SITE SERVICING

& STORM WATER MANAGEMENT REPORT

FOR

1050 KLONDIKE ROAD, OTTAWA, ONTARIO

November 22, 2022

Prepared by:

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1. Introduction

1.1 Site Description and Proposed Development

This report describes the site servicing and stormwater management design pertaining to a street townhouses development proposed at 1050 Klondike Road. The proposed development consists of 9 townhouse units and parking area. The expected population is considered as 24 persons. The project is submitted for zoning bye law amendment and site plan approval on behalf of IAQI Holdings Inc.

The site contains an existing dwelling with gravel and landscaped areas.

Figure 1 - Site Location Plan

Proposed grading and servicing is shown on the drawings included in **Appendix A**.

1.1.1 Statement of Objectives and Servicing Criteria

The objective of this Site Servicing and Stormwater Management Report is to demonstrate that the proposed design meets the servicing requirements for the proposed development, while adhering to the appropriate regulatory requirements.

1.1.2 Location Map and Plan

The location of the site is illustrated in Figure 1. A detailed site layout is provided within the drawings in Appendix A

1.2 Background Documents

Existing conditions are shown on the Topographic and Legal Survey (Appendix G).

1.3 Consultation and Permits

1.3.1 Pre-consultation Meetings

A pre-consultation meeting was held with the City of Ottawa in May 2020. The comments were received for a condominium building which was later changed to street townhouses. Most of the comments are still relevant to the new proposal and are summarized as follows,

Stormwater Management:

- There is an available 675mm diameter concrete storm sewer located on Sandhill Road conveying flow to a ditch upstream of "Pond C".
- Based on both the Shirley's Brook Floodplain Analysis and SWM Report (Klondike Road Development Lands, prepared by Novatech, May 2006) and the Shirley's Brook SWM Facility "C" Detailed Design Report (prepared by Novatech, 2006), it appears that Pond "C" was sized to service the 1050 Klondike Road parcel. Please demonstrate that the existing storm sewer and pond have capacity to service this proposed development (quantity and quality control).
- Refer to the SWM design criteria in the Shirley's Brook SWM Facility "C" Detailed Design Report (prepared by Novatech, 2006) for the proposed development area:
  - Minor system allowable release rate of 85 L/s/ha;
  - Onsite major system storage of 50 m^3/ha (please see the note below);
  - ICDs [are] installed in the roadway catch basins to ensure flow into the storm sewer system does not exceed the 5-year runoff rates; and
  - HGL for 100-year event must have at least 0.3 m freeboard to the underside of footings.
- IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
- A calculated time of concentration (Cannot be less than 10 minutes).

Watermain:

- There is an available 300mm diameter PVC watermain fronting the site along Sandhill Road. However, looping of the Klondike Road watermain (from March Road stub to the Sandhill Road stub) is preferred.
- If a watermain extension along Klondike Road is pursued an MECP Form 1 will need to be completed.
- Drinking Water Boundary condition requests must include the location of the service connection and the expected loads required by the proposed development.
- Determine the total water demand based on maximum demand and required fire flow for water boundary conditions.

Sanitary:

- There is an available 200mm diameter PVC sanitary sewer located on Klondike Road. However, it currently does not front the proposed site.
- A sanitary sewer extension within the Klondike Road Right-Of-Way (ROW) will be required to service this site.

- The proponent will be required to demonstrate what the expected sanitary flows from the proposed site will be and show that the existing sanitary sewer infrastructure can accommodate the proposed site flows without any adverse affects.
- The existing sanitary sewer on Klondike Road connects to the Briar Ridge Pump Station (BRPS). This pump station currently has limited capacity. Upgrades to the BRPS are expected to be completed by Dec 2021 or early 2022.
- Due to the municipal sanitary sewer extension a Ministry of Environment, Conservation and Parks Environmental Compliance Approval (MECP ECA) will be required and will be reviewed under the Transfer of Review program (Standard Works) with the City of Ottawa.
- Also due to the municipal sanitary extension, a Municipal Consent (MC) circulation will be required after or in the later stages of the Site Plan Application stage. The ROW Approvals Department at the City, may, to their review and discretion, exempt the proposed extension from the MC Circulation process.

The full comments regarding site-servicing and stormwater management-specific requirements can be found in **Appendix B**.

1.4 Available Existing Infrastructure

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages and the Sandhill Road intersection.

Sandhill Road

- 300mm diameter PVC watermain
- 675mm diameter Conc. storm sewer

The existing development is not served by municipal services. An existing well and septic system is currently working on site which will be decommissioned as per city/ MOE requirements.

A demolition plan is prepared to show the removal of existing features on site prior to construction. (Refer drawing C105)

2. Geotechnical Study

A Geotechnical Investigation was completed by GEMTEC and is documented in Report No. 65153.01 dated April 7, 2020.

A total of 3 boreholes were drilled to a maximum depth of 6.7 - 8.5m below the existing ground surface. The subsurface profile at the borehole locations consists of 100mm topsoil layer underlain by a fill layer to approximately 1.2 to 2.9m depth.

The fill material below the topsoil and/or granular fill material can be described as brown, fine to coarse grained sand with trace to some silt. The fill material extends to depths ranging from about 1.2 to 2.9 meters below existing grade (elevation 73.5 to 76.1 meters)

Groundwater was encountered at depths of 3.8 to 5.3m below the existing ground surface.

The geotechnical report provides recommendations for excavation, backfill, pavement structure and pipe bedding and backfill.

3. Water Services

3.1 Design Criteria

The water service will be designed in accordance with the 2010 City of Ottawa Water Design Guidelines as well as MOE Design Guidelines for Drinking Water Systems.

The required domestic water demand and pressure design parameters for the development has been calculated based in **Table 1**:

Table 1– Summary of Water Demand Parameters

Design Parameter	Value
	Residential
Average Daily Demand	350 L/d/P[1]
Max. Daily Peaking Factor	9.5 x Average Daily[2]
Max. Hourly Peaking Factor	14.3 x Average Daily[2]
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
Min. pressure during normal operating conditions	345kPa
Max. pressure during normal operating conditions	552kPa
Min. pressure during maximum hourly demand	276kPa
Min. pressure during maximum daily demand + fire flow	140kPa
[1] Daily average based on Appendix 4-A from Water Supply Guidelines [2] Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons	

3.2 Water Demand

Total No. Townhouse Units = 9 units (7 Units are 3-Storeys, 2 Units are 2-Storeys stacked dwelling)
Gross Floor Area = 1511 m^2 (Approximate area of each floor = 503 m^2)

Population = 2.7 x 9 = 24 persons

Daily Average Water Demand = 24 x 350 l/cap/day = 84,00 L/Day = 0.097 L/sec

Maximum Daily Demand = 0.097 x 9.5 = 0.92 L/sec

Maximum Hourly Demand = 0.097 x 14.3 = 1.39 L/sec

The water demand/fire flow for the development based on the **Ottawa Design Guidelines (2010 incl. Technical Bulletins)** and the **Fire Underwriters Survey (1999)** is summarized below;

Table 2– Summary of Water Demand Calculations

Design Parameter	Water Demand (L/s)
	Residential
Average Daily Demand	0.097
Maximum Daily Demand	0.92
Maximum Hourly Demand	1.39
Fire Flow	216.67
Total Max Daily Demand + Fire Flow	217.59

Fire flow calculations, Fire hydrant coverage map (DR03) are provided in Appendix C.

Total no. of 9 water service connections (19 mm diameter, approximate length 15m-18m) are provided for each unit. The service connections will be installed by 1055 Klondike contractor from 400 mm diameter water main along Klondike Road. Refer Drawing C101 for details.

3.3 Adequacy of Supply for Domestic and Fire Flows

Preliminary water demands and fire flow requirements for the proposed development were provided to the City of Ottawa (Table 2). The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand, as indicated in the boundary request correspondence included in Appendix C.
The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow, as indicated by the correspondence and results of boundary conditions (Appendix C).

Fire flow calculated using the ISTDB-2018-02 method used the following assumptions from the Architect:

- Type of construction – Combustible;
- Occupancy type – Limited Combustibility;
- Sprinkler Protection – None; and
- Single block considered for the townhouses block.

The above assumptions result in a maximum estimated fire flow of approximately 13,000 L/min (217 l/sec). See Appendix C for detailed calculations using the ISDTB-2018-02 method. The minimum and maximum pressures fall within the required range identified in Table 3.1 & 3.2 below. Two connection nodes have been analyzed at March Road (Node 1) and at Sandhill Road (Node 2).

Table 3.1 - Results from Hydraulic Analysis – Connection 1

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL	130.5	76.8
Peak Hour	126.1	70.5
Max Day plus Fire 1 (at 167 l/sec)	123.3	66.5
Max Day plus Fire 2 (at 250 l/sec)	120.1	62.0

Ground Elevation = 76.5 m

Table 3.2 - Results from Hydraulic Analysis – Connection 2

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL	130.5	79.1
Peak Hour	126.2	72.8
Max Day plus Fire 1 (at 167 l/sec)	122.5	67.7
Max Day plus Fire 2 (at 250 l/sec)	118.5	61.9

Ground Elevation = 74.9 m

Hydraulic Analysis of the watermain network was carried out by Novatech (Refer Novatech Memorandum dated June 14, 2022, Appendix C). It was concluded that fire hydrants available within the 75m radius from the proposed development are shown on Drawing DR03, Appendix C. Two fire hydrants are rated AA (blue top) as per correspondence with the city (Refer Appendix C). This means that 5700 l/min (95 l/sec) flow will be available from each hydrant, thus providing a total flow of 11,440 l/min within the 75m radius. An additional hydrant (HYD4) has been proposed by Novatech on Klondike Road as part of their development which is within the 75m radius and provide a maximum flow of 5700 l/min (95 l/sec). Therefore, the required fire flow demand will be met by the two existing and one new hydrant. Water retention was analyzed at each node during average day demand in the Novatech Hydraulic analysis. The maximum age throughout the system is within City standards.

3.4 Pressure Check

As per Novatech Hydraulic Analysis results summary (Refer Appendix C), the maximum pressure of 552.70 kPa is available at existing hydrant 1 and 514.83 kPa at proposed hydrant 4 (HYD4). The average day pressure at existing hydrant 1 (EXHYD1) is slightly above 552 kPa. The remaining average day pressures which are in closer proximity to the water service connections are below 552 kPa, therefore pressure reducing valves are not required.

3.5 Reliability Requirements

A shut off valve for the water service will be provided at the property line.

3.6 Watermain Extension on Klondike Road

In order to service the townhouse block for water, multiple options were discussed with the city staff which consisted of servicing through the laneway as private services or from Klondike Road as municipal services. The servicing option from Klondike Road was preferred and adopted for the project.
The watermain extension on Klondike Road is part of proposed servicing for 1055 Klondike Road development. Water Services drops for the current project will also be provided by the 1055 Klondike Road contractor. Coordination with Novatech was done to obtain the watermain extension design and is shown on the site plan as “work done by others”. The final sequence of construction and cost sharing is being discussed and will be submitted to the city.

The watermain extension on Klondike Road and servicing for the townhouses is shown on Drawing C101, Appendix A.

3.7 Water Supply Conclusion

It is proposed to service the private development from the proposed watermain extension on Klondike Road. Individual service connections are proposed from the 400mm watermain which will be installed as part of 1055 Klondike Road development works.
The anticipated water demand was submitted to the City of Ottawa for establishing boundary conditions. The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow. As demonstrated by Table 2 & 3, based on the City's model, the municipal system is capable of delivering water within the pressure range prescribed in the Water Supply Guidelines.
Hydraulic Analysis carried out by Novatech concludes that the required fire and domestic flow can be met with the two existing hydrants and one proposed hydrant on Klondike Road.
The available pressure during the fire flow scenario as per the OBC and ISDTB-2018-02 calculations exceeds 140 kPa. The proposed water supply design conforms to all relevant City Guidelines and Policies.

4. Sanitary Servicing

4.1 Background and Existing Infrastructure

Sanitary sewer along the property frontage on Klondike Road is not available. The sanitary extension will be installed as part of 1055 Klondike Road development works along with sanitary drops from the 1050 Klondike Road development.

4.2 Proposed Servicing and Calculations

The proposed development will require individual service connections to the townhouses from the proposed sanitary sewer extension on Klondike Road which will be provided by the 1055 Klondike Road contractor.

The sanitary servicing design parameters are defined in Table **4**.

Table 4 - Summarization of Sanitary Servicing Design Parameters

Design Parameter	Value
Residential Average Flow	280 l/c.d
Residential Peaking Factor (Maximum 4.0)	Based on the Harmon Equation $P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$
Infiltration and Inflow Allowance	0.33 L/ha/s

Design Parameter	Value
Manning's Coefficient 'n'	0.013
Minimum Depth of Cover	2.5m from obvert of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
As per Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012 incl. all Tech. Bulletins as of November 2019	

Total No. of Townhouse Units = 9 units
Population = 2.7 x 9 = 24 persons

Average Daily Flow = 24 x 280 l/c/d = 6,720 l/day = 0.078 l/sec

Catchment Area = 0.16 ha (Refer sanitary drainage plan DR04 attached in Appendix D)

Infiltration Allowance = 0.16 x 0.33 l/day = 0.053 l/sec

Harmon's Peaking Factor = 4.0

Peak Flow = 0.078 x 4.0 + 0.053 = 0.365 l/sec.

Total no. of 9 sanitary service connections (125 mm diameter, approximate length 10m-14m) are proposed to be connected to the sanitary sewer extension with built in tees on Klondike Road. The service stubs will be provided by the 1055 Klondike Road contractor. The arrangement of service connections is shown on Drawing C101.

4.3 Sanitary Sewer Extension on Klondike Road

As per pre consultation comments, extension of sanitary sewer on Klondike Road is required to service the site. Sanitary sewer extension is shown on Drawing C101 which is based on the design proposed by Novatech for 1055 Klondike Road development. Sanitary Sewer sizing calculations are attached in **Appendix D**.

4.4 Effect of Proposed Development on Downstream Sanitary Infrastructure

The proposed development at present is not part of the contributing area for Briar Ridge Pump station (Refer sanitary drainage plan of Briar Ridge Pump station attached in Appendix D). However, sanitary sewer extension along with proposed service drops on Klondike Road will add the site to the contributing area of Briar Ridge Pump station. As per sanitary flow calculations, an additional flow of 0.36 l/sec is added to the sanitary sewer on Klondike Road. The additional flow gets reduced to 0.3 l/sec downstream due to the peak factor calculations at higher population counts. The pre and post development sanitary flows are shown in Appendix D.

4.5 Summary and Conclusions

The proposed development requires extension of sanitary sewer west of Sandhill street intersection that to be completed by 1055 Klondike Road contractor. An additional flow of 0.3 l/sec is added to the existing sanitary infrastructure which is considered a small addition that will not compromise the sanitary sewer/ pump station capacity or result in significant change to the sanitary hydraulic grade line.

5. Storm Servicing and Stormwater Management

5.1 Background

The existing site does not have a piped storm connection. The site sheet drains towards existing ditch inlet catch basin at Klondike Road and Sandhill Road intersection without any storm water management controls.

5.2 Storm Servicing Strategy

The proposed stormwater management system will provide the necessary detention storage on site to meet the stormwater management requirements. Quantity control will be provided to control the post development flows to the stipulated subdivision criteria of 85 l/sec/ha.

5.3 Proposed Storm Servicing

A new 300 mm diameter storm service will extend from the east side of the proposed development to connect to the existing 675mm storm sewer on Sandhill Road. The proposed pre-development and post-

development catchment areas, runoff coefficients and catchment total areas are indicated in **Appendix E**.

5.4 Design Criteria (Minor and Major Systems)

The site specific SWM criteria as per the comments from the city's pre consultation meeting are as follows,

- Refer to the SWM design criteria in the Shirley's Brook SWM Facility "C" Detailed Design Report (prepared by Novatech, 2006) for the proposed development area:
  - Minor system allowable release rate of 85 L/s/ha;
  - Onsite major system storage of 50 m^3/ha
- Rational method is used to calculate pre and post development flows

Rational Method (Q) = 2.78CIA, where
Q = peak flow (L/s)
C = runoff coefficient
I = rainfall intensity

Intensity is calculated by the following formulae,

$$i = \frac{A}{(T d + C)^B}$$

where A, B and C are all factors of the IDF Return Period, T_d being the time of concentration and A the drainage area (Detailed calculations provided in **Appendix E**).

Time of concentration is determined using the inlet time graph (Appendix 5D Ottawa City Sewer Design Guidelines) which results in a value less than 10 minutes. Therefore 10 minutes will be used to calculate peak flows.

5.5 Stormwater Quantity Control

5.5.1 Catchment Areas

The site is mainly divided in to two catchments based on proposed development and grading. Catchment Area (A1 - 0.126 ha) consists of building footprint and parking area. Area A1 will be controlled and outlet to existing storm network on Sandhill Road.

Catchment Area (A2 - 0.031ha) consist of mostly landscape area with partially hardscape surface. Area A2 is uncontrolled and discharged towards existing ditch inlet catch basin at Sandhill Road and Klondike Road intersection in pre and post development conditions.

In predevelopment conditions, the whole site area runoff is flowing uncontrolled. After development about 80% of site area run off will be controlled.

Pre and post development drainage area plans are attached as DR01 and DR02 in Appendix A.

5.5.2 Peak Flows

Table E1 attached in Appendix E shows the overall pre development site runoff coefficient as 0.50 which is in line with the pre consultation comments limiting the pre development runoff coefficient to 0.5 or less. As per sanitary catchment plan of Pond C storm sewers, the site is included in the catchment Area 59 (Refer Brookside Sub division Storm Drainage Plan attached in Appendix E) at a runoff coefficient of 0.45. Further a minor system flow rate of 85 l/sec /ha is recommended as per pre

consultation comments. The allowable flow as per these limiting criteria are presented in Table 5 below to demonstrate that the site has been over controlled to the most stringent case.

Table 5– Allowable Flow and Storage Summary

Return Period (yrs)	Catchment Area* (ha	Uncontrolled Pre Development Flow @ R=0.45 (liters/sec)	Uncontrolled Post Development Flow @ (liters/sec)	Controlled Post Development Flow @ 85 l/sec/ha (liters/sec)	Storage Required (m^3)
2	0.126	12.06	21.23	6.0	10.05
5	0.126	16.36	28.80	6.0	16.25
10	0.126	19.18	33.76	6.0	20.56
25	0.126	22.72	39.99	6.0	26.28
50	0.126	25.35	44.63	6.0	30.75
100	0.126	35.00	61.61	6.0	48.26*

**-Site Area A1 (0.126ha) is the controlled area. Area A2 (0.031ha) is uncontrolled area due to grading constraints and is deducted from pre and post development flow calculations.*
*** Maximum storage required.*

5.5.3 Allowable Flow/Vortex Control

As per subdivision criteria, the site will be controlled to 85 l/sec/ha.

Area A1 Release rate @ 85 L/s/ha (0.85X0.126) =10.71 l/sec

Area A2 Release rate 85 L/s/ha (0.85X0.031) =2.63 l/sec

Total Release rate (Area A1 & A2) = 10.71+2.63 = 13.34 l/sec

100 year peak flow Area A2 (Uncontrolled) = 9 l/sec (See Table E3a, Appendix E)

Allowable flow = 13.34-9 = 4.34 l/sec

ICD @ flow 6 l/sec is considered as controlled allowable flow

A Vortex Flow Control Valve (Hydro-Break) is proposed to control the post development flow to 6 l/sec (Refer Appendix E for details).

5.5.4 Onsite Storage

An allowable flow of 6 l/sec has been used for storage calculations using Rational formula. The calculation of required onsite storage volume is given in Table E4, E5 and E6, Appendix E.

The required onsite storage is summarized for all storms (Refer Table 5 above). The maximum onsite storage volume of 48.26 m^3 is required to control 100 year post development flows. Ponding on surface will not occur for all storms (2-100 year) scenario as required storage is available in the below ground storm tank.

5.5.4.1 Storm Tank

Brentwood Storm Tank (ST-24) is provided to meet the onsite storage requirement. The tank has total capacity of 50.33 m^3. The Storm tank model volume calculator sheet and specifications are provided in Appendix E.

(Refer drawing C101 for storm tank details and location)

5.5.5 Summary

Table 6 summarizes the proposed release rates and confirms that the total release rate does not exceed the allowable release rate.

Table 6 – Post-Development Controlled Peak Flows

	Post-Development Controlled Peak Flows (L/s)
Allowable Release Rate @ 85 l/s/ha (l/sec)	4.34
Release Rate from Controlled Drainage Areas (l/sec)	6.0
Required Storage (m^3)	48.26
Provided Storage (m^3)	50.33

Therefore, a total of **50.33 m^3** of onsite detention is available compared to the required storage of 48.26 m^3. Ponding will not occur for all storms (2-100 year) scenario as required storage is available below ground in storm tank.

5.5.6 Impact on Existing Stormwater Infrastructure

The proposed development was included as Catchment Area 59 (Refer Brookside Subdivision Storm Drainage Plan in Appendix E). The plan shows that the site was accounted as a catchment area with runoff coefficient of 0.45 which allows a 5year flow of 17.0 l/sec. As described in section 5.5.1, the onsite quantity controls limit the site discharge to 6.0 l/sec to ensure that the downstream storm sewers and storm water pond "C" capacity and hydraulic grade line is not affected by the proposed development.

Storm Sewer Design Calculations are provided in **Appendix E**.

5.6 Storm Water Quality Control

The required water quality treatment is achieved with the help of a treatment train approach comprising of the following measures,

1- MVCA considers run-off from building roof areas to be "clean", and therefore not require quality control.

2- Oil/grit separator (OGS) has been proposed as Stormceptor EFO4 unit shown on Drawing C101, Appendix A. The sizing calculations are attached in Appendix E which shows that the unit is capable of achieving 90% TSS removal for site flows.

5.7 Pre-Consultation with MECP and Conservation Authority

As the sanitary sewer extension is designed and constructed under 1055 Klondike Road development works, therefore MECP approval will also be covered under the approval process for 1055 Klondike Road, being designed by Novatech.

5.8 Minor and Major Systems

The minor storm sewer system consists of the storm connection from the townhouse block up to the city storm sewer on Sandhill Road. The major system consists of flow east through the laneway on to

Sandhill Road. The site has been graded to direct run-off from storms in excess of the 100-year event safely to Sandhill Road.

Individual townhouse roof areas will discharge at surface on the laneway as shown on Drawing C101, Appendix A.

5.9 Impacts to Receiving Watercourses

No negative impacts to receiving watercourses are anticipated.

5.10 100 Year Flood Levels and Major Flow Routing

The site is not within a 100-year floodplain.

6. Grading

The proposed grading plan is shown in Drawing C102 in **Appendix A**. The development will be tied into existing grades along Sandhill Road and Klondike Road.

The existing grades will be matched at the property limits along the south and west property boundary.

7. Erosion and Sediment Control

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

- Extent of exposed soils shall be limited at any given time;
- Exposed areas shall be re-vegetated as soon as possible;
- Minimize the area to be cleared and disruption of adjacent areas;
- Silt sack or approved equivalent shall be installed inside all catch basins, catch basin manholes, and storm manholes as identified on the erosion and sediment control plan;
- Mud matt is required at the construction entrance to prevent mud tracking on municipal roads. Mud matt to be installed and maintained as indicated on the erosion and sediment control plan;
- Visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations;
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed;
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract;
- During construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer; and,
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

We trust you will find this submission complete and in order. Should you have any questions, please contact the undersigned.

Respectfully Submitted,
Jain Infrastructure Consultants Ltd.

Yasar Ayub , P.Eng
Project Engineer
November 22, 2022

Usman Arif
Project Designer
November 22, 2022

Appendix A

Figures

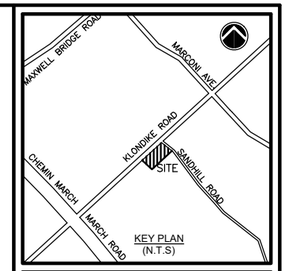
DR01 Pre Development Drainage Areas

DR02 Post Development Drainage Areas

Site Servicing, Grading and Erosion and Sediment Control Plan

Removal & Demolition Plan

TRUE NORTH



KEY PLAN
(N.T.S)

LEGAL DESCRIPTION:
PLAN OF SURVEY & TOPOGRAPHIC INFORMATION PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. (OLS), IDENTIFIED AS PART OF LOT 10, CONCESSION 4 GEOGRAPHIC TOWNSHIP OF MARCH CITY OF OTTAWA

BEARING NOTE:
BEARINGS ARE GRID, DERIVED FROM CAN-NET 2016 REL TIME NETWORK GPS OBSERVATIONS, MTM ZONE 9 (76° 30' WEST LONGITUDE) NAD-83 (ORIGINAL).

CATCHMENT AREA BOUNDARY

CATCHMENT AREA No.

WEIGHTED RUNOFF COEFFICIENT

CATCHMENT AREA IN HECTARES (Ha)

LANDSCAPE

GRAVEL

ASPHALT

CONCRETE

BUILDING

OVERLAND FLOW ROUTE

No.	DESCRIPTION	DATE
	REVISION	
3	ISSUED FOR SPA	NOV 22,22
2	ISSUED FOR SPA	JUN 27,22
1	ISSUED FOR SPA	NOV 25,21

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PROJECT
1050 KLONDIKE ROAD
OTTAWA, ONTARIO, K2K 1X7

DRAWING TITLE
PRE DEVELOPMENT DRAINAGE AREAS

SCALE:	1: 125
DATE:	Nov. 22, 22
DRAWN BY:	CC
CHECKED BY:	YA

DWG No. DR01

Scale 1 : 125
6 4.5 3.0 1.5 0 3 6 Meters

#18639

TRUE NORTH

KEY PLAN (N.T.S)

MAXWELL BRIDGE ROAD
MARCONI AVE.
KLONDIKE ROAD
SANDHILL ROAD
CHEMIN MARCH
MARCH ROAD
SITE

LEGAL DESCRIPTION:
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ASPHALT
CONCRETE
BUILDING
OVERLAND FLOW ROUTE

No.	DESCRIPTION	DATE
3	ISSUED FOR SPA	NOV 22,22
2	ISSUED FOR SPA	JUN 27,22
1	ISSUED FOR SPA	NOV 25,21

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Jain Infrastructure Consultants Ltd.
7405 EAST DANBRO CRESCENT
MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

PROJECT
1050 KLONDIKE ROAD
OTTAWA, ONTARIO, K2K 1X7

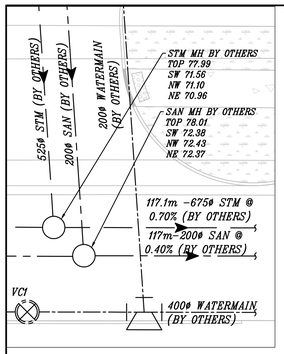
DRAWING TITLE
POST DEVELOPMENT DRAINAGE AREAS

SCALE: 1: 125
DATE: Nov. 22, 22
DRAWN BY: CC
CHECKED BY: YA

DWG No. DR02

Scale 1 : 125
6 4.5 3.0 1.5 0 3 6 Meters

#18639



SECTION A-A STORM TANK
SCALE: N.T.S.

SERVICE CONNECTIONS:

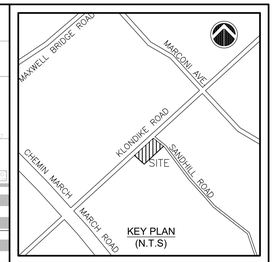
KLONDIKE ROAD
9 Nos. - 19Ø WATER SERVICE CONNECTION (TYPE "K", COPPER)
9 Nos. - 125Ø SANITARY SERVICE CONNECTION (PVC SDR-28)

WATERMAIN

1. ALL WATERMAIN AND WATER SERVICE MATERIALS AND INSTALLATION SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS.
2. ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m. THERMAL INSULATION SHALL BE INSTALLED WHERE ADEQUATE SEPARATION CANNOT ACHIEVED AS PER CITY STANDARD W21, W22 AND W23.
3. ALL WATERMAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE. WATERMAIN CONNECTIONS BY CITY OF OTTAWA FORCES WITH ALL EXCAVATION BACKFILL AND ROAD REINSTATEMENT BY CONTRACTOR.
4. WATERMAIN IS TO BE PVC DR18 WITH TRACER WIRE AS PER CITY OF OTTAWA STANDARD W36 UNLESS OTHERWISE NOTED.
5. VALVE BOXES AS PER CITY OF OTTAWA DETAIL W24.
6. ALL FIRE HYDRANTS TO BE INSTALLED AS PER CITY STANDARD W19 AND LOCATED AS PER CITY STANDARD W18 AND/OR CITY STANDARD CROSS SECTIONS.
7. WATERMAIN BEDDING IS TO BE AS PER CITY OF OTTAWA DETAIL W17.
8. THRUST BLOCKS AND RESTRAINT AS PER CITY OF OTTAWA DWGS: W25.3, W25.4, W25.5 AND W25.6.
9. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY OF OTTAWA DWGS W389,W40, W41.
10. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
11. DISINFECTION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
12. WATER SERVICES TO BE INSTALLED AS PER CITY OF OTTAWA STANDARD W26 AND W35.
13. WITHIN THE FROST ZONE, THE BACKFILL IN THE SERVICE TRENCHES SHOULD MATCH THE SOIL ON SIDES TO MINIMIZE DIFFERENTIAL FROST HEAVING IN THE SUBGRADE.
14. INSTALLATION OF WATER METER AND REMOTE RECEPTACLE SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
15. GATE VALVE TO BE INSTALLED INSIDE THE WATER ROOM OF THE EXISTING BUILDING FOR THE PHASE 2 WATER SUPPLY AND SHALL REMAIN CLOSED UNTIL PHASE 2 IS COMMISSION TO ENSURE NO STAGNANT WATER RESIDES WITHIN THE SERVICE STUB.
16. BACKFLOW VALVE TO BE INSTALLED TO PREVENT CROSS-CONNECTION BETWEEN WELL AND MUNICIPAL WATER SUPPLIES.

STORM AND SANITARY SEWERS

1. SANITARY AND STORM SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATION AND OPSS 407 AND 410.
2. SEWER BEDDING AS PER CITY STANDARD S6 & S7.
3. ALL SANITARY SEWERS ARE TO BE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR35.
4. ALL STORM SEWERS ARE TO BE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR35 OR REINFORCED CONCRETE IN ACCORDANCE WITH CSA STANDARDS A257.2 AND A257.3 (JOINTS).
5. ALL MANHOLES , CATCHBASINS AND CATCHBASIN MANHOLES TO BE BACKFILLED WITH MIN. 0.3m HORIZONTAL THICKNESS GRANULAR 'A'.
6. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN TO WITHIN 1.0m OF BUILDING WALLS AND PROVIDE TEMPORARY CAPS.
7. THE CONTRACTOR SHALL CONDUCT INFILTRATION/EXFILTRATION (AS PER CURRENT OPSS) TESTING ON ALL NEWLY INSTALLED SANITARY SEWERS. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWER INSTALLATION AND SUPERVISED BY THE ENGINEER.
8. THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED STORM AND SANITARY SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED AND SUPERVISED BY THE ENGINEER.
9. ALL SERVICE CONNECTIONS TO BE CONSTRUCTED AS PER CITY STANDARD S11 & S11.1.
10. ALL SANITARY BUILDING DRAINS TO BE EQUIPPED WITH SANITARY BACKWATER VALVES INSTALLED PER CITY OF OTTAWA STANDARD DRAWING S14.1
11. MINIMUM SOIL COVER TO BE 2.0m TO PROTECT SEWERS FROM FROST DAMAGE. IN AREAS WHERE ADEQUATE COVER CANNOT BE ACHIEVED, THERMAL INSULATION TO BE INSTALLED AS PER OPSD 514.010.



KEY PLAN
(N.T.S)

DRAWING REFERENCES
1. THE SITE PLAN MUST BE READ IN CONJUNCTION WITH ARCHITECTURAL, LANDSCAPING, ELECTRICAL & STRUCTURAL PLANS.
2. FOR GRADING PLAN, REFER DRAWING C102
3. FOR EROSION CONTROL, CITY STANDARD NOTES & DETAILS REFER DRAWING C103.

LEGAL DESCRIPTION:
PLAN OF SURVEY & TOPOGRAPHIC INFORMATION PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. (OLS), IDENTIFIED AS PART OF LOT 10, CONCESSION 4 GEOGRAPHIC TOWNSHIP OF MARCH CITY OF OTTAWA

BEARING NOTE:
BEARINGS ARE GRID, DERIVED FROM CAN-NET 2016 REL TIME NETWORK GPS OBSERVATIONS, MTM ZONE 9 (76° 30' WEST LONGITUDE) NAD-83 (ORIGINAL).

LEGEND

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCH BASIN
- FH — PROPOSED FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- VC — EXISTING VALVE CHAMBER (WATERMAIN)
- FH — EXISTING FIRE HYDRANT
- W — EXISTING WATER MAIN
- SAN — EXISTING SANITARY
- STM — EXISTING STORM
- CURB STOP
- RD — ROOF DRAIN
- TOF — TOP OF FOUNDATION ELEVATION
- USF — UNDERSIDE OF FOOTING ELEVATION
- FFE — FINISHED FLOOR ELEVATION

No.	REVISION	DATE
4	ISSUED FOR SPA	NOV 22,22
3	ISSUED FOR SPA	JUN 27,22
2	ISSUED FOR SPA	NOV 25,21
1	ISSUED FOR SPA	MAY 19,21

LICENCED PROFESSIONAL ENGINEER — Y.AYUB — 10007645 — NOV 22,22 — PROVINCE OF ONTARIO — 20~525

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PROJECT
1050 KLONDIKE ROAD
OTTAWA, ONTARIO, K2K 1X7

DRAWING TITLE
SITE SERVICING PLAN

SCALE:	1: 150
DATE:	Nov. 22, 22
DRAWN BY:	CC
CHECKED BY:	YA

DWG No. C101

D07-12-21-0066

#18639

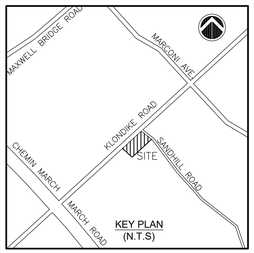
GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
3. JOB BENCH MARK - CONFIRM WITH JIC LTD. PRIOR TO UTILIZATION.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED. ALL DRAWINGS SHOULD NOT BE SCALED BY THE CONTRACTOR. ANY MISSING OR QUESTIONABLE DIMENSIONS ARE TO BE CONFIRMED WITH THE CONSULTANT IN WRITING.
5. CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWING SUPPLEMENTS WHERE APPLICABLE AND ONTARIO PROVINCIAL STANDARDS SHALL APPLY WHERE NO CITY STANDARDS ARE AVAILABLE.
6. ANY DISCREPANCIES, INTERPRETATIONS, CHANGES AND ADDITIONS TO THESE DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, WHEN NOTED AND BEFORE PROCEEDING WITH CONSTRUCTION WORKS.
7. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. REFER TO THE LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
9. FOR GEOTECHNICAL INFORMATION REFER TO THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY GEMTEC CONSULTING ENGINEERS AND SCIENTISTS LTD. DATED OCTOBER 2020.
10. ALL DISTURBED AREAS TO BE REINSTATED TO EQUAL OR BETTER CONDITION. ALL NEW WORK SHALL TIE INTO EXISTING.
11. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
12. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAWCUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
13. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON CITY STREETS.
14. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO CITY OF OTTAWA AND OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
15. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS ETC THAT ARE FOUND. DO NOT CONTINUE CONSTRUCTION IN AREAS WHERE DISCREPANCIES APPEAR UNTIL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
16. THE CONTRACTOR SHALL PROTECT ANY SUCH EXISTING SERVICES & FACILITIES. SUCH REQUIRED MEASURES INCLUDE, BUT ARE NOT LIMITED TO: ENSURE ALL CONCERNED UTILITIES HAVE LOCATED THEIR PLANT PRIOR TO ANY EXCAVATING, LOCATE AND FLAG/PAINT THE LOCATIONS OF OTHER U/G PLANT WHICH MIGHT BE DAMAGED BY EXCAVATION AND CONSTRUCTION TRAFFIC, HAND DIG IN PROXIMITY TO EXISTING BURIED SERVICES TO LOCATE THEM WITHOUT ANY RESULTING DAMAGE, BRACE AND SUPPORT WHERE REQUIRED.
17. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES FOR THE PROTECTION OF THE AREA'S DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
18. DESIGN ELEVATIONS GIVEN ON THESE PLANS ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY JIC LTD. SURFACE PONDING STORAGE VOLUMES AND INLET CONTROL DEVICE DIMENSIONS MUST COMPLY WITH THE DESIGN REPORT PREPARED BY JIC LTD. FOR THIS PROJECT.
19. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATION AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUND WATER IN A CONTROLLED AND APPROVED MANNER. THE CONTRACTOR SHALL APPLY FOR A PERMIT TO TAKE WATER FROM THE MINISTRY OF ENVIRONMENT IF MORE THAN 50,000 LITERS PER/DAY OF GROUNDWATER IS PUMPED FOR CONSTRUCTION ACTIVITIES.
20. FOR TOPOGRAPHICAL INFORMATION REFER TO PLAN PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. FOR LEGAL PROPERTY LINE DESCRIPTIONS.
21. CITY INSPECTOR IS TO NOTIFIED OF ANY WORKS IN THE ROW WITH SUFFICIENT NOTICE.
22. CLAY SEAL TO BE AS PER OPSD 802.095.
23. SHOULD ANY CONDITIONS AT THE SITE BE ENCOUNTERED WHICH DIFFER FROM THE TEST LOCATIONS IDENTIFIED IN THE GEOTHECHICAL REPORT, GEMTEC'S GEOTHECHNICAL ENGINEER IS TO BE NOTIFIED IMMEDIATELY IN ORDER TO PERMIT REASSESMENT OF THE GEOTECHNICAL RECOMMENDATIONS.

ROADWAYS & CURBS

1. ASPHALT REINSTATEMENT AS PER CITY OF OTTAWA STANDARD DRAWING R10.
2. CURBS TO BE CONCRETE BARRIER CURBS AS PER CITY OF OTTAWA STANDARD DRAWING SC1.1
3. THE CONTRACTOR SHALL COMPLETE ALL RESTORATION WITHIN CITY ROW'S TO A CONDITION EQUAL TO ORIGINAL OR BETTER AND TO THE SATISFACTION OF THE MUNICIPAL AUTHORITIES.

TRUE NORTH



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(N.T.S)

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LEGEND

+74.82	EXISTING ELEVATION (SURVEY)
	PROPOSED STORM MANHOLE
	PROPOSED CATCH BASIN
	EXISTING MANHOLE
	EXISTING CATCH BASIN
VC	EXISTING VALVE CHAMBER (WATERMAIN)
FH	EXISTING FIRE HYDRANT
+76.04(Ex.)	EXISTING ELEVATION TO REMAIN
+76.15	PROPOSED ELEVATION
+76.30 TC	PROP. TOP OF CURB ELEVATION
+76.68	ROAD ELEVATIONS BY OTHERS
2.0%	SLOPE BY OTHERS
	PROPOSED SLOPE
	OVERLAND FLOW ROUTE
	CURB STOP
RD	ROOF DRAIN
TOF	TOP OF FOUNDATION ELEVATION
USF	UNDERSIDE OF FOOTING ELEVATION
FFE	FINISHED FLOOR ELEVATION

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LICENSED PROFESSIONAL ENGINEER
Y. AYUB
10007645
NOV 22,22
PROVINCE OF ONTARIO
20~525

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PROJECT
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OTTAWA, ONTARIO, K2K 1X7

DRAWING TITLE
SITE GRADING PLAN

SCALE:	1: 150
DATE:	Nov. 22, 22
DRAWN BY:	CC
CHECKED BY:	YA

DWG No.
C102

007-12-21-0066

#18639

PAVEMENT SPECIFICATION

FOR THE ACCESS ROADWAYS AND PARKING LOTS, THE FOLLOWING MINIMUM PAVEMENT STRUCTURE SHOULD BE USED:
- 100 MILLIMETRES OF HOT MIX ASPHALTIC CONCRETE, OVER
- 150 MILLIMETRES OF OPSS GRANULAR A BASE, OVER
- 450 MILLIMETRES OF OPSS GRANULAR B, TYPE II SUBBASE

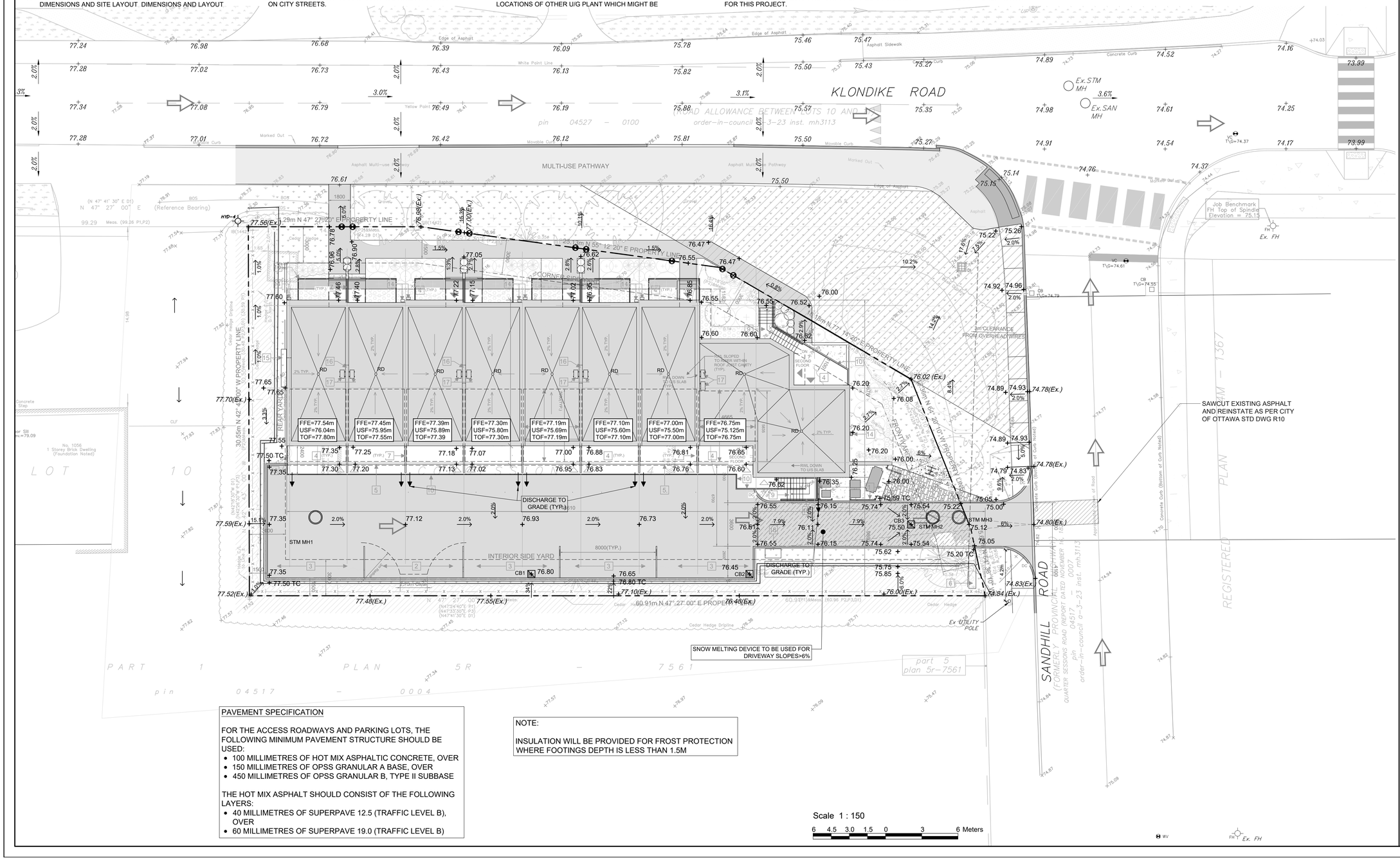
THE HOT MIX ASPHALT SHOULD CONSIST OF THE FOLLOWING LAYERS:
- 40 MILLIMETRES OF SUPERPAVE 12.5 (TRAFFIC LEVEL B), OVER
- 60 MILLIMETRES OF SUPERPAVE 19.0 (TRAFFIC LEVEL B)

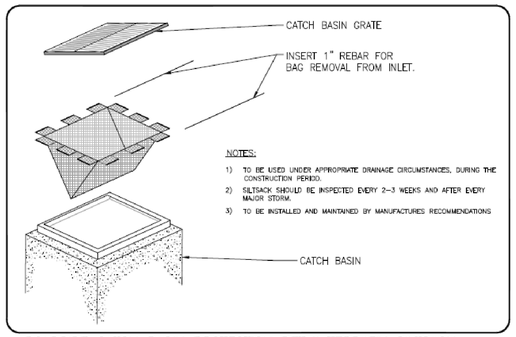
NOTE:

INSULATION WILL BE PROVIDED FOR FROST PROTECTION WHERE FOOTINGS DEPTH IS LESS THAN 1.5M

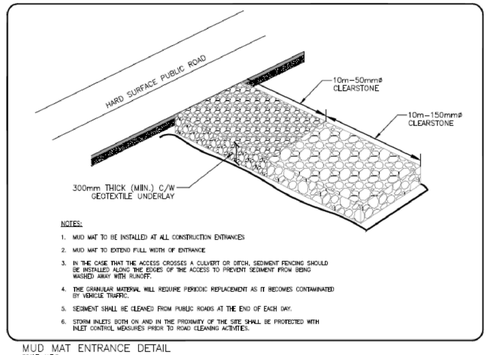
Scale 1 : 150

6 4.5 3.0 1.5 0 3 6 Meters





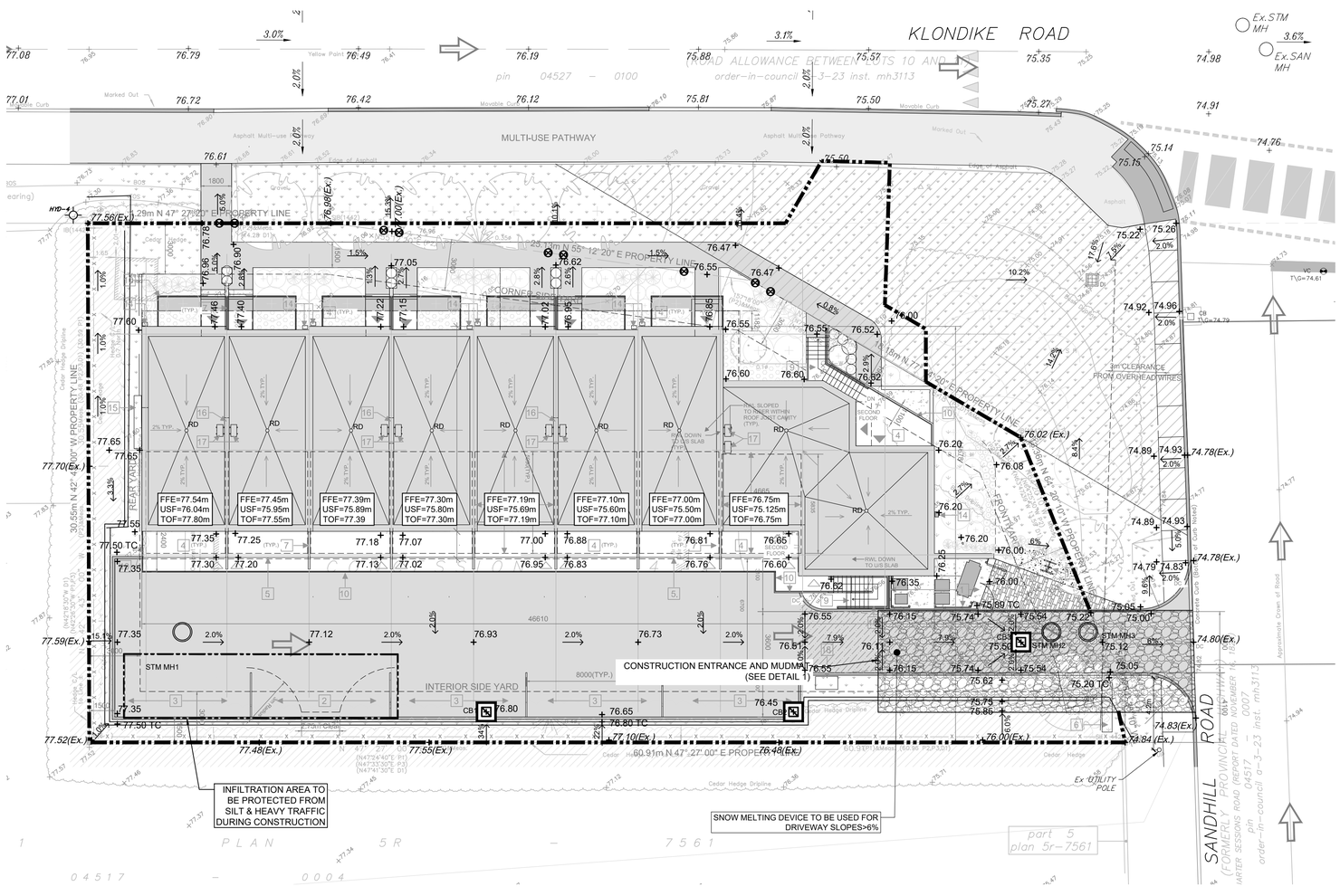
ROADSIDE CATCH BASIN PROTECTION DETAIL:TERRAFIX SILTSACK
SCALE: N.T.S.



MUD MAT ENTRANCE DETAIL
SCALE: N.T.S.

LEGEND:

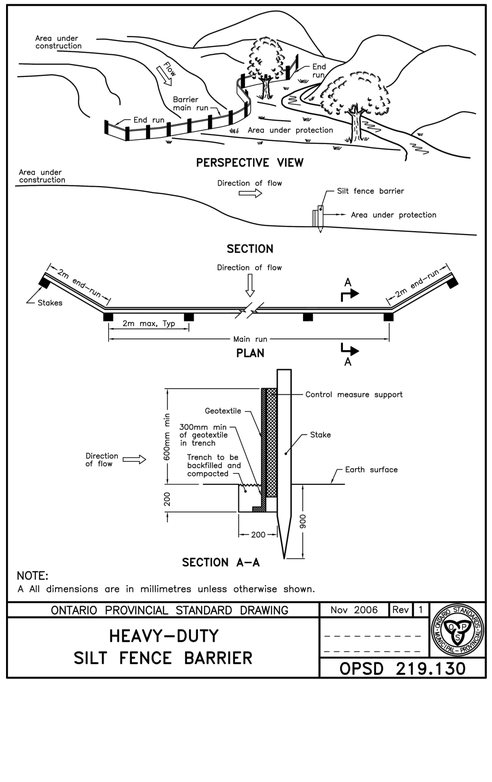
- SEDIMENT CONTROL FENCE
- CATCH BASIN SEDIMENT PROTECTION



TRUE NORTH

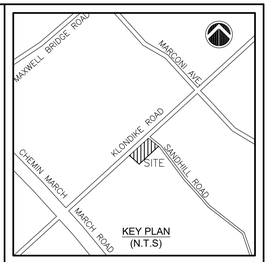
EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES, AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
3. REGULAR INSPECTION AND MAINTENANCE OF THE EROSION AND SEDIMENT MEASURES SHALL BE UNDERTAKEN. THE IMPLEMENTATION AND ADJUSTMENT AND/OR CORRECTIVE MAINTENANCE OF THE EROSION AND SEDIMENT MEASURES IS AN INTEGRAL PART OF THE PLAN AND MUST BE PERFORMED.
4. GEOTEXTILE FILTER FABRIC SHALL BE PLACED BETWEEN THE STRUCTURE FRAME AND COVER FOR ALL MANHOLES, CATCHBASINS, AND CATCHBASIN MANHOLES IN THE VICINITY OF WORK.
5. THE CONTRACTOR SHALL MAINTAIN ADJACENT ROADS IN A CLEAN CONDITION AT ALL TIMES.
6. PROVIDE MUD MATS AT SITE CONSTRUCTION ENTRANCE(S) AND EGRESS(S).



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev 1
HEAVY-DUTY SILT FENCE BARRIER		OPSD 219.130



KEY PLAN
(N.T.S)

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DRAWING TITLE
EROSION CONTROL PLAN & DETAILS

SCALE:	1: 150
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CHECKED BY:	YA

DWG No.
C103

D07-12-21-0066

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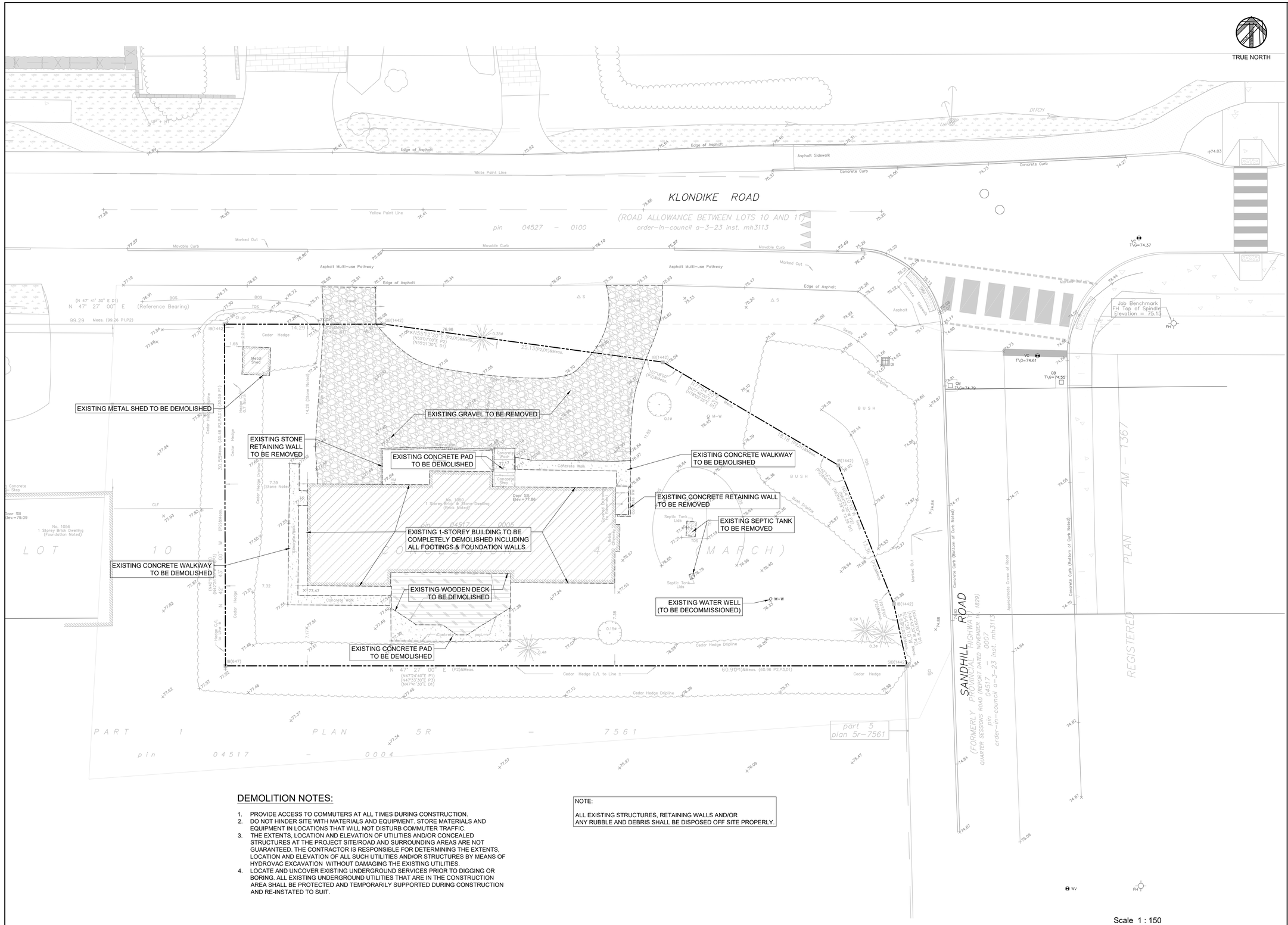

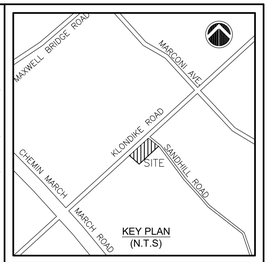

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PLAN OF SURVEY & TOPOGRAPHIC INFORMATION PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. (OLS), IDENTIFIED AS PART OF LOT 10, CONCESSION 4 GEOGRAPHIC TOWNSHIP OF MARCH CITY OF OTTAWA

BEARING NOTE:
BEARINGS ARE GRID, DERIVED FROM CAN-NET 2016 REL TIME NETWORK GPS OBSERVATIONS, MTM ZONE 9 (76° 30' WEST LONGITUDE) NAD-83 (ORIGINAL).

LEGEND

- GRAVEL REMOVAL
- BUILDING/SHED REMOVAL
- WOODEN DECK REMOVAL
- CONCRETE WALKWAY/PAD REMOVAL
- SEPTIC TANK REMOVAL
- RETAINING WALL REMOVAL

DEMOLITION NOTES:

1. PROVIDE ACCESS TO COMMUTERS AT ALL TIMES DURING CONSTRUCTION.
2. DO NOT HINDER SITE WITH MATERIALS AND EQUIPMENT. STORE MATERIALS AND EQUIPMENT IN LOCATIONS THAT WILL NOT DISTURB COMMUTER TRAFFIC.
3. THE EXTENTS, LOCATION AND ELEVATION OF UTILITIES AND/OR CONCEALED STRUCTURES AT THE PROJECT SITE/ROAD AND SURROUNDING AREAS ARE NOT GUARANTEED. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXTENTS, LOCATION AND ELEVATION OF ALL SUCH UTILITIES AND/OR STRUCTURES BY MEANS OF HYDROVAC EXCAVATION WITHOUT DAMAGING THE EXISTING UTILITIES.
4. LOCATE AND UNCOVER EXISTING UNDERGROUND SERVICES PRIOR TO DIGGING OR BORING. ALL EXISTING UNDERGROUND UTILITIES THAT ARE IN THE CONSTRUCTION AREA SHALL BE PROTECTED AND TEMPORARILY SUPPORTED DURING CONSTRUCTION AND RE-INSTATED TO SUIT.

NOTE:
ALL EXISTING STRUCTURES, RETAINING WALLS AND/OR ANY RUBBLE AND DEBRIS SHALL BE DISPOSED OFF SITE PROPERLY.

REVISION

LICENCED PROFESSIONAL ENGINEER
Y. AYUB
10007645
NOV 22,22
PROVINCE OF ONTARIO
20-525

No.	DESCRIPTION	DATE
3	ISSUED FOR SPA	NOV 22,22
2	ISSUED FOR SPA	JUN 27,22
1	ISSUED FOR SPA	NOV 25,21

JAIN
Jain Infrastructure Consultants Ltd.
7405 EAST DANBRO CRESCENT
MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

PROJECT
1050 KLONDIKE ROAD
OTTAWA, ONTARIO, K2K 1X7

DRAWING TITLE
REMOVAL & DEMOLITION PLAN

SCALE: 1: 150
DATE: Nov. 22, 22
DRAWN BY: CC
CHECKED BY: YA

DWG No.
C105

D07-12-21-0066

#18639

Appendix B
Correspondence with Regulatory Authorities

Yasar Ayub

Subject: FW: 1050 Klondike Road - preconsultation meeting notes

----- Forwarded Message -----
From: McCreight, Laurel <laurel.mccreight@ottawa.ca>
To: Deborah Belfie <belfied@rogers.com>
Sent: Tuesday, May 26, 2020, 03:52:36 p.m. EDT
Subject: Pre-Consultation Follow-Up: 1050 Klondike Road

Hi Debbie,

Please refer to the below regarding the Pre-Application meeting held on May 21, 2020 for the property at 1050 Klondike Road for a Zoning By-law Amendment and Site Plan Control Application for a 4-storey apartment building. I have also attached the required Plans & Study List for application submission.

Below are staff's preliminary comments based on the information available at the time of the pre-consultation meeting:

Planning / Urban Design

- The parking on the ground floor in the proposed design concept must be redesigned, as it will have significant negative impacts on the public realm.
- The proposed design concept requires more animation to both Klondike and Sandhill. This could include revising the proposal with:
    - Removing the two vehicular accesses and provide only one access off Sandhill;
    - Removing the vehicle maneuvering area in the front encroaching into the public right of way;
    - Revising the location of the garbage room that directly faces the street;
    - Providing underground parking and
    - Relocating the bike parking away from the façade of the building.
- The majority of the units, which are south facing, are approximately 3 metres away from the property line. This could be concerning depending on the development potential on the abutting property.
- The road closure at the corner of Klondike and Sandhill, if possible, can potentially alleviate some pressures and offer some flexibilities for design. Regardless of the final lot configuration, the design should:
    - Animate both public streets (neither ground floor parking nor blank walls should be allowed);
    - Improve public realm through adequate provision of landscaping and architecture design;
    - Ensure access to natural lights for all units in the long run taking into consideration development potential on abutting properties; and
    - Provide adequate private amenities.
- A scoped Design Brief is required for the rezoning application. The Terms of Reference of the Design Brief is attached to provide guidance.
- You are encouraged to contact the Ward Councillor, Councillor Jenna Sudds, about the proposal.

Engineering

- The Servicing Study Guidelines for Development Applications are available here.
- Servicing and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (October 2012)
    - Ottawa Design Guidelines – Water Distribution (2010)
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
    - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
    - City of Ottawa Environmental Noise Control Guidelines (January 2016)
      City of Ottawa Park and Pathway Development Manual (2012)
    - City of Ottawa Accessibility Design Standards (2012)
    - Ottawa Standard Tender Documents (latest version)
    - Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email or by phone at (613) 580-2424 x.44455).
- For the re-zoning application, please provide a site serviceability study proving the site can be serviced by the existing municipal infrastructure and discuss any improvements that may be required to service the proposed site.
- Sanitary Infrastructure
    - There is an available 200mm diameter PVC sanitary sewer located on Klondike Road. However, it currently does not front the proposed site.
    - A sanitary sewer extension within the Klondike Road Right-Of-Way (ROW) will be required to service this site. The sanitary sewer can be extended solely the +/-20m required to service the site, and does not need to extend the full length of the site's Klondike Road frontage.
    - The proponent will be required to demonstrate what the expected sanitary flows from the proposed site will be and show that the existing sanitary sewer infrastructure can accommodate the proposed site flows without any adverse affects.
    - The existing sanitary sewer on Klondike Road connects to the Briar Ridge Pump Station (BRPS). This pump station currently has limited capacity. Upgrades to the BRPS are expected to be completed by Dec 2021 or early 2022.
    - Due to the municipal sanitary sewer extension a Ministry of Environment, Conservation and Parks Environmental Compliance Approval (MECP ECA) will be required and will be reviewed under the Transfer of Review program (Standard Works) with the City of Ottawa.
    - Also due to the municipal sanitary extension, a Municipal Consent (MC) circulation will be required after or in the later stages of the Site Plan Application stage. The ROW Approvals Department at the City, may, to their review and discretion, exempt the proposed extension from the MC Circulation process.
- Watermain

    - There is an available 305mm diameter PVC watermain fronting the site along Sandhill Road. However, looping of the Klondike Road watermain (from March Road stub to the Sandhill Road stub) is preferred.
    - Water frontage charges will not apply.
    - If a watermain extension along Klondike Road is pursued an MECP Form 1 will need to be completed.
    - Drinking Water Boundary condition requests must include the location of the service connection and the expected loads required by the proposed development. Please provide the following information:

        a. Location of service (map/plan view)
        b. (Draft) site plan or similar plan for building location
        c. Fire flow demand: ____L/s (as per FUS, 1999)
        d. Average daily demand: ___ L/s.
        e. Maximum daily demand: ___L/s.

f. Maximum hourly daily demand: ___ L/s.
g. Supporting calculations for domestic demands
h. Supporting calculations for FUS required fire flow

- The Stormwater Management Criteria, for the subject site, is to be based on the following:
    - There is an available 675mm diameter concrete storm sewer located on Sandhill Road conveying flow to a ditch upstream of "Pond C".
    - Based on both the Shirley's Brook Floodplain Analysis and SWM Report (Klondike Road Development Lands, prepared by Novatech, May 2006) and the Shirley's Brook SWM Facility "C" Detailed Design Report (prepared by Novatech, 2006), it appears that Pond "C" was sized to service the 1050 Klondike Road parcel. Please demonstrate that the existing storm sewer and pond have capacity to service this proposed development (quantity and quality control).
    - Refer to the SWM design criteria in the Shirley's Brook SWM Facility "C" Detailed Design Report (prepared by Novatech, 2006) for the proposed development area:

        a. Minor system allowable release rate of 85 L/s/ha;

        b. Onsite major system storage of 50 m^3/ha (please see the note below);

        c. ICDs [are] installed in the roadway catchbasins to ensure flow into the storm sewer system does not exceed the 5-year runoff rates; and

        d. HGL for 100-year event must have at least 0.3 m freeboard to the underside of footings.

    - IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
    - A calculated time of concentration (Cannot be less than 10 minutes).
    - Use of rooftop controls are recommended for this site, but are not limited to them, to meet the requirements.
- Please note that there is a Special Area Development Charge for the subject site. Please refer to the current W-2 Development Charge Brochure attached. You can find By-Law No. 2019 – 163 online on the City of Ottawa website. Note that this is the Charge for 2019 and may change over time.
- If the site plan changes to include underground parking, a Geotechnical Report will be required for the Re-Zoning application. If not, the Geotechnical Report will be required at Site Plan Application stage.

Please contact Infrastructure Project Manager Gabrielle Schaeffer for follow-up questions.

Transportation

- Only one access off Sandhill should be provided.
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Provide dedicated pedestrian paths.
    - Grey out any area that will not be impacted by this application.

Please contact Transportation Project Manager, Mike Giampa for follow-up questions.

Other

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-consultation 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 do not hesitate to contact me if you have any questions.

Regards,

Laurel

Laurel McCreight MCIP, RPP

Planner

Development Review West

Urbaniste

Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa

613.580.2424 ext./poste 16587

ottawa.ca/planning / ottawa.ca/urbanisme

'

Yasar Ayub

To: Yasar Ayub
Subject: FW: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Hi Yasar,

Pardon the delay. As we discussed over the phone last month, the applicant can service 1050 Klondike from either Sandhill Rd (Option 2) or Klondike Road for sanitary and water, however Option 1 is not a preferred approach. Since the proposal is no longer a low-rise building, but now townhouses, services for each townhouse can be provided from either the proposed laneway or from Klondike Rd directly. The City's preference would be to service the townhouses from Klondike Road as this would extend the City infrastructure and reduces the shared maintenance costs of the townhouses for the shared private infrastructure through the rear private lane.

I also mentioned that there is a proposed development at 1055 Klondike that is proposing to extend the sanitary and water infrastructure along Klondike Road, however I am currently unsure of their timelines. Please take a look on the City of Ottawa Development Applications Search Tool (link) to find the latest plans produced by the nearby 1055 Klondike Rd under development application D07-16-19-0024 to see how they have approached the Klondike Road sewer and watermain extensions. Perhaps you can reach out to the developer of 1055 Klondike to coordinate works.

Please let me know if you have further questions.

Regards,
Gabrielle (Gabi) Schaeffer, P.Eng
Senior Engineer - Infrastructure Applications

City of Ottawa
Development Review - West Branch
Planning, Infrastructure and Economic Development Department
110 Laurier Ave., 4th Floor East;
Ottawa ON K1P 1J1
Mail Code 01-14
Tel: 613-580-2424 x 22517
Cell: 613-227-7419
Fax: 613-560-6006

****During this period of uncertainty surrounding COVID-19, we are following recommended best practices to minimize the risk of exposure, while ensuring service to our clients remains as uninterrupted as possible. I am working from home, and my work hours may be affected, but I will respond to emails at my earliest opportunity. Should there be delays, I thank you for your understanding and patience.****

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: March 16, 2021 12:58 PM
To: Deborah Belfie <belfied@rogers.com>; Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

On Wednesday, February 24, 2021, 11:15:56 a.m. EST, Yasar Ayub <yayub@jainconsultants.com> wrote:

Hi Gabrielle,

Just checking to see if you were able to consult with other city staff and give your feedback on the servicing arrangement for the revised proposal. We will then need to discuss with our client and proceed with one of the three options.

Yasar

416.668.6367

From: Yasar Ayub
Sent: February 18, 2021 1:18 PM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Hi Gabrielle,

We would like to request a review of the proposed sanitary connection arrangement for the revised building footprint (row townhouses instead of apartments).

Option 1- As per the pre consultation comments, we were supposed to run a small section of sanitary sewer on Klondike and connect to the existing sanitary manhole at the Klondike/ Sandhill intersection. This arrangement would involve removal of several trees on the south west corner. A gas main will also need to be crossed and the sanitary sewer on Klondike will be a short section. This option is shown as a solid line on Drawing C101.

Option 2- To go east through the laneway on to Sandhill Rd and run a sanitary sewer on Sandhill Rd to the existing sanitary manhole at the Klondike/ Sandhill intersection. This would avoid damaging the trees and involve less conflicts with existing services. This option is shown as a dashed line on Drawing C101.

Please have a look and we can always discuss it further through email or an online meeting. It would help us to avoid any abortive work later and make a coordinated submission for the sanitary servicing.

Regards,

Yasar

416.668.6367

Yasar Ayub, P.Eng., PMP

Jain Infrastructure Consultants Ltd.

7405 East Danbro Crescent, 2nd FLoor

Mississauga, ON L5N 6P8

Tel: (905) 285-9900 X 225

Fax: (905) 567-5246

Cell:(416) 668 6367

www.jainconsultants.com

Please consider the environment before printing this email

From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: October 6, 2020 12:29 PM
To: Yasar Ayub <yayub@jainconsultants.com>
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Hi Yasar,

I have attached two screenshots of the GeoOttawa site for City staff. There is one for the public, but with limited information. You will see that the infrastructure between March and Sandhill was not constructed. The second attachment provides the exist SAN MH invert information we have on record, however it is the proponent's responsibility to verify the elevations on-site. We cannot guarantee this information is correct if there are any discrepancies found.

Hope this helps,

Gabrielle

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: October 06, 2020 9:57 AM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Please confirm if you have received my email. We would like to request your advise so that we can proceed with the SPA design.

Yasar

416.668.6367

From: Yasar Ayub
Sent: September 30, 2020 3:29 PM
To: gabrielle.schaeffer@ottawa.ca
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Hi Gabrielle,

We would like to seek clarification on the extent of services constructed on Klondike Road west of the sandhill street intersection.

The attached the engineering plans acquired from the City; Plans 14070-19& 20 (As built drawings prepared by NovaTech in November 2013) show these services .

We would like to check the city record as we need to extend the sanitary sewer 20m west of Sandhill Street intersection.

Yasar

416.668.6367

Yasar Ayub, P.Eng., PMP

Jain Infrastructure Consultants Ltd.

7405 East Danbro Crescent, 2nd FLoor

Mississauga, ON L5N 6P8

Tel: (905) 285-9900 X 225

Fax: (905) 567-5246

Cell:(416) 668 6367

www.jainconsultants.com

Please consider the environment before printing this email

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

Appendix C

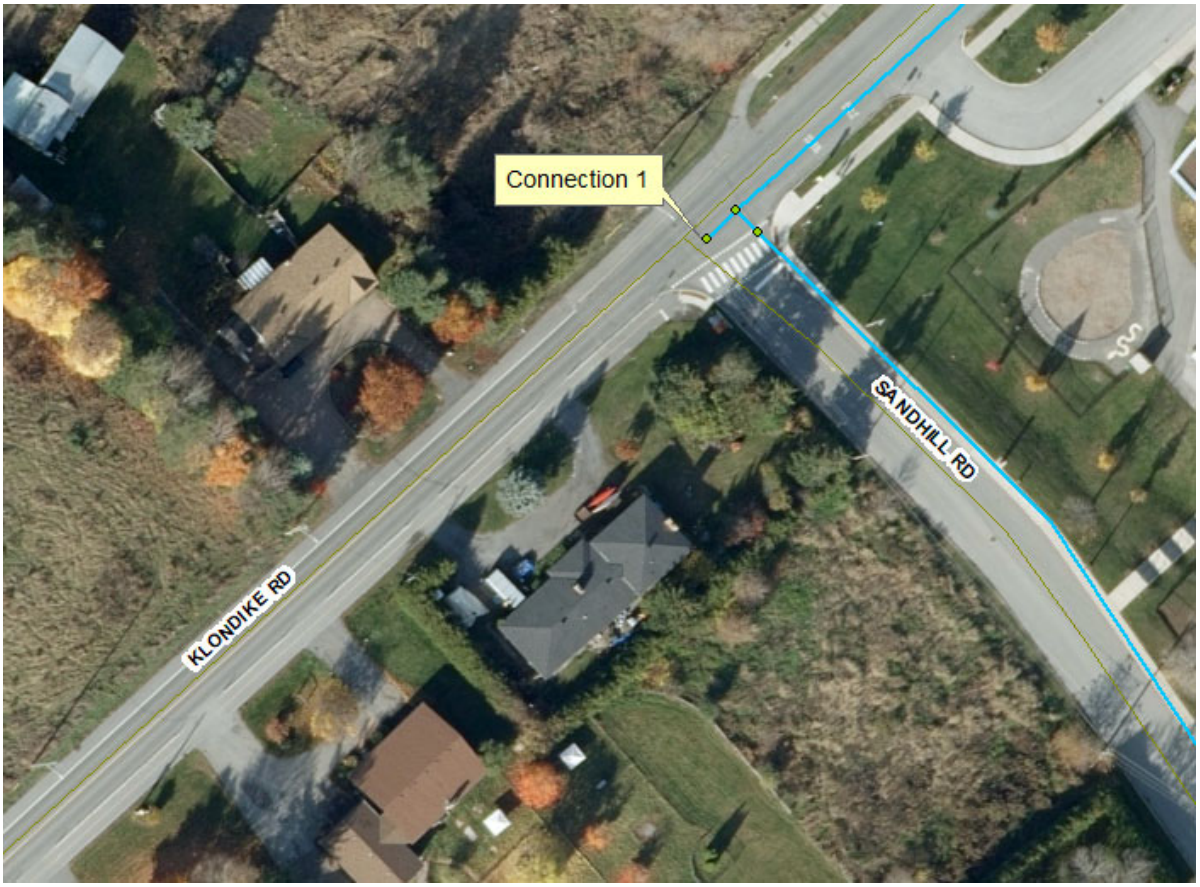
Water Demand and FUS Calculations
DR03 Fire Hydrant Coverage Map
Hydraulic Analysis Report by Novatech

Boundary Conditions
1050 Klondike Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	6	0.097
Maximum Daily Demand	55	0.92
Peak Hour	83	1.39
Fire Flow Demand #1	13,000	216.67

Location



Results

Connection 1 – Klondike Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	78.3
Peak Hour	126.3	73.1
Max Day plus Fire 1	121.2	65.8

Ground Elevation = 74.9 m

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Table C1 **FIRE FLOW CALCULATION as per FIRE UNDERWRITERS SURVEY (1999)**

Date: 19-May-21
Designer: UA
Checked By: YA

PROJECT: 1050 Klondike Road
Ottawa, ON

1. Fire Flow Equation

$$F = 220\ C\ \sqrt{A}$$

where F is the required fire flow [LPM]
C is the coefficient determined by type of construction [unitless]
A is the total protection area [sq.m]

2. Architecture Information (To be confirmed)

Type of Construction	Combustible
Fire Rating	Wood Frame
Sprinkler Provided (Y/N)	N
Total Floor Area [sq.m]	1511
Coefficient, C [1]	1.5
Fire Flow, F [LPM]	12828

3 - Storeys
Wood Frame

3. Occupancy Reduction

Occupancy Adjustment	0.85
Fire Flow, F [LPM]	10903

- 15 % reduction for residential building

4. Sprinkler Reduction

Sprinkler Reduction	0.00
Sprinkler Reduction [LPM]	0

No sprinkler system

5. Exposure Adjustment

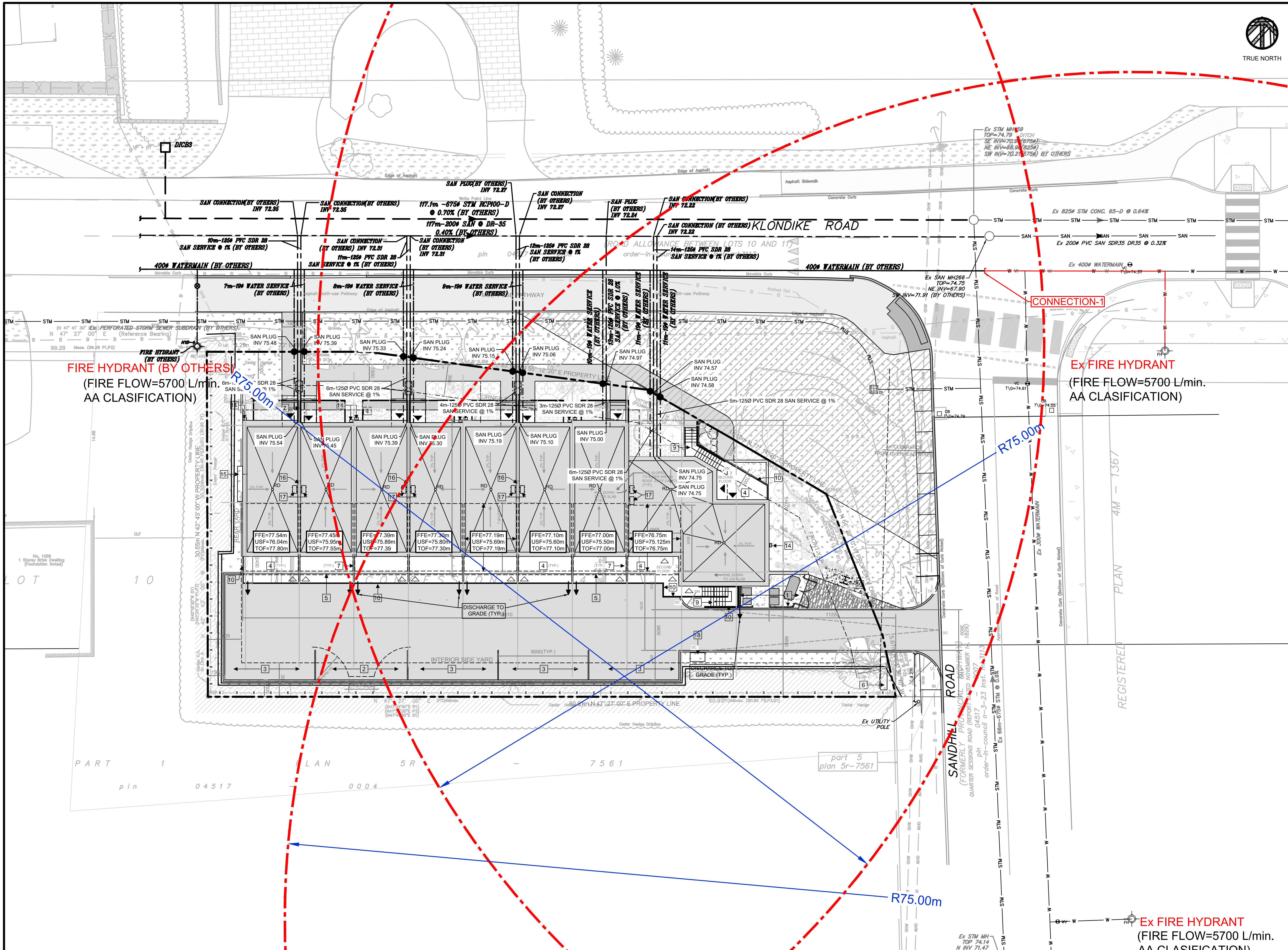
North	0.05	44 m
East	0.00	75 m
South	0.00	85 m
West	0.15	13 m
Total	**0.20**	
Exposure Adjustment [LPM]	2181	

See attachment for off set distance

6. Required Fire Flow, Duration & Volume

Fire Flow, F [LPM]	10903
Sprinkler Reduction [LPM]	0
Exposure Adjustment [LPM]	2181
Required Fire Flow [LPM]	13084
Required Fire Flow [LPM]	**13000**
Required Fire Flow [LPS]	**217**
Req. Duration of Fire Flow [hrs]	2
Req. Storage [cubic.m]	1560

Round to nearest 1000



KEY PLAN (N.T.S)

MAXWELL BRIDGE ROAD, MARCONI AVE, KLONDIKE ROAD, SANDHILL ROAD, CHEMIN MARCH, MARCH ROAD, SITE

LEGEND

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCH BASIN
- FH PROPOSED FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- VC EXISTING VALVE CHAMBER (WATERMAIN)
- FH EXISTING FIRE HYDRANT
- W EXISTING WATER MAIN
- SAN EXISTING SANITARY
- STM EXISTING STORM
- CURB STOP
- RD ROOF DRAIN
- TOF TOP OF FOUNDATION ELEVATION
- USF UNDERSIDE OF FOOTING ELEVATION
- FFE FINISHED FLOOR ELEVATION
- FIRE HYDRANT COVERAGE BOUNDARY

REVISION

No.	DESCRIPTION	DATE
3	ISSUED FOR SPA	NOV 22,22
2	ISSUED FOR SPA	JUN 27,22
1	ISSUED FOR SPA	NOV 25,21

JAIN

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MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

PROJECT

1050 KLONDIKE ROAD

OTTAWA, ONTARIO, K2K 1X7

DRAWING TITLE

FIRE HYDRANT COVERAGE MAP FOR 1050 KLONDIKE ROAD

SCALE:	1: 150
DATE:	Nov. 22, 22
DRAWN BY:	CC
CHECKED BY:	YA
DWG No.	DR03

USMAN ARIF

From: Armstrong, Justin <justin.armstrong@ottawa.ca>
Sent: November-12-21 9:27 AM
To: Yasar Ayub
Cc: USMAN ARIF; Dieme, Abi
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request
Attachments: Tech bulletin ISTB-2018-02.pdf

Hi Yasar,

Ahmed Elsayed is no longer with the City, and Abi Dieme has taken over this file. I am including Abi in this e-mail so that she can help with questions you may have as it relates to the City engineering comments previously provided.

Note that from Google Streetview, it seems the hydrant in question is a AA rated hydrant, which means it can be considered to contribute 5,700 L/min of fire flow if it is within 75 meters of the site, and can be considered to contribute 3,800 L/min of fire flow if it is between 75 meters and 150 meters from the site. This is as per City Water Design Guidelines Technical Bulletin Document ISTB-2018-02, Appendix I (attached for your reference).

Regards,

Justin

Justin Armstrong, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - West Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 21746, justin.armstrong@ottawa.ca

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: November 10, 2021 6:26 PM
To: Armstrong, Justin <justin.armstrong@ottawa.ca>
Cc: USMAN ARIF <uarif@jainconsultants.com>; Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

Hi John,

Can we get the flow available at the hydrant located at the corner of sandhill and klondike road. We need this info to address one of the city comments.

Yasar
416.668.6367

Yasar Ayub

From: Yasar Ayub
Sent: May 4, 2021 5:02 PM
To: Armstrong, Justin
Cc: USMAN ARIF
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request
Attachments: Drinking Water Boundary condition request - 04-05-2021.pdf; Map - off set Distance.pdf; FUS Cal.pdf

Hi Justin,

The revised FUS calculations are attached as per the Ottawa FUS procedure.
Please review and forward accordingly.

Yasar Ayub, P.Eng., PMP
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Mississauga, ON L5N 6P8
Tel: (905) 285-9900 X 225
Fax: (905) 567-5246
Cell:(416) 668 6367
www.jainconsultants.com

From: Armstrong, Justin <justin.armstrong@ottawa.ca>
Sent: May 4, 2021 1:09 PM
To: Yasar Ayub <yayub@jainconsultants.com>
Subject: FW: 1050 Klondike Kanata - Boundary Conditions Request

Hi Yasar,

As Ahmed is out of the office for the next little while, I will be helping out with this boundary request. Our boundary conditions group has flagged some concerns with the required fire flow and I am wondering if you can help clarify. Without having much knowledge about this project, the required fire flow of 3000 L/min seems rather low.

In your e-mail below you identify that the development proposal has been revised from condominium apartment buildings to freehold townhouses. In the attached FUS calculation sheet, the gross (total) floor area for the townhouse block is identified as 159 sq.m. This seems small for the gross floor area of a townhouse block. The area that should be used in the FUS method should be the gross floor area of the entire townhouse block (i.e. townhouse block footprint * number of floors).

You have used a construction class coefficient (C) of 0.8 which reflects non-combustible construction. Typically, townhouses are wood-frame which would correspond to a construction class coefficient (C) of 1.5 (typical wood frame construction) or 1.0 (a construction class of *ordinary construction (1.0)* can be used for wood frame construction if the exterior walls are masonry or non-combustible). Please confirm construction class for the townhouse block.

For residential buildings, an occupancy charge of -15% should be used.

For the exposure section of the attached FUS calculation sheet, please provide the offset distance of the townhouse block to the nearest structure for each of the north, east, south, and west exposures. A site plan showing the proposed location of the townhouse block on the property and its offset distance to any adjacent building is very helpful here.

Also, for your info, the City of Ottawa's Water Distribution Guidelines Technical Bulletin ISTB-2018-02 provides a very detailed description of the FUS method and how it should be followed for City of Ottawa applications.

Regards,

During this period of uncertainty surrounding COVID-19, we are following best practices recommended to minimize the risk of exposure, while ensuring that service to our clients remains as uninterrupted as possible. For the most part I am working from home and will respond to emails at my earliest opportunity. Should there be delays due to internet connectivity, I thank your understanding and patience.

Justin Armstrong, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - West Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 21746, justin.armstrong@ottawa.ca

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: Monday, May 3, 2021 5:09 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: USMAN ARIF <uarif@jainconsultants.com>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

The development proposal was revised and freehold townhouses are being proposed instead of the condominium apartment building.

The revised water demand and FUS calculations are attached. Requesting a review of the boundary conditions provided previously .

Regards,

Yasar
416.668.6367

From: Yasar Ayub
Sent: November 6, 2020 11:54 AM

To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

Thanks Ahmed.

From: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Sent: November 6, 2020 11:12 AM
To: Yasar Ayub <yayub@jainconsultants.com>
Subject: FW: 1050 Klondike Kanata - Boundary Conditions Request

Hi Yasar,

Attached is the BC as requested.

Thanks,
Ahmed

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: October 26, 2020 4:29 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

The revised request documents with 100% floor area taken for FUS calculations is attached.

Yasar

From: Yasar Ayub
Sent: October 26, 2020 3:53 PM
To: 'Elsayed, Ahmed' <ahmed.elsayed@ottawa.ca>
Cc: 'Schaeffer, Gabrielle' <gabrielle.schaeffer@Ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

Hi Ahmed,

Find attached all the documents.

Yasar
416.668.6367

From: Yasar Ayub
Sent: October 26, 2020 1:28 PM
To: 'Elsayed, Ahmed' <ahmed.elsayed@ottawa.ca>

Cc: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

Hi Ahmed,

I sent the following yesterday. Please have a look if it provides this info and call me on cell to discuss further.

Yasar
416.668.6367

From: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Sent: October 26, 2020 1:21 PM
To: Yasar Ayub <yayub@jainconsultants.com>
Cc: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

Hi Yasar,

Please compile all the information in the same email, also please provide some description/ information about the project.

- Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

1. Location map with water service connection location
2. Average daily demand (l/s)
3. Maximum daily demand (l/s)
4. Maximum hourly demand (l/s)
5. Fire flow demand (provide fire detailed flow calculations based on the fire underwriters survey method)

Regards,

Ahmed Elsayed, P. Eng.
Project Manager, Planning Services
Development Review West Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 21206
Fax: 613-580-2576

Please take note that due to current COVID situation, I am working remotely and Phone communication and messaging may not be reliable at this time. Preferred method of communications will be e-mails during this period. If your preference is telephone communication, please indicate this via e-mail and provide a contact telephone number.

I apologize for any inconvenience.
*Please consider your environmental responsibility before printing this e-mail

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: October 26, 2020 1:13 PM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Cc: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

The FUS calculations are attached.

Yasar

From: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Sent: October 26, 2020 1:04 PM
To: Yasar Ayub <yayub@jainconsultants.com>
Cc: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: FW: 1050 Klondike Kanata - Boundary Conditions Request

Hi Yasar,

Can you please provide your calculations for the fire flow demand?

After providing the information needed, it usually takes 10 business days to receive a feed back from IPU about the BC.

If you have any more questions, please let me know.

Thanks,
Ahmed

From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: October 26, 2020 11:33 AM
To: Elsayed, Ahmed <ahmed.elsayed@ottawa.ca>
Subject: FW: 1050 Klondike Kanata - Boundary Conditions Request

Hi Ahmed,

Please review and coordinate this boundary conditions request. Please let Yasar know the BC timeline.

Thanks,

Gabi

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: October 26, 2020 11:12 AM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Boundary Conditions Request

The request for water boundary conditions is attached. Pl review and let us know the turnaround time for this request.

Yasar Ayub, P.Eng., PMP
Jain Infrastructure Consultants Ltd.
7405 East Danbro Crescent, 2nd FLoor
Mississauga, ON L5N 6P8
Tel: (905) 285-9900 X 225
Fax: (905) 567-5246
Cell:(416) 668 6367
www.jainconsultants.com

From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: October 6, 2020 12:29 PM
To: Yasar Ayub <yayub@jainconsultants.com>
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Hi Yasar,

I have attached two screenshots of the GeoOttawa site for City staff. There is one for the public, but with limited information. You will see that the infrastructure between March and Sandhill was not constructed. The second attachment provides the exist SAN MH invert information we have on record, however it is the proponent's responsibility to verify the elevations on-site. We cannot guarantee this information is correct if there are any discrepancies found.

Hope this helps,
Gabrielle

From: Yasar Ayub <yayub@jainconsultants.com>
Sent: October 06, 2020 9:57 AM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: RE: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Please confirm if you have received my email. We would like to request your advise so that we can proceed with the SPA design.

Yasar
416.668.6367

From: Yasar Ayub
Sent: September 30, 2020 3:29 PM
To: gabrielle.schaeffer@ottawa.ca
Cc: Deborah Belfie <belfied@rogers.com>; Junaid Israr <jisrar@gmail.com>; israr akhtar <israrakhtar@hotmail.com>
Subject: 1050 Klondike Kanata - Confirmation for Extent of Services on Klondike Road.

Hi Gabrielle,

We would like to seek clarification on the extent of services constructed on Klondike Road west of the sandhill street intersection.
The attached the engineering plans acquired from the City; Plans 14070-19& 20 (As built drawings prepared by NovaTech in November 2013) show these services .

We would like to check the city record as we need to extend the sanitary sewer 20m west of Sandhill Street intersection.

Yasar
416.668.6367

Yasar Ayub, P.Eng., PMP
Jain Infrastructure Consultants Ltd.
7405 East Danbro Crescent, 2nd FLoor
Mississauga, ON L5N 6P8
Tel: (905) 285-9900 X 225
Fax: (905) 567-5246
Cell:(416) 668 6367
www.jainconsultants.com

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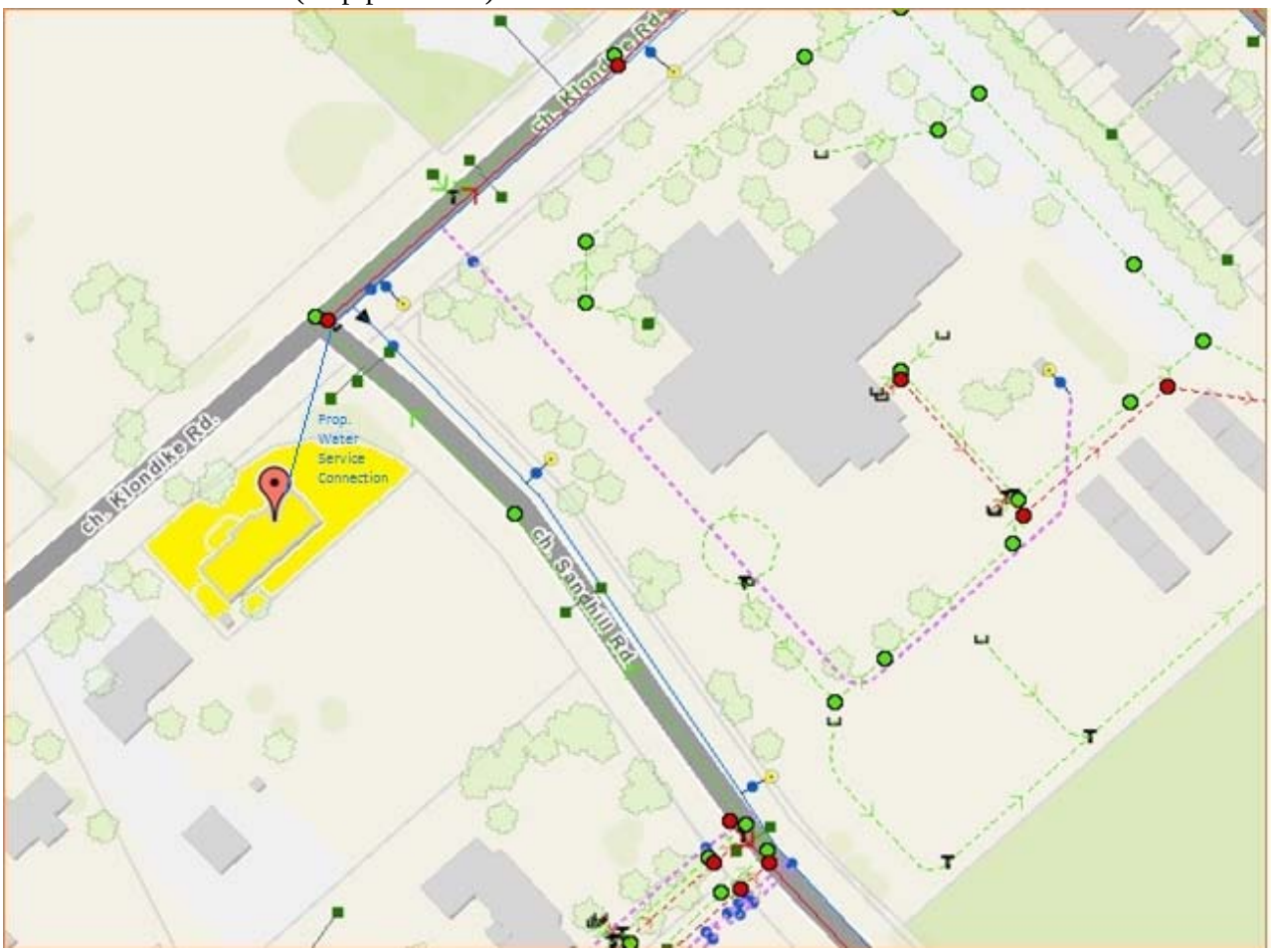
Please provide the boundary conditions for the proposed water service connection for the property at 1050 Klondike Drive.

a. Location of service (map/plan view)



b. (Draft) site plan or similar plan for building location (Attached)

Design Parameter	Water Demand (L/s)
	Residential
Average Daily Demand	0.097
Maximum Daily Demand	0.92
Maximum Hourly Demand	1.39
Fire Flow	217.00
Total Max Daily Demand + Fire Flow	217.92

c. Supporting calculations for domestic demands

Total No. of Units = 9 units
Population = 2.7 x 9 = 24 persons

Daily Average Water Demand = 24 x 350 l/cap/day = 84**,00 L/Day (0.097 L/sec)**

Maximum Daily Demand = 0.097 x 9.5 = 0.92 L/sec

Maximum Hourly Demand = 0.097 x 14.3 = 1.39 L/sec

FIRE FLOW CALCULATION as per
FIRE UNDERWRITERS SURVEY (1999)

Date: 04-May-21
Designer: UA
Checked By: YA

PROJECT: 1050 Klondike Road
Ottawa, ON

1. Fire Flow Equation

$$F = 220\ C\ \sqrt{A}$$

where F is the required fire flow [LPM]
C is the coefficient determined by type of construction [unitless]
A is the total protection area [sq.m]

2. Architecture Information (To be confirmed)

Type of Construction	Combustible	
Fire Rating	Wood Frame	
Sprinkler Provided (Y/N)	N	
Total Floor Area [sq.m]	1511	3 - Storeys
Coefficient, C [1]	1.5	Wood Frame
Fire Flow, F [LPM]	12828	

3. Occupancy Reduction

Occupancy Adjustment	0.85	- 15 % reduction for resedential building
Fire Flow, F [LPM]	10903	

4. Sprinkler Reduction

Sprinkler Reduction	0.00	No sprinkler system
Sprinkler Reduction [LPM]	0	

5. Exposure Adjustment

North	0.05	44 m
East	0.00	75 m
South	0.00	85 m
West	0.15	13 m
Total	**0.20**	
Exposure Adjustment [LPM]	2181	

See attachment for off set distance

6. Required Fire Flow, Duration & Volume

Fire Flow, F [LPM]	10903	
Sprinkler Reduction [LPM]	0	
Exposure Adjustment [LPM]	2181	
Required Fire Flow [LPM]	13084	
Required Fire Flow [LPM]	**13000**	Round to nearest 1000
Required Fire Flow [LPS]	**217**	
Req. Duration of Fire Flow [hrs]	2	
Req. Storage [cubic.m]	1560	


44 m
North
1050 Klondike Rd
13 m
7 5 m
85 m

NOVATECH
Engineers, Planners & Landscape Architects

M E M O R A N D U M

DATE: **JUNE 14, 2022**

TO: **YASAR AYUB, JAIN INFRASTUCTURE CONSULTANTS LTD.**

FROM: **LUCAS WILSON**

RE: **1050 KLONDIKE ROAD,**
HYDRAULIC ANALYSIS, SERVICING MEMO

JAIN Infrastructure Consultants Ltd. has retained Novatech to perform a hydraulic analysis for the development at 1050 Klondike Road located within the 2W Pressure Zone. The site consists of 9 townhouse units at the corner of Klondike Road and Sandhill Road with water services connecting to the proposed 400mm watermain in Klondike Road. This technical memo reviews and assesses the results of the hydraulic analysis and determines if there is adequate fire protection and domestic service under all operating conditions.

As part of the assessment, Novatech has reviewed the Site Servicing & Stormwater Management Report for 1050 Klondike Road.

Proposed Watermain System

The 9 townhouse units will be serviced off the proposed 400mm watermain within Klondike Road that is being constructed as part of the 1055 Klondike Road development. Boundary conditions were provided by the City of Ottawa as part of the 1055 Klondike Road application and are included in the attachments.

Table 1: Boundary Conditions

Boundary Condition #1 – March Road

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL	130.5	76.8
Peak Hour	126.1	70.5
Max Day plus Fire (167 L/s)	123.3	66.5
Max Day plus Fire (250 L/s)	120.1	62.0

Boundary Condition #2 – Sandhill Road

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL	130.5	79.1
Peak Hour	126.2	72.8
Max Day plus Fire (167 L/s)	122.5	67.7
Max Day plus Fire (250 L/s)	118.5	61.9

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

Design Criteria

The Fire Flow demand of 217 L/s has been calculated as per the Fire Underwriter's Survey (FUS). For consistency, the watermain analysis was completed based on the following criteria taken from Section 3.1 of the 1050 Klondike Road Site Servicing & Stormwater Management Report provided by JAIN.

Table 2: Design Parameters

Design Parameter	Value
Average Daily Demand	350 L/d/P
Townhouse Density	2.7 persons/unit
Max. Daily Peak Factor	9.5 x Average Daily
Max. Hourly Peaking Factor	14.3 x Average Daily
Max. pressure during normal operating conditions	552 kPa (80 psi)
Min. pressure during maximum hourly demand	276 kPa (40 psi)
Min. pressure during maximum daily demand + fire flow	140 kPa (20 psi)

Hydraulic analysis of the Site was completed using EPANET 2.0. EPANET is public domain software capable of modeling municipal water distribution systems by performing simulations of the water movement within a pressurized system. EPANET uses the Hazen-Williams equation to analyze the performance of the proposed watermain and considered the following input parameters: water demand, pipe length, pipe diameter, pipe roughness, and pipe elevation.

Hydraulic Analysis

Summary of the model results are shown below in **Table 3**, **Table 4,** and **Table 5**. Full model results are included in the attachments. Refer to the attached Figure for details about the node and pipe network.

Table 3: Summary of Hydraulic Model Results – Maximum Day + Fire Flow

Operating Condition	Minimum Pressure
217.935 L/s	419.77 kPa (T1)

Table 4: Summary of Hydraulic Model Results – Peak Hour Demand

Operating Condition	Maximum Pressure	Minimum Pressure
1.408 L/s through system	483.04 kPa (HYD4)	450.00 kPa (EXHYD2)

The hydraulic modeling summarized above highlights the maximum and minimum system pressures during Peak Hour conditions, and the minimum system pressures during the Maximum Day + Fire condition. Since the Maximum Day + Fire Flow pressures are above the minimum 140 kPa, and the Peak Hour Pressures fall within the normal operating pressure range (345 kPa to 552 kPa) the proposed development can be adequately serviced.

The fire flow of 217 L/s can be provided through 3 class AA (blue top) hydrants located within 150 m of the townhouse block. An existing hydrant located at the intersection of Sandhill and Klondike Road and another hydrant located approximately 52 m south along Sandhill Road are within 75 m of the proposed site and each provide a maximum flow of 95 L/s. The third hydrant is

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proposed (HYD4) and will be located on the west side of the 1050 Klondike Road property limit and is within 75 m of the Site providing a maximum flow of 95 L/s.

Table 5: Summary of Hydraulic Model Results – Maximum Pressure Check

Operating Condition	Maximum Pressure	Minimum Pressure	Maximum Age
0.098 L/s through system	552.70 kPa (EXHYD1)	514.83 kPa (T2)	27.2 Hours (HYD4)

The average day pressure at EXHYD1 is slightly above 552 kPa. The remaining average day pressures which are in closer proximity to the water service connections are below 552 kPa, therefore pressure reducing valves are not required.

Water retention was analyzed at each node during average day demand. The maximum age throughout the system is within City standards.

Conclusion

Based on the analysis provided above, the proposed watermain provides adequate fire protection and domestic service under all operating conditions to service the development at 1050 Klondike Road.

Yours truly,

NOVATECH

Lucas Wilson, P.Eng
Project Manager

Attachments: City of Ottawa Boundary Conditions
Fire Flow Calculations
EPANET Model Results
Figure 1 – Hydraulic Analysis, Node and Pipe Details

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

Boundary Conditions for 1055 Klondike Road

Provided Information:
Date Provided: Jan 9, 2020

Scenario	Demand	
	L/min	L/s
Average Daily Demand	50	0.83
Maximum Daily Demand	125	2.09
Peak Hour	275	4.59
Fire Flow Demand #1	10,020	167.00
Fire Flow Demand #2	15,000	250.00

Location:

Results:

Connection 1 - March Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.5	76.8
Peak Hour	126.1	70.5
Max Day plus Fire 1	123.3	66.5
Max Day plus Fire 2	120.1	62.0

[1] Ground Elevation = 76.5m

Connection 2 - Sandhill Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.5	79.1
Peak Hour	126.2	72.8
Max Day plus Fire 1	122.5	67.7
Max Day plus Fire 2	118.5	61.9

[1] Ground Elevation = 74.9m

Notes:

1. Construct a 406 mm watermain on Klondike Road from March Road to Sandhill Road.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121313
Project Name: 1050 Klondike Road
Date: 26/11/2021
Input By: Lucas Wilson
Reviewed By: Mark Bissett

Building Description: 9-Unit Townhouse Block
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	520			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,040**	
	F	**Base fire flow without reductions**				**11,000**
		F = 220 C (A)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**9,350**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)		-30%		**0**
		Standard Water Supply		-10%		
		Fully Supervised System		-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	30.1- 45 m		5%	**3,740**
		East Side	> 45.1m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	3.1 - 10 m		20%	
				Cumulative Total	**40%**	
Results						
6	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**13,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1950

1050 KLONDIKE ROAD
Water Demand

	Area (ha)	Units	Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Towns	N/A	9	24	0.098	0.935	1.408
Total	**0.00**	**9**	**24**	**0.098**	**0.935**	**1.408**

Water Demand Parameters

Towns	2.7	ppl/unit
Residential Demand	350	L/c/day
Residential Max Day	9.5	x Avg Day
Residential Peak Hour	14.3	x Avg Day
Residential Fire Flow	217	L/s

1050 Klondike Road: Watermain Analysis

Network Table - Nodes - (Peak Hour)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc HYD4	76.9	1.41	126.18	49.24	483.04	70.06
Junc HYD5	77.84	0	126.13	48.29	473.72	68.71
Junc EXHYD1	74.16	0	126.2	52.04	460.00	66.72
Junc EXHYD2	75	0	126.2	51.2	450.00	65.27
Junc T1	77.9	0	126.14	48.24	473.23	68.64
Junc T2	78.02	0	126.13	48.11	471.96	68.45
Resvr RES1	126.1	28.07	126.1	0	0.00	0.00
Resvr RES2	126.2	-47.51	126.2	0	0.00	0.00

Network Table - Links - (Peak Hour)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	17	400	120	6.55	0.05	0.01	0.033
Pipe P2	59	300	120	6.71	0.09	0.05	0.033
Pipe P3	77	400	120	34.25	0.27	0.25	0.027
Pipe P4	44	300	120	32.84	0.46	0.95	0.026
Pipe P5	48	400	120	29.45	0.23	0.19	0.027
Pipe P6	7	400	120	28.07	0.22	0.17	0.027
Pipe P7	166	400	120	28.07	0.22	0.17	0.027

1050 Klondike Road: Watermain Analysis

Network Table - Nodes - (Max Pressure Check)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi	Age Hours
Junc HYD4	76.94	0.1	130.5	53.56	525.42	76.21	27.21
Junc HYD5	77.84	0	130.5	52.66	516.59	74.93	6.67
Junc EXHYD1	74.16	0	130.5	56.34	552.70	80.16	0.5
Junc EXHYD2	75	0	130.5	55.5	544.46	78.97	0.95
Junc T1	77.9	0	130.5	52.6	516.01	74.84	11.01
Junc T2	78.02	0	130.5	52.48	514.83	74.67	6.97
Resvr RES1	130.5	-0.87	130.5	0	0.00	0.00	0
Resvr RES2	130.5	-2.51	130.5	0	0.00	0.00	0

Network Table - Links - (Max Pressure Check)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	17	400	120	-1.19	0.01	0.00	0.048
Pipe P2	59	300	120	1.22	0.02	0.00	0.041
Pipe P3	77	400	120	0.10	0.00	0.00	0.000
Pipe P4	44	12	100	0.00	0.00	0.00	0.121
Pipe P5	48	400	120	-0.41	0.00	0.00	0.000
Pipe P6	7	400	120	-0.87	0.01	0.00	0.000
Pipe P7	166	400	120	-0.87	0.01	0.00	0.046

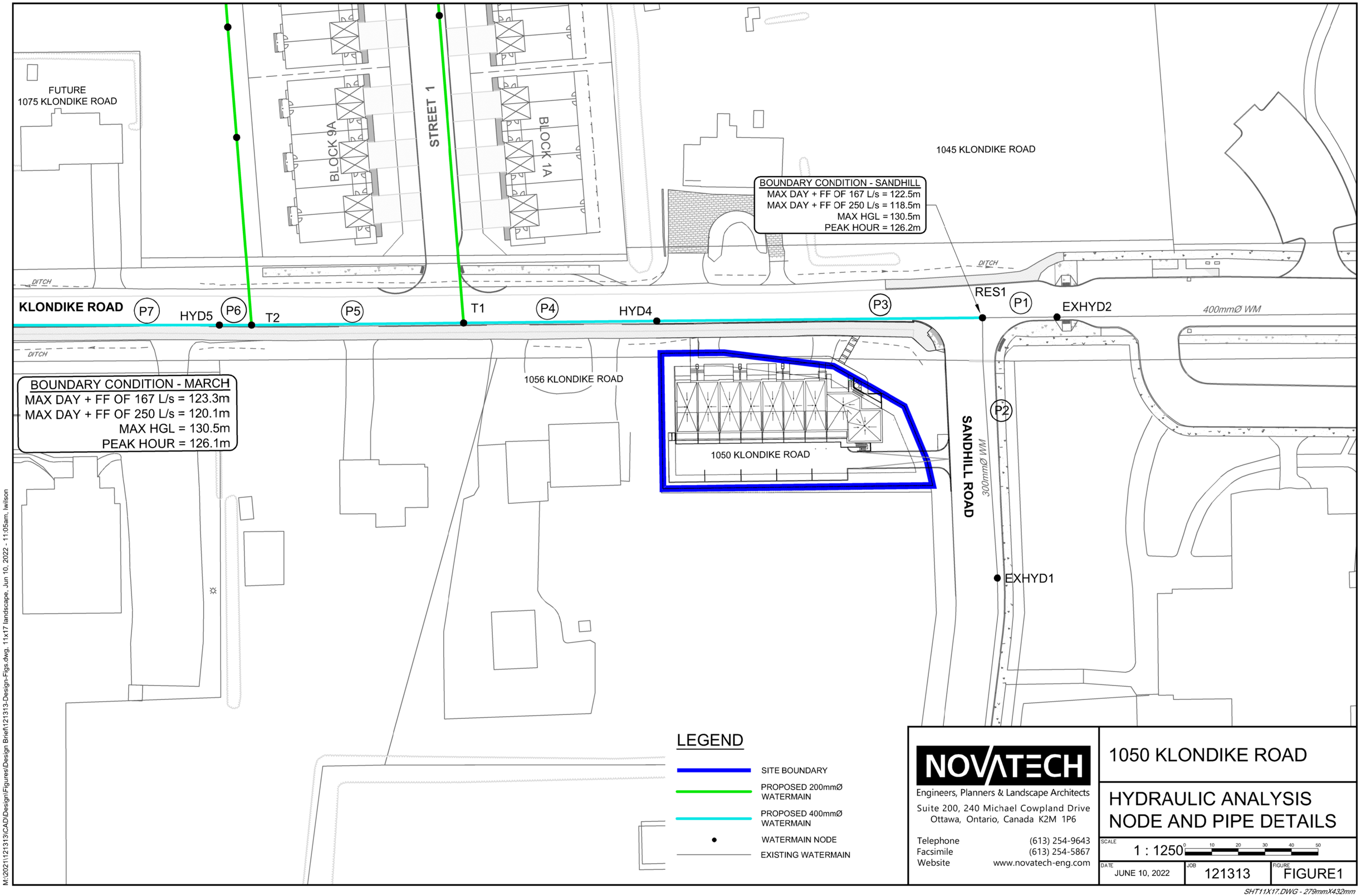
1050 Klondike Road: Watermain Analysis

Network Table - Nodes (Max Day + FF)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc HYD4	76.94	95.93	120.12	43.18	423.60	61.44
Junc HYD5	77.84	0	120.85	43.01	421.93	61.20
Junc EXHYD1	74.16	95	120.07	45.91	450.38	65.32
Junc EXHYD2	75	27	120.05	45.05	441.94	64.10
Junc T1	77.9	0	120.69	42.79	419.77	60.88
Junc T2	78.02	0	120.83	42.81	419.97	60.91
Resvr RES2	120.1	-89.02	120.1	0	0.00	0.00
Resvr RES1	121.4	-137.08	121.4	0	0.00	0.00

Network Table - Links (Max Day + FF)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	17	400	120	-98.73	0.79	1.79	0.023
Pipe P2	59	300	120	29.30	0.41	0.77	0.026
Pipe P3	77	400	120	-39.04	0.31	0.32	0.026
Pipe P4	44	300	120	-134.97	1.91	12.99	0.021
Pipe P5	48	400	120	-127.74	1.02	2.89	0.022
Pipe P6	7	400	120	-137.11	1.09	3.29	0.022
Pipe P7	166	400	120	-137.11	1.09	3.29	0.022



M:\2021\121313\CAD\Design\Figures\Design Brief\121313-Design-Figs.dwg, 11x17 landscape, Jun 10, 2022 - 11:05am, lwilson

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

1050 KLONDIKE ROAD

HYDRAULIC ANALYSIS NODE AND PIPE DETAILS

SCALE 1 : 1250 (0 10 20 30 40 50)

DATE JUNE 10, 2022 | JOB 121313 | FIGURE FIGURE1

SHT11X17.DWG - 279mmX432mm

Appendix D
DR04 Sanitary Drainage Plan
Sanitary Flow Calculations
Sanitary Drainage Plan for Briar Ridge Pump station

TRUE NORTH

KEY PLAN (N.T.S)

CATCHMENT AREA BOUNDARY

A=0.16 — DRAINAGE AREA IN HECTARES
U=9.0 — No. OF UNITS
P=24 — POPULATION

KLONDIKE ROAD

SAN CONNECTION(BY OTHERS) INV 72.35

SAN CONNECTION(BY OTHERS) INV 72.35

SAN PLUG(BY OTHERS) INV 72.27

SAN CONNECTION (BY OTHERS) INV 72.27

SAN PLUG (BY OTHERS) INV 72.24

SAN CONNECTION(BY OTHERS) INV 72.22

SAN CONNECTION (BY OTHERS) INV 72.22

117m-200ø SAN @ DR-35 0.40% (BY OTHERS)

10m-125ø PVC SDR 28 SAN SERVICE @ 1% (BY OTHERS)

SAN CONNECTION (BY OTHERS) INV 72.31

11m-125ø PVC SDR 28 SAN SERVICE @ 1% (BY OTHERS)

SAN CONNECTION (BY OTHERS) INV 72.31

12m-125ø PVC SDR 28 SAN SERVICE @ 1% (BY OTHERS)

14m-125ø PVC SDR 28 SAN SERVICE @ 1% (BY OTHERS)

13m-125ø PVC SDR 28 SAN SERVICE @ 1.0% (BY OTHERS)

Ex 200ø PVC SAN SDR35 DR35 @ 0.32%

Ex SAN MH266 TOP=74.75 NE INV=67.90 SW INV=71.91 (BY OTHERS)

DITCH

Edge of Asphalt

Asphalt Sidewalk

Concrete Curb

White Point Line

Movable Curb

Marked Out

Asphalt Multi-use Pathway

MULTI-USE PATHWAY

(ROAD ALLOWANCE BETWEEN LOTS 10 AND 11)

pin 04517 – 0004 order-in-council a-3-23 inst. mh3113

FIRE HYDRANT (BY OTHERS)

HYD-1

(Reference Bearing)

SAN PLUG INV 75.48

SAN PLUG INV 75.39

SAN PLUG INV 75.33

SAN PLUG INV 75.24

SAN PLUG INV 75.15

SAN PLUG INV 75.06

SAN PLUG INV 74.97

SAN PLUG INV 74.57

SAN PLUG INV 74.58

6m-125Ø PVC SDR 28 SAN SERVICE @ 1%

6m-125Ø PVC SDR 28 SAN SERVICE @ 1%

4m-125Ø PVC SDR 28 SAN SERVICE @ 1%

3m-125Ø PVC SDR 28 SAN SERVICE @ 1%

5m-125Ø PVC SDR 28 SAN SERVICE @ 1%

SAN PLUG INV 75.54

SAN PLUG INV 75.45

SAN PLUG INV 75.39

SAN PLUG INV 75.30

SAN PLUG INV 75.19

SAN PLUG INV 75.10

SAN PLUG INV 75.00

A=0.16
U=9.0
P=24

6m-125Ø PVC SDR 28 SAN SERVICE @ 1%

SAN PLUG INV 74.75

SAN PLUG INV 74.75

FFE=77.54m USF=76.04m TOF=77.80m

FFE=77.45m USF=75.95m TOF=77.55m

FFE=77.39m USF=75.89m TOF=77.39

FFE=77.30m USF=75.80m TOF=77.30m

FFE=77.19m USF=75.69m TOF=77.19m

FFE=77.10m USF=75.60m TOF=77.10m

FFE=77.00m USF=75.50m TOF=77.00m

FFE=76.75m USF=75.125m TOF=76.75m

REAR YARD

INTERIOR SIDE YARD

FRONT YARD

46610

8000(TYP.)

30.55m N 42° 43' 00" W PROPERTY LINE

60.91m N 47° 27' 00" E PROPERTY LINE

2m CLEARANCE FROM OVERHEAD WIRES

SNOW MELTING DEVICE TO BE USED FOR DRIVEWAY SLOPES>6%

Ex UTILITY POLE

SANDHILL ROAD (FORMERLY PROVINCIAL HWY 417)

QUARTER SESSION'S ROAD (REPORT DATED NOVEMBER 16, 1829)

CONCESSION 4

REGISTERED PLAN 4M – 1367

part 5 plan 5r–7561

pin 04517 – 0004

Scale 1 : 125

6 4.5 3.0 1.5 0 3 6 Meters

REVISION		
3	ISSUED FOR SPA	NOV 22,22
2	ISSUED FOR SPA	JUN 27,22
1	ISSUED FOR SPA	NOV 25,21
No.	DESCRIPTION	DATE

JAIN

Jain Infrastructure Consultants Ltd.
7405 EAST DANBRO CRESCENT
MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

PROJECT

1050 KLONDIKE ROAD

OTTAWA, ONTARIO, K2K 1X7

DRAWING TITLE

SANITARY DRAINAGE PLAN

SCALE:	1: 125
DATE:	Nov. 22, 22
DRAWN BY:	CC
CHECKED BY:	YA

DWG No. DR04

D07-12-21-0068

#18639

1050 Klondike Road - Post Development Sanitary Design Sheet

AREA			RESIDENTIAL													ICI					INFILTRATION				PIPE					
			Singles		Semi-Detached / Towns					1050 Klondike Rd	TOTAL					Light Industrial Area (ha)	Accum. Area (ha)	Peak Factor	Commercial Area (ha)	Institutional Area (ha)	Accum. Area (ha)	Peak Flow (l/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)	**Total Flow (l/s)**	Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q full (%)
ID	From	To	Units	Pop.	Units	Pop.	Future Block 10	Future 1075 Klondike	Pop.	No. OF Units @ 2.7 Persons	Pop.	Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)																	
1055 Klondike Road Drainage Areas																															
A1-1	**7**	**5**	0	0.0	15	40.5	0.00		0.0		0.0	40.5	40.5	3.7	0.5				0.00	0.00	0.00	0.0	0.64	0.64	0.2	0.7	200	0.65	19.9	27.6	0.85	2.5%
A1-2	**5**	**3**	0	0.0	29	78.3	0.00		0.0		0.0	78.3	118.8	3.6	1.4				0.00	0.00	0.00	0.0	0.80	1.44	0.5	1.9	200	0.50	100.0	24.2	0.75	7.7%
A1-3	**3**	**1**	0	0.0	14	37.8	0.00		0.0		0.0	37.8	156.6	3.5	1.8				0.00	0.00	0.00	0.0	0.41	1.85	0.6	2.4	200	0.50	62.3	24.2	0.75	10.0%
A2-1, A2-2	**9**	**1**	0	0.0	0	0.0	53	10	128.9		0.0	128.9	128.9	3.6	1.5				0.00	0.00	0.00	0.0	0.88	0.88	0.3	1.8	200	0.65	46.2	27.6	0.85	6.5%
	1	**266**	0	0.0	0	0.0	0.00		0.0	9	24.3	24.3	309.8	4.0	4.02				0.00	0.00	0.00	0.0	0.16	2.89	1.0	**5.0**	200	0.65	117.0	27.6	0.85	14.9%
Off-site Drainage Areas (To Briar Ridge Pump Station)																															
A3-3	266	265	0	0.0	57	153.9	0.00		0.0		0.0	153.9	463.7	3.4	5.1				0.00	0.00	0.00	0.0	2.47	5.36	1.8	**6.9**	200	0.32	91.0	19.4	0.60	33.9%
A3-4	265	264	0	0.0	0	0.0	0.00		0.0		0.0	0.0	463.7	3.4	5.1				0.00	2.21	2.21	1.1	2.21	7.57	2.5	**8.7**	200	0.32	120.0	19.4	0.60	43.2%
A3-5	264	206	0	0.0	107	288.9	0.00		0.0		0.0	288.9	752.6	3.4	8.3				0.00	0.00	2.21	1.1	3.99	11.56	3.8	**13.2**	250	0.24	306.3	30.4	0.60	41.6%
A3-1, A3-2, A3-6	206	205	201	683.4	392	1058.4	0.00		0.0		0.0	1741.8	2494.4	3.0	24.3				9.02	0.00	11.23	5.5	37.33	48.89	16.1	**45.9**	450	0.20	52.5	133.0	0.81	34.3%
A3-7, A3-8	205	204	0	0.0	0	0.0	0.00		0.0		0.0	0.0	2494.4	3.0	24.3	5.4	5.4	4.7	0.00	0.00	11.23	15.7	5.40	54.29	17.9	**57.9**	450	0.20	79.7	133.0	0.81	43.4%
	204	203	0	0.0	0	0.0	0.00		0.0		0.0	0.0	2494.4	3.0	24.3		5.4	4.7	0.00	0.00	11.23	15.7	0.00	54.29	17.9	**57.9**	450	0.20	79.7	133.0	0.81	43.4%
	203	202	0	0.0	0	0.0	0.00		0.0		0.0	0.0	2494.4	3.0	24.3	7.9	13.3	3.9	0.00	0.00	11.23	26.5	7.90	62.19	20.5	**71.3**	450	0.26	90.0	151.7	0.92	46.8%
	202	201	0	0.0	0	0.0	0.00		0.0		0.0	0.0	2494.4	3.0	24.3		13.3	3.9	0.00	0.00	11.23	26.5	0.00	62.19	20.5	**71.3**	450	0.25	270.0	148.7	0.91	47.8%
	201	PS	0	0.0	0	0.0	0.00		0.0		0.0	0.0	2494.4	3.0	24.3		13.3	3.9	0.00	0.00	11.23	26.5	0.00	62.19	20.5	**71.3**	450	0.15	21.6	115.2	0.70	61.7%

Design Parameters:

Avg Flow/Person = 280 l/day Comm./Inst. Flow = 28000 l/ha/day Light Industrial Flow = 35000 l/ha/day Infiltration = 0.33 l/s/ha

Pipe Friction n = 0.013

Residential Peaking Factor = Harmon Equation (max 4, min 2) Peaking Factor Comm./Inst. 1.5

Population Density:	ppl/unit	units/ha
Future Block 10 Apartment Unit	2.1	
Future 1075 Klondike Road	1.8	35
Single	3.4	
Semi / Town	2.7	

Project: 1050 Klondike Road

Designed: UA Checked: YA

Date: May 20,2021

Jain Infrastructure Consultants Ltd

Shaded Cells show revised numbers as per 1050 Klondike Rd Flows

LEGEND

3 — AREA I.D.

10.5 RES 500 — AREA IN HECTARES; LANDUSE TYPE: RES = RESIDENTIAL, IND = LIGHT INDUSTRIAL; POPULATION ESTIMATE

SANITARY DRAINAGE AREA BOUNDARY

NOTES

1. SANITARY DRAINAGE AREAS AND POPULATION VALUES DEPICTED ON THIS DRAWING WERE TAKEN FROM THE "BRIAR RIDGE SANITARY PUMP STATION PRE-DESIGN REPORT" BY CCL (REPORT No. xxxxxxx). THE BOUNDARY LINES ON THIS PLAN HAVE BEEN APPROXIMATED FROM THAT REPORT. PRECISE BOUNDARY LOCATIONS SHOULD BE TAKEN FROM THE APPROVED PUMPING STATION REPORT.
2. AREA No.1 AS BOUNDED HAS A LAND AREA OF 9.0ha. A SIZEABLE PORTION IS ATTRIBUTED TO FUTURE STORMWATER MANAGEMENT FACILITY 'A' WHICH HAS YET TO BE DESIGNED. THE BALANCE OF THE LAND AREA IS ATTRIBUTED TO RESIDENTIAL AND ROADWAY USES. THE DEVELOPMENT AREA=6.10ha WITH POPULATION 610 IS TAKEN DIRECTLY FROM THE "BRIAR RIDGE SANITARY PUMP STATION PRE-DESIGN REPORT".
3. AREA No.2 CURRENTLY EXCLUDES A SMALL PARCEL OF LAND (±1.1ha) ON THE NORTH SIDE OF KLONDIKE ROAD BETWEEN SANDHILL ROAD AND SHIRLEY'S BROOK. THE CITY OF OTTAWA MAY CHOOSE TO EXPLORE SERVICING THIS PARCEL WITH A CONNECTION TO A FUTURE SANITARY SEWER WITHIN KLONDIKE ROAD. RESIDUAL FREE FLOW CAPACITY APPEARS TO EXIST IN THE SANITARY SEWER LINES TO THE PUMP STATION.
4. FOR AREAS No. 3, No. 5 AND No.6 THE POPULATION AND AREA VALUES HAVE BEEN UPDATED FROM THE NOVEMBER 2000 CCL REPORT "BRIAR RIDGE SANITARY PUMP STATION PRE-DESIGN REPORT" TO REFLECT THE LATEST LANDUSE PLANS.
5. ALL PIPE DISTANCES AND SLOPE VALUES IDENTIFIED ON THIS PLAN ARE NOMINAL.

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

No.	REVISION	DATE	BY
9.	AS-BUILT	JAN 16/14	MAB
8.	ISSUED FOR MOE APPROVAL	NOV 09/06	MAB
7.	ISSUED TO CLIENT	OCT 10/06	MAB
6.	ISSUED FOR CONSTRUCTION	AUG 17/06	MAB
5.	ISSUED WITH MOE APPLICATION	AUG 08/06	MAB
4.	ISSUED FOR TENDER	MAY 26/06	MAB
3.	ISSUED FOR MOE APPROVAL	MAY 01/06	MAB
2.	REVISED PER CITY COMMENTS	APR 24/06	MAB
1.	ISSUED TO CITY FOR REVIEW	MAR 20/06	MAB

LICENSED PROFESSIONAL ENGINEER M.A. BISSETT PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER J.G. RIDDELL PROVINCE OF ONTARIO

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Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

DESIGN	MAB
CHECKED	SAY
DRAWN	SM
CHECKED	MAB
APPROVED	JGR
SCALE	1:2000

CITY OF OTTAWA

BROOKSIDE SUBDIVISION

BRIAR RIDGE PUMP STATION SANITARY DRAINAGE PLAN

PROJECT No. 103106-0

DATE AUGUST 2006

DRAWING No. 103106-SANI

PLAN.DWG - 1000mmX707mm

Drawing:M:\2003\03106\CAD\design\03106san.dwg Layout:SAN Updated NOV 09, 2006 at 3:32pm by smatthews

1055 Klondike Road - Orr Ridge: Sanitary Sewer Design Sheet

AREA			RESIDENTIAL											ICI							INFILTRATION				PIPE					
			Singles		Semi-Detached / Towns				TOTAL																					
ID	From	To	Units	Pop.	Units	Pop.	Future Block 10	Future 1075 Klondike Rd	Pop.	Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)	Light Industrial Area (ha)	Accum. Area (ha)	Peak Factor	Commercial Area (ha)	Institutional Area (ha)	Accum. Area (ha)	Peak Flow (l/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)	**Total Flow (l/s)**	Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
1055 Klondike Road Drainage Areas																														
A1-1	**7**	**5**	0	0.0	15	40.5	0.00		0.0	40.5	40.5	3.7	0.5				0.00	0.00	0.00	0.0	0.64	0.64	0.2	0.7	200	0.65	19.9	27.6	0.85	2.5%
A1-2	**5**	**3**	0	0.0	29	78.3	0.00		0.0	78.3	118.8	3.6	1.4				0.00	0.00	0.00	0.0	0.80	1.44	0.5	1.9	200	0.50	100.0	24.2	0.75	7.7%
A1-3	**3**	**1**	0	0.0	14	37.8	0.00		0.0	37.8	156.6	3.5	1.8				0.00	0.00	0.00	0.0	0.41	1.85	0.6	2.4	200	0.50	62.3	24.2	0.75	10.0%
A2-1, A2-2	**9**	**1**	0	0.0	0	0.0	53	10	128.9	128.9	128.9	3.6	1.5				0.00	0.00	0.00	0.0	0.88	0.88	0.3	1.8	200	0.65	46.2	27.6	0.85	6.5%
	1	**266**	0	0.0	0	0.0	0.00		0.0	0.0	285.5	3.5	3.2				0.00	0.00	0.00	0.0	0.00	2.73	0.9	4.1	200	0.65	117.0	27.6	0.85	14.9%
Off-site Drainage Areas (To Briar Ridge Pump Station)																														
A3-3	266	265	0	0.0	57	153.9	0.00		0.0	153.9	439.4	3.4	4.8				0.00	0.00	0.00	0.0	2.47	5.20	1.7	6.6	200	0.32	91.0	19.4	0.60	33.9%
A3-4	265	264	0	0.0	0	0.0	0.00		0.0	0.0	439.4	3.4	4.8				0.00	2.21	2.21	1.1	2.21	7.41	2.4	8.4	200	0.32	120.0	19.4	0.60	43.2%
A3-5	264	206	0	0.0	107	288.9	0.00		0.0	288.9	728.3	3.3	7.8				0.00	0.00	2.21	1.1	3.99	11.40	3.8	12.6	250	0.24	306.3	30.4	0.60	41.6%
A3-1, A3-2, A3-6	206	205	201	683.4	392	1058.4	0.00		0.0	1741.8	2470.1	3.0	24.1				9.02	0.00	11.23	5.5	37.33	48.73	16.1	45.6	450	0.20	52.5	133.0	0.81	34.3%
A3-7, A3-8	205	204	0	0.0	0	0.0	0.00		0.0	0.0	2470.1	3.0	24.1	5.4	5.4	4.7	0.00	0.00	11.23	15.7	5.40	54.13	17.9	57.7	450	0.20	79.7	133.0	0.81	43.4%
	204	203	0	0.0	0	0.0	0.00		0.0	0.0	2470.1	3.0	24.1		5.4	4.7	0.00	0.00	11.23	15.7	0.00	54.13	17.9	57.7	450	0.20	79.7	133.0	0.81	43.4%
	203	202	0	0.0	0	0.0	0.00		0.0	0.0	2470.1	3.0	24.1	7.9	13.3	3.9	0.00	0.00	11.23	26.5	7.90	62.03	20.5	71.0	450	0.26	90.0	151.7	0.92	46.8%
	202	201	0	0.0	0	0.0	0.00		0.0	0.0	2470.1	3.0	24.1		13.3	3.9	0.00	0.00	11.23	26.5	0.00	62.03	20.5	71.0	450	0.25	270.0	148.7	0.91	47.8%
	201	PS	0	0.0	0	0.0	0.00		0.0	0.0	2470.1	3.0	24.1		13.3	3.9	0.00	0.00	11.23	26.5	0.00	62.03	20.5	71.0	450	0.15	21.6	115.2	0.70	61.7%

Design Parameters:

Avg Flow/Person =	280	l/day
Comm./Inst. Flow =	28000	l/ha/day
Light Industrial Flow =	35000	l/ha/day
Infiltration =	0.33	l/s/ha
Pipe Friction n =	0.013	

Residential Peaking Factor = Harmon Equation (max 4, min 2)

Peaking Factor Comm./Inst. 1.5

Population Density:

	ppl/unit	units/ha
Future Block 10 Apartment Unit	2.1	
Future 1075 Klondike Road	1.8	35
Single	3.4	
Semi / Town	2.7	

Project: 1055 Klondike Road - Orr Ridge (117034)

Designed: LRW

Checked: MAB

Date: February 18, 2021

NOVATECH
Engineers, Planners & Landscape Architects

Appendix E

Storm Sewer Design Calculations
Hydro Break Flow Control Device
SWM Catchments for Brookside Subdivision & Pond “C”
Stormceptor Sizing Calculations
Storm Tank Module

TABLE E1. Land use Breakdown and Composite Runoff Coefficients Calculations Existing Conditions

Project: 1050 Klondike Drive, Ottawa, ON

Date: 20-Jun-22
Designed By: UA
Checked By: YA

TABLE E1.1 AREA A1

Existing Land Use Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Bldg/ Roof	0.024	0.90	0.02
Concrete	0.011	0.90	0.01
Gravel	0.017	0.80	0.013
Landscape	0.074	0.25	0.02
Overall	0.126	0.50	0.06

TABLE E1.2 AREA A2

Existing Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Building	0.001	0.90	0.00
Gravel	0.009	0.80	0.01
Landscape	0.022	0.25	0.01
Overall	0.031	0.42	0.013

Note: As per pre consultation commnets, Pre development runoff coefficient "R" is recommended as a maximum equivalent of "0.5". However as per Brookside Subdivision Storm Drainage Area Plan, R is considered as "0.45" and same has been adopted for current design

TABLE E2. Land use Breakdown and Composite Runoff Coefficients Calculations Proposed Conditions

Project: 1050 Klondike Drive, Ottawa, ON

Date: 20-Jun-22
Designed By: UA
Checked By: YA

TABLE E2.1 AREA A1

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Bldg/ Roof	0.052	0.90	0.047
Concrete/Asphalt	0.053	0.90	0.047
Landscape	0.021	0.25	0.005
Overall	0.126	0.79	0.100

TABLE E2.2 AREA A2

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Concrete	0.010	0.90	0.009
Landscape	0.021	0.25	0.005
Overall	0.031	0.46	0.015

TABLE E3 PEAK FLOWS CALCULATION USING RATIONAL METHOD
EXISTING AND PROPOSED CONDITIONS

Project: 1050 Klondike Drive, Ottawa, ON

Date: 24-Oct-22
Designed By: UA
Checked By: YA

TABLE E3.1 Intensity-Duration-Frequency Parameters, Ottawa

$I = A / (td + C)^B$ td = 10 min

Return Period	A	B	C
2 year	732.951	0.810	6.199
5 year	998.071	0.814	6.053
10 year	1174.184	0.816	6.014
25 year	1402.884	0.819	6.018
50 year	1569.580	0.820	6.014
100 year	1735.688	0.820	6.041

TABLE E3.2 Peak Flows - Existing Condition for Addition Areas

Existing Condition	Area (ha.)	R	A x R
Area A1	0.126	0.45	0.06
T c = 10 minutes			
Storm Event			
2 year	**5 year**	**10 year**	**25 year**	**50 year**	**100 year**
Intensity (mm/hr)					
76.8	104.2	122.1	144.7	161.5	178.3
Peak Flow (l/sec)					
12.06	16.36	19.18	22.72	25.35	35.00

As per pre consultation comments,pre development runoff coefficient "R" is recommended as "0.5" max. As per Brookside Subdivision Storm Drainage Area Plan, "R" is considered as "0.45".
Quantity control of 85 l/sec/ha has been used for actual orifice/vortex sizing.

TABLE E3.3 Peak Flows - Proposed Condition

Proposed Condition	Area (ha.)	R	A x R
Area A1	0.126	0.79	0.10
T c = 10 minutes			
Storm Event			
2 year	**5 year**	**10 year**	**25 year**	**50 year**	**100 year**
Intensity (mm/hr)					
76.8	104.2	122.1	144.7	161.5	178.3
Peak Flow (l/sec) - Uncontrolled					
21.23	28.80	33.76	39.99	44.63	61.61
Peak Flow (l/sec) - Controlled					
6.00	6.00	6.00	6.00	6.00	6.00

(100 year pre and post development flows are calculated based on increased Runoff coefficent of 25% upto maximum of 1.0)

Area A1 Release rate 85 L/s/ha (0.85X0.126) =10.71 l/sec
Area A2 Release rate 85 L/s/ha (0.85X0.031 =2.63 l/sec
Total Release rate (Area A1&A2) = 10.71+2.63 = 13.34 l/sec
100 year peak flow Area A2 = 9 l/sec (See Table 3a)
Allowable flow = 13.34-9 = 4.34 l/sec
ICD @ flow 6 l/sec is considered as controlled allowable flow
Hydro Break (Refer Appendix E for details)

TABLE E3.4 Change in Peak Flows (Reduction -ve; Increase +ve)

Percent Change (%)					
-50.2%	-63.3%	-68.7%	-73.6%	-76.3%	-82.9%

TABLE E3a. PEAK FLOWS CALCULATION USING RATIONAL METHOD
EXISTING AND PROPOSED CONDITIONS (Area A2)

Project: 1050 Klondike Drive, Ottawa, ON

Date: 24-Oct-22
Designed By: UA
Checked By: YA

TABLE E3a.1 Intensity-Duration-Frequency Parameters, Ottawa

$I = A / (td + C)^B$ td = 10 min

Return Period	A	B	C
2 year	732.951	0.810	6.199
5 year	998.071	0.814	6.053
10 year	1174.184	0.816	6.014
25 year	1402.884	0.819	6.018
50 year	1569.580	0.820	6.014
100 year	1735.688	0.820	6.041

TABLE E3a.2 Peak Flows - Proposed Condition

Proposed Condition			Area (ha.)	R	A x R
Area A1			0.031	0.46	0.01
T c = 10 minutes					
Storm Event					
2 year	**5 year**	**10 year**	**25 year**	**50 year**	**100 year**
Intensity (mm/hr)					
76.8	104.2	122.1	144.7	161.5	178.3
Peak Flow (l/sec) - Uncontrolled					
3.1	4.2	4.9	5.8	6.5	9.0

(100 year pre and post development flows are calculated based on increased Runoff coefficent of 25% upto maximum of 1.0)

On-Site Storage Calculator

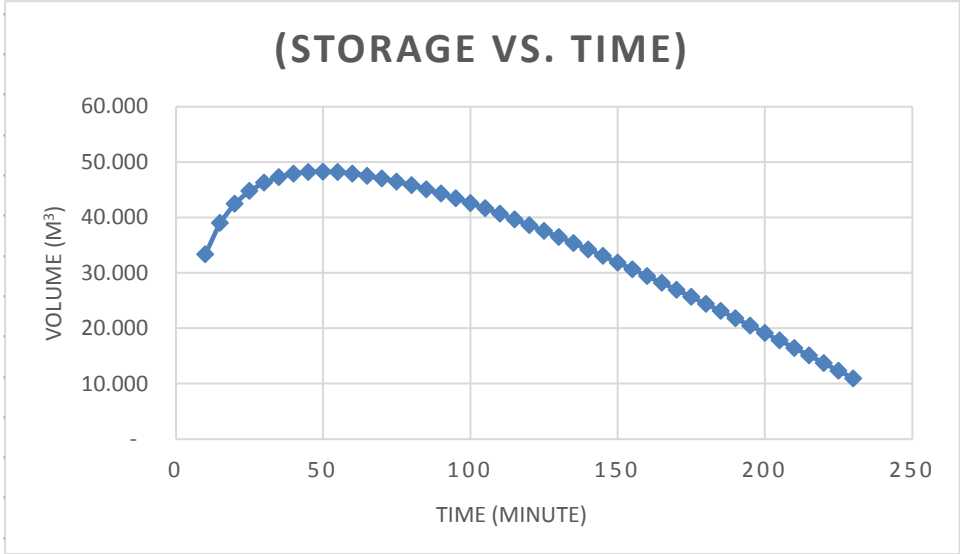
Ottawa, ON

Table E4 -Overall Site

Project: 1050 Klondike Drive
By: UA
Date: 24-Oct-22

R =	0.99		100 yr rainfall:
A =	0.126	ha	
$Q_{release}$ =	0.006	m^3/s	
	6.00	L/s	

T.C (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	178.313	0.062	0.056	33.365	
15	142.744	0.049	0.043	38.987	
20	119.848	0.041	0.035	42.490	
25	103.773	0.036	0.030	44.782	
30	91.812	0.032	0.026	46.299	
35	82.534	0.029	0.023	47.284	
40	75.109	0.026	0.020	47.882	
45	69.020	0.024	0.018	48.187	
50	63.929	0.022	0.016	48.264	***
55	59.602	0.021	0.015	48.157	
60	55.876	0.019	0.013	47.900	
65	52.630	0.018	0.012	47.518	
70	49.775	0.017	0.011	47.031	
75	47.243	0.016	0.010	46.452	
80	44.979	0.016	0.010	45.796	
85	42.943	0.015	0.009	45.071	
90	41.101	0.014	0.008	44.285	
95	39.426	0.014	0.008	43.446	
100	37.895	0.013	0.007	42.559	
105	36.490	0.013	0.007	41.628	



On-Site Storage Calculator

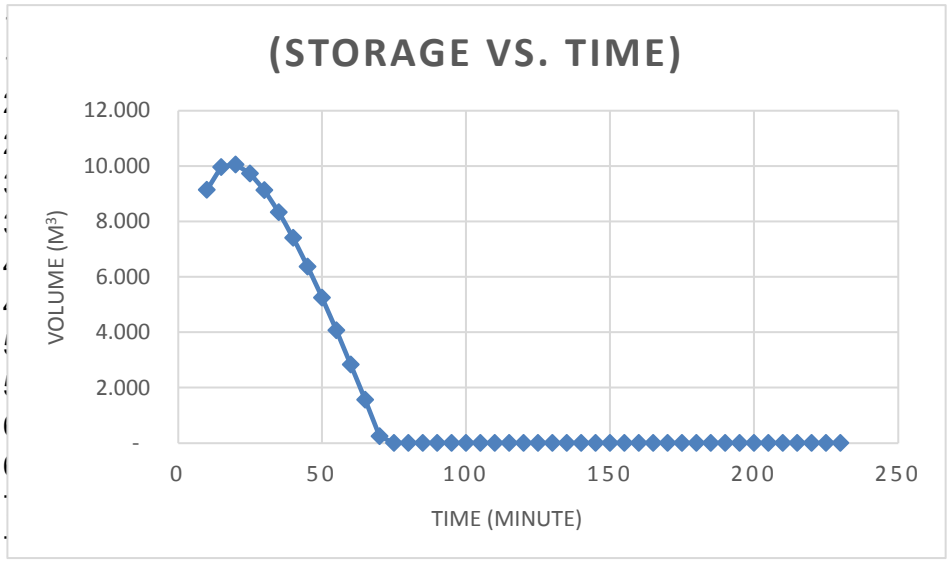
Ottawa, ON

Table E5 -Overall Site

Project: 1050 Klondike Drive
By: UA
Date: 24-Oct-22

R = 0.79 2 yr rainfall:
A = 0.126 ha
$Q_{release}$ = 0.006 m^3/s
6.00 L/s

T.C (min)	i_2 (mm/hr)	Q_2 (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	76.805	0.021	0.015	9.138	
15	61.767	0.017	0.011	9.966	
20	52.031	0.014	0.008	10.058	***
25	45.167	0.012	0.006	9.727	
30	40.043	0.011	0.005	9.123	
35	36.059	0.010	0.004	8.331	
40	32.864	0.009	0.003	7.401	
45	30.239	0.008	0.002	6.368	
50	28.041	0.008	0.002	5.252	
55	26.171	0.007	0.001	4.071	
60	24.558	0.007	0.001	2.836	
65	23.151	0.006	0.000	1.557	
70	21.913	0.006	0.000	0.239	
75	20.813	0.006	-	-	
80	19.830	0.005	-	-	
85	18.944	0.005	-	-	
90	18.143	0.005	-	-	
95	17.413	0.005	-	-	
100	16.746	0.005	-	-	
105	16.134	0.004	-	-	



On-Site Storage Calculator

Ottawa, ON

Table E6 -Overall Site

Project: 1050 Klondike Drive
By: UA
Date: 24-Oct-22

R = 0.79 5 yr rainfall:
A = 0.13 ha
$Q_{release}$ = 0.006 m^3/s
6.00 L/s

T.C (min)	i_5 (mm/hr)	Q_5 (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	104.193	0.029	0.023	13.680	
15	83.557	0.023	0.017	15.386	
20	70.251	0.019	0.013	16.102	
25	60.896	0.017	0.011	16.248	***
30	53.928	0.015	0.009	16.031	
35	48.518	0.013	0.007	15.562	
40	44.184	0.012	0.006	14.911	
45	40.629	0.011	0.005	14.121	
50	37.653	0.010	0.004	13.223	
55	35.123	0.010	0.004	12.238	
60	32.943	0.009	0.003	11.181	
65	31.044	0.009	0.003	10.065	
70	29.372	0.008	0.002	8.898	
75	27.888	0.008	0.002	7.688	
80	26.562	0.007	0.001	6.441	
85	25.369	0.007	0.001	5.161	
90	24.288	0.007	0.001	3.853	
95	23.305	0.006	0.000	2.518	
100	22.407	0.006	0.000	1.161	
105	21.582	0.006	-	-	

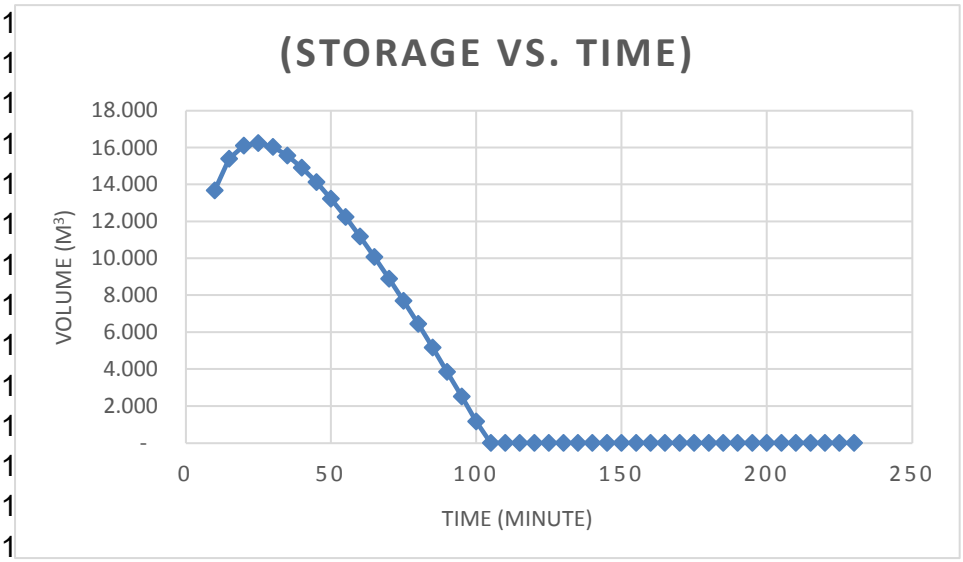


Table E7 - Storm Drainage Design Chart

DESIGN STORM:	5 YEAR RETURN
I (5-YEAR):	$I = A / (td + C)^B$ (mm/hr)
td (start):	10.0 minutes

Jain Infrastructure Consultants Ltd.	
PROJECT:	1050 Klondike Drive
PREPARED BY:	UA
FILE No.:	20-525
DATE PREPARED	15-Jun-22

LOCATION	MANHOLES		A	C	A x C	ACC.	td (min)	I (mm/hr)	Q	Q	STORM SEWER DESIGN INFORMATION					TIME	REMARKS
	FROM MH#	TO MH#	area (ha)	runoff Coeffi.		A x C			(5-YR) (l/s)	(@85 l/sec/ha) (l/s)	size (mm)	slope (%)	length (m)	Q full (l/s)	V full (m/s)	SECT. (min)	
Parking	STM MH1	STM MH2	0.13	0.79	0.10	0.10	10.00	104.91	29	10.9	300	2.00	51.00	137	1.93	0.44	
Parking	STM MH2	STM MH3	0.00	0.79	0.00	0.10	10.44	102.81	29	10.9	300	2.00	2.00	137	1.93	0.02	
Parking	STM MH3	EX. STM Sewer Dia 675mm Line (Sandhill Road)	0.00	0.79	0.00	0.10	10.46	102.73	29	10.9	300	2.00	11.00	137	1.93	0.09	Hydro Break

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.660	6.000
Flush-Flo™	0.394	5.978
Kick-Flo®	0.885	4.488
Mean Flow		5.180

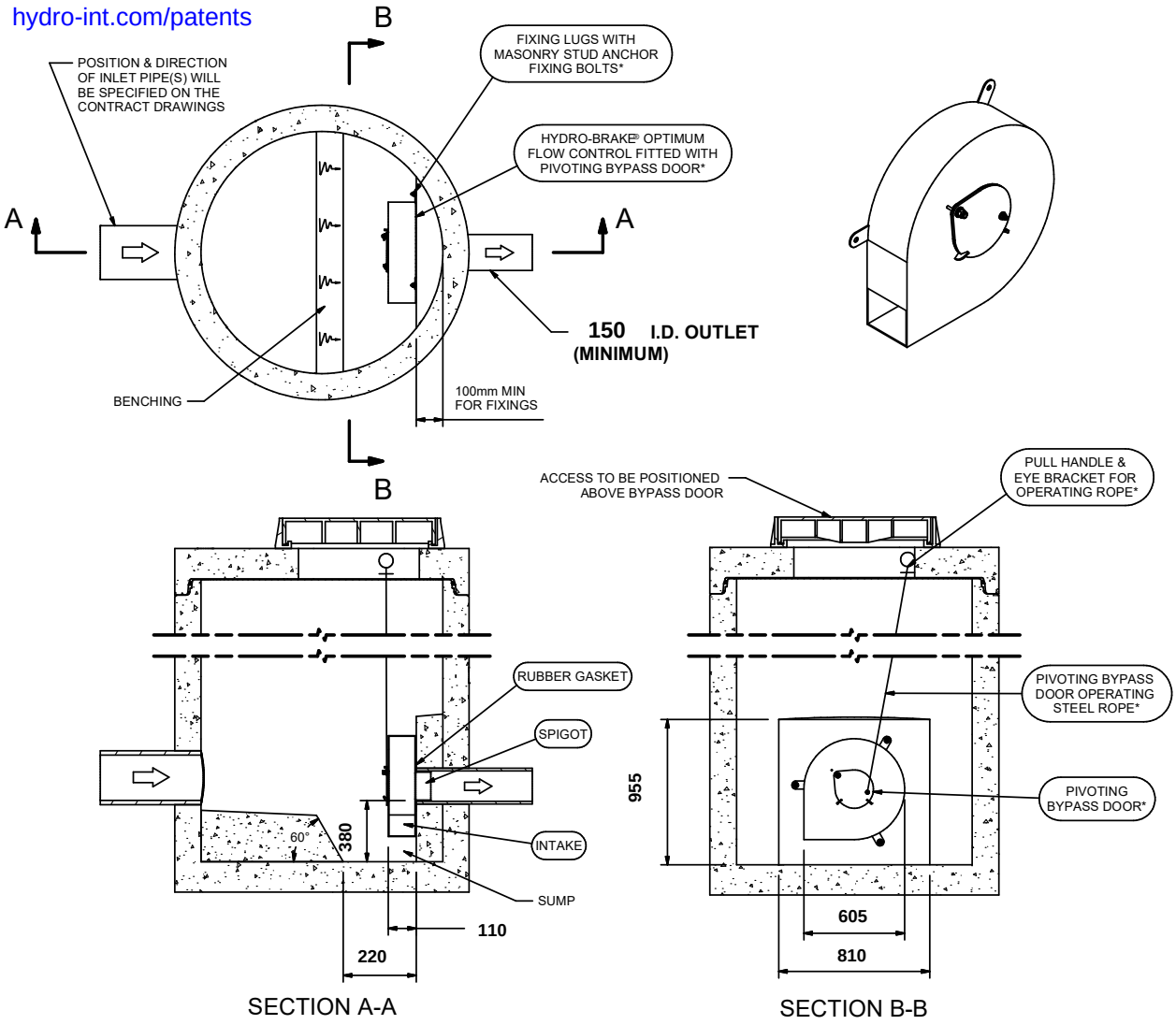
Hydro-Brake® Optimum Flow Control including:

- **3 mm** grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 172 kg

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

WRc Approved PT/329/0412

hydro-int.com/patents



SECTION A-A

SECTION B-B

IMPORTANT: ⬭ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this SCL-0101-6000-1660-6000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International®

DATE	10/14/2022 8:23 PM
SITE	
DESIGNER	**USMAN ARIF**
REF	**21_12_3857**

SCL-0101-6000-1660-6000

Hydro-Brake® Optimum

uarif@jainconsultants.com

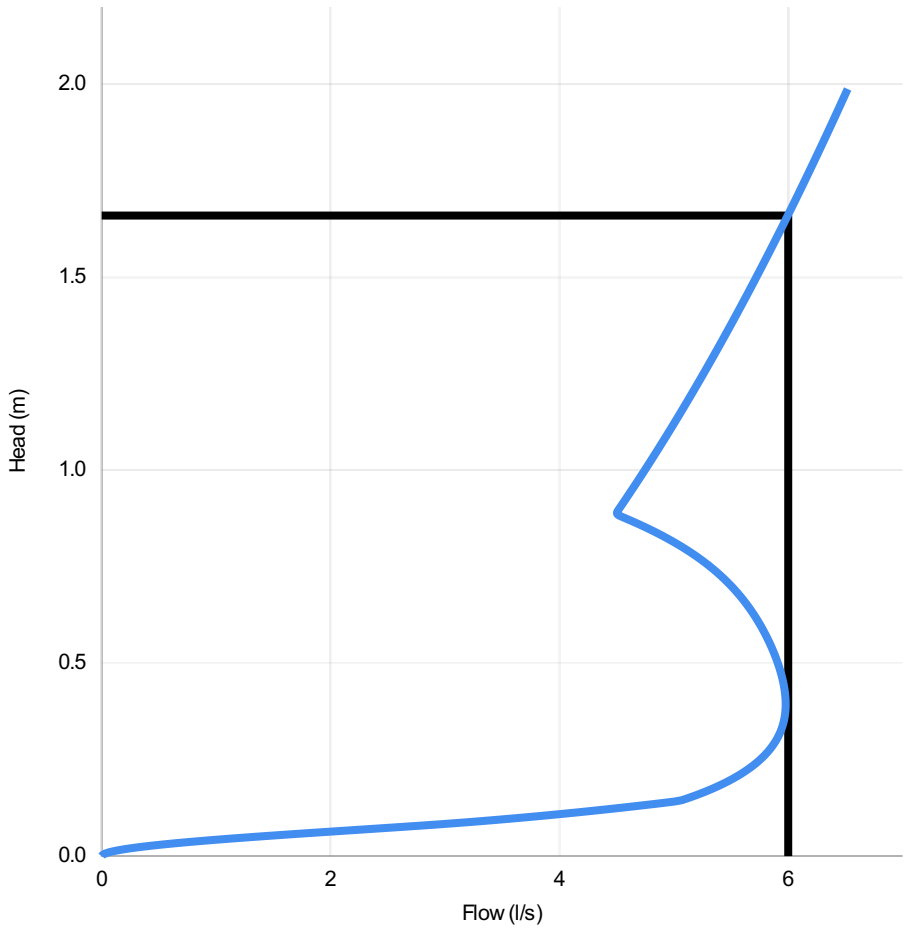
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.660	6.000
Flush-Flo	0.394	5.978
Kick-Flo®	0.885	4.488
Mean Flow		5.180

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

WRc APPROVED
PT/329/0412

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.057	1.687
0.114	4.195
0.172	5.313
0.229	5.667
0.286	5.864
0.343	5.956
0.401	5.977
0.458	5.950
0.515	5.890
0.572	5.804
0.630	5.691
0.687	5.542
0.744	5.343
0.801	5.071
0.859	4.706
0.916	4.558
0.973	4.687
1.030	4.811
1.088	4.932
1.145	5.050
1.202	5.165
1.259	5.277
1.317	5.386
1.374	5.493
1.431	5.598
1.488	5.700
1.546	5.800
1.603	5.899
1.660	5.996

DESIGN ADVICE

The head/flow characteristics of this SCL-0101-6000-1660-6000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modeling evaluates the full head/flow characteristic curve.

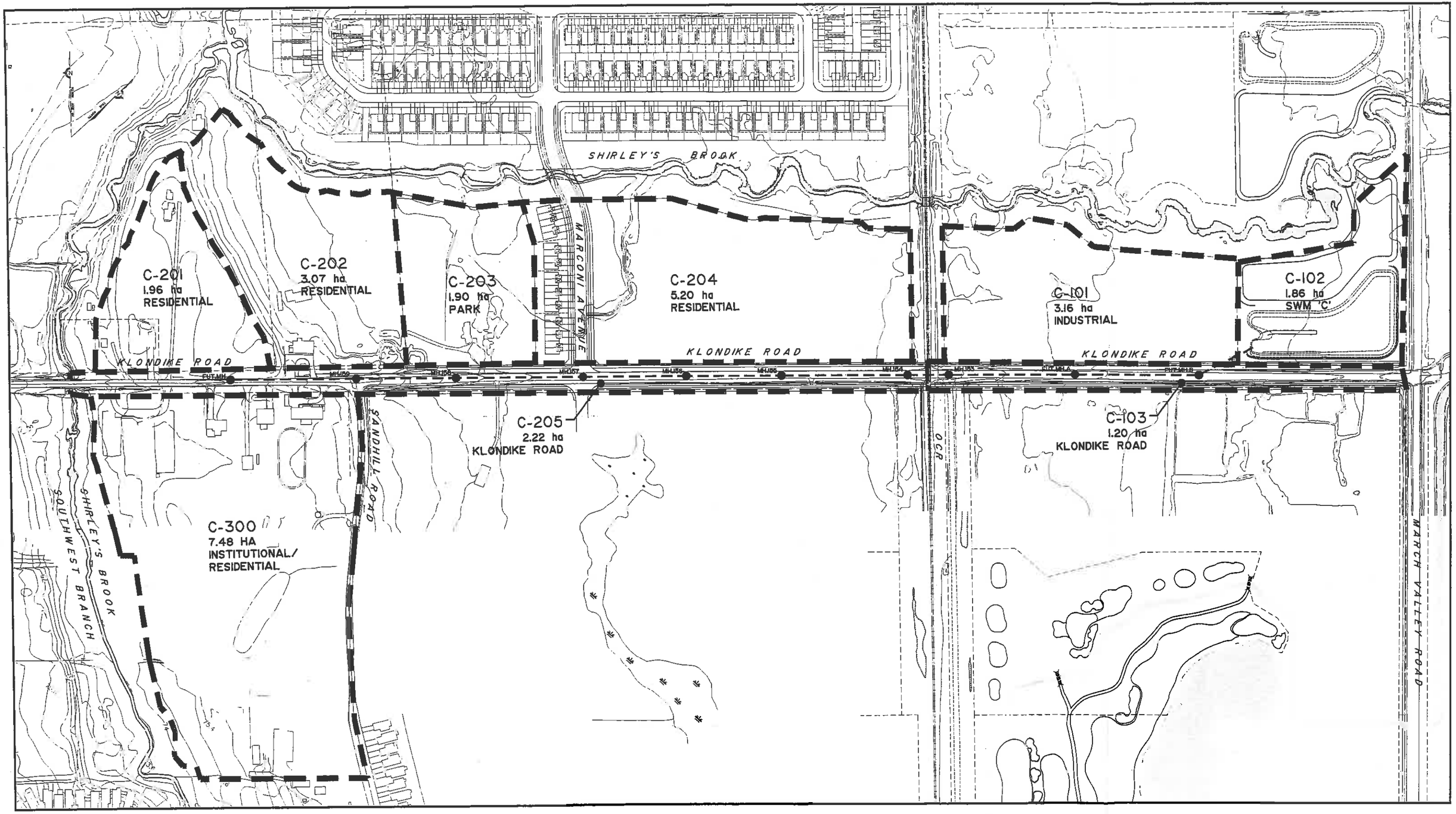
! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International®

DATE	10/14/2022 8:23 PM
Site	
DESIGNER	USMAN ARIF
Ref	21_12_3857

SCL-0101-6000-1660-6000

Hydro-Brake Optimum®



NOVATECH
ENGINEERING
CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novatech@novatech-eng.com

FIGURE 3
STORM DRAINAGE AREAS
TO SWM FACILITY 'C'

103106 MAY 2006 N.T.S.

SHTIIX17.DWG - 279mmX431mm

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

No.	REVISION	DATE	BY
12.	AS-BUILT	JAN 16/14	MAB
11.	ISSUED WITH MOE APPLICATION - PHASE 2	OCT 31/07	MAB
10.	PHASE 2 DESIGN REVISIONS	MAY 02/07	MAB
9.	BRIAR RIDGE DRAINAGE AREA ADDED	NOV 17/06	MAB
8.	ISSUED FOR MOE APPROVAL	NOV 09/06	MAB
7.	ISSUED TO CLIENT	OCT 10/06	MAB
6.	ISSUED FOR CONSTRUCTION	AUG 17/06	MAB
5.	ISSUED WITH MOE APPLICATION	AUG 08/06	MAB
4.	ISSUED FOR TENDER	MAY 26/06	MAB
3.	ISSUED FOR MOE APPROVAL	MAY 01/06	MAB
2.	REVISED PER CITY COMMENTS	APR 24/06	MAB
1.	ISSUED TO CITY FOR REVIEW	MAR 20/06	MAB

LICENSED PROFESSIONAL ENGINEER — M.A. BISSETT — PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER — J.G. RIDDELL — PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
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Ottawa, Ontario, Canada
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Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

DESIGN	MAB
CHECKED	SAY
DRAWN	SM
CHECKED	MAB
APPROVED	JGR

SCALE 1:2000

CITY OF OTTAWA

BROOKSIDE SUBDIVISION

SWM FACILITIES
STORM DRAINAGE AREA PLAN

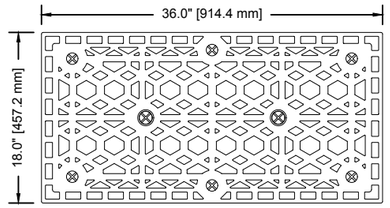
PROJECT No. 103106-0

DATE AUGUST 2005

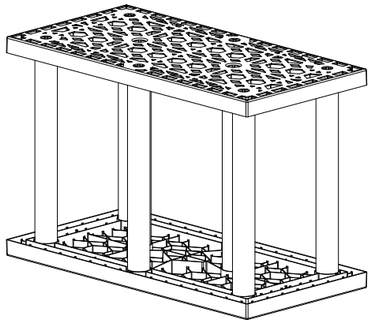
DRAWING No. 103106-STMI

PLANBLDWG - 1000mmX707mm

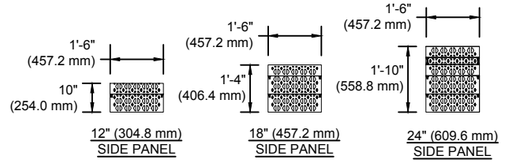
Drawing:M:\2003\103106\CAD\design\103106stm.dwg Layout:STM Updated: MAY 01, 2007 at 4:28pm by: smatheson

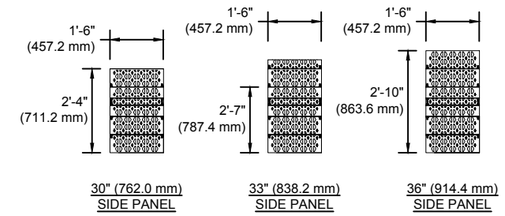


TOP



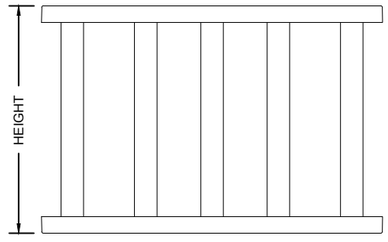
ISOMETRIC VIEW





NOTES:
1. SIDE PANELS TO BE INSTALLED ALONG SYSTEM PERIMETER, UNLESS OTHERWISE SPECIFIED.
2. ALL HEIGHTS TO BE CUT FROM A 36" (914.4 mm) SIDE PANEL AT PRE-SCRIBED LOCATIONS, EXCEPT 33" (838.2 mm) & 12" (304.8 mm) SIDE PANEL.

SIDE PANEL DETAIL



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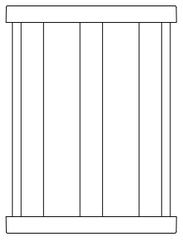


SIDE

MODULE DETAIL

STORMTANK® MODULE				
NAME	HEIGHT (mm)	CAPACITY (m^3)	VOID RATIO	NOMINAL WEIGHT (kg)
ST-12	12" (304.8)	4.22 cf (0.1194)	93.70%	17.56 lbs. (7.965)
ST-18	18" (457.2)	6.44 cf (0.1824)	95.50%	22.70 lbs. (10.29)
ST-24	24" (609.6)	8.66 cf (0.2452)	96.00%	26.30 lbs. (11.92)
ST-30	30" (762.0)	10.88 cf (0.3081)	96.50%	29.50 lbs. (13.38)
ST-33	33" (838.2)	11.99 cf (0.3395)	96.90%	29.82 lbs. (13.53)
ST-36	36" (914.4)	13.10 cf (0.3710)	97.00%	33.10 lbs. (15.01)

NOTES:
a. REFERENCE CURRENT INSTALLATION INSTRUCTIONS FOR PROPER ASSEMBLY AND INSTALLATION PRACTICES.
b. SIDE PANELS REQUIRED AROUND THE PERIMETER OF THE INSTALLATION ONLY, UNLESS OTHERWISE NOTED.
c. SIDE PANELS ARE TO BE CUT FROM A 36" PANEL AT THE PRE-SCRIBED LOCATIONS.

REV.	DATE	RECORD OF CHANGES	BY	APPRV.
D	2/17/17	ST-12 MODULE ADDED, METRIC DIMENSIONS UPDATED	CGB	
C	9/12/13	NOTE REVISION, FORMATTING UPDATE & DWG. NO. UPDATE	JKB	JKB
B	9/11/12	FORMATTING & DWG. NO. UPDATE	JKB	FK
A	4/5/12	INITIAL RELEASE	BLL	FK

BRENTWOOD
610 Morgantown Road
Reading, PA 19611 U.S.A.
Phone: (610) 374-5109
Fax: (610) 376-6022
www.brentwoodindustries.com

Project Name: MODULE DETAIL

Title: STORMTANK® MODULE

Drawn By: B.LINE | Date: 4/5/12
Drawing No.: STM-000-00 | Sheet: 1 of 2 | Scale: NTS

STORMTANK® Module

Volume Calculator Series 25

Inputs

Project Name:	1050 Klondike Road - Ottawa REV1			
Engineer:	Jain Infra Consultants Ltd.	Date:	17-Oct-22	
Units:	SI	Shape:	Square/Rectangle	
Liner:	Yes	Location:	Excavation	
Stacking:	Single	Height:	609.6	
Stone Storage:	All	Porosity:	40%	

Dimensions

Module		
Length:	3.6576	m
Width:	16.002	m
Excavation		
Length:	4.2672	m
Width:	16.6116	m
Stone		
Leveling Bed:	0.1524	m
Top Backfill:	0.3048	m
Compacted Fill:	0.3048	m

Results

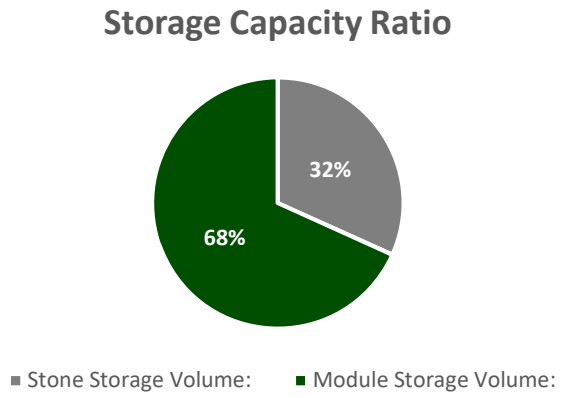
Capacity:

Stone Storage Volume:	15.98	m^3
Module Storage Volume:	34.36	m^3
Total Storage Volume:	50.33	m^3

Quantities:

Required Excavation:	97.23	m^3
Required Stone Volume:	39.94	m^3
Estimated Geotextile:		m^2
Estimated Liner:		m^2

(Estimations include 10% for scrap and overlap)



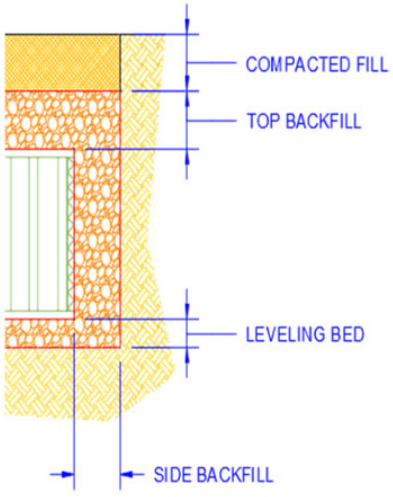
Basin Detail

Component Quantities:

	Bottom Layer	Top Layer	Total
Height	609.6	N/A	609.6
# of Modules	140	N/A	140
# of Platens	280	N/A	280
# of Side Panels	86	N/A	86
# of Columns	1,120	N/A	1,120
# of Stacking Pins	0	N/A	0

2- 10" Observation Ports
Estmtaed Liner - 360 sq.m.
LP6 - 300 sq.m.
LP8 - 720 sq.m.

Cross-Section:



Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/12/2021

Province:	Ontario
City:	OTTAWA
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	
Drainage Area (ha):	0.13
Runoff Coefficient 'c':	0.98
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Project Name:	1050 KLONDIKE DRIVE
Project Number:	20-525
Designer Name:	USMAN ARIF
Designer Company:	Jain Infrastructure Consultants
Designer Email:	uarif@jainconsultants.com
Designer Phone:	647-510-0353
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	4.32
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	10.88
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	92
EFO6	97
EFO8	99
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 92

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

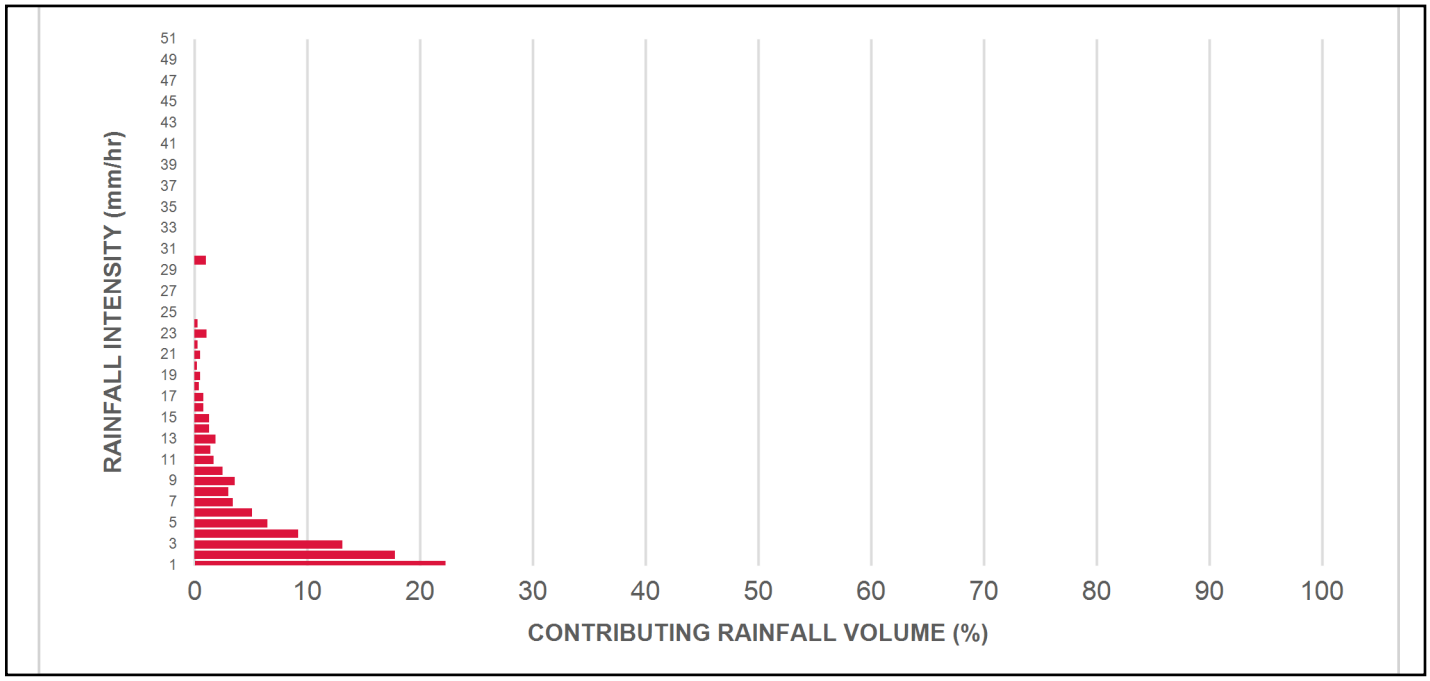
imbrium

Upstream Flow Controlled Results

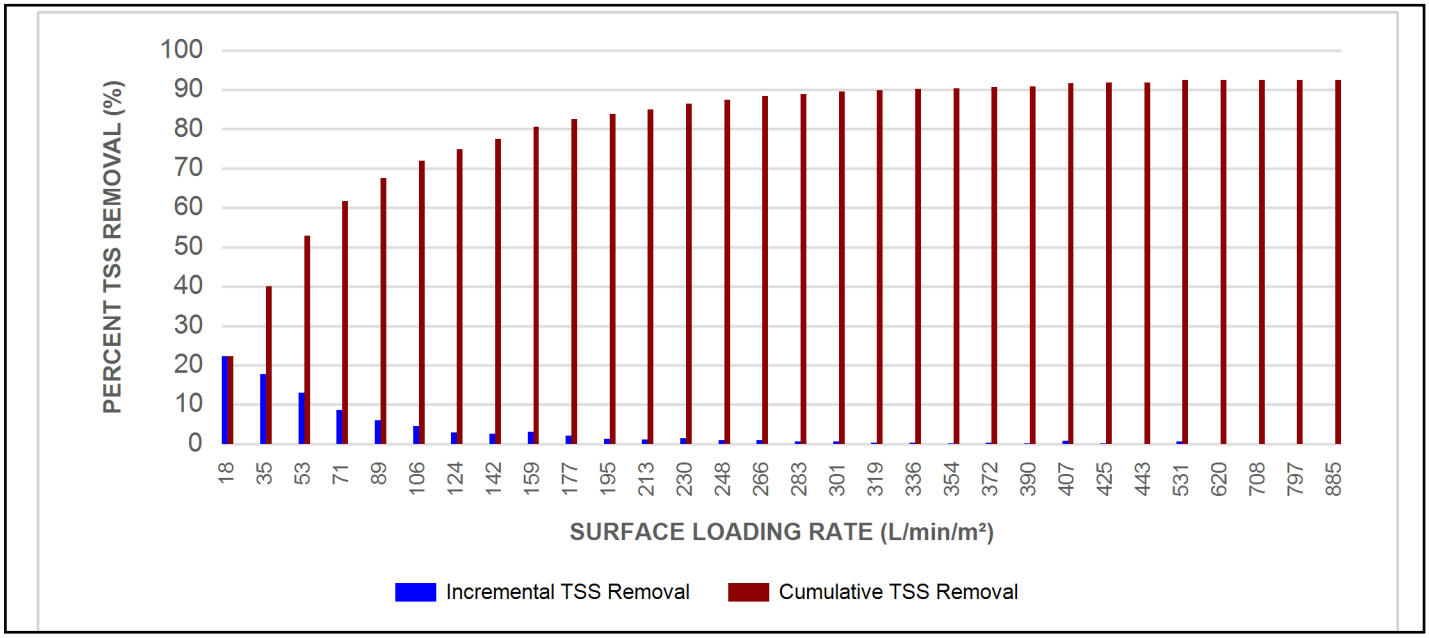
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	22.3	22.3	0.35	21.0	18.0	100	22.3	22.3
2	17.8	40.0	0.71	43.0	35.0	100	17.8	40.0
3	13.1	53.1	1.06	64.0	53.0	98	12.9	52.9
4	9.2	62.4	1.42	85.0	71.0	94	8.7	61.6
5	6.5	68.9	1.77	106.0	89.0	91	5.9	67.5
6	5.1	74.0	2.13	128.0	106.0	89	4.5	72.0
7	3.4	77.3	2.48	149.0	124.0	87	2.9	74.9
8	3.0	80.3	2.83	170.0	142.0	84	2.5	77.5
9	3.6	84.0	3.19	191.0	159.0	82	3.0	80.5
10	2.5	86.5	3.54	213.0	177.0	81	2.0	82.5
11	1.7	88.2	3.90	234.0	195.0	78	1.3	83.8
12	1.4	89.6	4.25	255.0	213.0	77	1.1	84.9
13	1.9	91.5	4.60	276.0	230.0	76	1.4	86.4
14	1.3	92.8	4.96	298.0	248.0	75	1.0	87.4
15	1.3	94.1	5.31	319.0	266.0	75	0.9	88.3
16	0.8	94.9	5.67	340.0	283.0	74	0.6	88.9
17	0.8	95.7	6.02	361.0	301.0	73	0.6	89.5
18	0.4	96.1	6.38	383.0	319.0	72	0.3	89.8
19	0.5	96.6	6.73	404.0	336.0	72	0.3	90.1
20	0.2	96.8	7.08	425.0	354.0	71	0.2	90.3
21	0.5	97.3	7.44	446.0	372.0	70	0.4	90.6
22	0.3	97.6	7.79	468.0	390.0	69	0.2	90.8
23	1.1	98.7	8.15	489.0	407.0	69	0.8	91.6
24	0.3	99.0	8.50	510.0	425.0	68	0.2	91.8
25	0.0	99.0	8.85	531.0	443.0	67	0.0	91.8
30	1.0	100.0	10.63	638.0	531.0	63	0.6	92.4
35	0.0	100.0	11.00	660.0	550.0	62	0.0	92.4
40	0.0	100.0	11.00	660.0	550.0	62	0.0	92.4
45	0.0	100.0	11.00	660.0	550.0	62	0.0	92.4
50	0.0	100.0	11.00	660.0	550.0	62	0.0	92.4
						Estimated Net Annual Sediment (TSS) Load Reduction =		**92 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

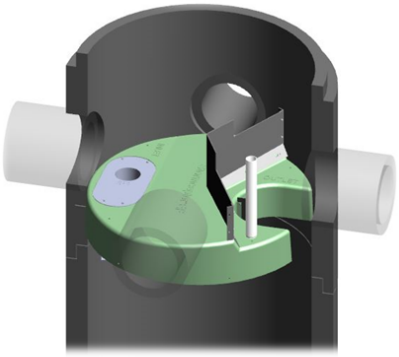
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

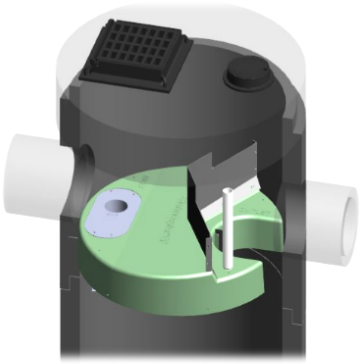
DESIGN FLEXIBILITY

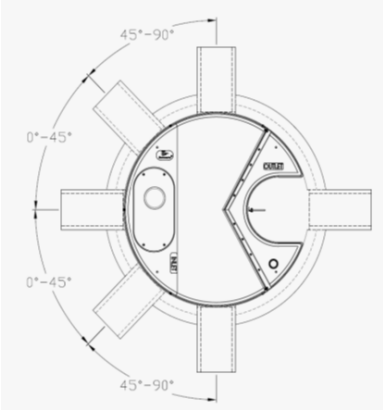
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix F
Site Servicing Checklist

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☐ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☒ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☒ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Appendix G
Topographic and Legal Survey

SURVEYOR'S REAL PROPERTY REPORT

PART 1 Plan of

PART OF LOT 10 CONCESSION 4 GEOGRAPHIC TOWNSHIP OF MARCH CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 150

6 4.5 3.0 1.5 0 3 6 Metres

Metric

DISTANCES 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 and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 14th day of September, 2020.

SEPT. 21, 2020
Date

E. H. Herweyer
Ontario Land Surveyor

PART 2

THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED:- September 21, 2020

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to _____ ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Surveyor's Real Property Report in transactions involving The Client.

Notes & Legend

		Denotes
□	=	Survey Monument Planted
■	=	Survey Monument Found
SIB	=	Standard Iron Bar
SSIB	=	Short Standard Iron Bar
	=	Iron Bar
(W/T)	=	Witness
Meas.	=	Measured
(AOG)	=	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	=	Plan 5R-7561
(P2)	=	(1442) Plan August 10, 1989
(P3)	=	Plan 5R-6127
(P4)	=	Plan 4R-14643
DI	=	Inst. N499485
	=	Deciduous Tree
	=	Coniferous Tree
FH	=	Fire Hydrant
WV	=	Water Valve
MH-ST	=	Maintenance Hole (Storm Sewer)
MH-S	=	Maintenance Hole (Sanitary)
VC	=	Valve Chamber (Watermain)
S	=	Underground Sanitary Sewer
ST	=	Underground Storm Sewer
W	=	Underground Water
G	=	Underground Gas
OHW	=	Overhead Wires
B	=	Bell
CB	=	Catch Basin
DI	=	Ditch Inlet
HM	=	Hydro Meter
TB-B	=	Bell Terminal Box
CLF	=	Chain Link Fence
+65.00	=	Location of Elevations
65.00	=	Top of Concrete Curb / RW Elevation
C/L	=	Centreline
RW	=	Retaining Wall
HT	=	Hydro Transformer
TWSI	=	Tactile Walking Surface Indicator
M-W	=	Monitoring Well

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).
For bearing comparisons, a rotation of 0°25'00" counter-clockwise was applied to bearings on P1, P2 & P3.

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum, derived from control monument No. 019680037 having an elevation of 79.283 metres.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. Underground utility data and inverts derived from City of Ottawa utility sheet reference A-L-13, 103106-P19 & P20, 10518-109-1 & ISD15-5072-009.
4. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
5. Underground Bell and Gas Marked out on site by others shown; this infrastructures is not shown on the engineering plans acquired from the City of Ottawa

Job Benchmark
FH Top of Spindle
Elevation = 75.15

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2136354

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

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Ontario Land Surveyors

Job No. 21006-20 PI LTD C4 MA T F FS

REGISTERED PLAN 4M - 1367