas, and a 10-minute time of concentration, results in an estimated 2-year flow of 81.43 l/s from Building 1, 61.13 l/s from Building 2, and 55.09 l/s from Building 3. The receiving 525 mm diameter storm sewer on Bareille-Snow Street has been designed with the capacity to accept 358.26 l/s from Building 1 and 2, and other future areas. And the receiving 750 mm diameter storm sewer on Codd's Road has also been designed with the capacity to accept 246.92 l/s from Building 3 and other future areas. Capacity in the minor system is not a concern. Refer to storm sewer design on Appendix D for details.

4.3 DRAINAGE DRAWING

Drawing C103, C204 and C205 shows the receiving storm sewer and site storm sewer network for Building 1, 2 and 3. Drawing C102, C202 and C03 provide proposed grading and drainage, and includes existing grading information. Site sub-area information and storm sewer design sheet attached in Appendix D.

4.4 WATER QUANTITY CONTROL OBJECTIVE

Refer to the Stormwater Management Report for the water quantity objective for the site.

4.5 WATER QUALITY CONTROL OBJECTIVE

RVCA has no objection to the development. As the proposed modification in use of the site will result in less runoff leaving the sites, drainage from the proposed sites will be attenuated to the underground chamber for infiltration as per the LID requirements, a conceptual net improvement in stormwater water quality in anticipated.

4.6 DESIGN CRITERIA

The stormwater system was designed following the principles of dual drainage, making accommodation for both major and minor flow.

Some of the key criteria include the following:

• Design Storm (minor system)	1:2 year return (Ottawa)
• Rational Method Sewer Sizing	
• Initial Time of Concentration	10 minutes
• Runoff Coefficients	
Landscaped Areas	C = 0.25
Asphalt/Concrete	C = 0.90
Traditional Roof	C = 0.90
• Pipe Velocities	0.80 m/s to 6.0 m/s
• Minimum Pipe Size	250 mm diameter (200 mm CB Leads and service pipes)

4.7 PROPOSED MINOR SYSTEM

The detailed design for this site will maintain the existing storm sewer network to Codd's Road and Hemlock Road intersection of the development site. The drainage system consists of a series of manholes, catchbasins and storm sewers leading to the underground chambers for each site. All drainage areas on the site are collected in the site piped drainage system.

It is also customary for larger buildings to be provided with piped storm services for roof drainage. There are no downspouts proposed. Separate outlet pipes are provided for foundation drains, and therefore roof drainage will not negatively impact the foundation. The foundation drains are connected to the storm sewer downstream of inlet control which is downstream of the controlled flow point, ensuring an unobstructed flow for these areas.

Using the above noted criteria, the existing on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated post development storm sewer drainage area plan are included in Appendix C.

4.8 WATERCOURSES

The minor flow will be directed to existing SWM pond and ultimately directed to the Ottawa River.

4.9 IMPACTS TO RECEIVING WATERCOURSES

No significant negative impact is anticipated to downstream receiving watercourses due to proposed quantity and quality control measures, the separation of the site from the eventual receiving watercourse as a result of discharge through City owned sewers, and the existing stormwater management pond on the south side of Sir-George-Etienne Cartier Parkway.

5 SEDIMENT AND EROSION CONTROL

5.1 GENERAL

During construction, existing storm sewer system can be exposed to sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings will be used including;

- Filter cloths will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a “filter sock.” Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed, these structures will be covered to prevent sediment from entering the minor storm sewer system. These measures will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are placed in stockpiles. Mitigative measures and proper management to prevent these materials entering the sewer system are needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally placed before any catchbasins are installed.

Refer to the Erosion and Sedimentation Control Plan C09, C10 and C11 provided in Appendix E.

6 APPROVAL AND PERMIT REQUIREMENTS

6.1 GENERAL

The proposed development is subject to site plan approval and building permit approval.

No approvals related to municipal drains are required.

No permits or approvals are anticipated to be required from the Ontario Ministry of Transportation, National Capital Commission, Parks Canada, Public Works and Government Services Canada, or any other provincial or federal regulatory agency.

7 CONCLUSION CHECKLIST

7.1 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development can meet all provided servicing constraints and associated requirements. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

7.2 COMMENTS RECEIVED FROM REVIEW AGENCIES

This is the 2nd submission. Responses to first round comments is attached.

APPENDIX

A

- PRE-CONSULTATION MEETING NOTES
- TOPOGRAPHIC SURVEY PLAN
- IBI CONFIRMATION EMAIL
- IBI DESIGN BRIEF AND UPDATED MEMO REPORT (ATTACHED SEPERATELY)

1000/1050 Tawadina Road, Ottawa
Meeting Date: Thursday, February 3, 2022
PC2022-0013
MS Teams

Attendees:

City of Ottawa:
Allison Hamlin, File Lead, Senior Planner
Wally Dubyk, Transportation
Christopher Moise, Urban Designer
Parthvi Patel, Student Planner

Applicant Team:
Rod Price
Alnoor Gulamani
Sameer Gulamani

Waterridge Community Association:
Jane Thompson
Darren Kipp

Subject: Proposal for a four-building, 9-storey development at 1000/1050 Tawadina Road

Proposal Details:

- Development of 4 nine storey apartment buildings, with a total of 480 units with ground floor commercial
- One level of underground parking should accommodate each building. Street level visitor parking will be tucked behind and away from street views.

Technical Comments – City Staff

Urban Design Comments – Christopher Moise

- All mixed-use blocks are subject to review by the Urban Design Review Panel. If the mixed-use components stand apart from the proposed blocks, they will be subject to internal review, if they fit within the blocks, this project will have to attend the UDRP.
- There is some very strong design direction in the CDP on pages 101 and 102, which speak to several issues that have not been addressed yet (such as articulation and active frontages). It is encouraged to look at this document closely to help in the design development phase.
- How is this project aligned with the master plan, the master plan had a different vision for how the ground plane is being treated? The landscaping thoughts around the outside of these blocks is appreciated, but the inside of these blocks seem to be largely vehicle oriented. The percentage of vehicular infrastructure may need to be thought through to be more efficient with less runs and dead ends in roads.

- Consider the treatment of landscaping between the commercial and street and how the building transitions down to the park – more of an urbanized landscape.
- The building has a very long frontage, consider looking into its articulation how to make that space more interactive with the environment and community.
- The massing model shows a commercial sized floor at-grade, any private units at grade will be problematic, the ground floor should be a combination of commercial and amenity space for tenants.

Planning Comments – Allison Hamlin

- There needs to be a greater consideration of how the surface areas can be less car-oriented
- There is some commercial proposed, but not every unit along the ground floor is commercial. In the future, it is likely that more people and tenants are to come to the area. Consider examining a commercial frontage along Hemlock.
- There are active frontage requirements, ensure that all units have a main door, not just an entrance from the hallway.

Transportation Comments – Wally Dubyk

- Submit a screening form to determine if a transportation impact assessment report will be required.
- The laneways should be at least 6 meters wide to accommodate a fire truck.
- Show where bicycle parking spaces will be located.

Community Comments – Jane Thompson, Darren Kipp

- The secondary plan mentions building frontages. Hemlock is the main street, which is the building frontage. This same frontage wraps around the two parks and is envisioned as a space that has cafes and commercial. This is the core of the community, and it is critical that both sides of the square have commercial uses as residential uses will be uncomfortable and won't reflect the intention of the space.
- The space should be designed so that it is convertible to commercial in the future.
- Groceries, pharmacies, restaurants, stores, and basic community services are some commercial uses that the community is looking for.
- A large community concern is that there is a lack of street parking as current parking is overtaken by demand. Residents on site will have trouble looking for parking outside of the site if it is not provided.

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE:_____________

____
ANDREW J. BROXHAM
ONTARIO LAND SURVEYOR

PLAN 4R-

RECEIVED AND DEPOSITED
DATE: _____________

____
REPRESENTATIVE FOR
LAND REGISTRAR FOR THE
LAND TITLES DIVISION OF
OTTAWA-CARLETON NO. 4.

SCHEDULE

AREA (Sq.m.) below	AREA (Sq.m.) above	PART	BLOCK	CONCESSION/PLAN	PIN
	2.25	1	ALL OF 13	4M-1651	ALL OF 04273-0842
	0.91	2			
	16.75	3			
	1.20	4			
	2.28	5			
2.25		6			
0.91		7			
16.75		8			
1.20		9			
2.28		10			
	3.59	11	ALL OF 12	4M-1651	ALL OF 04273-0841
	10.80	12			
	3341.2	13			
3.59		14			
10.80		15			
3341.2		16			
	4.50	17			
	3.00	18			
	5256.9	19			
	2.12	20			
4.50		21			
3.00		22			
5256.9		23			
2.12		24			
	1133.3	25			
	462.9	26			
	2120.8	27			
	18.40	28			
1133.3		29			
462.9		30			
2120.8		31			
18.40		32			
	12.00	33	ALL OF 11	4M-1651	ALL OF 04273-0840
	4.50	34			
	3730.1	35			
	640.3	36			
	2800.9	37			
12.00		38			
4.50		39			
3730.1		40			
640.3		41			
2800.9		42			
	4.50	43			
	3.00	44			
	5162.2	45			
	24.44	46			
4.50		47			
3.00		48			
5162.2		49			
24.44		50			

Parts 6 to 10 (both inclusive), 14, 15, 16, 21 to 24 (both inclusive), 29 to 32 (both inclusive), 38 to 42 (both inclusive), 47 to 50 (both inclusive): Subject to easement Inst. OC1771382.

Parts 11 to 50 (both inclusive) : Subject to easement Inst. OC2201021.

Parts 28, 32, 46, 50 : Subject to easement Inst. OC2090069.

Parts 20, 24, 26, 30, 36, 41 : Subject to easement Inst. OC1755037.

STRATA PLAN OF SURVEY OF

BLOCKS 11, 12, 13
REGISTERED PLAN 4M-1651
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the __ day of ________, 2022.

____
Date

____
Andrew J. Broxham
Ontario Land Surveyor

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
(WIT)	"	Witness
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	"	Measured
(P1)	"	Registered Plan 4M-1651
(P2)	"	Registered Plan 4M-1581
↑	"	Continues Without Limit
Ⓥ	"	Vertical Limit
Ⓗ	"	Horizontal Limit

Parts 1 to 50 (both inclusive) are limited vertically.

All found survey monuments are (AOG) unless otherwise noted.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999947.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, and are referenced to Specified Control Points 01919680105 and 019198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919680105 and 01918434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 01919680105	Northing	5024915.16	Easting	373971.65
. 019198434761	Northing	5036178.12	Easting	372436.11
. Point A	Northing	5035324.64	Easting	372560.98
. Point B	Northing	5035304.64	Easting	372798.60

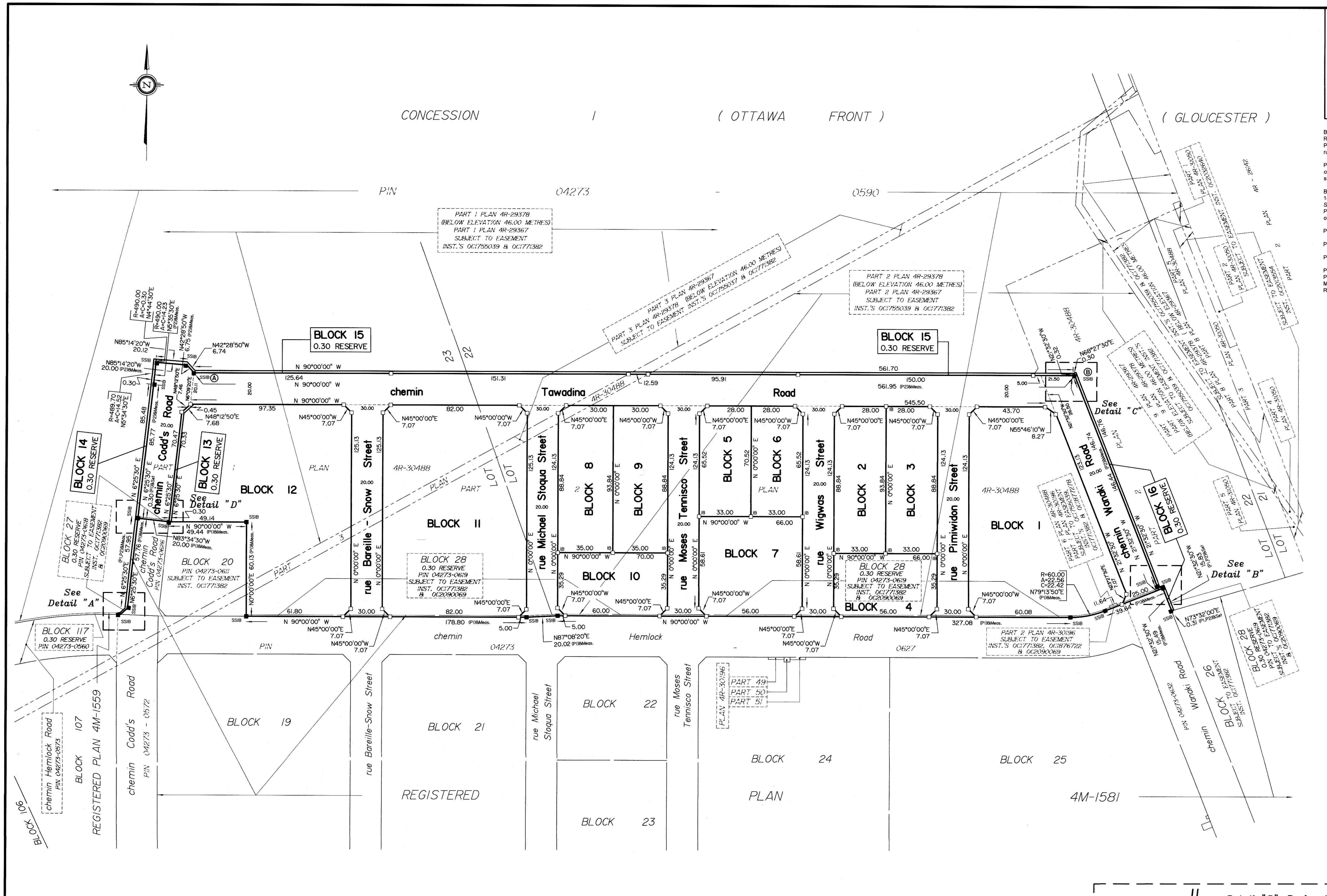
Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

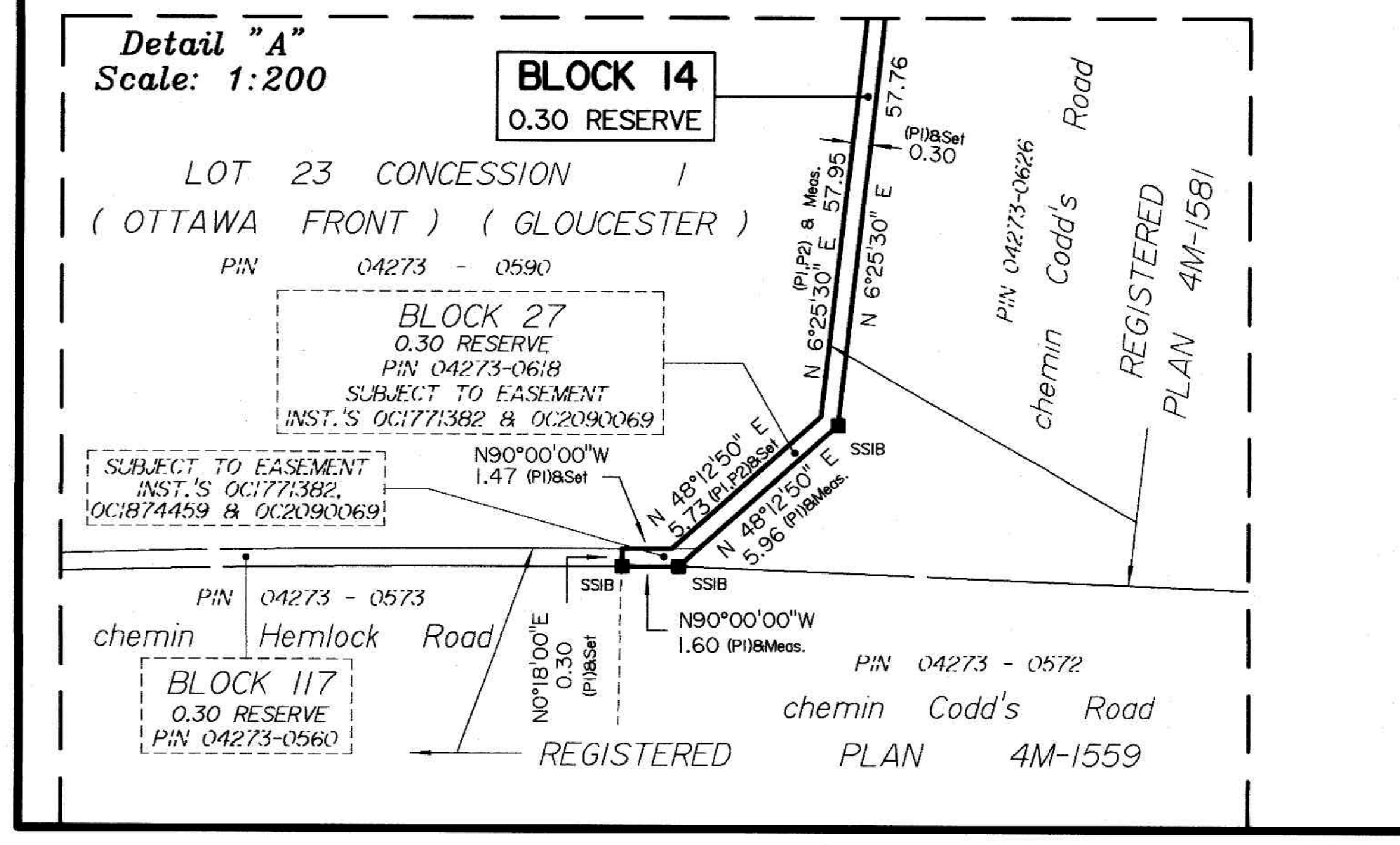
ELEVATION NOTES

1. Elevations are geodetic and referred to City of Ottawa Vertical Bench Mark No. 396 (01919680138), having an elevation of 95.06 metres.

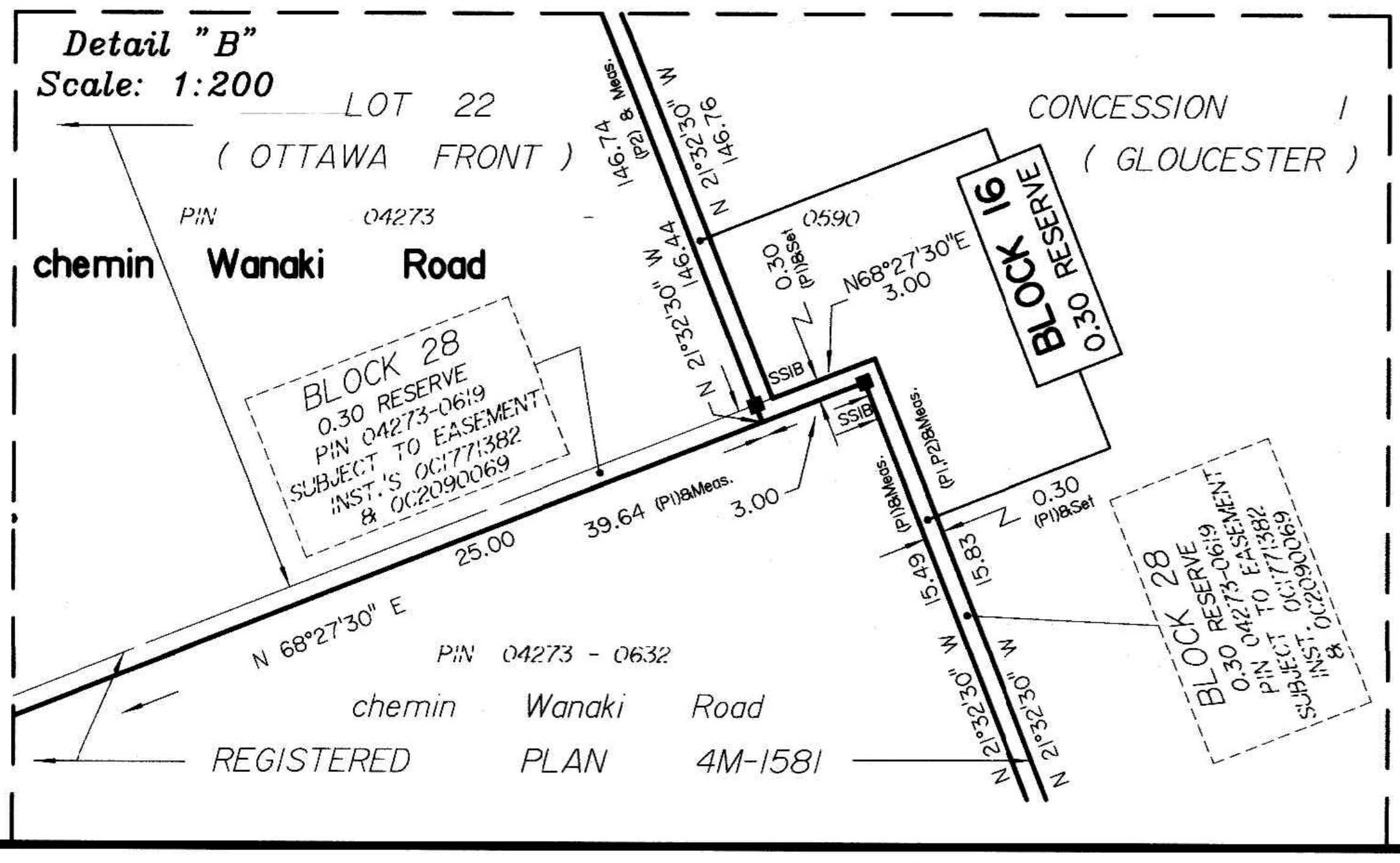
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 21181-20 CLC Blk 11&12 R D1 ig

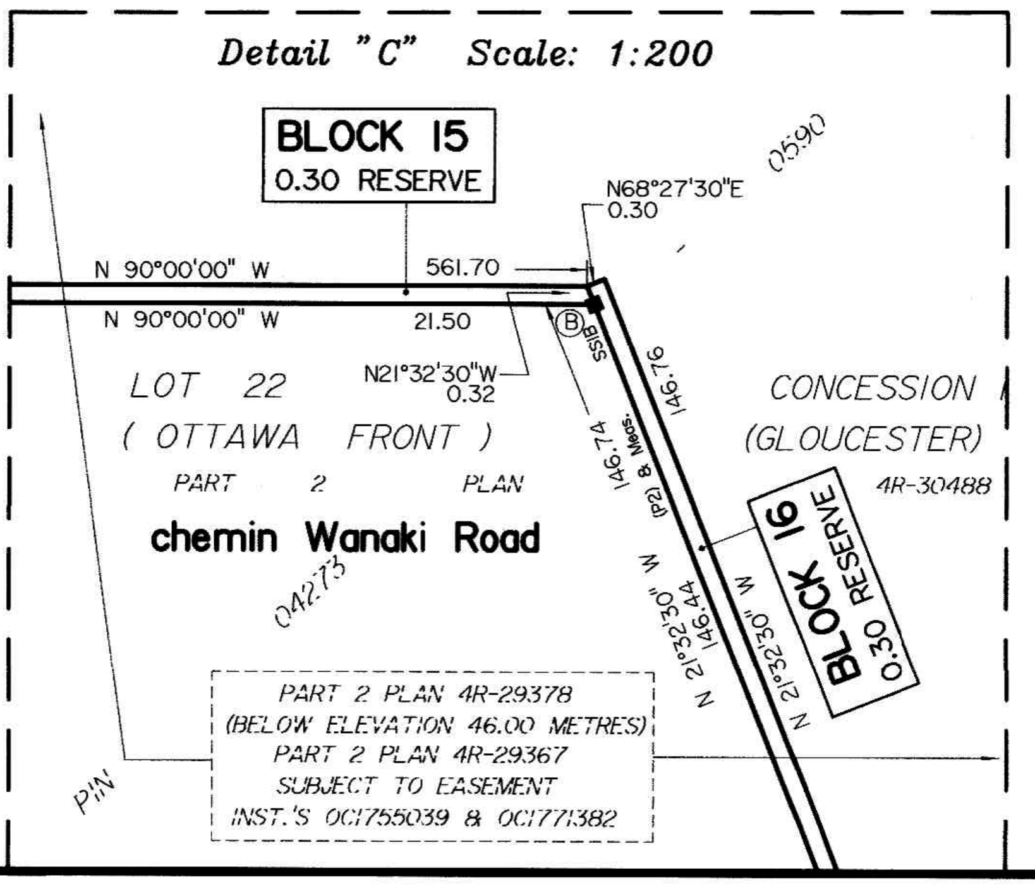




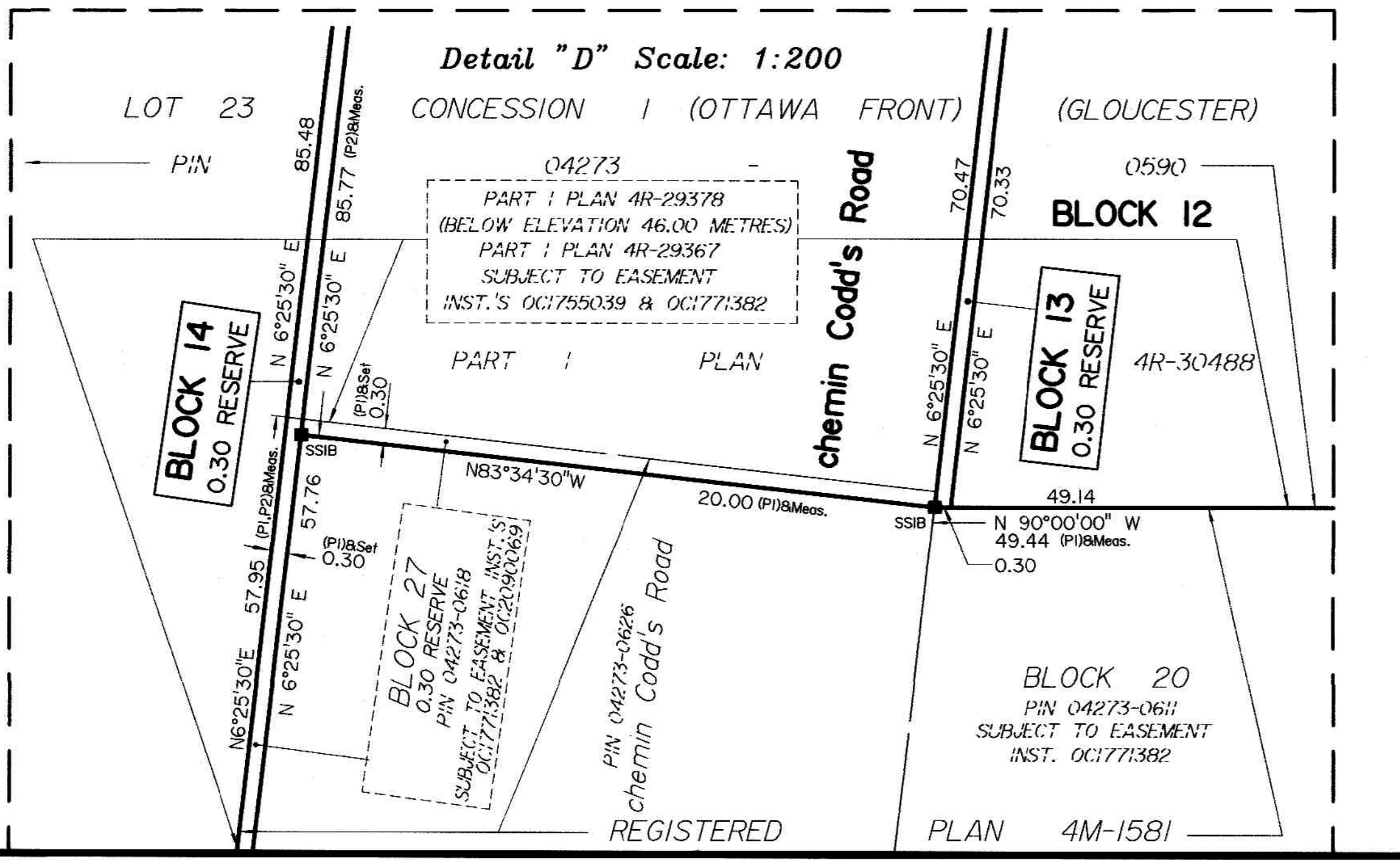
Detail "A" Scale: 1:200



Detail "B" Scale: 1:200



Detail "C" Scale: 1:200



Detail "D" Scale: 1:200

APPROVED UNDER SECTION 51 OF THE PLANNING ACT
BY THE CITY OF OTTAWA.

THIS 25 DAY OF February, 2020

STEPHEN WILLIS, MCIP, RPP,
GENERAL MANAGER
PLANNING, INFRASTRUCTURE AND ECONOMIC
DEVELOPMENT DEPARTMENT
CITY OF OTTAWA

PLAN 4M- 1651

I CERTIFY THAT THIS PLAN
IS REGISTERED IN THE LAND REGISTRY OFFICE
FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4
AT 11:36 O'CLOCK ON THE 3rd DAY OF March 2020
AND ENTERED IN THE PARCEL REGISTER FOR
PROPERTY IDENTIFIERS 04273-0590, 04273-0618 AND 04273-0619

AND THE REQUIRED CONSENTS ARE REGISTERED AS
PLAN DOCUMENT NO. OC2197707

C. Holloway
REPRESENTATIVE FOR LAND REGISTRAR

This plan comprises all of PIN 04273-0618 and 04273-0619 and part of PIN 04273-0590.

Blocks 1 to 16, both inclusive, rue Bareille-Snow Street, chemin Codd's Road, rue Michael Stoqua Street, rue Moses Tennisco Street, rue Pimiwidon Street, chemin Tawadina Road, chemin Wanaki Road and rue Wigwas Street are subject to easement Inst. OC1771382.

Part of Blocks 8, 11, 12 and 15, Part of rue Bareille-Snow Street, Part of rue Michael Stoqua Street and Part of chemin Tawadina Road are subject to easement Inst. OC1755037.

Blocks 2, 3, 5, 6, 9 and 13 and Part of Blocks 1, 4, 7, 8, 10, 11, 12, 14 , 15 and 16, Part of rue Bareille-Snow Street, Part of rue Michael Stoqua Street, Part of rue Moses Tennisco Street, Part of rue Pimiwidon Street, Part of chemin Tawadina Road, Part of chemin Wanaki Road and Part of rue Wigwas Street are subject to easement Inst. OC1755039.

Part of Block 1 is subject to easement Inst. OC1876722.

Part of Block 1 is subject to easement Inst. OC1877278.

Part of Block 14 is subject to easement Inst. OC1874459.

Part of Blocks 1, 4, 7, 10, 11, 12, 14, 16, chemin Wanaki Road, rue Pimiwidon Street, rue Wigwas Street, rue Moses Tennisco Street, rue Michael Stoqua Street, rue Bareille-Snow Street and chemin Codd's Road are subject to easement Inst. OC2090069.

PLAN OF SUBDIVISION OF
PART OF LOTS 22 And 23
CONCESSION 1 (OTTAWA FRONT)
Geographic Township of Gloucester
And
BLOCKS 27 And 28
REGISTERED PLAN 4M-1581
CITY OF OTTAWA

Surveyed by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1250

50 37.5 25 12.5 0 25 50 Metres

Metric

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 15th day of November, 2019.

FEB.7, 2020
Date

E. H. Herweyer
Ontario Land Surveyor

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT :

1. Blocks 1 to 12, both inclusive, and the Streets, namely, rue Bareille-Snow Street, chemin Codd's Road, rue Michael Stoqua Street, rue Moses Tennisco Street, rue Pimiwidon Street, chemin Tawadina Road, chemin Wanaki Road and rue Wigwas Street and the Reserves, namely, Blocks 13, 14, 15 and 16 have been laid out in accordance with our instructions.
2. The Streets are dedicated to City of Ottawa as public highways.

Dated the 5th day
of February, 2020

Tara Dinsmore, Vice President,
Real Estate (National Captial Region,
Atlantic and Acquisitions)
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

Dated the 5th day
of February 2020

Chris Millier, Acting Senior Director
Real Estate (National Captial Region,
Atlantic and Acquisitions)
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

NOTES AND LEGEND

—□—	denotes	Survey Monument Planted.
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar.
SSIB	"	Short Standard Iron Bar.
CC	"	Cut Cross.
IB	"	Iron Bar.
CLF	"	Chain Link Fence
BF	"	Board Fence
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 4M-1581
(P2)	"	(AOG) Plan, December 11, 2017

All found survey monuments are (AOG), unless otherwise noted.

All planted survey monuments are SSIB's unless otherwise noted.

Distances shown on curved limits are Arc distances unless otherwise noted.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999947.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, having a bearing of N 90°00'00" W and are referenced to Specified Control Points 01919680105 and 019198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919680105 and 0198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 01919680105	Northing	5024915.16	Easting	373971.65
. 019198434761	Northing	5036178.12	Easting	372436.11
. Point A	Northing	5035324.64	Easting	372560.98
. Point B	Northing	5035324.64	Easting	373122.90

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ELEVATION NOTES

1. Elevations are geodetic, referred to City of Ottawa Vertical Bench Mark No. 396 (01919680138), having an elevation of 95.06 metres.

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Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 18904-18 CLC Pt Lts 22 23 CI OF GL SUB 2B F N

Yang, Winston

From:	Jim Moffatt <jmoffatt@IBIGroup.com>
Sent:	December 13, 2022 12:34 PM
To:	Rod Price; Mary Jarvis
Cc:	Yang, Winston; Anton Chetrar
Subject:	RE: Bayview Tawadina Development
Attachments:	Wateridge MSS page 98.pdf; CTM_BLOCK11_12_2022-04-26.pdf; 2022-12-12_ 221-00473-00_C-SK2.pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hey Rod, IBI has had a chance to review the City comment respecting sanitary flows from your proposed development at 1000-1050 Tawadina Street. For this area of Wateridge Village, IBI prepared the attached Technical Memorandum (TM) earlier this year which recommends how the various parcels in Blocks 11 and 12 can be serviced with water, sanitary and stormwater management. The development proposal is in line with the recommendations from the TM, including the proposed sanitary outlets. (Refer to pages 9 and 10 and Figure 4 from the TM). With respect to the actual comment about different numbers of dwelling units and related populations between the TM and the proposed development, IBI notes that the total population for the development proposal tributary to Bareille Snow Street is actually less than noted in the TM (625 proposed vs the 633.6 from the TM). Consequently there is less flow being proposed by your development than indicated in the TM so there is no issue with respect to the sanitary design since it is in line with the TM, which is the latest document addressing design criteria in this area of the subdivision.
With respect to the City comment suggesting that the MSS study be updated to reflect these changes, we refer you to the attached page 98 of the MSS document which discusses candidates that would trigger an update. In this case, the proposed changes are minor and quite insignificant since no changes to the surrounding infrastructure are required. In our opinion, the proposed changes are minor and no update is warranted. The MSS document is a high level guiding document that demonstrates how the property can be serviced. The MSS plans indicate only one way to complete the overall development and cannot anticipate minor changes as the subdivision develops over time.
We trust this response is satisfactory. If you require anything else from CLC/IBI, just let us know.
Cheers.

From: Rod Price <rod@demarcoconstruction.ca>
Sent: Wednesday, December 7, 2022 2:04 PM
To: Mary Jarvis <mjarvis@clc.ca>
Cc: Jim Moffatt <jmoffatt@IBIGroup.com>; Yang, Winston <Winston.Yang@wsp.com>
Subject: Bayview Tawadina Development

Hi Jim and Mary,

I hope all is well. We have submitted our Site Plan Applications for the three blocks that Bayview purchased from CLC on Tawadina (11 and 12) and we have received the City's first round of comments. As WSP has been working through their responses and based on the latest info. provided by CLC/IBI we have an issue with numbers anticipated for each building.

IBI has revisited both the storm and sanitary drainage outlets for each subdivided parcel within Block 11 and 12 to align with the current development. However, the estimated population numbers used in the MSS are different than what we had been proposing (see below summary provided by Winston Yang at WSP).

IBI Report	Building 1	Building 2	Building 3
Units (APT @ 1.8 p/p/u)	192	160	212
Population	345.6	288.0	381.6

And below is our estimates

WSP report	Building 1	Building 2	Building 3
Units (APT @ 1.8 p/p/u)	216	131	135
Population	389	236	243

For Building 2 and 3, our number is below the IBI MSS document, which is good, it is within the acceptable limit. But for Building 1, our number exceeds the limit outlined in the new IBI document. The City is going to want us to follow the MSS estimated number of have IBI update the MSS for sanitary and water to support WSP's estimation. Looking for your input on how best to achieve a smooth resubmission package to the City.

Happy to discuss at your earliest convenience.

Thanks,

Rod

Rod Price,
Vice President/General Manager
DEMARCO
CONSTRUCTION
195 Menten Place, Unit 103
Ottawa, ON.
K2H 9C1
Tel: 613-829-2777 Fax: 613-829-0778 C: 613-323-2146
Email: rod@demarcoconstruction.ca

10 Implementation and Phasing

This MSS develops a servicing strategy for the preferred concept plan developed in the CDP. The servicing strategy has built flexibility into the design of the municipal services to allow for changes in land use to be accommodated as build out occurs in several phases over several years. The configuration of the trunk watermains, trunk sanitary sewers and trunk storm sewers has also been arranged to build flexibility into the potential phasing options to accommodate changing market demands for building product type and quantity required to build out. A preliminary phasing plan is presented in **Figure 1.6**. In recognition of the probability that the preferred concept plan may not be entirely built out as currently planned due to unforeseen circumstances, the following process is set out to deal with changes which occur after approval of the Environmental Assessment, but prior to construction.

The change process distinguishes between minor and major changes. A major design change would require completion of an amendment to this EA, while a minor change would not. For either kind of change, it is the responsibility of the proponent to ensure that all possible concerns of the public and affected agencies are addressed.

10.1 Minor Changes

Minor design changes may be defined as those which do not appreciably change the expected net impacts associated with the project. For example, a design change in a utility location within a road right-of-way or the size of a pipe would be considered minor. Changes in utility alignment between road allowances, which do not affect other landowners, would also be considered as minor. All appropriate stakeholders will be provided details of the modification. The majority of such changes could likely be dealt with during the detailed design phase and would remain the responsibility of the proponent to ensure that all relevant issues are taken into account.

10.2 Major Changes

Major changes may be defined as those which change the intent of the EA or appreciably change the expected net impacts associated with the project. An example of a major change would result from a proposed shift in a preferred design alignment or configuration which would warrant changes in mitigation as described in the EA and affect other landowners. If the proposed modification is major, the recommendations and conclusions in this report would require updating. An addendum to the EA would be required to document the change, identify the associated impacts and mitigation measures and allow related concerns to be addressed and reviewed by the appropriate stakeholders.

The preferred servicing solution developed in this MSS presents a high level trunk servicing solution to illustrate the feasibility of servicing the concept plan and guide the final design process, but does not attempt to provide detailed design on a street by street basis. This more detailed level of design will be completed as part of the plan of subdivision or Site Plan Application process when site specific details such as individual lotting, building configurations, and final geotechnical information will be available. This more rigorous level of analysis will undoubtedly result in adjustments to the design presented in this MSS. These adjustments are to be expected as the design evolves in detail and can be dealt with as described above.

10.3 Phasing

Phasing of development of the CFB Rockcliffe site is determined by several key servicing factors which dictate the logical progression of development. Two principal services with limited initial phasing flexibility are the supply of water and vehicular access. In order to provide the necessary

APPENDIX

APPENDIX

B

- WATERMAIN BOUNDARY CONDITIONS FROM CITY OF OTTAWA
- EMAILS FROM CITY OF OTTAWA
- FIRE UNDERWRITERS SURVEY – FIRE FLOW CALCULATION
- WATER DEMAND CALCULATION

Yang, Winston

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: June 28, 2022 10:54 AM
To: Yang, Winston
Subject: RE: 1000 and 1050 Tawadina Road - Boundary Condition requests
Attachments: 1000 and 1050 Tawadina Road June 2022.pdf

Good morning, Winston.

Please find requested information attached and below:

The following are boundary conditions, HGL, for hydraulic analysis for three buildings at 1000 – 1050 Tawadina Road (zone MONT), assumed to be connected to the 406 mm watermain on Codd's Road, and the 203 mm on Bareille-Snow Street (see attached PDF for location).

	Building 1 Bareille-Snow	Building 2 Bareille Snow	Building 3 Codd's
Min HGL (m)	143.0	143.0	143.0
Max HGL (m)	143.0	143.0	143.0
Max Day + FF (117 L/s)	141.1	N/A	N/A
Max Day + FF (67 L/s)	N/A	142.1	142.8

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Real Estate and Economic Development Department | Direction générale de la planification des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

*****Please also note that, while my work hours may be affected by the current situation and am working from home, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Yang, Winston <Winston.Yang@wsp.com>
Sent: June 23, 2022 1:22 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Hamlin, Allison <Allison.Hamlin@ottawa.ca>
Subject: RE: 1000 and 1050 Tawadina Road - Boundary Condition requests

Hi Shawn,

The required RFF have been revised as per the FUS 2020 method.

Bldg 1 – 117 L/s
Bldg 2 – 67 L/s
Bldg 3 – 67 L/s

See attached pdfs for detail calculations.

Yours truly,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-0538
M+ 1 647-628-8108

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: June 22, 2022 8:08 PM
To: Yang, Winston <Winston.Yang@wsp.com>; Hamlin, Allison <Allison.Hamlin@ottawa.ca>
Subject: RE: 1000 and 1050 Tawadina Road - Boundary Condition requests

Good evening, Winston

Upon further review, we have noted that you are not using the 2020 FUS method.

Please revise and send to me asap.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Real Estate and Economic Development Department | Direction générale de la planification des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

*****Please also note that, while my work hours may be affected by the current situation and am working from home, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Yang, Winston <Winston.Yang@wsp.com>
Sent: June 13, 2022 1:47 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Hamlin, Allison <Allison.Hamlin@ottawa.ca>
Subject: 1000 and 1050 Tawadina Road - Boundary Condition requests

Hi Shawn,

We are working on the SPA for the 1000 – 1050 Tawadina Road. The proposed development consists three sites, each site will have a 9 storey apartment building.
Building 1 is bounded by Barielle Snow St to the west, Michael/Stoqua Street to the east, Hemlock Road to the south and future residential development to the north.
Building 2 is bounded by Barielle Snow St to the east, Hemlock Road to the south, future residential development to the north and future park land to the west.
Building 3 is bounded by Codd's Road to the west, Tawadina Road to the north, future residential development to the east and future parking land to the south.

Building 1 and 2, each building will be serviced by a dual 200mm dia. water services from the existing 200mm W/M along Barielle Snow Street. Building 3 will be serviced by a dual 200mm dia. water servides from the existing 400mm dia. W/M along Codd's Road.
Please see attached servicing plan for services location to all 3 buildings for your reference.

The domestic water demands were calculated using the City of Ottawa's Water Design Guidelines and fire demands were calculated using FUS 1999.

The results are summarized as follow.

Proposed Buildings	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Maximum Hourly Demand (L/s)	Fire Demand (L/s)
Building 1				
Apartment Units	1.26	3.15	6.93	250
Commercial	0.01	0.02	0.04	
Total	1.27	3.17	6.94	250
Building 2				
Apartment Units	0.76	1.91	4.20	150
Commercial	0.01	0.01	0.02	
Total	0.77	1.92	4.22	150
Building 3				
Apartment Units	0.79	1.97	4.33	150
Commercial	0	0	0	
Total	0.79	1.97	4.33	150

Please also see attached pdfs for the detail calculation for FUS and water demands for your reference.

Please provide boundary condition at the connection points of Barielle Snow Street and Codd's Road in the vicinity of the property.

Should you have any questions please do not hesitate to contact me.

Yours truly,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
Municipal Engineering - Ottawa

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M+ 1 647-628-8108

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-LAEmHhHzdJzBITWla4Hgs7pbKI

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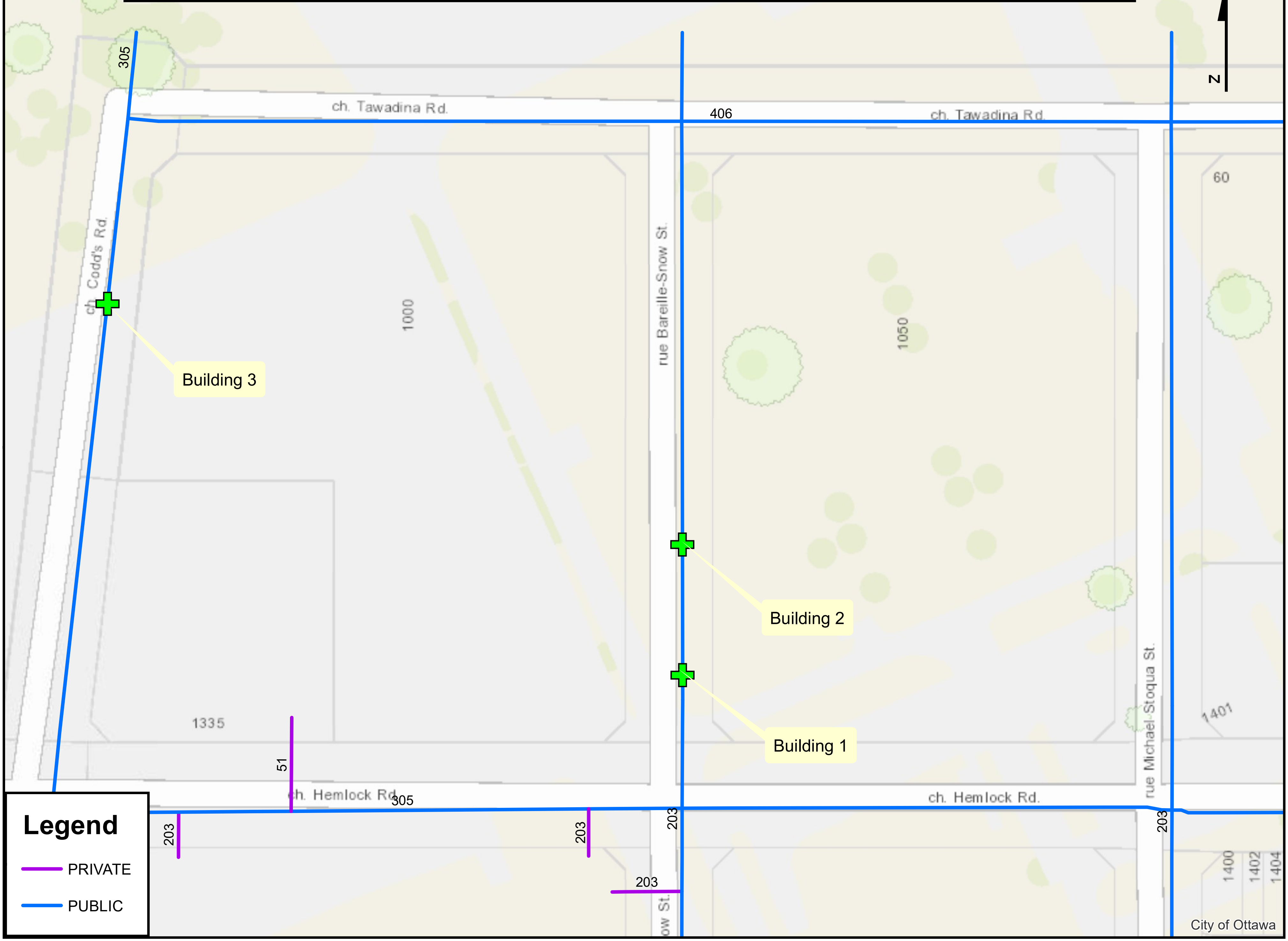
Boundary Conditions for 1000 and 1050 Tawadina Road



City of Ottawa

Water Demand Calculation Sheet

Project:	**1000 - 1050 Tawadina Street**	**Date:**	**2023-01-16**
Location:	**City of Ottawa**	**Design:**	**WY**
WSP Project No.	**221-04473-00**	**Page:**	**1 of 1**

Proposed Buildings	Residential					Non-Residentail			Average Daily			Maximum Daily			Maximum Hourly			Fire
	Units				Pop.	Industrial	Institutional	Commercial	Demand (l/s)			Demand (l/s)			Demand (l/s)			Demand
	SF	1 BED APT	2 BED APT	ST		(ha)	(ha)	(ha)	Res.	Non-Res.	Total	Res.	Non-Res.	Total	Res.	Non-Res.	Total	(l/s)
Proposed 9-Storey Building 1																		
Units		156	60		407				1.32		1.32	3.30		3.30	7.25		7.25	117
Commercial								0.05		0.01	0.01		0.02	0.02		0.04	0.04	117
Total					407			0.05			1.33			3.32			7.29	117
Proposed 9-Storey Building 2																		
Units		96	35		246				0.80		0.80	2.00		2.00	4.39		4.39	67
Commercial								0.02		0.01	0.01		0.01	0.01		0.02	0.02	67
Total					246			0.02			0.81			2.01			4.41	67
Proposed 9-Storey Building 3																		
Units		101	34		253				0.82		0.82	2.05		2.05	4.51		4.51	67
Commercial								0.00		0.00	0.00		0.00	0.00		0.00	0.00	67
Total					253			0.00			0.82			2.05			4.51	67

Population Densities

Single Family	3.4	person/unit
Semi-Detached	2.7	person/unit
Duplex	2.3	person/unit
Townhome (Row)	2.7	person/unit
Bachelor Apartment	1.4	person/unit
1 Bedroom Apartment	1.8	person/unit
2 Bedroom Apartment	2.1	person/unit
3 Bedroom Apartment	3.1	person/unit
4 Bedroom Apartment	4.1	person/unit

Average Daily Demand

Residentail	280	l/cap/day
Industrial	35000	l/ha/day
Institutional	28000	l/ha/day
Commercial	28000	l/ha/day

Maximum Daily Demand

Residential	2.5	x avg. day
Industrial	1.5	x avg. day
Institutional	1.5	x avg. day
Commercial	1.5	x avg. day

Maximum Hourly Demand

Residential	2.2	x max. day
Industrial	1.8	x max. day
Institutional	1.8	x max. day
Commercial	1.8	x max. day

Fire Flow Design Sheet (FUS)
1000 - 1500 Tawadina Street
City of Ottawa
WSP Project No. 221-04473-00
Date: 23-Jun-22

Proposed 9-Storey Building 1
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\,C\sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 3338 m^2
C = 0.8
F = 10167.7 L/min

rounded off to 10,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 10,000 = 8,500 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 8,500 = -3,400 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	45	0%	north side
Side 2	30	10%	east side
Side 3	35	5%	south side
Side 4	31	5%	west side
		20%	(Total shall not exceed 75%)

Increase due to separation 20% x 8,500 = 1,700 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 7,000 L/min (Rounded to nearest 1000 L/min)
or **117 L/sec**
or 1,849 gpm (us)
or 1,540 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
1000 - 1500 Tawadina Street
City of Ottawa
WSP Project No. 221-04473-00
Date: 23-Jun-22

Proposed 9-Storey Building 2
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\,C\sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
1.5 for **Type V** Wood Frame Construction
0.8 for **Type IV-A** Mass Timber Construction
0.9 for **Type IV-B** Mass Timber Construction
1.0 for **Type IV-C** Mass Timber Construction
1.5 for **Type IV-D** Mass Timber Construction
1.0 for **Type III** Ordinary Construction
0.8 for **Type II** Noncombustible Construction
0.6 for **Type I** Fire resistive Construction
A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 2150 m^2
C = 0.8
F = 8159.8 L/min

rounded off to 8,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 8,000 = 6,800 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 6,800 = -2,720 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	125	0%	north side
Side 2	31	0%	east side
Side 3	35	0%	south side
Side 4	90	0%	west side
		0%	(Total shall not exceed 75%)

Increase due to separation 0% x 6,800 = 0 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.
The fire flow requirement is 4,000 L/min (Rounded to nearest 1000 L/min)
or **67 L/sec**
or 1,057 gpm (us)
or 880 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
1000 - 1500 Tawadina Street
City of Ottawa
WSP Project No. 221-04473-00
Date: 23-Jun-22

Proposed 9-Storey Building 3
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\,C\sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 2112 m^2
C = 0.8
F = 8088.3 L/min

rounded off to 8,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 8,000 = 6,800 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 6,800 = -2,720 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	45	0%	north side
Side 2	100	0%	east side
Side 3	95	0%	south side
Side 4	40	0%	west side
		0%	(Total shall not exceed 75%)

Increase due to separation 0% x 6,800 = 0 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is	4,000	L/min	(Rounded to nearest 1000 L/min)
or	**67**	**L/sec**	
or	1,057	gpm (us)	
or	880	gpm (uk)	

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

APPENDIX

APPENDIX

C

- SANITARY SEWER DESIGN SHEET

SANITARY SEWER DESIGN SHEET

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00

Date: January, 2023

LOCATION				RESIDENTIAL AREA AND POPULATION												INDUSTRIAL				COMMERCIAL		INSTITUTIONAL		I+C+I	INFILTRATION				PIPE					
LOCATION	FROM M.H.	TO M.H.	SANITARY DRAINAGE AREA ID	INDV AREA (ha)	ACCU AREA (ha)	NUMBER OF UNITS						POPULATION		PEAK FACT.	PEAK FLOW (l/s)	GROSS AREA (ha)	DEVEL. AREA (ha)	ACCU. AREA (ha)	PEAK FACTOR	INDIV AREA (ha)	ACCU. AREA (ha)	INDIV AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	INDIV AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	**TOTAL FLOW (l/s)**	LENGTH (m)	DIA. (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	AVAIL. CAP. (%)
						SINGLES	SEMIS	TOWNS	1-BED APT.	2-BED APT.	3-BED APT.	INDIV POP.	ACCU POP.																					
BUILDING 1 - BAREILLE-SNOW STREET																																		
	BLDG 1	SAMH101		0.469	0.469				156.00	60.00		407	407	3.41	4.50					0.05	0.05			0.02	0.519	0.52	0.17	**4.69**	1.70	200	1.00	32.80	1.04	**85.70%**
Bareille-Snow Street	SAMH101	*Ex. SANMH308A*			0.469								407	3.41	4.50						0.05			0.02	0.000	0.52	0.17	**4.69**	10.85	200	1.00	32.80	1.04	**85.70%**
BUILDING 2 - BAREILLE-SNOW STREET																																		
	BLDG 2	SAMH201		0.354	0.354				96.00	35.00		246	246	3.49	2.79					0.02	0.02			0.01	0.374	0.37	0.12	**2.92**	3.95	200	1.00	32.80	1.04	**91.11%**
Bareille-Snow Street	SAMH201	*EXISTING SEWER*			0.354								246	3.49	2.79						0.02			0.01	0.000	0.37	0.12	**2.92**	10.92	200	1.00	32.80	1.04	**91.11%**
IBI DESIGN BRIEF PHASE 2B																																		
EXT-1	*BULK304AN*	*Ex. SANMH304A*		7.350	7.350				905.00			1629	1629	3.12	16.49										7.350	7.35	2.43	**18.91**	*20.00*	*250*	*0.25*	29.73	0.61	**36.40%**
Future Development	*Ex. SANMH304A*	*Ex. SANMH308A*		1.475	8.825				140.00			252	1881	3.09	18.81										1.475	8.83	2.91	**21.72**	*119.13*	*250*	*0.25*	29.73	0.61	**26.96%**
	Ex. SANMH308A	*BULK206AN*		0.070	9.718							0	2534	3.00	24.66						0.07				0.070	9.79	3.23	**27.89**	*17.00*	*250*	*2.05*	85.14	1.73	**67.24%**
BUILDING 3 - CODD'S ROAD																																		
	BLDG 3	SAMH301		0.375	0.375				101.00	34.00		253	253	3.49	2.86										0.375	0.38	0.12	**2.99**	6.10	200	1.00	32.80	1.04	**90.90%**
Codd's Road	SAMH301	*EXISTING SEWER*			0.375								253	3.49	2.86										0.000	0.38	0.12	**2.99**	12.75	200	1.00	32.80	1.04	**90.90%**
IBI DESIGN BRIEF PHASE 2B																																		
EXT-1	*Ex. SANMH340A*	*Ex. SANMH231A*		0.599	0.599								0	3.80	0.00										0.599	0.60	0.20	**0.20**	*70.00*	*250*	*1.50*	72.83	1.48	**99.73%**
	Ex. SANMH231A	*BULK176AN*			0.974							0	253	3.49	2.86										0.000	0.97	0.32	**3.18**	*50.22*	*250*	*1.83*	80.45	1.64	**96.04%**

DESIGN PARAMETERS

RESIDENTIAL AVG. DAILY FLOW =	280	l/cap/day
COMMERCIAL AVG. DAILY FLOW =	28,000	l/ha/day
	0.324	l/ha/s
INSTITUTIONAL AVG. DAILY FLOW =	28,000	l/ha/day
	0.324	l/ha/s
LIGHT INDUSTRIAL FLOW =	35,000	l/ha/day
	0.405	l/ha/s
HEAVY INDUSTRIAL FLOW =	55,000	l/ha/day
	0.637	l/ha/s

COMMERCIAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)
	1.0	(WHEN AREA < 20%)
INSTITUTIONAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)
	1.0	(WHEN AREA < 20%)
RESIDENTIAL CORRECTION FACTOR, K =	0.80	
MANNING N =	0.013	
PEAK EXTRANEOUS FLOW, I (l/s/ha) =	0.33	

PEAK POPULATION FLOW, (l/s) = P*q*M/86400
PEAK EXTRANEOUS FLOW, (l/s) = I*Ac
RESIDENTIAL PEAKING FACTOR, M = 1+(14/(4+P^0.5))*K
Ac = CUMULATIVE AREA (ha)
P = POPULATION (THOUSANDS)

SEWER CAPACITY, Qcap (l/s) = 1/N S^(1/2) R^(2/3) Ac
(MANNING'S EQUATION)

UNIT TYPE	PERSONS/UNIT
SINGLES	3.4
SEMI-DETACHED	2.7
TOWNHOMES	2.7
SINGLE APT. UNIT	1.8
2-BED APT. UNIT	2.1
3-BED APT. UNIT	3.1

DESIGN PARAMETERS title block:

	NO.	REVISION	DATE
DESIGNED:			
Jieyi Tan	1.	City Submission No.1	2022-08-15
CHECKED:	2.	City Submission No. 2	2023-01-18
Ding Bang Yang, P.Eng.			
PROJECT:			
1000 - 1050 Tawadina Street			
Residential Development			
LOCATION:			
Ottawa, Ontario			
PAGE NO:	**FILE & DWG. REFERENCE:**		
1 of 1	C103, C204, C205		

APPENDIX

APPENDIX

D

- STORM SEWER DESIGN SHEET
- GRADING PLANS
- SERVICING PLANS
- DRAINAGE AREAS PLANS

STORM SEWER DESIGN SHEET

1000 - 1050 Tawadina Road
Residential Development
Project: 211-04473-00
Date: January, 2023

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW														PROPSOED SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.25	C= 0.50	C= 0.70	C= 0.80	C= 0.90	C= 1.00	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	ICD FIXED FLOW (L/s)	DESIGN FLOW (L/s)	MODIFIED DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	(%)
To Bareille-Snow Street from Building 1																																
Bareille-Snow Street	S101	CB101	STMH106	0.006				0.028		0.074	0.074	10.00	10.44	76.81	104.19	178.56		5.70				5.70		PVC DR-35	200.0	1.00	27.70	32.83	1.04	0.44	27.13	82.64%
		STMH106	CBMH105							0.000	0.074	10.44	10.65	75.15	101.91	174.61		5.58				5.58		PVC DR-35	250.0	0.50	10.90	42.09	0.86	0.21	36.51	86.75%
	S102	CBMH105	CBMH104	0.010				0.048		0.127	0.201	10.65	11.15	74.38	100.86	172.79		14.97				14.97		PVC DR-35	250.0	0.50	25.70	42.09	0.86	0.50	27.12	64.43%
	S-BLDG1 & 2	BLDG	CBMH104						0.284	0.790	0.790	10.00	10.06	76.81	104.19	178.56		60.64				60.64		PVC DR-35	300.0	1.00	5.10	96.80	1.37	0.06	36.16	37.36%
	S103	CBMH104	CHAMBER	0.009				0.054		0.141	1.132	11.15	11.18	72.64	98.47	168.65		82.24				82.24		PVC DR-35	375.0	0.40	1.35	111.00	1.00	0.02	28.76	25.91%
		CHAMBER	CBMH101							0.000	1.132	11.18	11.22	72.56	98.36	168.47		82.15				82.15		PVC DR-35	375.0	0.40	2.40	111.00	1.00	0.04	28.85	25.99%
		CBMH101	STMH103							0.000	1.132	11.22	11.37	72.43	98.18	168.15		82.00				82.00		PVC DR-35	375.0	0.40	9.10	111.00	1.00	0.15	29.00	26.13%
		STMH103	STMH205							0.000	1.132	11.37	11.57	71.92	97.48	166.95		81.43				81.43		PVC DR-35	375.0	0.40	12.40	111.00	1.00	0.21	29.57	26.64%
To Bareille-Snow Street from Building 2																																
Bareille-Snow Street	S201	CB201	STMH204	0.011				0.005		0.020	0.020	10.00	10.28	76.81	104.19	178.56		1.55				1.55		PVC DR-35	200.0	1.00	17.70	32.83	1.04	0.28	31.28	95.29%
		STMH204	CHAMBER							0.000	0.020	10.28	10.32	75.74	102.72	176.02		1.53				1.53		PVC DR-35	250.0	1.00	3.00	59.53	1.21	0.04	58.00	97.44%
	S-BLDG3 TO 5	BLDG	CBMH203	0.007					0.223	0.625	0.625	10.00	10.05	76.81	104.19	178.56		47.99				47.99		PVC DR-35	300.0	1.00	4.20	96.80	1.37	0.05	48.81	50.42%
	S202	CBMH203	CHAMBER	0.012				0.071		0.186	0.811	10.05	10.11	76.61	103.92	178.09		62.11				62.11		PVC DR-35	300.0	1.00	4.85	96.80	1.37	0.06	34.68	35.83%
		CHAMBER	CBMH202							0.000	0.811	10.32	10.38	75.58	102.51	175.65		61.28				61.28		PVC DR-35	300.0	1.00	4.25	96.80	1.37	0.05	35.52	36.69%
		CBMH202	STMH205							0.000	0.811	10.38	10.63	75.39	102.25	175.20		61.13				61.13		PVC DR-35	300.0	1.00	21.10	96.80	1.37	0.26	35.67	36.85%
To Bareille-Snow Street from Future Development																																
Bareille-Snow Street	Future Block 11						0.721			1.604	1.604	12.00	12.00	69.89	94.70	162.13		112.07				112.07										
Bareille-Snow Street	Future Block 12						0.492			1.094	1.094	12.00	12.00	69.89	94.70	162.13		76.48				76.48										
From IBI Phase 2B Design Brief																																
Bareille-Snow Street	*S309, S08, S308A*	*EX. MH309*	*EX. BULK206N*			0.350				0.681	5.322	12.00	12.33	69.89	94.70	162.13		371.96				371.96		PVC DR-35	*525.0*	*1.43*	*46.47*	514.80	2.38	0.33	142.84	27.75%
To Codd's Road from Building 3																																
Codd's Road	S301	CB302	CBMH302	0.035				0.025		0.087	0.087	15.00	15.10	61.77	83.56	142.89		5.37				5.37		PVC DR-35	200.0	1.00	6.15	32.83	1.04	0.10	27.47	83.66%
Codd's Road	S302	CB301	CHAMBER	0.010				0.022		0.062	0.062	10.00	10.04	76.81	104.19	178.56		4.76				4.76		PVC DR-35	200.0	1.00	2.30	32.83	1.04	0.04	28.07	85.50%
	S-BLDG6 & 7	BLDG	CBMH305	0.018					0.264	0.746	0.746	10.00	10.01	76.81	104.19	178.56		57.33				57.33		PVC DR-35	300.0	1.00	1.00	96.80	1.37	0.01	39.47	40.77%
		CBMH305	CHAMBER							0.000	0.746	10.01	10.03	76.76	104.13	178.45		57.29				57.29		PVC DR-35	300.0	1.00	1.19	96.80	1.37	0.01	39.50	40.81%
		CHAMBER	CBMH302							0.000	0.808	10.04	10.05	76.66	104.00	178.22		61.98				61.98		PVC DR-35	300.0	1.00	1.00	96.80	1.37	0.01	34.82	35.97%
		CBMH302	*EX. SEWER*							0.000	0.895	15.10	15.27	61.54	83.24	142.35		55.09				55.09		PVC DR-35	300.0	1.00	14.30	96.80	1.37	0.17	41.70	43.08%
From IBI Phase 2B Design Brief																																
Codd's Road	*S304, S304A, S340, B340A*	*EX. MH305*	*EX. MH231*				0.400	0.780		2.841	3.736	15.27	15.77	61.13	82.69	141.39		228.42				228.42		PVC DR-35	*750.0*	*1.30*	*85.55*	1270.61	2.87	0.50	1042.20	82.02%

Definition:
Q=2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall Intensity in millimeters per hour (mm/hr)

i = 732.951/(TC+6.199)^0.810	2 Year
i = 1174.184/(TC+6.014)^0.816	5 Year
i = 1735.688/(TC+6.014)^0.820	100 Year

Notes:
1. Mannings coefficient (n) = 0.013

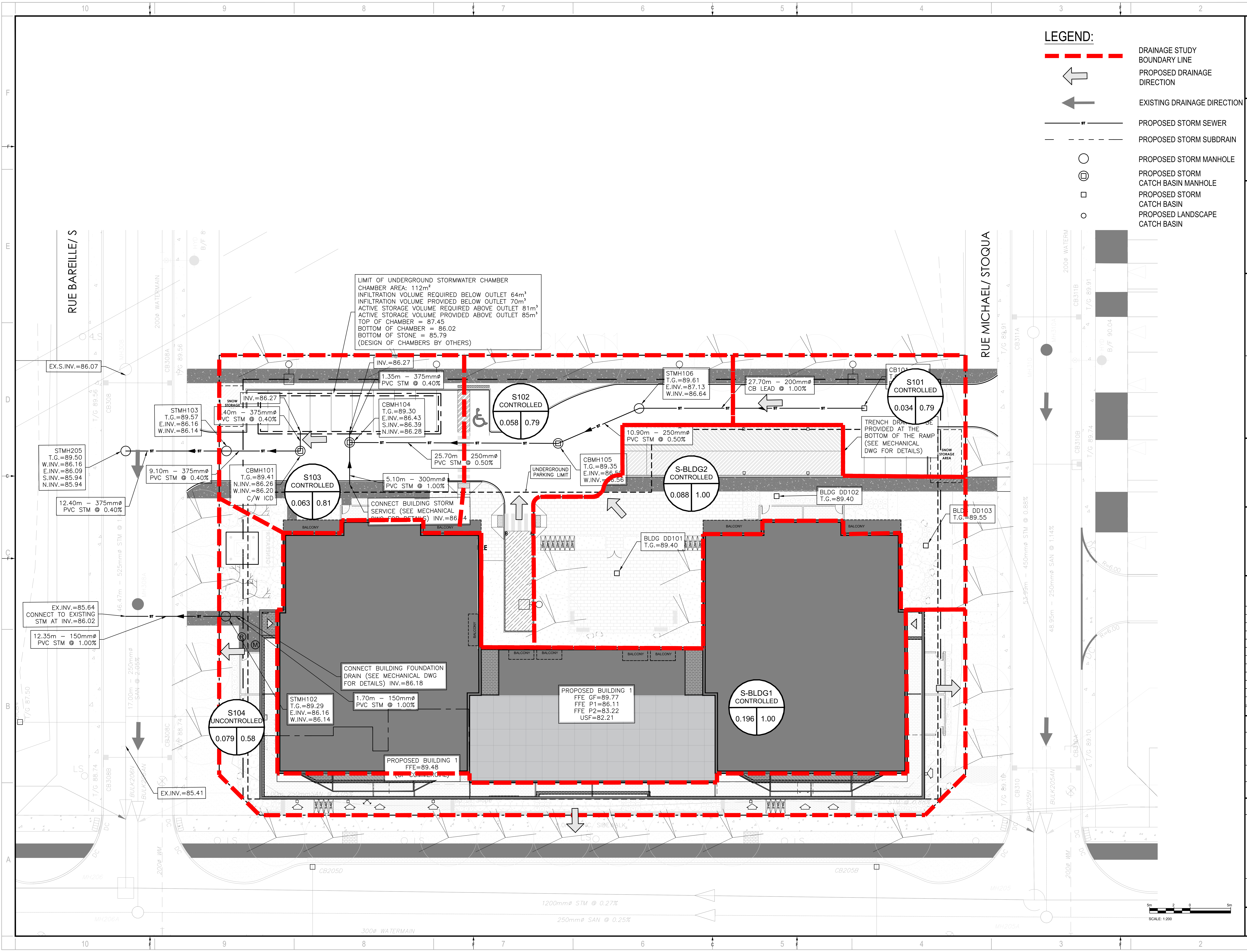
Time-of-Concentration in the Swale
FAA Equation: t (min) = 3.258 [(1.1 - C) L^0.5 / S^.33]
Where: Longest Watercourse Length, L (m). S (%)
Runoff Coef.C = Impervious

No.	L (m)	S %	Tc (min)
			#DIV/0!

Designed: J.T.
Checked: D.B.Y.
Dwg. Reference: C105, C208, C209

No.	Revision	Date
1.	City Submission No. 1	2022-08-15
2.	City Submission No. 2	2023-01-16

File Reference:	Date:	Sheet No:
221-04473-00	2023-01-16	1 of 1



LEGEND:

▬ ▬ ▬	DRAINAGE STUDY BOUNDARY LINE
⇦	PROPOSED DRAINAGE DIRECTION
←	EXISTING DRAINAGE DIRECTION
——ST——	PROPOSED STORM SEWER
— — —	PROPOSED STORM SUBDRAIN
○	PROPOSED STORM MANHOLE
⊡	PROPOSED STORM CATCH BASIN MANHOLE
□	PROPOSED STORM CATCH BASIN
○	PROPOSED LANDSCAPE CATCH BASIN

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D. B. YANG
100230568
2023–01–16

NORTH

CLIENT:

CLIENT REF. #:

PROJECT:

WATERIDGE
APARTMENTS BUILDINGS
1000/1050 TAWADINA
ROAD, OTTAWA, ON

KEY PLAN:

DISCLAIMER: COPYRIGHT:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
3		2023-01-16	REVISED AS PER CITY COMMENTS
2		2022-08-15	ISSUED FOR SPA
1		2022-05-24	ISSUED FOR CLC REVIEW

PROJECT NO: 221-04473-00
DATE: JANUARAY 16, 2023
ORIGINAL SCALE: 1:200
DESIGNED BY: DY
DRAWN BY: JT
CHECKED BY: DY
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DISCIPLINE: CIVIL
TITLE:

RESIDENTIAL DEVELOPMENT
STORM DRAINAGE PLAN
BUILDING 1

SHEET NUMBER: C105
SHEET #: OF
ISSUE: REVISED AS PER CITY COMMENTS
DATE OF: 2023-01-16
REV #: 0

D07-12-22-0127

#XXXXX

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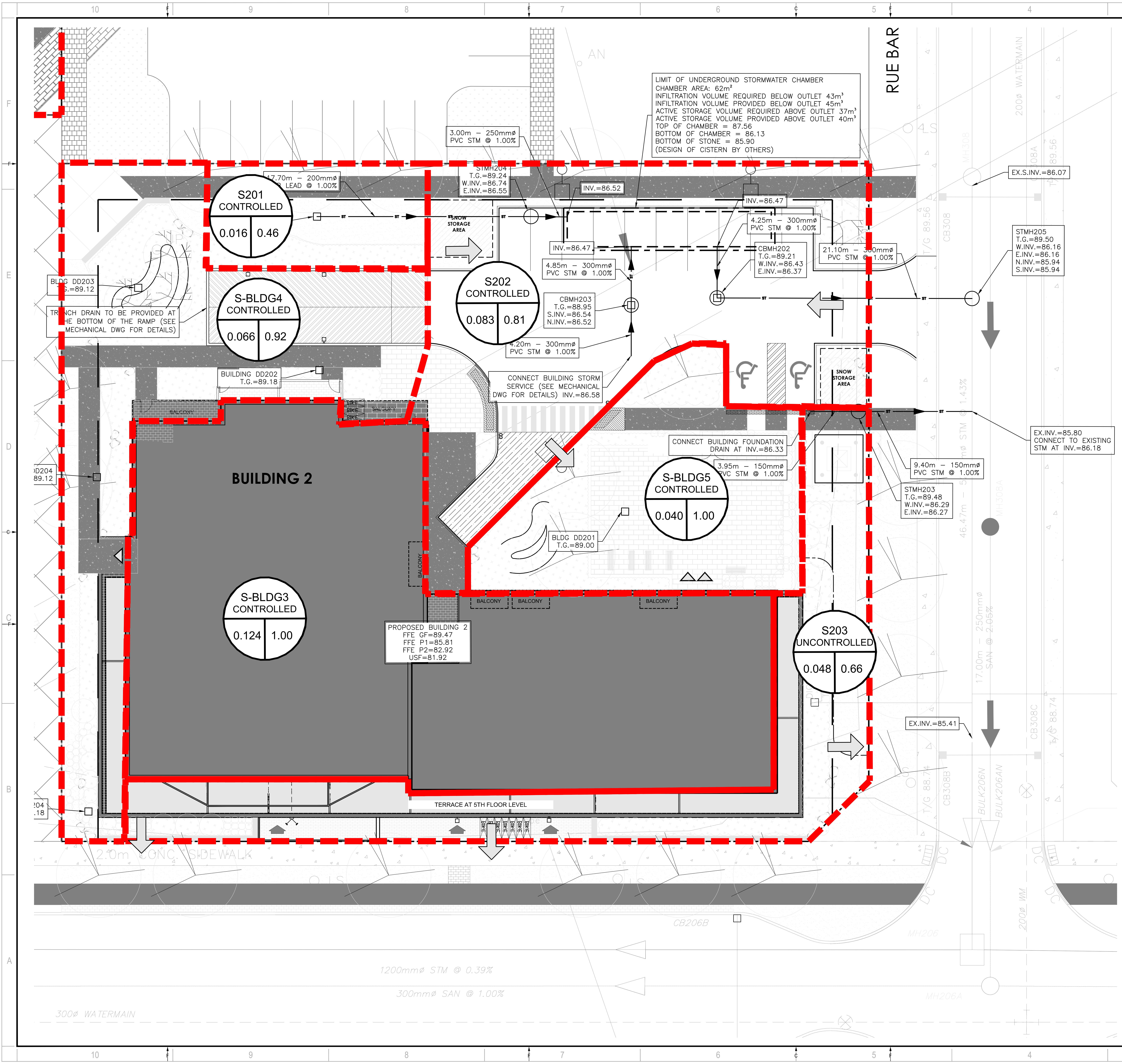

LEGEND:

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3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

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CLIENT:

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PROJECT:

WATERIDGE
APARTMENTS BUILDINGS
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ROAD, OTTAWA, ON

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CHECKED BY: DY
DISCIPLINE: CIVIL

TITLE:

RESIDENTIAL DEVELOPMENT
STORM DRAINAGE PLAN
BUILDING 2

SHEET NUMBER: C208
SHEET #: OF
ISSUE: REVISED AS PER CITY COMMENTS
REV #: 0
DATE OF: 2023-01-16

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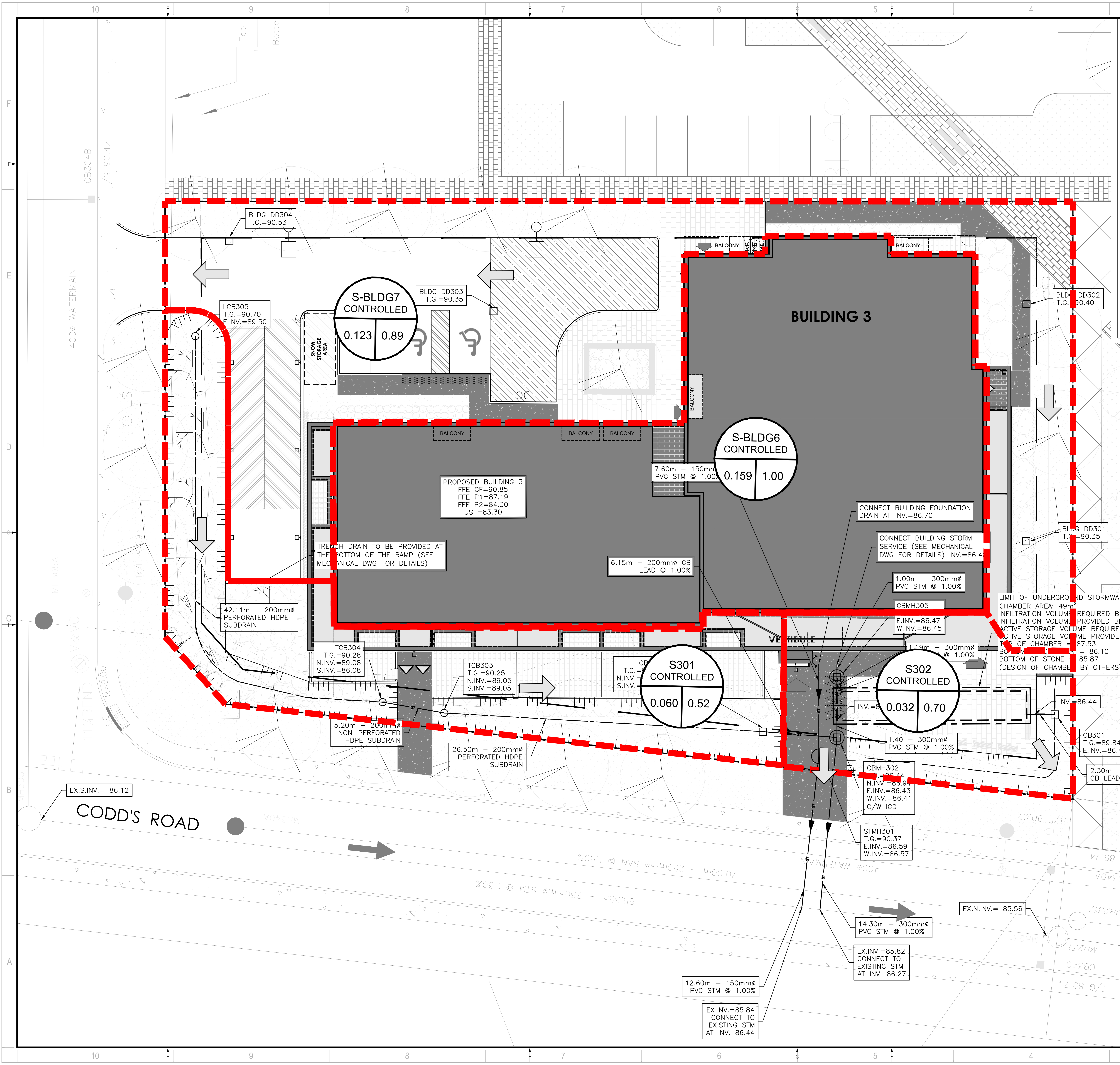

LEGEND:

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25mm
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DRAWN BY: JT
CHECKED BY: DY
DISCIPLINE: CIVIL

TITLE:

RESIDENTIAL DEVELOPMENT
STORM DRAINAGE PLAN
BUILDING 3

SHEET NUMBER: C209
SHEET #: OF
ISSUE: REVISED AS PER CITY COMMENTS
DATE OF: 2023-01-16
REV #: 0

APPENDIX

APPENDIX

E

- EROSION AND SEDIMENTATION CONTROL PLANS

APPENDIX

APPENDIX

F

- SUBMISSION CHECK LIST