1137 OGILVIE
SERVICING AND STORMWATER MANAGEMENT REPORT

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Prepared for:
TCU Development Corporation

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 Introduction

Stantec Consulting Ltd. has been commissioned by TCU Development Corporation to prepare the following Functional Servicing Report in support of a Zoning By-Law Amendment application for the proposed development located at 1137 Ogilvie Road in the City of Ottawa.

The 0.46 ha site is situated along the west side of Cummings Avenue, at the northeast corner of the intersection between Cummings Avenue and Ogilvie Road. The site is currently zoned LC6 and contains an existing one-storey commercial building with surface parking and small grassed areas. The property consists of the 1137 Ogilvie Road and 1111 Cummings Avenue parcel. The site is bound by Ogilvie Road to the south, Cummings Avenue to the west, an existing residential development to the north and an existing commercial development to the east as shown in **Figure 1-1** below.

Figure 1-1: Key Plan of Site

The proposed 0.46 ha site comprises of a 24-storey residential building with 488 m^2 of ground floor commercial area. Rla Architecture has prepared a site plan dated July 4, 2024, which defines the proposed development (see **Appendix A.1**), while the unit type breakdown is listed in **Table 1.1** below.

Table 1.1: Unit Type Breakdown

Unit Type	Number
Studio	123
One-bedroom	106
One-bedroom with Study	27
Two-bedroom	46
Two-bedroom with Study	28
Three-bedroom	3
Total	**323**

1.1 Objective

This site servicing and stormwater management (SWM) report presents a servicing scheme that is free of conflicts, provides on-site servicing in accordance with City of Ottawa Design Guidelines, and uses the existing municipal infrastructure in accordance with any limitations communicated during consultation with the City of Ottawa staff. Details of the existing infrastructure located within Cummings Avenue and Ogilvie Road were obtained from available as-built drawings and site topographic survey.

Criteria and constraints provided by the City of Ottawa have been used as a basis for the detailed servicing design of the proposed development. Specific and potential development constraints to be addressed are as follows:

- Potable Water Servicing
    - Estimated water demands to characterize the proposed feed(s) for the proposed development which will be serviced from the existing 305 mm diameter watermain within the Cummings Avenue ROW.
    - Watermain servicing for the development is to be able to provide average day and maximum day (including peak hour) demands (i.e., non-emergency conditions) at pressures within the acceptable range of 345 to 552 kPa (50 to 80 psi)
    - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 140 kPa (20 psi)
- Wastewater (Sanitary) Servicing
    - Define and size the sanitary service laterals which will be connected to the existing 250 mm diameter sanitary sewer within the Cummings Avenue ROW.
- Storm Sewer Servicing
    - Define major and minor conveyance systems in conjunction with the proposed grading plan.
    - Determine the stormwater management storage requirements to meet the allowable release rate for the site.
    - Define and size the proposed storm service lateral that will be connected to the existing 525 mm diameter municipal storm sewer within the Ogilvie Road ROW.
- Prepare a grading plan in accordance with the proposed site plan and existing grades.

Drawing SSP-1 illustrates the proposed internal servicing scheme for the site.

2 Background

Documents referenced in preparing of this stormwater and servicing report for the 1184 Cummings Avenue development include:

- *City of Ottawa Sewer Design Guidelines* (SDG), City of Ottawa, October 2012, including all subsequent technical bulletins
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010, including all subsequent technical bulletins
- *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation, and Parks (MECP), 2008
- *Fire Protection Water Supply Guideline* for Part 3 in the Ontario Building Code, Office of the Fire Marshal (OFM), October 2020
- *Water Supply for Public Fire Protection*, Fire Underwriters Survey (FUS), 2020
- *Geotechnical Investigation – Proposed Multi-Storey Building, 1111 Cummings Avenue & 1137 Ogilvie Road, Ottawa, ON, Paterson Group Inc, May 2021.*

3 Water Servicing

3.1 Background

The proposed building is in Pressure Zone 1E of the City of Ottawa's Water Distribution System. The existing dwellings have water service lateral connections to the existing 305 mm diameter watermain on Cummings Avenue. The existing service will be blanked at the main by City forces, which will be confirmed at the detailed design.

3.1 Water Demands

3.1.1 POTABLE (DOMESTIC) WATER DEMANDS

The City of Ottawa Water Distribution Guidelines (July 2010) and ISTB 2021-03 Technical Bulletin were used to determine water demands based on projected population densities for residential areas and associated peaking factors.

The population was estimated using an occupancy of 1.4 persons per unit for studio and one-bedroom apartments, 2.1 persons per unit for one-bedroom with study and two-bedroom apartments and 3.1 persons per unit for two-bedroom with study and three-bedroom units. Based on the unit type breakdown in **Table 1.1**, the proposed building is estimated to have a total population of 539 persons.

A daily rate of 280 L/cap/day has been used to estimate average daily (AVDY) potable water demand for the residential units. Maximum daily (MXDY) demands were determined by multiplying the AVDY demands by a factor of 2.5 for residential areas, while peak hourly (PKHR) demands were determined by multiplying the MXDY demands by a factor of 2.2 for residential areas. A daily rate of 28,000 L/gross ha/day has been used to estimate AVDY potable water demand for the commercial area. The MXDY demands were determined by multiplying the AVDY demands by a factor of 1.5 for commercial areas, while PKHR demands were determined by multiplying the MXDY demands by a factor of 1.8. The estimated demand for the proposed residential building is summarized in **Table 3.1** below and detailed in **Appendix B.1**.

Table 3.1: Estimated Water Demands

Demand Type	Area (m^2)	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Residential	-	539	1.78	4.38	9.56
Commercial	488	-	0.02	0.02	0.04
Total Site:	**488**	**539**	**1.80**	**4.40**	**9.60**

3.1.2 FIRE FLOW DEMANDS

Fire flow demand was calculated based on the 2020 Fire Underwriters Survey (FUS) Guidelines. The FUS estimate is based on a building of non-combustible construction type. Additionally, it is anticipated that the building will be equipped with an automatic sprinkler system that is fully supervised and conforms to the NFPA 13 standard. Required fire flows were determined to be 66.7 L/s (4000 L/min). Detailed fire flow calculations per the FUS methodology are provided in **Appendix B.2**, while correspondence with the architect on the construction type are provided in **Appendix A.3**.

3.2 Level of Servicing

3.2.1 BOUNDARY CONDITIONS

The estimated domestic water and fire flow demands were used to define the level of servicing required for the proposed development from the municipal watermain and hydrants within the Cummings Avenue ROW. **Table 3.2** outlines the boundary conditions provided by the City of Ottawa (**Appendix B.3**).

Table 3.2: Boundary Conditions

	Connection at Cummings Avenue
Min. HGL (m)	110.6
Max. HGL (m)	118.3
Max. Day + Fire Flow (66.7 L/s) HGL (m)	115.4

3.2.2 ALLOWABLE DOMESTIC PRESSURES

The desired normal operating pressure range in occupied areas as per the City of Ottawa 2010 Water Distribution Design Guidelines is 345 kPa to 552 kPa (50 psi to 80 psi) under a condition of maximum daily flow and no less than 276 kPa (40 psi) under a condition of maximum hourly demand. Furthermore, the maximum pressure at any point in the water distribution should not exceed 689 kPa (100 psi) as per the Ontario Building/Plumbing Code; pressure reducing measures are required to service areas where pressures greater than 552 kPa (80 psi) are anticipated in occupied areas.

The proposed finished floor elevation, 72.15 m, will serve as the ground floor elevation for the calculation of the residual pressures at ground level. As per the boundary conditions, the on-site pressures are

expected to range from 377.0 kPa (54.7 psi) to 452.5 kPa (65.6 psi) under normal operating conditions, which are within the normal operating pressure range defined by the City of Ottawa as within 276 kPa (40 psi) to 552 kPa (80 psi). It is anticipated that booster pumps will be required to service the building.

3.2.3 ALLOWABLE FIRE FLOW PRESSURES

The boundary conditions provided by the City of Ottawa indicate that the watermain within Cummings Avenue is expected to maintain a residual pressure of 43.25 m equivalent to 424 kPa (61.5 psi) under worst-case fire flow conditions. This demonstrates that the watermain and nearby hydrants can provide the required fire flows while maintaining a residual pressure of 20 psi.

3.2.4 FIRE HYDRANT COVERAGE

The building will be sprinklered and a Siamese (fire department) connection is to be provided with an unobstructed maximum distance of 45 m from the Siamese connection to the closest hydrant, as per the Ontario Building Code (OBC). There are two existing hydrants in the proximity of the proposed development site, as shown in **Figure 3-1**.

According to the NFPA 1 Table 18.5.4.3 in Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02, a hydrant situated less than 76 m away from a building can supply a maximum capacity of 5,678 L/min, while a hydrant situated between 76 m and 152 m away from a building can supply a maximum capacity of 3,785 L/min. Hence, the required fire flow demands for the site can be achieved with HYD-01 alone. See **Appendix B.4** for fire hydrant coverage table calculations and NFPA Table 18.5.4.3.

Figure 3-1: Existing Fire Hydrant Coverage Map

3.3 Proposed Water Servicing

The development will be serviced via dual 150 mm building services connecting to the existing 305 mm diameter watermain on Cummings Avenue with a 300 mm main isolation valve. The water valves are proposed to allow for the isolation of the municipal watermain to the north or south on Cummings Avenue in case of any breaks, repairs, or replacements of the municipal water system north or south of the Site.

The proposed water servicing is shown on **Drawing SSP-1**. Based on the City of Ottawa Water Design Guidelines and the provided boundary conditions, the existing 305 mm diameter watermain on Cummings Avenue can provide adequate fire and domestic flows for the subject site.

Confirmation of the service sizes to the building, the water pressure within the building, and booster pump requirements to meet building code will be the responsibility of the mechanical engineering consultant at the building permit phase.

4 Wastewater Servicing

4.1 Background

The existing municipal sanitary sewers adjacent to the site consist of the existing 250 mm diameter asbestos cement sanitary sewer within the Cummings Avenue ROW.

4.2 Design Criteria

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP Design Guidelines for Sewage Works, the following criteria were used to calculate the estimated wastewater flow rates and to determine the size and location of the sanitary service lateral:

- Minimum velocity = 0.6 m/s (0.8 m/s for upstream sections)
- Maximum velocity = 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes = 0.013
- Minimum size of sanitary sewer service = 135 mm
- Minimum grade of sanitary sewer service = 1.0 % (2.0 % preferred)
- Average wastewater generation = 280 L/person/day (per City Design Guidelines)
- Peak Factor = based on Harmon Equation; maximum of 4.0 (residential)
- Harmon correction factor = 0.8
- Infiltration allowance = 0.33 L/s/ha (per City Design Guidelines)
- Minimum cover for sewer service connections – 2.0 m
- Population density for one-bedroom and bachelor apartments – 1.4 persons/apartment
- Population density for one-bedroom with den and two-bedroom apartments – 2.1 persons/apartment
- Population density for two-bedroom with den and three-bedroom apartments – 3.1 persons/apartment

4.3 Wastewater Generation and Servicing Design

The estimated peak wastewater flow generated are based on the current site plan and unit breakdown as shown in **Table 1.1**. The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 4.1** below.

Table 4.1: Estimated Peak Wastewater Flow

Peak Residential Wastewater Flow			C+I+I Flow	Infiltration Flow (L/s)	Total Peak Flow (L/s)
Population	Peak Factor	Peak Flow (L/s)			
539	3.37	5.88	0.02	0.14	6.05

Preliminary sanitary sewage calculations are included in **Appendix C.1**.

The anticipated peak wastewater flows for the proposed development were provided to the City of Ottawa staff on June 13, 2024 (see **Appendix C.2**) to evaluate the adequacy of the receiving municipal sanitary

sewer system in the vicinity of the site and downstream network. City Staff had confirmed that the downstream municipal sanitary sewers have adequate capacity to accept the estimated peak sanitary flow from the proposed development.

4.4 Proposed Sanitary Servicing

Sanitary discharge from the site is to outlet through a sanitary monitoring manhole (anchored as per S.P. No. F-4070) before connecting to the existing 250 mm diameter sanitary sewer in Cummings Avenue via a 200 mm diameter sanitary building service and a new manhole within Cummings Avenue. The proposed functional sanitary servicing is shown on **Drawing SSP-1 and SA-1**.

The mechanical engineering consultant is responsible to confirm service lateral sizes and that the appropriate backwater valve requirements are satisfied at the building permit phase.

5 Stormwater Management and Servicing

5.1 Background

The existing storm servicing system along the boundaries of the site consists of curb and catch basins (urban roadway section) along Cummings Avenue and Ogilvie Road, with the drainage collected by the catch basins directed to the 525 mm diameter storm sewer within Ogilvie Road and the 600 mm diameter storm sewer within Cummings Avenue.

5.2 Stormwater Management (SWM) Criteria

The Stormwater Management (SWM) criteria were established by combining current design practices outlined by the City of Ottawa Sewer Design Guidelines (SDG) (October 2012), review of project pre-consultation notes with the City of Ottawa, and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

- Use of the dual drainage principle (City of Ottawa SDG)
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa SDG)
- Assess impact of 100-year event outlined in the City of Ottawa Sewer Design Guidelines on the major and minor drainage systems (City of Ottawa SDG)

Storm Sewer & Inlet Controls

- Discharge for each storm event to be restricted to a 2-year storm event pre-development rate with a maximum pre-development C coefficient of 0.5 (City of Ottawa pre-consultation)
- Peak flows generated from events greater than the 2-year and including the 100-year storm must be detained on site (City of Ottawa pre-consultation)
- The preferred stormwater system outlet for this site is the 525 mm diameter storm sewer within Ogilvie Road
- The foundation drainage system is to be pumped to the building site storm service lateral tying to Cummings Avenue.
- Internal roof drainage system shall not be routed through the cistern.
- T_c should be not less than 10 minutes (City of Ottawa SDG).

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.30 m above the 100-year water level (City of Ottawa SDG)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35 m (City of Ottawa SDG)

- Provide adequate emergency overflow conveyance off-site with a minimum vertical clearance of 15 cm between the spill elevation and the ground elevation at the building envelope in the proximity of the flow route or ponding area (City of Ottawa SDG)

Quality Control

- An enhanced level of quality control of 80% Total Suspended Solids (TSS) Removal is required for this site (City of Ottawa pre-consultation)
- Sizing shall be under the ISO 14034 Environmental Technology Verification (ETV) particle distribution (City of Ottawa pre-consultation)

5.3 Existing Conditions

The 0.46 ha site area currently consists of an existing strip mall with asphalt parking and patches of grassed areas and some trees. The existing storm drainage plan (**Drawing EXSD-1**) shows the existing surface conditions and related runoff coefficients considered. The pre-development imperviousness of the proposed development area is calculated at 93 % (C = 0.85). Under existing conditions there are no controls in place to manage stormwater runoff and all runoff the from site boundary drains uncontrolled to the existing public drainage system.

5.4 Stormwater Management Design

The Modified Rational Method is employed to assess the rate and volume of runoff anticipated during post-development rainfall runoff events. Based on the proposed Site Plan and preliminary Grading Plan, drainage area boundaries are defined, Runoff coefficient values are then assigned to each drainage area based on the anticipated finished surface condition (e.g. asphalt, concrete, gravel, grass, etc.). Runoff coefficients for each surface type are assigned based on City of Ottawa SDG and accepted practices. A summary of subareas and runoff coefficients is provided in **Table 5.1** below. Further details can be found in **Appendix D.1**, while **Drawing SD-1** illustrates the proposed sub-catchments.

Table 5.1: Summary of Subcatchment Areas

Catchment Areas	C	A (ha)	Catchment Type	Outlet
ROOF-1	0.90	0.20	Tributary	525 mm Storm Sewer (Ogilvie Road)
CISTRN-1	0.84	0.20	Tributary	525 mm Storm Sewer (Ogilvie Road)
UNC-1	0.30	0.06	Non-Tributary	Ogilvie Road ROW Cummings Avenue ROW
Total Site	**0.79**	**0.46**	**-**	**-**

5.4.1 ALLOWABLE RELEASE RATE

Based on pre-consultation with City of Ottawa staff, the design criterion for the peak post-development discharge from the subject site is to be limited to the discharge resulting from the 2-year pre-development event using a site runoff coefficient of C= 0.5 or the pre-development C, whichever is less. Based on the calculated C value of 0.85 for the existing site condition, a runoff coefficient of 0.5 is used to establish the allowable release rate.

Given the limitations of site grading based on the existing topography, and the existing uncontrolled runoff condition for the site, it is proposed that the post-development drainage pattern for the uncontrolled area (UNC-1) along the west and south perimeters be allowed to continue to drain uncontrolled to the adjacent public roads. The resultant areas that can be restricted to meet the allowable release rate is limited to drainage areas defined by 'ROOF-1', and 'CISTRN-1', totalling 0.40 ha.

The allowable release rate for the site is determined using the modified rational method based on the criteria above. A time of concentration of 10 minutes is used based on the small site size, its proximity to the existing drainage outlet, and recommendations provided during pre-consultation with the City.

The peak pre-development flow rates shown in **Table 5.2** have been calculated using the rational method as follows:

$$Q = 2.78\,(C)(I)(A)$$

Where:
$Q = peak\ flow\ rate, L/s$
$C = site\ runoff\ coefficient$
$I = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ IDF\ curves)$
$A = drainage\ area, ha$

Table 5.2: Peak Pre-Development Flow Rates

Design Storm	Pre-Development Flow Rate (L/s) for C=0.50, A=0.46 ha, t_c = 10 min
2-year	49.4

For the proposed development, the target allowable release rate of 49.4 L/s is used to assess water quantity control measures to be applied.

5.4.1.1 Uncontrolled Areas

As specified above, considering the existing conditions of the site and the grading restrictions along the site's perimeter, it is proposed to control the interior of the site and the apartment building roof area only and allow the rest of the site to drain uncontrolled per existing conditions. The drainage area UNC-1 will direct uncontrolled surface runoff to the Cummings Avenue and Ogilvie Road ROWs. Peak discharges from the uncontrolled areas are calculated using the Modified Rational Method (MRM) approach and are summarized in the **Table 5.3** below.

Table 5.3: Peak Post-Development Discharge of Uncontrolled Areas (UNC-1)

Uncontrolled Drainage Area	Design Storm	Post-Development Discharge (L/s)
UNC-1	2-Year	3.9
	100-Year	11.5

The proposed uncontrolled runoff condition from 0.06 ha is considered an improvement over the existing condition during which the area outside the commercial building, at 0.34 ha, contributes uncontrolled runoff to the existing public drainage system.

For reference, the uncontrolled runoff rates for the existing 0.46 ha site area (applying the 0.85 runoff coefficient) are 84.0 L/s for the 2-year return period, and 195.6 L/s for the 100-year return period design storms.

5.4.2 QUANTITY CONTROL

Based on the change in overall imperviousness of the site, expressed by the calculated runoff coefficients, quantity control measures are needed to manage stormwater runoff. Two storage options are proposed to reduce the site's peak outflow: Solely using underground storage, or a combination of rooftop capture and underground storage. A spreadsheet approach using the MRM is used to determine the storage volume required for both storage options.

The associated calculations consider the allowable release rate of 49.4 L/s, minus the 11.5 L/s of uncontrolled flow during the 100-year event, from the roof area and controlled areas tributary to the proposed SWM underground storage and the runoff coefficients associated with the proposed post-development catchments. The MRM calculations used to establish the storage volume requirements for both storage options are provided in **Appendix D.1** and the storm sewer design sheet is provided in **Appendix D.2**.

The total storage volumes for each storage option are tabulated in **Table 5.4** below, both options can attenuate peak flows from the roof and controlled areas for a release at a controlled flow rate of **38 L/s**.

Table 5.4: Total Volume for Each Storage Option

Storage Option	Roof Storage (m^3)	Cistern (m^3)	Total (m^3)
Cistern Only	-	120	120
Cistern + Rooftop	80	50	130

5.4.3 QUALITY CONTROL

To meet the expected quality control requirements for the site, storm runoff from the proposed development area will be captured within the site storm sewer system and directed to a proposed oil/grit separator (OGS) unit. A Stormceptor, or approved equivalent product, sized to provide 80% TSS removal under the ETV particle distribution is anticipated to achieve the enhanced water quality control objective.

The preliminary sizing of a feasible Stormceptor unit is provided in **Appendix D.3**. Further sizing details will be made available at detailed design.

5.5 Results

Through the MRM analysis, the controlled 2-year post-development release rate of 39 L/s meets the pre-development target release rate of 49.4 L/s. In addition, the 100-year post-development storm event release rate will be maintained at the 49.4 L/s allowable target. The uncontrolled portions of the site with runoff draining to the adjacent ROWs are consistent with the existing drainage pattern.

Relative to the existing site condition with 100 % uncontrolled runoff, the proposed post-development 2-year flow control for 0.46 ha of the site is anticipated to reduce the total stormwater discharge from the site. The data summarized in **Table 5.5** indicates that the proposed SWM plan reduces the overall site storm runoff release rate by 75 % compared to the pre-development C=0.85, 100-year design storm event.

Table 5.5: Comparison of Pre- and Post-Development Release Rates

Drainage areas	2-year Discharge (L/s)	100-Year Discharge (L/s)
Pre-Development Total (0.46 ha)	84.0	195.6
Post-Development		
Tributary (0.40 ha)	34.7	37.9
Non-Tributary (0.06 ha)	3.9	11.5
Post-Development Total (0.46 ha)	38.6	49.4
Target (L/s)	**49.4**	**49.4**
Difference (Post minus Pre)	**-45.4 (-54.0 %)**	**-146.2 (-74.7 %)**

5.6 Proposed Stormwater Servicing

The development is to be serviced via an internal storm network part of the building's mechanical system, which will receive the runoff from the roof and site areas. Stormwater detention infrastructure (e.g. cistern, underground linear pipe storage, rooftop storage, etc.) will be provided onsite and discharged from the proposed development at a controlled flow rate of **37.9 L/s**. The final sizing and layout of the infrastructure, including the method(s) of flow attenuation, shall be confirmed at detailed design. See **Drawings SSP-1** and **SD-1** for the proposed preliminary locations of the stormwater infrastructure.

The mechanical engineering consultant is responsible to confirm sizing of the sump pumps and services to the building, that the appropriate backwater valve requirements are satisfied, and that any roof drainage systems and underground storages and pumping systems are adequate for accommodating the 100-year design storm conditions.

6 Site Grading

The proposed re-development site measures approximately 0.46 ha in area and consists of surface parking, grassed areas with trees and an existing commercial building. The topography across the site generally slopes from the eastern boundary towards the Cummings Avenue ROW at the west and away from the commercial building to the Ogilvie Road ROW to the south.

A functional grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, as detailed in **Section 5**, adhere to any grade raise restrictions for the site, and provide for minimum cover requirements for storm and sanitary sewers where possible.

Site grading has been established to provide emergency overland flow routes required for stormwater management. Upon review of the existing grading at neighbouring properties, it is concluded the site will not receive external drainage from the neighbouring properties. The overland escape route will follow the east and north boundary drive aisle with overland flow to Cummings Avenue right of way. The proposed development will require a section of retaining wall along the east to maintain existing property line ground conditions and to ensure the overland spill route is directed to Cummings Avenue along the drive aisle rather than to neighboring parcels.

7 Utilities

Overhead (OH) hydro-wires run parallel to the west property line. All utilities within the work area will require relocation during construction. The existing utility poles within the public right of way are to be protected during construction.

As the site is surrounded by existing residential and commercial development, Hydro Ottawa, Bell, Rogers, and Enbridge servicing is readily available through existing infrastructure to service this site. The exact size, location, and routing of utilities will be finalized after design circulation. Existing underground hydro ducts and gas service north of the existing commercial building are to be removed as per **Drawing EXRV-1**. Existing overhead wires and utility plants may need to be temporarily moved/reconfigured to allow sufficient clearance for the movement of heavy machinery required for construction. The relocation of existing utilities will be coordinated with the individual utility providers upon design circulation.

8 Approvals

The proposed development lies on a private site under singular ownership; drains to an approved separated sewer outlet; and is not intended to service industrial land or land uses. Therefore, the site is exempt from the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Application (ECA) process under O.Reg. 525/98.

For ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). It is possible that groundwater may be encountered during the foundation excavation on this site. A minimum of two to four weeks should be allotted for completion of the EASR registration and the preparation of the Water Taking and Discharge Plan by a Qualified Person as stipulated under O.Reg. 63/16. An MECP Permit to Take Water (PTTW), which is required for dewatering volumes exceeding 400,000L/day, is not anticipated for the site.

9 Erosion and Sediment Control During Construction

To protect downstream water quality and prevent sediment build-up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Install silt barriers/fencing around the perimeter of the site as indicated in **Drawing ECDS-1** to prevent the migration of sediment offsite.
7. Install trackout control mats (mud mats) at the entrance/egress to prevent migration of sediment into the public ROW.
8. Provide sediment traps and basins during dewatering works.
9. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
10. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing ECDS-1** for the proposed location of silt fences, sediment traps, and other erosion control measures.

10 Geotechnical Investigation

A geotechnical investigation for 1111 Cummings Avenue and 1137 Ogilvie Road was completed by Paterson on May 25, 2021. Field testing consisting of the advancement of five boreholes to a maximum depth of 6.8m below existing grade was carried out throughout the subject site on April 19, 2021. The information obtained from the field investigation will guide the site design and identify development constraints.

The subsurface profile encountered at the test hole locations consists of asphaltic concrete, underlain by fill, overlying bedrock. The fill was noted to consist of a mixture of brown silty sand with gravel and crushed stone, trace topsoil and organics. Bedrock was observed to consist of black and is classified as very poor quality at the top, generally increasing in quality with depth.

Groundwater levels were measured to be at depths ranging from 2.80 m to 3.15 m below ground surface (BGS) at three boreholes on site. Long term groundwater level is estimated to be at 2.5 to 3.5 m BGS, though seasonal variations in the water table should be expected. Clean imported granular fill should be used for grading beneath the building areas, while site-excavated soil and non-specified existing fill can be used for general landscaping fill where settlement of the ground surface is of minor concern.

The subject site is considered suitable for the proposed building, and it is recommended that it be founded using conventional spread footings placed on clean, surface sounded bedrock. Bedrock removal will be required to complete the underground parking level.

The recommended rigid pavement structure is provided as follows in **Table 10.1** below.

Table 10.1: Pavement Structure

Material	Thickness (mm)	
	Driveways	Underground Parking
Exposure Class C2 – 32 MPa concrete with air entrainment	-	150
Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete	40	-
Binder – HL-8 or Superpave 19.0 Asphaltic Concrete	50	-
Base – OPSS Granular A Crushed Stone	150	300
Sub-Base – OPSS Granular B Type II	450	-

Refer to the full geotechnical report attached as part of the submission package for further details.

11 Conclusions

11.1 Water Servicing

Based on the supplied boundary conditions for existing watermains and calculated domestic and fire flow demands for the subject site, the adjacent watermain on Cummings Avenue has sufficient capacity to sustain the required domestic demands and fire flow demands for the site. The proposed development will be serviced by the existing 300 mm watermain on Cummings Avenue via a dual connection. Sizing of the water service laterals are to be confirmed by the mechanical engineering consultant.

11.2 Sanitary Servicing

The proposed sanitary sewer service will consist of a 200 mm diameter sanitary service lateral connected to the existing 250 mm diameter sanitary sewer on Cummings Avenue. The municipal sanitary sewers have the downstream capacity required to receive the projected peak wastewater flows from the proposed development. Sizing of the service lateral and the appropriate backwater valve requirements are to be confirmed by the mechanical consultant.

11.3 Stormwater Servicing and Management

The proposed storm service will consist of the internal storm sewers within the building's mechanical system and roof and foundation drains directing stormwater to the existing 525 mm diameter storm sewer in Ogilvie Road. Stormwater storage options (cistern only or combination of rooftop storage with cistern) proposed onsite will meet the site's target discharge. The final sizing of the infrastructure shall be confirmed at detailed design. Sizing of the storm sewer laterals, and the appropriate backwater valve requirements are to be confirmed by the mechanical engineering consultant.

11.4 Grading

Preliminary site grading is designed to provide an adequate emergency overland flow route and drainage to support the proposed storm sewer network and SWM systems. The site will not receive external drainage from neighbouring properties. The west and south sides drain uncontrolled to the Cummings Avenue and Ogilvie Road rights-of-way as per existing conditions.

11.5 Erosion and Sediment Control During Construction

Erosion and sediment control measures and best management practices outlined in this report and included in the drawing set will be implemented during construction to reduce the impact on adjacent properties, the public ROW, and existing facilities.

11.6 Geotechnical Investigation

Based on the Geotechnical Investigation, the site is considered suitable for the proposed building, and it is recommended that it be founded using convention spread footing placed on clean, surface sounded bedrock. Long term groundwater level is estimated to be at 2.5 to 3.5 m BGS, though seasonal variations in the water table should be expected.

11.7 Utilities

The site is situated within an established neighbourhood, hence existing utility infrastructure is readily available to service the proposed development.

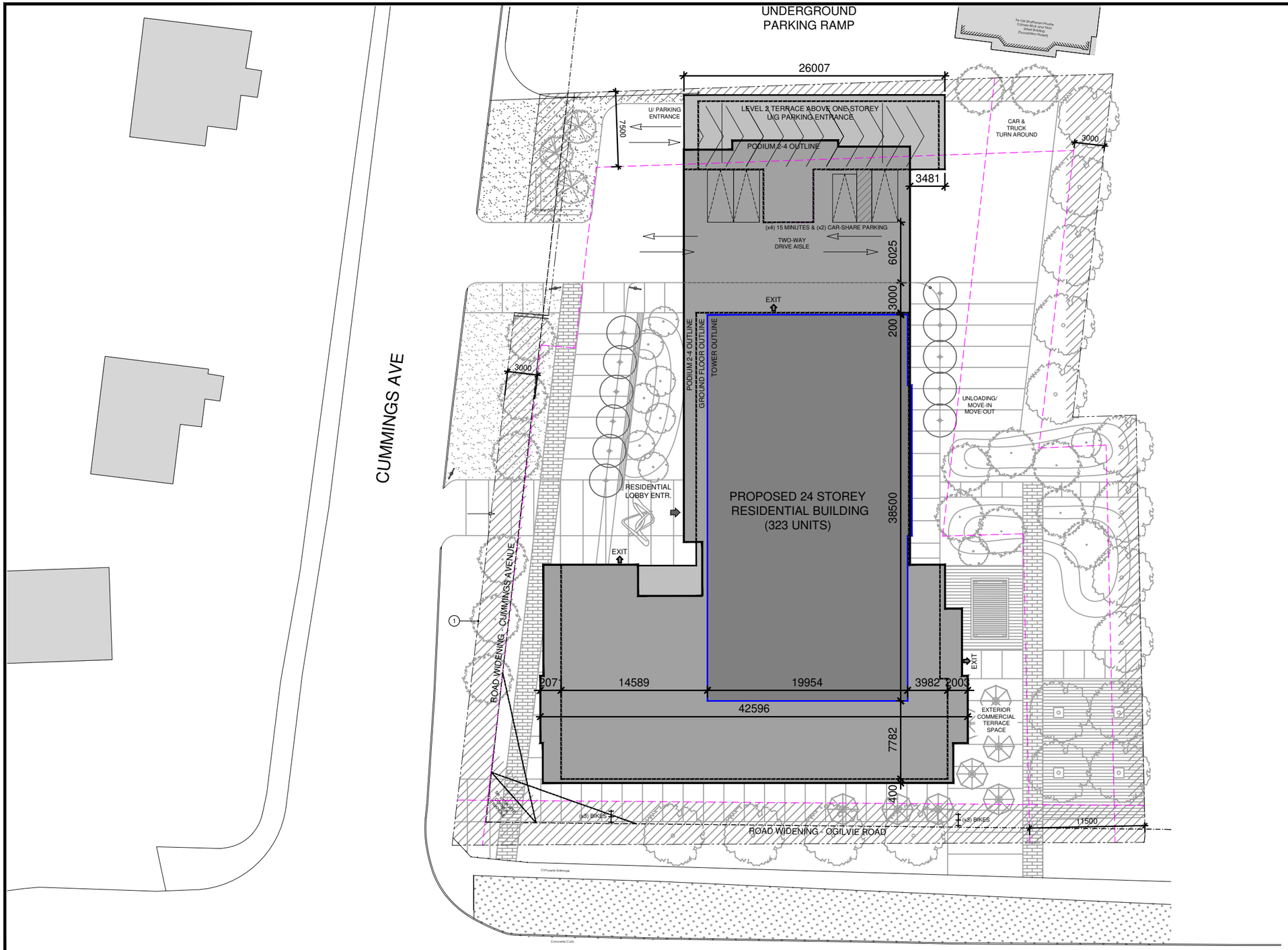
11.8 Approvals

This site is exempt from the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Application (ECA) process under O.Reg. 525/98. For the expected dewatering needs of 50,000 to 400,000 L/day, the proponent will need to register on the MECP's Environmental Activity and Sector Registry (EASR). A Permit to Take Water, for dewatering needs in excess of 400,000 L/day, is not anticipated for this site.

APPENDICES

Appendix A Background Documents

A.1 Site Plan



DRAWING NOTES

1. PROPERTY LINE
2. EXISTING BUILDING
3. HARD SURFACE PAVING, SEE LANDSCAPE PLAN FOR PATTERN AND TYPE
4. DEPRESSED CURB AND SIDEWALK TO CITY OF OTTAWA STANDARD DETAIL
5. GROUND COVER IN CONCRETE PLANTERS
6. RESERVED
7. BICYCLE PARKING SPACES
8. SIAMESE CONNECTION @ GROUND FLOOR
9. RESERVED
10. EXISTING FIRE HYDRANT
11. OUTLINE OF UNDERGROUND PARKING LEVELS
12. EXISTING TREE TO BE REMOVED
13. RESERVED
14. RELOCATE EXISTING UTILITY POLE AND GUIDE CABLES
15. RESERVED
16. RESERVED
17. EXTENT OF GROUND FLOOR
18. ENTRY DRIVEWAY TO U/G PARKING GARAGE
19. EXISTING UTILITY POLE
20. EXISTING 2 STOREY BUILDING TO BE REMOVED
21. SPLASH PAD
22. SOD AREA

SITE PLAN SYMBOLS

- HATCH PATTERN INDICATES AREAS OF DEEP SOIL CONDITIONS
- CONCRETE UNIT PAVERS SURFACE
- PROPOSED CONCRETE SURFACE
- EXISTING CONCRETE CITY SIDEWALK
- SOFT LANDSCAPING
- BIKE RACK
- TWO WAY VEHICLE CIRCULATION
- MAIN/COMMERCIAL ENTRANCE
  BIKE ROOM/RESIDENTIAL ENTRANCE
- FIRE EXIT
- PROPERTY LINE
- ZONING SETBACKS

PROPERTY OWNER

LEGAL DESCRIPTION

SURVEYOR

URBAN PLANNER

FoTenn Consultants Inc.
223 McLeod Street
Ottawa, ON Canada, K2P 0Z8
Tel.: (613) 730-5709
E-Mail: beed@fotenn.com

LANDSCAPE ARCHITECT

CIVIL ENGINEER

PROJECT INFORMATION

EXISTING ZONING		LC6
PROPOSED ZONING Zoning By-Law 2008-250		TD3
SITE AREA (AFTER ROAD WIDENING)		4,351 sq. m. (46,834) sq. ft.
OPEN AREA		41.5% 1,860 sq. m. / (20,201) sq. ft.
BUILDING HEIGHT - VARIES		77.90 M

PROJECT STATISTICS

BUILDING HEIGHT		24 STOREY - 77.90 M

GFA - AREAS (24 STOREY BLDG.)

PARKING LEVELS (2 LEVELS U/G)		N/A
GROUND FLOOR		488 sq. m. (5,253) sq. ft.
L2-4 TYP. FLOORS	3 x 1,508 sq. m. 3 x (16,232) sq. ft.	4,524 sq. m. (48,696) sq. ft.
L5-L24 TYP. FLOORS	20 x 663 sq. m. 20 x (7,137) sq. ft.	13,260 sq. m. (142,731) sq. ft.
TOTAL AREA		18,272 sq. m. (196,680) sq. ft.

UNIT STATISTICS

STUDIO UNIT	123	38%
1 BEDROOM UNIT	106	33%
1 BEDROOM + STUDY UNIT	27	8%
2 BEDROOM UNIT	46	14%
2 BEDROOM + STUDY UNIT	18	6%
3 BEDROOM	3	1%
TOTAL	323	
COMMERCIAL RETAIL AREA		488 sq. m. 5,252 sq. ft.

CAR PARKING

REQUIRED by ZONING BY-LAW

RESIDENCE	- 0.5 PER UNIT (323 UNITS) (AFTER 12 UNITS -10% FOR UG)	162
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS -MAX 30)	30
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- 0 UNDER 500 sq.m.PER UNIT	0
TOTAL		192

PROVIDED

2 LEVEL UNDER GROUND PARKING	180
SURFACE (CAR SHARE)	6
TOTAL	186

BICYCLE PARKING

REQUIRED

RESIDENCE	- 0.5 PER UNIT (323 UNITS)	162
COMMERCIAL RETAIL	[illegible]	1
TOTAL		163

PROVIDED

SURFACE	6
INDOOR ON P1 & P2 PARKING LEVELS	192
TOTAL	198

AMENITY AREA

REQUIRED

[illegible]	1,938 sq. m.
REQUIRED COMMUNAL @ 50% =	969 sq. m.

PROVIDED

EXTERIOR COMMUNAL AT GRADE	760 sq. m.
GROUND FLOOR LOBBY	54.35 sq. m.
GROUND FLOOR COMMUNAL AMENITY	446.5 sq. m.
PRIVATE AMENITY (LEVELS 2 & 5)	623 sq. m.
PRIVATE BALCONIES (LEVELS 2-4)	267 sq. m.
TOTAL AMENITY	2,150.85 sq. m.
TOTAL COMMUNAL AMENITY	1,260.85 sq. m.
TOTAL PRIVATE AMENITY	890 sq. m.

rla/architecture

1137 Ogilvie Rd — SITE PLAN

SCALE: 1:400

PLOT DATE: July 4, 2024

1137 OGILVIE

OTTAWA, ONTARIO

SHEET # 01

PROJ. # 2317

A.2 Topographic Survey

TOPOGRAPHIC PLAN OF SURVEY OF

PART OF LOT 18
REGISTERED PLAN 217
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 _ _ day of November, 2023.

Date

Mirel Aradau
Ontario Land Surveyor

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CP	"	Concrete Pin
CC	"	Cut Cross
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Plan 5R-8898
(P2)	"	(1287) Plan dated January 7, 2003
(P3)	"	Ottawa-Carleton Standard Condominium Plan 692
(P4)	"	Plan 5R-11914
(P5)	"	(857) Plan dated January 25, 1989
RWC	"	Concrete Retaining Wall
CLF	"	Chain Link Fence
BF	"	Board Fence
C/L	"	Centreline
T/S	"	Top of Spindle
T/G	"	Top of Grate
CB	"	Catch Basin
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH-T	"	Maintenance Hole (Traffic)
MH	"	Maintenance Hole (Unidentified)
MW	"	Monitoring Well
VC	"	Valve Chamber (Watermain)
Inv.	"	Invert
—ST—	"	Underground Storm Sewer
—S—	"	Underground Sanitary Sewer
—W—	"	Underground Water
—P—	"	Underground Power
—G—	"	Underground Gas
—B—	"	Underground Bell
—OHW—	"	Overhead Wires
UP	"	Utility Pole
AN	"	Anchor
LS	"	Light Standard
FH	"	Fire Hydrant
WV	"	Water Valve
HH	"	Handhole
TB-B	"	Bell Terminal Box
TB-T	"	Traffic Terminal Box
GV	"	Gas Valve
GM	"	Gas Meter
B	"	Bollard
S	"	Sign
	"	Deciduous Tree
	"	Coniferous Tree
ø	"	Diameter
+65.00	"	Location of Elevations
+65.00	"	Location of Top of Curb Elevations
+65.00	"	Location of Top of Wall Elevations

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-60597

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

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations and are referenced to Specified Control Points 01919680105 and 01919834761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°02'50" counter-clockwise was applied to bearings on plans (P2) and (P3), and a rotation of 0°02'30" counter-clockwise was applied to bearings on plans (P1), (P4) and (P5).

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
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. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

Site Benchmark #1
Cut Cross - Set in Light Standard
Elevation = 71.55

Site Benchmark #2
Cut Cross - Set in Concrete Pedestal
Elevation = 72.82

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

Ontario Land Surveyors

Job No. 24453-23 TOU Develp.Pt 1 LIB RP217 0 02 ISM

V:\2023\24453\21_TOU\Dev Corp_1137 Ogilvie Rd_Topo-Bdy_SP\plan-Bdy\Drawings\24453-23 TOU Develp.Pt 1 LIB RP217 0 02.dwg

A.3 Correspondence with Architect on Construction Type

From:	Kevin Reid
To:	Kilborn, Kris
Cc:	Wu, Michael; Moroz, Peter; Renon, Ava; Evan Johnson
Subject:	RE: 1137 Ogilvie Road Confirmation of Construction Type
Date:	Thursday, July 11, 2024 5:21:40 PM
Attachments:	image001.jpg image003.jpg

Hi Kris,

This will be Part 3 Non-Combustible.
I can send through a rooftop plan tomorrow for your review and coordination.

Kevin Reid MArch OAA NSAA AIBC MRAIC CPHC

56 Beech Street,
Ottawa, Ontario K1S 3J6
Tel: 613.724.9932 x 249
Mob: 902.266.4307
kreid@rlaarchitecture.ca

From: Kilborn, Kris <kris.kilborn@stantec.com>
Sent: July 11, 2024 2:32 PM
To: Kevin Reid <kreid@rlaarchitecture.ca>
Cc: Wu, Michael <Michael.Wu@stantec.com>; Moroz, Peter <peter.moroz@stantec.com>; Renon, Ava <Ava.Renon@stantec.com>
Subject: RE: 1137 Ogilvie Road Confirmation of Construction Type

Good afternoon Kevin

Just wanted to follow up with you on the Building classification type as confirmation is required for our reporting we are trying to finalize.

Also, do you have a roof top plan for the development. We are hoping to utilize the roof for stormwater and will more than likely require a cistern within the building to help control stormwater flows.

If rooftop storage is available, we would require approximately 70cu.m cistern. If no roof storage available the cistern would need to be around 120 cu.m.

Please get back to me at your earliest convenience so we can use this information to finalize civil.

Sincerely

Kris Kilborn
Principal, Community Development
Business Center Practice Lead

Mobile: 613 297-0571
Fax: 613 722-2799
kris.kilborn@stantec.com
Stantec
300 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

The Ottawa office is open however many staff are working remotely. To contact me please use email, or my mobile and leave a message.

Please note our reception is on the 3rd floor.

From: Renon, Ava <Ava.Renon@stantec.com>
Sent: Monday, July 8, 2024 10:19 AM
To: kreid@rlaarchitecture.ca
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>
Subject: 1137 Ogilvie Road Confirmation of Construction Type

Good morning Kevin,

We were wondering if you could confirm the classification / type of construction for the proposed 24-storey building for the 1137 Ogilvie Road site.

Thank you for looking into this for us.

Regards,

Ava Renon
Summer Student, Community Development

ava.renon@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa ON K2C 3G4

précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

A.4 Pre-Consultation Meeting Minutes

Appendix B Water Servicing

B.1 Domestic Water Demands

1137 Ogilvie Road & 1111 Cummings Avenue - Domestic Water Demand Estimates

Based on Site Plan from rla Architecture (2024-07-04)

Project No. 160401681 Designed by: AR

Date: 2024-07-12 Checked by: MW

Revision: 01

Population densities per Table 4.1 City of Ottawa Water Design Guidelines:		
Studio and 1 Bedroom	1.4	ppu
2 Bedroom	2.1	ppu
3 Bedroom	3.1	ppu
Demand conversion factors per Table 4.2 of the City of Ottawa Water Design Guidelines and Technical Bulletin ISTB-2021-03:		
Residential	280	L/cap/day
Commercial	28000	L/gross ha/day

Unit Type	Commercial Area (m^2)	Number of Residential Units	Population	Avg Day Demand		Max Day Demand [1, 2]		Peak Hour Demand [1, 2]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Studio	-	123	172	33.5	0.56	83.7	1.40	184.2	3.07
1 Bedroom	-	106	148	28.9	0.48	72.1	1.20	158.7	2.65
1 Bedroom + Study[3]	-	27	57	11.0	0.18	27.6	0.46	60.6	1.01
2 Bedroom	-	46	97	18.8	0.31	47.0	0.78	103.3	1.72
2 Bedroom + Study[3]	-	18	56	10.9	0.18	27.1	0.45	59.7	0.99
3 Bedroom	-	3	9	1.8	0.03	4.5	0.08	9.9	0.17
Ground Floor Commercial Space	488	-	-	0.9	0.02	1.4	0.02	2.6	0.04
Total Site :	**488.0**	**323**	**539**	**105.8**	**1.8**	**263.4**	**4.4**	**579.0**	**9.6**

Notes:

1 The City of Ottawa water demand criteria used to estimate peak demand rates for residential areas are as follows:
maximum day demand rate = 2.5 x average day demand rate
peak hour demand rate = 2.2 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

2 Water demand criteria used to estimate peak demand rates for gross commercial area are as follows:
maximum daily demand rate = 1.5 x average day demand rate
peak hour demand rate = 1.8 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

3 Assumption that "1 bedroom with study" has density of 2.1 ppu, "2-bedroom with with study" has density of 3.1 ppu

B.2 Fire Flow Demands (2020 FUS)

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401681
Project Name: 1137 Ogilvie Road
Date: 6/12/2024
Fire Flow Calculation #: 1

Description: 24-Storey high residential building

Notes:

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction								0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?			YES	-
		1267	316.75	316.75						1425.375	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min								-	7000
4	Determine Occupancy Charge	Combustible								0%	7000
5	Determine Sprinkler Reduction	Conforms to NFPA 13								-30%	-3500
		Standard Water Supply								-10%	
		Fully Supervised								-10%	
		% Coverage of Sprinkler System								100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?		-	-
		North	20.1 to 30	23	3	61-80	Type V	NO		6%	420
		East	> 30	52	2	> 100	Type V	YES		0%	
		South	> 30	43	2	81-100	Type V	YES		0%	
		West	> 30	52	2	> 100	Type V	YES		0%	
7	Determine Final Required Fire Flow	**Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min**									**4000**
		Total Required Fire Flow in L/s									**66.7**
		Required Duration of Fire Flow (hrs)									**1.50**
		Required Volume of Fire Flow (m^3)									**360**

B.3 Boundary Conditions

From: Polyak, Alex
To: Renon, Ava
Cc: Kilborn, Kris; Wu, Michael; Elsby, Cam
Subject: 1137 Ogilvie Road Boundary Conditions
Date: Tuesday, July 2, 2024 1:04:52 PM
Attachments: image001.png
image002.jpg
1137 Ogilvie Road June 2024.pdf

Hello Ava,

The following are boundary conditions, HGL, for hydraulic analysis at 1137 Ogilvie Road (zone 1E) assumed to be connected to the 305mm watermain on Cummings Avenue (see attached PDF for location).

Minimum HGL = 110.6 m
Maximum HGL =118.3 m
Max Day + Fire Flow (66.7 L/s) = 115.4 m

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

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

Regards,

Oleksandr (Alex) Polyak, B.Eng., C.E.T., P.Eng.
Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l'examen des projets d'aménagement – Est.
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB

City of Ottawa | Ville d'Ottawa
110 Laurier Ave., 4th Fl East, Ottawa ON K1P 1J1
Email: alex.polyak@ottawa.ca
Cell : 613-857-4380
www.Ottawa.ca

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B.4 Fire Hydrant Coverage Calculations

Stantec	Project:	**1137 Ogilvie Road**	160401681
	TABLE 1: FIRE HYDRANT COVERAGE TABLE		
	Revision: 01	Prepared By: MW	
	Revision Date: 2024-07-12	Checked By:	

Description	Hydrants[1]			Total Available Fire Flow (L/min)	Total Required Fire Flow[2] (L/min)
	HYD-01	**HYD-02**			
1137 Ogilvie Road					
Distance from building (m)	25.7	122.5		-	-
Maximum fire flow capacity[3] (L/min)	5,678	3,785		**9,463**	4,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	**5,678**
> 76 and ≤ 152	**3,785**
> 152 and ≤ 305	**2,839**

Notes:

1. Hydrant locations as per GeoOttawa accessed on July 12, 2024. Refer to Figure 3-1 in report
2. See FUS Calculations, Appendix B.2 for fire flow requirements.
3. See NFPA 1 Table 18.5.4.3 for maxiumim fire flow capacity of hydrants by distance to building.

Appendix C Sanitary

C.1 Sanitary Calculation Sheet

Stantec

SUBDIVISION:

1137 Ogilvie Road

DATE: 2024-07-12
REVISION: 1
DESIGNED BY: AR
CHECKED BY: MW

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401681

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 L/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 L/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 L/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 L/ha/day	BEDDING CLASS	B
PERSONS / 1 BEDROOM	1.4	INSTITUTIONAL	28,000 L/ha/day	MINIMUM COVER	2.50 m
PERSONS / 2 BEDROOM	2.1				
PERSONS / 3 BEDROOM	3.1	INFILTRATION	0.33 L/s/ha	HARMON CORRECTION FACTOR	0.8
PERSONS / TOWNHOME	2.7				

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	1 BEDROOM	2 BEDROOM	3 BEDROOM	TOWNHOME	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (L/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (L/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (L/s)	TOTAL FLOW (L/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Proposed Site	BLDG	MONITOR	0.435	229	73	21	0	539	0.435	539	3.37	5.88	0.049	0.049	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.02	0.435	0.435	0.14	6.05	2.0	200	PVC	SDR 35	1.00	33.4	**18.08%**	1.05	0.98
	MONITOR	SAN1	0.000	0	0	0	0	0	0.435	539	3.37	5.88	0.000	0.049	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.02	0.000	0.435	0.14	6.05	16.6	200	PVC	SDR 35	0.50	23.6	**25.57%**	0.74	0.60

Notes

1. Unit breakdown provided by rla Architects and dated July 4, 2024
2. Site to outlet to existing 250 mm dia. sanitary sewer on Cummings Avenue.
3. Entire site area considered as potential source of infiltration.
4. Studio unit has 1.4 ppu, and assume "1 bedroom with den" has 2.1 ppu, "2 bedroom with den" has 3.1 ppu.

C.2 Correspondence with City on Sanitary Sewer Capacity

From: Elsby, Cam
To: Renon, Ava
Cc: Kilborn, Kris; Wu, Michael; Polyak, Alex
Subject: Re: 1137 Ogilvie Road Sanitary Capacity
Date: Monday, July 8, 2024 11:02:55 AM

Hi Ava,

Confirmed no concerns with the proposed 5.85 L/s peak sanitary flow for the site.

Kind regards,

Cam Elsby
Project Manager, Infrastructure Approvals
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
Development Review – East 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 21443
cam.elsby@ottawa.ca

From: Elsby, Cam <Cam.Elsby@ottawa.ca>
Sent: Monday, July 8, 2024 10:15 AM
To: Renon, Ava <Ava.Renon@stantec.com>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>; Polyak, Alex <alex.polyak@ottawa.ca>
Subject: Re: 1137 Ogilvie Road Sanitary Capacity

Hi Ava,

I've just followed up with our Asset Management team for confirmation. I expect to have a response shortly.

Kind regards,

Cam Elsby
Project Manager, Infrastructure Approvals
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
Development Review – East 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 21443

cam.elsby@ottawa.ca

From: Renon, Ava <Ava.Renon@stantec.com>
Sent: Monday, July 8, 2024 10:07 AM
To: Elsby, Cam <Cam.Elsby@ottawa.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>; Polyak, Alex <alex.polyak@ottawa.ca>
Subject: RE: 1137 Ogilvie Road Sanitary Capacity

Good morning,

I just wanted to touch base with you regarding the sanitary capacity request for 1137 Ogilvie Road and check in to see if there were any updates.
Thank you for your time looking into this for us.

Regards,

Ava Renon
Summer Student

ava.renon@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Elsby, Cam <Cam.Elsby@ottawa.ca>
Sent: Thursday, June 13, 2024 10:00 AM
To: Renon, Ava <Ava.Renon@stantec.com>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>; Polyak, Alex <alex.polyak@ottawa.ca>

Subject: Re: 1137 Ogilvie Road Sanitary Capacity

Hi Ava,

I've reviewed the submitted sanitary flow calculations, and all is acceptable. As such, I've forwarded your request to our asset management team for confirmation of capacity in our system model. Turnaround time is typically within 2 weeks, dependent on demand.

Please don't hesitate to reach out should you have any questions or concerns.

Kind regards,

Cam Elsby
Project Manager, Infrastructure Approvals
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
Development Review – East 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 21443
cam.elsby@ottawa.ca

From: Renon, Ava <Ava.Renon@stantec.com>
Sent: Thursday, June 13, 2024 9:24 AM
To: Elsby, Cam <Cam.Elsby@ottawa.ca>; Polyak, Alex <alex.polyak@ottawa.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>
Subject: 1137 Ogilvie Road Sanitary Capacity

Good afternoon,

We would like to confirm if the downstream sanitary sewers have the capacity to take in an additional 5.85 L/s of sanitary peak flow for the proposed development at 1137 Ogilvie Road. The proposed development comprises of a 24-storey residential building and is projected to service a total population of 520 persons with around 488 m^2 of commercial space.

Attached is the sanitary calculation sheet and site map for your review, and please let us know if you have any questions or comments.

Thanks,

Ava Renon

Stantec
300-1331 Clyde Avenue
Ottawa ON K2C 3G4

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Appendix D Stormwater Servicing

D.1 Modified Rational Method Sheet

Stormwater Management Calculations

File No: **160401681**
Project: **1137 Ogilvie Road**
Date: **12-Jul-24**

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Uncontrolled - Non-Tributary	UNC-1	Hard	0.009		0.9	0.008		
		Soft	0.053		0.2	0.011		
		Subtotal		0.06			0.018473	0.300
Uncontrolled - Tributary to Cistern	CISTRN-1	Hard	0.183		0.9	0.165		
		Soft	0.017		0.2	0.003		
		Subtotal		0.20			0.168451	0.840
Uncontrolled - Tributary to Cistern	ROOF-1	Hard	0.200		0.9	0.180		
		Soft	0.000		0.2	0.000		
		Subtotal		0.20			0.180387	0.900
Total				**0.463**			**0.367**	
Overall Runoff Coefficient= C:								**0.79**

Total Roof Areas	**0.200 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.201 ha**
Total Tributary Area to Outlet	**0.401 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.062 ha**
Total Site	**0.463 ha**

Stormwater Management Calculations

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

2 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	732.951
b =	6.199
c =	0.81

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

2 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.4625
C: 0.50

Typical Time of Concentration

tc (min)	I (2 yr) (mm/hr)	Qtarget (L/s)
10	76.81	**49.38**

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: CISTERN — Cistern
Area (ha): 0.40
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	72.77	37.92	34.85	**20.91**
20	52.03	49.30	37.92	11.38	13.66
30	40.04	37.94	37.92	0.02	0.04
40	32.86	31.14	31.14	0.00	0.00
50	28.04	26.57	26.57	0.00	0.00
60	24.56	23.27	23.27	0.00	0.00
70	21.91	20.76	20.76	0.00	0.00
80	19.83	18.79	18.79	0.00	0.00
90	18.14	17.19	17.19	0.00	0.00
100	16.75	15.87	15.87	0.00	0.00
110	15.57	14.75	14.75	0.00	0.00
120	14.56	13.80	13.80	0.00	0.00

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	37.92	20.91	120.00	OK

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.06
C: 0.30

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	3.94	3.94		
20	52.03	2.67	2.67		
30	40.04	2.06	2.06		
40	32.86	1.69	1.69		
50	28.04	1.44	1.44		
60	24.56	1.26	1.26		
70	21.91	1.13	1.13		
80	19.83	1.02	1.02		
90	18.14	0.93	0.93		
100	16.75	0.86	0.86		
110	15.57	0.80	0.80		
120	14.56	0.75	0.75		

Subdrainage Area: CISTRN-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.20
C: 0.84

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	35.97	35.97		
20	52.03	24.37	24.37		
30	40.04	18.75	18.75		
40	32.86	15.39	15.39		
50	28.04	13.13	13.13		
60	24.56	11.50	11.50		
70	21.91	10.26	10.26		
80	19.83	9.29	9.29		
90	18.14	8.50	8.50		
100	16.75	7.84	7.84		
110	15.57	7.29	7.29		
120	14.56	6.82	6.82		

Subdrainage Area: ROOF-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.20
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)
10	76.81	38.52	38.52			
20	52.03	26.09	26.09			
30	40.04	20.08	20.08			
40	32.86	16.48	16.48			
50	28.04	14.06	14.06			
60	24.56	12.32	12.32			
70	21.91	10.99	10.99			
80	19.83	9.94	9.94			
90	18.14	9.10	9.10			

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.4625
C: 0.50

Estimated Time of Concentration after Development

tc (min)	I (100 yr) (mm/hr)	Q100yr (L/s)
10	178.56	**114.80**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: CISTERN — Cistern
Area (ha): 0.40
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	199.04	37.92	161.12	96.67
20	119.95	133.71	37.92	95.79	114.95
30	91.87	102.40	37.92	64.49	**116.07**
40	75.15	83.76	37.92	45.85	110.03
50	63.95	71.29	37.92	33.37	100.11
60	55.89	62.31	37.92	24.39	87.79
70	49.79	55.50	37.92	17.58	73.84
80	44.99	50.15	37.92	12.23	58.72
90	41.11	45.83	37.92	7.91	42.70
100	37.90	42.25	37.92	4.33	25.99
110	35.20	39.24	37.92	1.32	8.72
120	32.89	36.67	36.67	0.00	0.00

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	37.92	116.07	120.00	OK
					3.93	

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.06
C: 0.38

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	11.46	11.46		
20	119.95	7.70	7.70		
30	91.87	5.90	5.90		
40	75.15	4.82	4.82		
50	63.95	4.11	4.11		
60	55.89	3.59	3.59		
70	49.79	3.20	3.20		
80	44.99	2.89	2.89		
90	41.11	2.64	2.64		
100	37.90	2.43	2.43		
110	35.20	2.26	2.26		
120	32.89	2.11	2.11		

Subdrainage Area: CISTRN-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.20
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	99.55	99.55		
20	119.95	66.87	66.87		
30	91.87	51.22	51.22		
40	75.15	41.89	41.89		
50	63.95	35.65	35.65		
60	55.89	31.16	31.16		
70	49.79	27.76	27.76		
80	44.99	25.08	25.08		
90	41.11	22.92	22.92		
100	37.90	21.13	21.13		
110	35.20	19.63	19.63		
120	32.89	18.34	18.34		

Subdrainage Area: ROOF-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.20
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)
10	178.56	99.49	99.49			
20	119.95	66.84	66.84			
30	91.87	51.19	51.19			
40	75.15	41.87	41.87			
50	63.95	35.63	35.63			
60	55.89	31.14	31.14			
70	49.79	27.74	27.74			
80	44.99	25.07	25.07			
90	41.11	22.91	22.91			

Stormwater Management Calculations

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

100	16.75	8.40	8.40
110	15.57	7.81	7.81
120	14.56	7.30	7.30

SUMMARY TO OUTLET

			Vrequired	Vavailable*		
Tributary Area	0.601	ha				
Total 2yr Flow from Cistern	38	L/s				
Total 2yr Flow to Sewer	38	L/s	21	200	m^3	Ok
Non-Tributary Area	0.062	ha				
Total 2yr Flow Uncontrolled	4	L/s				
Total Area	0.663	ha				
Total 2yr Flow	42	L/s				

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

100	37.90	21.12	21.12
110	35.20	19.61	19.61
120	32.89	18.33	18.33

SUMMARY TO OUTLET

			Vrequired	Vavailable*		
Tributary Area	0.601	ha				
Total 100yr Flow from Cistern	38	L/s				
Total 100yr Flow to Sewer	38	L/s	116	200	m^3	Ok
Non-Tributary Area	0.062	ha				
Total 100yr Flow Uncontrolled	11	L/s				
Total Area	0.663	ha				
Total 100yr Flow	49	L/s				

Stormwater Management Calculations

File No: **160401681**
Project: **1137 Ogilvie Road**
Date: **12-Jul-24**

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Uncontrolled - Non-Tributary	UNC-1	Hard	0.009		0.9	0.008		
		Soft	0.053		0.2	0.011		
		Subtotal		0.06			0.018473	0.300
Uncontrolled - Tributary to Cistern	CISTRN-1	Hard	0.183		0.9	0.165		
		Soft	0.017		0.2	0.003		
		Subtotal		0.20			0.168451	0.840
Roof	ROOF-1	Hard	0.200		0.9	0.180		
		Soft	0.000		0.2	0.000		
		Subtotal		0.20			0.180387	0.900
Total				**0.463**			**0.367**	
Overall Runoff Coefficient= C:								**0.79**

Total Roof Areas	**0.200 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.201 ha**
Total Tributary Area to Outlet	**0.401 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.062 ha**
Total Site	**0.463 ha**

Stormwater Management Calculations

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

2 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	732.951
b =	6.199
c =	0.81

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

2 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.4625
C: 0.50

Typical Time of Concentration

tc (min)	I (2 yr) (mm/hr)	Qtarget (L/s)
10	76.81	**49.38**

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: CISTERN — Cistern
Area (ha): 0.20
C: 0.84

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	35.97	27.15	8.82	**5.29**
20	52.03	24.37	24.37	0.00	0.00
30	40.04	18.75	18.75	0.00	0.00
40	32.86	15.39	15.39	0.00	0.00
50	28.04	13.13	13.13	0.00	0.00
60	24.56	11.50	11.50	0.00	0.00
70	21.91	10.26	10.26	0.00	0.00
80	19.83	9.29	9.29	0.00	0.00
90	18.14	8.50	8.50	0.00	0.00
100	16.75	7.84	7.84	0.00	0.00
110	15.57	7.29	7.29	0.00	0.00
120	14.56	6.82	6.82	0.00	0.00

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	27.15	5.29	50.00	OK

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.06
C: 0.30

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	3.94	3.94		
20	52.03	2.67	2.67		
30	40.04	2.06	2.06		
40	32.86	1.69	1.69		
50	28.04	1.44	1.44		
60	24.56	1.26	1.26		
70	21.91	1.13	1.13		
80	19.83	1.02	1.02		
90	18.14	0.93	0.93		
100	16.75	0.86	0.86		
110	15.57	0.80	0.80		
120	14.56	0.75	0.75		

Subdrainage Area: CISTRN-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.20
C: 0.84

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	35.97	35.97		
20	52.03	24.37	24.37		
30	40.04	18.75	18.75		
40	32.86	15.39	15.39		
50	28.04	13.13	13.13		
60	24.56	11.50	11.50		
70	21.91	10.26	10.26		
80	19.83	9.29	9.29		
90	18.14	8.50	8.50		
100	16.75	7.84	7.84		
110	15.57	7.29	7.29		
120	14.56	6.82	6.82		

Subdrainage Area: ROOF-1 — Roof
Area (ha): 0.20
C: 0.90
Maximum Storage Depth: 150 mm

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	38.52	7.13	31.38	18.83	91.0	0.00
20	52.03	26.09	7.55	18.54	22.25	97.3	0.00
30	40.04	20.08	7.58	12.50	**22.51**	97.7	0.00
40	32.86	16.48	7.47	9.01	21.62	96.1	0.00
50	28.04	14.06	7.31	6.75	20.26	93.6	0.00
60	24.56	12.32	7.12	5.20	18.71	90.8	0.00
70	21.91	10.99	6.92	4.07	17.08	87.8	0.00
80	19.83	9.94	6.73	3.22	15.45	84.9	0.00
90	18.14	9.10	6.53	2.56	13.85	82.0	0.00

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.4625
C: 0.50

Estimated Time of Concentration after Development

tc (min)	I (100 yr) (mm/hr)	Q100yr (L/s)
10	178.56	**114.80**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: CISTERN — Cistern
Area (ha): 0.20
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	99.55	27.15	72.40	43.44
20	119.95	66.87	27.15	39.72	**47.67**
30	91.87	51.22	27.15	24.07	43.32
40	75.15	41.89	27.15	14.74	35.38
50	63.95	35.65	27.15	8.50	25.51
60	55.89	31.16	27.15	4.01	14.44
70	49.79	27.76	27.15	0.61	2.55
80	44.99	25.08	25.08	0.00	0.00
90	41.11	22.92	22.92	0.00	0.00
100	37.90	21.13	21.13	0.00	0.00
110	35.20	19.63	19.63	0.00	0.00
120	32.89	18.34	18.34	0.00	0.00

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	27.15	47.67	50.00	OK
					2.33	

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.06
C: 0.38

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	11.46	11.46		
20	119.95	7.70	7.70		
30	91.87	5.90	5.90		
40	75.15	4.82	4.82		
50	63.95	4.11	4.11		
60	55.89	3.59	3.59		
70	49.79	3.20	3.20		
80	44.99	2.89	2.89		
90	41.11	2.64	2.64		
100	37.90	2.43	2.43		
110	35.20	2.26	2.26		
120	32.89	2.11	2.11		

Subdrainage Area: CISTRN-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.20
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	99.55	99.55		
20	119.95	66.87	66.87		
30	91.87	51.22	51.22		
40	75.15	41.89	41.89		
50	63.95	35.65	35.65		
60	55.89	31.16	31.16		
70	49.79	27.76	27.76		
80	44.99	25.08	25.08		
90	41.11	22.92	22.92		
100	37.90	21.13	21.13		
110	35.20	19.63	19.63		
120	32.89	18.34	18.34		

Subdrainage Area: ROOF-1 — Roof
Area (ha): 0.20
C: 1.00
Maximum Storage Depth: 150 mm

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	178.56	99.49	9.75	89.74	53.85	130.5	0.00
20	119.95	66.84	10.43	56.41	67.69	140.8	0.00
30	91.87	51.19	10.68	40.51	72.91	144.6	0.00
40	75.15	41.87	10.77	31.10	**74.64**	145.9	0.00
50	63.95	35.63	10.77	24.87	74.60	145.9	0.00
60	55.89	31.14	10.71	20.43	73.55	145.1	0.00
70	49.79	27.74	10.63	17.11	71.86	143.9	0.00
80	44.99	25.07	10.53	14.54	69.78	142.3	0.00
90	41.11	22.91	10.42	12.49	67.45	140.6	0.00

Stormwater Management Calculations

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

100	16.75	8.40	6.35	2.05	12.30	79.2	0.00
110	15.57	7.81	6.17	1.64	10.82	76.5	0.00
120	14.56	7.30	5.97	1.33	9.59	73.5	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	97.73	0.10	7.58	22.51	80.17	0.00

SUMMARY TO OUTLET

			Vrequired	Vavailable*		
Tributary Area	0.401	ha				
Total 2yr Flow from Roof	8	L/s				
Total 2yr Flow from Cistern	27	L/s				
Total 2yr Flow to Sewer	35	L/s	28	130	m^3	Ok
Non-Tributary Area	0.062	ha				
Total 2yr Flow Uncontrolled	4	L/s				
Total Area	0.463	ha				
Total 2yr Flow	39	L/s				

Project #160401681, 1137 Ogilvie Road
Modified Rational Method Calculations for Storage

100	37.90	21.12	10.29	10.83	64.96	138.7	0.00
110	35.20	19.61	10.17	9.45	62.36	136.8	0.00
120	32.89	18.33	10.04	8.29	59.71	134.9	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	145.91	0.15	10.77	74.64	80.17	0.00

SUMMARY TO OUTLET

			Vrequired	Vavailable*		
Tributary Area	0.401	ha				
Total 100yr Flow from Roof	11	L/s				
Total 100yr Flow from Cistern	27	L/s				
Total 100yr Flow to Sewer	38	L/s	122	130	m^3	Ok
Non-Tributary Area	0.062	ha				
Total 100yr Flow Uncontrolled	11	L/s				
Total Area	0.463	ha				
Total 100yr Flow	49	L/s				

D.2 Storm Sewer Design Sheet

Stantec

1137 Ogilvie Road

DATE: 2024-07-12
REVISION: 1
DESIGNED BY: MW
CHECKED BY: -

FILE NUMBER: **160401681**

STORM SEWER DESIGN SHEET
(City of Ottawa)

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min
BEDDING CLASS = B

LOCATION			DRAINAGE AREA																					PIPE SELECTION									
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)
ROOF-1, CISTRN-1	BLDG	OGS	0.40	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.348	0.348	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	37.9	37.9	37.9	2.3	300	300	CIRCULAR	CONCRETE	-	1.00	96.2	**39.42%**	1.37
																				10.04																
	OGS	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.348	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	37.9	37.9	5.2	300	300	CIRCULAR	CONCRETE	-	0.70	80.4	**47.11%**	1.14
																				10.09																

D.3 Preliminary Stormceptor Sizing Report

Stormceptor® Rinker Materials

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

07/15/2024

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	Preliminary ETV

Drainage Area (ha):	0.40
Runoff Coefficient 'c':	0.85

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Project Name:	1137 Ogilvie Road
Project Number:	160401681
Designer Name:	Michael Wu
Designer Company:	Stantec
Designer Email:	Michael.Wu@stantec.com
Designer Phone:	613-738-6033
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	10.97
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	319
Estimated Average Annual Sediment Volume (L/yr):	260

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	59
EFO6	64
EFO8	67
EFO10	69
EFO12	70

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 64

Water Quality Runoff Volume Capture (%): > 90

imbrium

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)

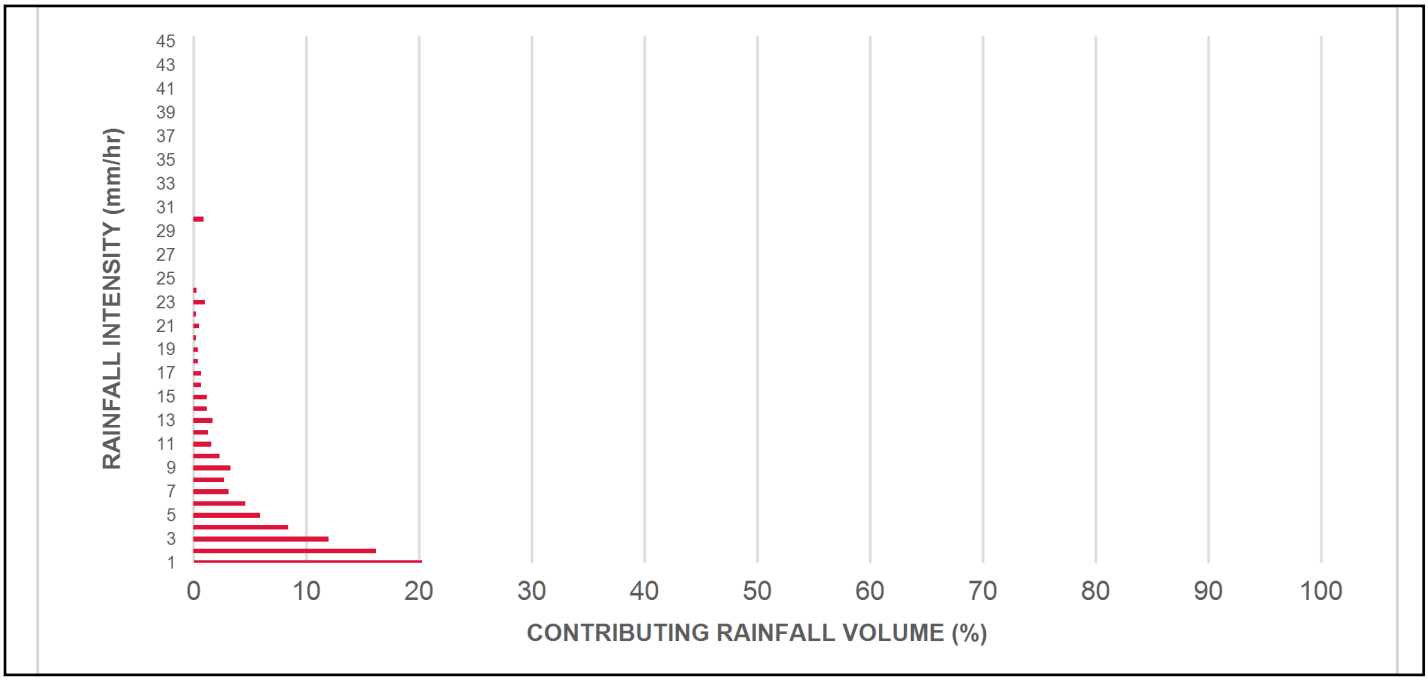
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a 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

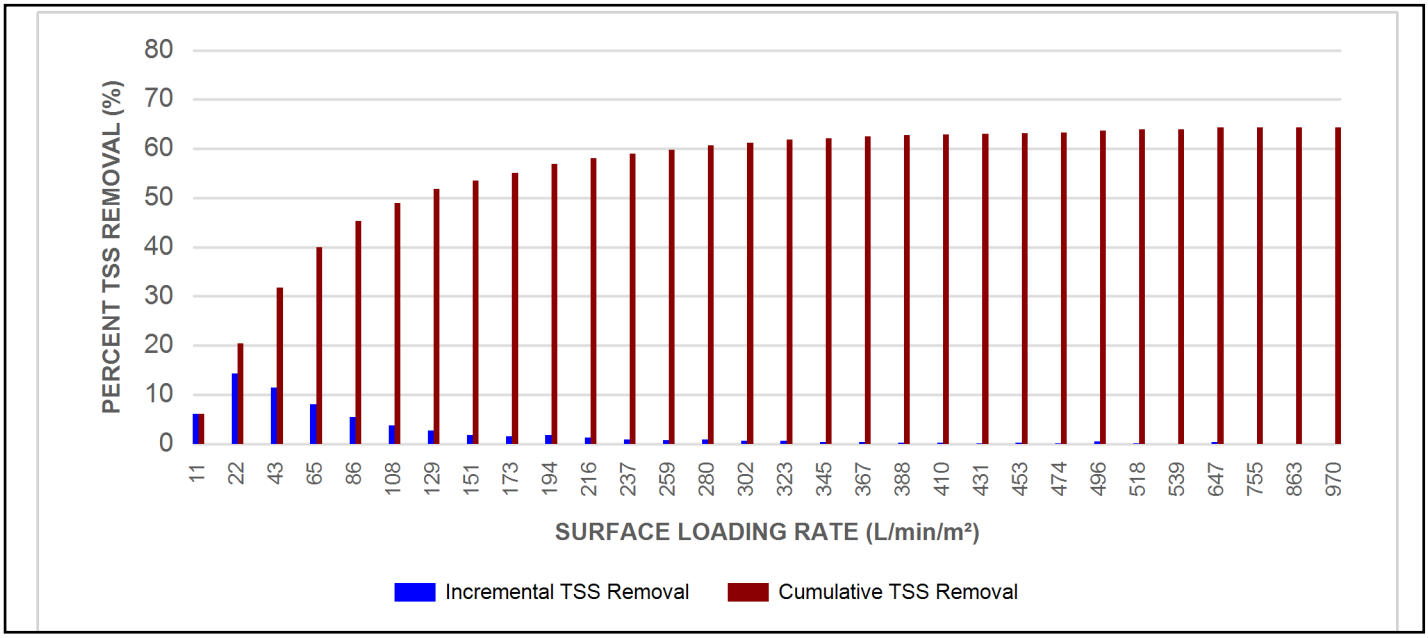
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.47	28.0	11.0	70	6.1	6.1
1.00	20.3	29.0	0.95	57.0	22.0	70	14.3	20.4
2.00	16.2	45.2	1.89	113.0	43.0	70	11.4	31.8
3.00	12.0	57.2	2.84	170.0	65.0	67	8.1	39.9
4.00	8.4	65.6	3.78	227.0	86.0	64	5.4	45.3
5.00	5.9	71.6	4.73	284.0	108.0	62	3.7	49.0
6.00	4.6	76.2	5.67	340.0	129.0	60	2.8	51.8
7.00	3.1	79.3	6.62	397.0	151.0	58	1.8	53.5
8.00	2.7	82.0	7.56	454.0	173.0	57	1.5	55.1
9.00	3.3	85.3	8.51	510.0	194.0	55	1.8	56.9
10.00	2.3	87.6	9.45	567.0	216.0	54	1.2	58.1
11.00	1.6	89.2	10.40	624.0	237.0	53	0.8	59.0
12.00	1.3	90.5	11.34	681.0	259.0	53	0.7	59.7
13.00	1.7	92.2	12.29	737.0	280.0	52	0.9	60.6
14.00	1.2	93.5	13.23	794.0	302.0	51	0.6	61.2
15.00	1.2	94.6	14.18	851.0	323.0	50	0.6	61.8
16.00	0.7	95.3	15.12	907.0	345.0	50	0.3	62.1
17.00	0.7	96.1	16.07	964.0	367.0	49	0.4	62.5
18.00	0.4	96.5	17.01	1021.0	388.0	49	0.2	62.7
19.00	0.4	96.9	17.96	1078.0	410.0	48	0.2	62.9
20.00	0.2	97.1	18.90	1134.0	431.0	47	0.1	63.0
21.00	0.5	97.5	19.85	1191.0	453.0	47	0.2	63.2
22.00	0.2	97.8	20.79	1248.0	474.0	46	0.1	63.3
23.00	1.0	98.8	21.74	1304.0	496.0	45	0.5	63.7
24.00	0.3	99.1	22.68	1361.0	518.0	45	0.1	63.9
25.00	0.0	99.1	23.63	1418.0	539.0	44	0.0	63.9
30.00	0.9	100.0	28.36	1701.0	647.0	42	0.4	64.3
35.00	0.0	100.0	33.08	1985.0	755.0	41	0.0	64.3
40.00	0.0	100.0	37.81	2268.0	863.0	41	0.0	64.3
45.00	0.0	100.0	42.53	2552.0	970.0	40	0.0	64.3
Estimated Net Annual Sediment (TSS) Load Reduction =								**64 %**

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

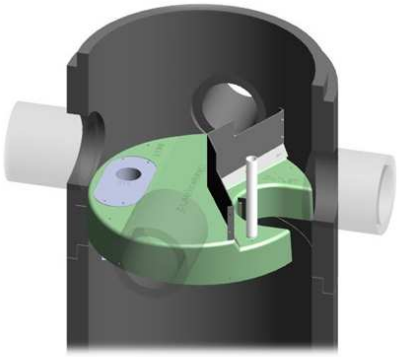
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

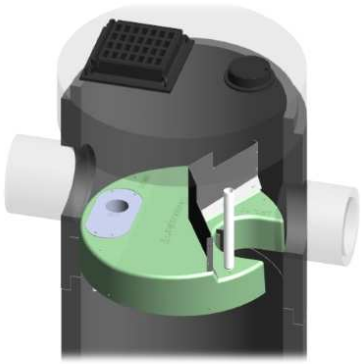
DESIGN FLEXIBILITY

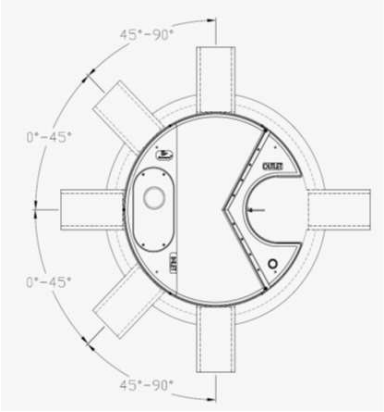
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend 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)	(ft³)	(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/ft³)

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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

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** S**eparators**

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 of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

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/m^2 to 2600 L/min/m^2) 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 E Background Studies

E.1 Geotechnical Investigation Excerpts (Paterson Group, May 2021)

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Noise and Vibration Studies

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Geotechnical Investigation

Proposed Multi-Storey Building
1111 Cummings Avenue
& 1137 Ogilvie Road
Ottawa, Ontario

Prepared For

TCU Development Corporation

May 25, 2021

Report: PG5770-1

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed multi-storey building. The proposed multi-storey building is recommended to be founded on conventional spread footings placed on clean, surface sounded bedrock.

Bedrock removal will be required to complete the underground parking level. Hoe ramming is an option where the bedrock is weathered and/or where only small quantities of bedrock need to be removed. Line drilling and controlled blasting is recommended where large quantities of bedrock need to be removed. The blasting operations should be planned and completed under the guidance of a professional engineer with experience in blasting operations.

Expansive shale bedrock could be present on site. Precautions should be provided during construction to reduce the risks associated with the potentially heaving shale bedrock. This is discussed further in Section 6.7.

The above and other considerations are discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organic materials, should be stripped from under any buildings, paved areas, pipe bedding, and other settlement sensitive structures.

Existing foundation walls and other construction debris should be entirely removed from within the building perimeter and within the lateral support zones of the foundations. Under paved areas, existing construction remnants, such as foundation walls, should be excavated to a minimum of 1 m below final grade.

Due to the relatively shallow depth of the bedrock surface and the anticipated founding level for the proposed building, all existing overburden material should be excavated from within the proposed building footprint.

Table 2 - Recommended Rigid Pavement Structure - Lower Parking Level	
Thickness (mm)	**Material Description**
150	**Exposure Class C2 - 32 MPa Concrete** (5 to 8% Air Entrainment)
300	**BASE** - OPSS Granular A Crushed Stone
SUBGRADE - Existing imported fill, or OPSS Granular B Type I or II material placed over bedrock.	

To control cracking due to shrinking of the concrete floor slab, it is recommended that strategically located saw cuts be used to create control joints within the concrete floor slab of the underground parking level. The control joints are generally recommended to be located at the center of the column lines and spaced at approximately 24 to 36 times the slab thickness (for example; a 0.15 m thick slab should have control joints spaced between 3.6 and 5.4 m). The joints should be cut between 25 and 30% of the thickness of the concrete floor slab and completed as early as 4 hour after the concrete has been poured during warm temperatures and up to 12 hours during cooler temperatures.

Table 3 - Recommended Asphalt Pavement Structure - Access Lanes and Heavy Loading Parking Areas	
Thickness (mm)	**Material Description**
40	**Wear Course** - HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - OPSS Granular B Type II overlying the Concrete Podium Deck.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98% of the material's SPMDD using suitable vibratory equipment.

7.0 Recommendations

A materials testing and observation services program is a requirement for the provided foundation design data to be applicable. The following aspects of the program should be performed by the geotechnical consultant:

- ❑ Review of the geotechnical aspects of the excavating contractor's shoring design, prior to construction.
- ❑ Review the bedrock stabilization and excavation requirements.
- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Sampling and testing of the concrete and fill materials used.
- ❑ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❑ Observation of all subgrades prior to backfilling.
- ❑ Field density tests to determine the level of compaction achieved.
- ❑ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued, upon request, following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations provided in this report are in accordance with our present understanding of the project. We request permission to review our recommendations when the drawings and specifications are completed.

A geotechnical investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test hole locations, we request immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine its suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than TCU Development Corporation or their agent(s) is not authorized without review by Paterson Group for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

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