Site Servicing and Stormwater Management Brief – Petrie's Landing III Block 8 Ottawa, ON

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Sign-off Sheet

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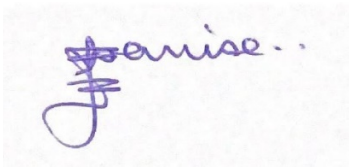

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1.0 INTRODUCTION

The following revised Site Servicing and Stormwater Management (SWM) Brief has been prepared to reflect the revised site plan and to address City comments to the first submission of December 2019. Specifically, the proposed building has been revised to a four-storey building and the parking area layout has been revised accordingly. The drawings have been revised to reflect the revised site plan and to address City comments and the results of the revised servicing analyses are summarized in this report. A summary of City comments is included in **Appendix F**.

Stantec Consulting Ltd. has been retained by Brigil Homes to prepare the following site servicing and stormwater management (SWM) brief to satisfy the City of Ottawa Site Plan Control Application process. The 0.75 ha site is located on 180 Prestige Circle, with the Highway 174 to the south, Jeanne D'Arc Boulevard to the north, Bellevue creek and a residential development to the east, and Brisebois Creek and its associated stormwater management (SWM) facility to the west in the City of Ottawa (see **Figure 1** below).

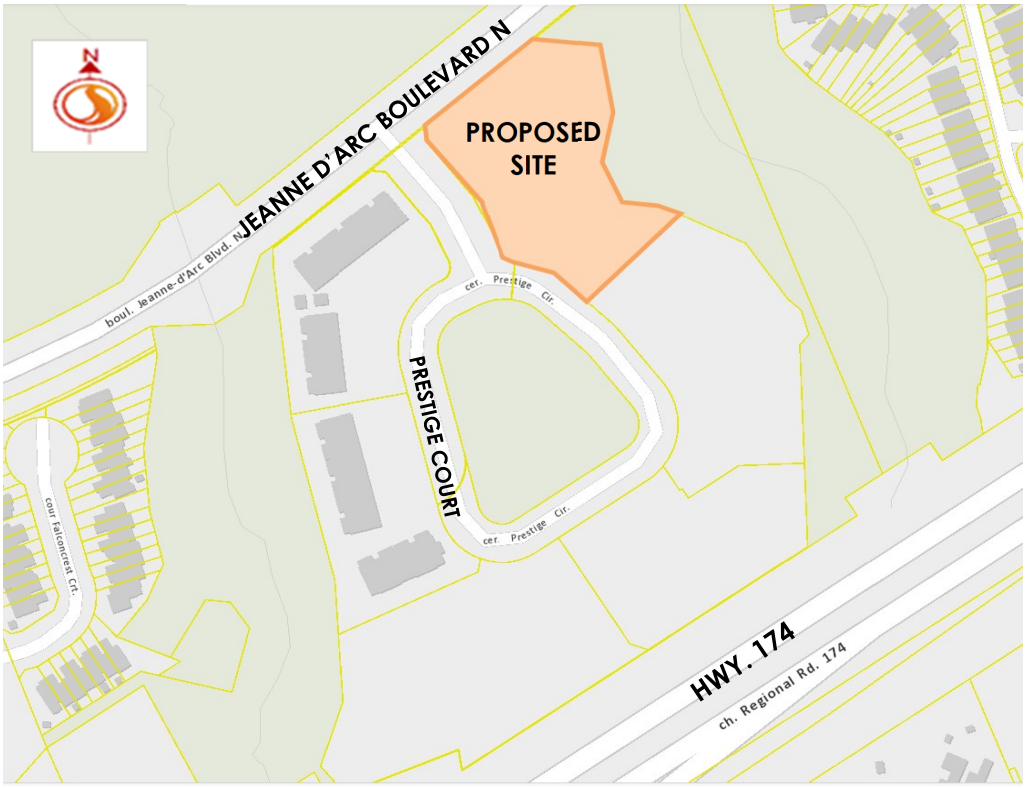


Figure 1: Site location

The proposed Block 8 is part of an existing development for which IBI prepared a servicing analysis for Blocks 1 to 5 and for which Stantec completed the detailed design of Blocks 6 and 7 and

outlined servicing criteria for Block 8 based on site plan assumptions. Block 8 is presently zoned R5 (Residential Fifth Density Zone) and consists of a four-storey residential building comprising 112 residential units comprising of studio (2 units), 1-bedroom (90 units), 2-bedroom (16 units) and 3-bedroom (4 units) apartments with associated surface and underground parking totaling 156 parking spaces consisting of 135 underground parking and 21 surface parking, communal amenity, and landscape areas. A copy of the proposed site plan prepared by Neuf Architect(e)s dated January 18th, 2021 can be found in **Appendix E**.

The intent of this report is to provide a servicing scenario for the site that is free of conflicts, provides on-site servicing in accordance with City of Ottawa design guidelines, and utilizes the existing local infrastructure in accordance with the guidelines outlined through consultation with City of Ottawa staff.

2.0 BACKGROUND

The following background studies have been referenced during the servicing design of the proposed site:

- *Design Brief Petrie's Landing II Phase 2, IBI Group., February 7, 2014*
- *Geotechnical Investigation*, Proposed Multi-Storey Buildings Block 6, 7 and 8 – Petrie's Landing II, Ottawa, Ontario, Paterson group, May 24, 2017
- *Site Servicing and Stormwater Management Brief – Petrie's Landing block 6, 7 and 8, Stantec Consulting Ltd., September 19, 2018*
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010
- *City of Ottawa Sewer Design Guidelines*, City of Ottawa, October 2012
- *Technical Bulletin ISDTB-2014-01,* City of Ottawa, February 2014
- *Technical Bulletin PIEDTB -2016-01,* City of Ottawa, September 6, 2016

3.0 WATER DISTRIBUTION

3.1 BACKGROUND

The proposed Block 8 consists of a four-storey apartment building with one floor of underground parking. The proposed building has a footprint of approximately 2910.04 m^2 (0.29 ha),and is proposed to connect to the existing 200 mm diameter watermain along Prestige Circle as shown on the site servicing plan (see **Drawing SSP-1**). The building comprises 2 studio apartments, ninety (90) 1-bedroom units, sixteen (16) 2-bedroom units, and four (4) 3-bedroom apartments totaling 112 overall residential units.

A detailed hydraulic analysis for the overall Petrie's Landing Development was included in the 2014 Petrie's Landing Design Brief prepared by IBI (see **Appendix D**). However, the FUS calculations for the proposed buildings within Blocks 6 and 7 generated higher fire flow demands than the values assumed in IBI's hydraulic analysis. As a result, the hydraulic analysis for the overall development was revised as part of the detailed design for Blocks 6 and 7 which used the same boundary conditions as per IBI's model. As the proposed site plan for Block 8 has been updated, the hydraulic model has been revised accordingly. The updated results have been included in **Appendix A**. A new boundary condition has been requested from the City and will be used in subsequent submissions.

3.2 WATER DEMANDS

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (July 2010) to determine the typical operating pressures to be expected at the buildings. A daily rate of 350 L/cap/day has been applied for the population of the proposed site. Population densities have been assumed as 1.4 persons/unit for studio units, 1.4 persons/unit for one-bedroom units, 2.1 persons/unit for two-bedroom units and 3.1 persons/unit for three-bedroom units. See **Appendix A** for detailed domestic water demand estimates.

The average day demand (AVDY) for the entire site was determined to be 0.7 L/s. The maximum daily demand (MXDY) is 2.5 times the AVDY for residential demand, which equates to 1.8 L/s. The peak hour demand (PKHR) is 2.2 times the MXDY for residential properties, totaling 3.9 L/s. As the average domestic demand for the site is greater than 50m^3/day, the site will require 2 service connections.

Wood frame construction has been used in the fire flow requirement calculations with a vertical fire wall splitting the building area into two sections with areas 1,756.23 m^2 and 1,153.81 m^2 respectively (see **Drawing SSP-1**). The largest area was used in the assessment of emergency fire flow requirements in accordance with FUS methodology and Ontario Building Code. The FUS Guidelines indicate that low hazard occupancies include apartments, dwellings, dormitories, hotels, and schools, and as such, a low hazard occupancy/ limited combustible building

contents credit was applied. A sprinkler system conforming to NFPA 13 was considered, and a credit applied per FUS Guidelines. Based on calculations per the FUS Guidelines (see **Appendix A**), the required fire flow for the proposed Block 8 is 283.3 L/s (17,000 L/min).

3.3 HYDRAULIC MODEL RESULTS

A hydraulic analysis was previously prepared as part of the detailed design of Blocks 6 and 7 of the development which included preliminary assumptions for Block 8. The hydraulic analysis has now been revised to include water demands and fire flow requirements based on the proposed site plan for Block 8.

The boundary conditions listed below were provided by the City of Ottawa to IBI Group and used in their 2014 hydraulic analysis for the overall development, which included Blocks One to Eight. The same boundary conditions were used in the hydraulic analysis as part of the design of Block 6 and 7 and were used in the revised hydraulic analysis for the proposed Block 8 (see model results in **Appendix A**). New boundary conditions have been requested to the City and will be used in subsequent submissions.

Peak Hour = 108.0m

Max Day + Fire Flow = 110.0m

Average Day = 115.0m

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

A hydraulic model of the water supply system was created in H2O Map based on the provided boundary conditions to assess the proposed watermain layout under the above demands and during the fire flow scenario. Results of the hydraulic modeling show that pressures for Block 8 range from **79.31psi** to **89.27psi** under normal operating conditions. These values are outside the normal operating pressure range as defined by MECP and City of Ottawa design guidelines. As a result, it is recommended that a pressure reducing valve be installed immediately downstream of the isolation valve of the proposed building. Since the proposed building is a 4-storey building, an additional 34 kPa (5 psi) for every additional storey over two storeys is required to account for the change in elevation head and additional head loss. Given that the lowest pressure is expected to be **547kPa (79.31 psi)** at ground level, the resultant equivalent pressure at the 4th floor will be approximately **478 kPa (69.31 psi)** and above the City's objective pressures of 40 psi.

As a result, a booster pump will not be required to maintain an acceptable level of service on the higher floors. Results of the hydraulic model analysis can be found in **Appendix A**.

A fire flow analysis was carried out using H2O MAP hydraulic model to determine the anticipated amount of flow that could be provided for the proposed development under maximum day demands and fire flow requirements per the FUS methodology. A fire flow demand of 283.3 L/s was assumed for the proposed Block 8, identified as node "16". Results of the modeling analysis indicate that flows of approximately 1,051 L/s can be delivered to Block 8 while still maintaining a residual pressure of **140 kPa (20 psi)**. Results of the hydraulic modeling are included for reference in **Appendix A**.

3.4 SUMMARY OF FINDINGS

Based on the results of the hydraulic analysis, it is recommended that a pressure reducing valve be installed to ensure normal operating pressures remain within City of Ottawa required limits. The service connection will be capable of providing anticipated demands to all storeys, no booster pump will be required to maintain minimum pressures of 276 KPa (40 psi) on the higher floors. The hydraulic model also indicates that fire flow requirements can be achieved at the proposed building location while still maintaining the minimum residual pressure per City requirements.

4.0 SANITARY SEWER

The site will be serviced via an existing 300 mm diameter sanitary sewer situated within the Prestige Circle ROW at the southern boundary of the site (see **Drawing SSP-1**). It is proposed to connect a 200mm diameter sanitary service lateral directly to the existing sewer to service the proposed site.

The anticipated wastewater peak flows generated from the proposed development are summarized in **Table 1** below:

Table 1: Estimated Wastewater Peak Flow

Block	Residential Units				Infiltration Flow (L/s)	Total Peak Flow (L/s)
	# of Units	Population	Peak Factor	Peak Flow (L/s)		
Block 8	112	175	4.0	2.27	0.25	2.51

1. Average residential flow based on 280 L/p/day
2. Peak factor for residential units calculated using Harmon's formula
3. Three- bedroom apartments assumed at 3.1 persons/unit, two-bedroom apartments assumed at 2.1 persons/unit, one-bedroom & studio apartments assumed at 1.4 persons/unit.
4. Infiltration flow based on 0.33 L/s/ha.

The Prestige Circle preliminary sanitary sewer design was completed as part of IBI's design (see **Appendix D**) and was based on the applicable City of Ottawa Design Guidelines at the time of the report. A preliminary concept plan for Block 8 which consisted of 81 units totaling a population of 146 people and allowing a sanitary discharge of 2.52 L/s was assumed during detailed design of Blocks 6 and 7 which is sufficient for the site based on the current site plan.

4.1 SANITARY SEWER DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines and the Ministry of the Environment, Conservation and Parks (MECP) Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewers:

- 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 – 200mm dia. for residential areas
- Average Wastewater Generation – 280L/cap/day
- Peak Factor – 4.0 (Harmon's)
- Extraneous Flow Allowance – 0.33 L/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.50 m
- Population density for single-bedroom and bachelor apartments – 1.4 pers./apartment

- Population density for two-bedroom apartments – 2.1 pers./apartment
- Population density for three-bedroom apartments – 3.1 pers./apartment

4.2 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 2.51 L/s with allowance for infiltration) to the existing 300 mm diameter sanitary sewer on Prestige Circle. A sanitary sewer design sheet for the proposed sanitary sewers is included in **Appendix B**. A full port backwater valve is to be installed on the proposed sanitary service to prevent any surcharge from the downstream sewer main from impacting the proposed property. All underground parking drains should be connected to the internal building plumbing and discharged through gravity into SAN 100 sanitary sewer stub as shown in **Drawing SAN-1** in **Appendix G**

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The objective of this stormwater management (SWM) plan is to determine the measures necessary to control the quantity of stormwater released from the proposed development to the required levels, and to provide sufficient detail for approval and construction.

5.2 SWM CRITERIA AND CONSTRAINTS

The stormwater management criteria for the proposed site are based on Stantec's 2018 Site Servicing and Stormwater Management Brief for Blocks 6 to 8 and City of Ottawa Sewer Design Guidelines. The following summarizes the criteria used in the preparation of this stormwater management plan:

- Stormwater runoff from the proposed Block 8 up to and including the 100-year event to be stored on site and released into the minor system at a maximum rate of 99.5 L/s
- Maximum 100-year water depth of 0.3 m in parking and access areas
- Provide adequate emergency overflow conveyance (overland flow route) off-site
- Size storm sewers in parking areas to convey a 2-year storm event, assuming the use of inlet control devices and sub-surface pipe storage to provide capacity for the system while meeting the target release from the site.
- Size storm sewers to convey 100-year storm from ramp, and parking deck areas.
- Size storm sewers using an inlet time of concentration (Tc) of 10 minutes
- Quality control of runoff from the proposed development to be provided in the downstream Brisebois Creek SWM Facility prior to discharge into the Ottawa River
- Post-development runoff coefficient (C) value based on proposed impervious areas as per site plan drawing (see **Appendix E**)

5.3 STORMWATER MANAGEMENT DESIGN

The proposed 0.75ha residential development consists of a four-storey building with underground and surface parking, and associated servicing infrastructure. The new overall imperviousness of the site is 57% (C = 0.60) based on the current site plan.

Stormwater runoff from the proposed development will be directed to the existing storm sewers on Prestige Circle which ultimately discharge into the Brisebois Creek SWM Facility. A sump pump and backwater valve will be provided for foundation drainage of the proposed building. The proposed site plan and existing storm sewer infrastructure on Prestige Circle are shown on **Drawing SSP-1**.

5.3.1 Design Methodology

The proposed stormwater management plan is designed to detain runoff on the rooftops, underground storage pipe and on surface areas to ensure that peak flows after construction will not exceed the target release rate for the site.

Due to the modified site plan layout and grading restrictions, part of the landscaped portion of the site backing into the existing ravine east of the site could not be graded to enter the site's storm system and as such it will sheet drain uncontrolled. Runoff from this uncontrolled area is included in the overall site discharge calculations. The parking deck and ramp are to be connected to the building's internal plumbing system discharging to a 250 mm diameter stub as shown in **Drawing SSP-1** in **Appendix G**

5.3.2 Water Quantity Control

The Modified Rational Method was used to assess the quantity and volume of runoff generated during post development conditions. The site was subdivided into six (6) subcatchments (subareas) tributary to storm sewer inlets, as defined by the location of catchbasins / inlet grates and used in the storm sewer design (see **Appendix C**). A summary of subareas and runoff coefficients is provided in **Appendix C**, and **Drawing SD-1** indicates the stormwater management subcatchments.

5.3.3 Allowable Release Rate

Stantec's Site Serving and Stormwater Management Brief for Blocks 6 and 7 outlines the quantity control criteria for the overall site. The report outlines that the overall system target criteria for Block 8 is 99.5 L/s.

5.3.4 Storage Requirements

The site requires quantity control measures to meet the stormwater release criteria. It is proposed that the restricted release rooftop drains be used to reduce the peak outflow from the site. Additionally, underground storage pipe and surface storage on parking areas will be provided. **Drawing SD-1** indicates the design release rate from the rooftop. Stormwater management calculations are provided in **Appendix C**.

5.3.4.1 Rooftop Storage

It is proposed to retain stormwater on the rooftop by installing restricted flow roof drains. The following calculations assume the roof will be equipped with eleven (11) Watts drains 50% open, see **Appendix C** for details.

Watts roof drain data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the "Watts" roof drain has been used as an example only and that other products may be specified for use, provided that the roof release rate is restricted to match the maximum rate of release indicated in **Table 2** and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater.

Table 2 provide details regarding the retention of stormwater on the proposed rooftop during the 2 and 100-year storm events. Refer to **Appendix C** for details.

Table 2: Peak Controlled (Rooftop) 2-Year and 100-Year Release Rate

Area ID	Return period	Area (ha)	Head (m)	$Q_{release}$ (L/s)	V_{stored} (m^3)
R1002A	2 Year	0.291	0.10	10.35	33.84
	100 Year		0.15	13.79	113.84

5.3.4.2 Surface and Pipe Storage

In addition to rooftop storage, it is proposed to detain stormwater on the surface parking lot areas (F1001A and F1001B) and in one pipe section using inlet control devices (ICDs) in the proposed drainage structures. A 90mm diameter orifice has been sized to restrict peak flows from area F1001A through the use of surface storage. Similarly, surface storage and 5.73 m^3 of pipe storage is provided in area F1001B through 9m of 900 mm diameter HDPE Boss 2000 pipe connected to CBMH 1001 which will be fitted with a Vortex LMF 70 or equivalent to restrict post development peak flows from this area as shown on **Drawing SD-1**. The modified rational method was used to determine the peak flow, ponding depth and required storage volume for the proposed site. **Table 3**: summarizes the proposed ICD characteristics.

Table 3: 100-Year ICD Characteristics

Area ID	Structure ID	Orifice Type	Head (m)	Peak Release Rate (L/s)	Storage Volume Required (m^3)	Storage Volume Available (m^3)
F1001A	CB 1001A	90mm Diameter Orifice	1.53	21.3	3.6	4.1
F1001B	CB 1001B	Vortex LMF 70	1.95	6.0	12.0	13.7

5.3.5 Uncontrolled Area

A small portion of the site fronting Prestige Circle and backing onto the ravine (see area UNC-1 on **Drawing SD-1**) could not be graded to enter the site's storm system and as such, it will sheet drain uncontrolled. For conservatism, runoff from this uncontrolled area is included in the overall site discharge calculations. **Table 4** summarize the 2 and 100-year uncontrolled release rates from the proposed development.

Table 4: Peak Uncontrolled (Non-tributary) 2-Year and 100-Year Release Rates

Storm Event	Area (ha)	Runoff 'C'	Tc (min)	$Q_{release}$ (L/s)
2-Year	0.243	0.26	10	13.49
100-Year		0.33		39.20

5.3.6 Results

The proposed building will have one level of underground parking and as such, it is proposed that the proposed parking ramp be equipped with a trench drain connected to the internal plumbing of the building to capture the 100-year runoff. Similarly, the proposed parking deck area F1002B will have a catchbasin connected to the internal plumbing of the building to capture the 100-year runoff.

It is recommended that the proposed building be equipped with a sump pump and a backwater valve for foundation drainage. **Table 5** and **Table 6** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflows for the site.

Table 5: Estimated Discharge from Site (2-Year)

Block	Area Type	Area ID	$V_{required}$ (m^3)	$V_{available}$ (m^3)	$Q_{release}$ (L/s)	Target (L/s)
BLOCK 8	Controlled – Surface (Includes Roof area)	F1001A, F1001B, R1002A	35.30	134.23	36.33	**99.5**
	Parking Ramp Area	F1002A	-	-	4.23	
	Parking Deck	F1002B	-	-	4.09	
	Uncontrolled Areas	UNC-1	-	-	13.49	
	Total Block 8		**35.30**	**134.23**	**58.14**	

Table 6: Estimated Discharge from Site (100-Year)

Block	Area Type	Area ID	$V_{required}$ (m^3)	$V_{available}$ (m^3)	$Q_{release}$ (L/s)	Target (L/s)
BLOCK 8	Controlled – Surface (Includes Roof area)	F1001A, F1001B, R1002A	129.51	134.23	41.07	99.5
	Parking Ramp Area	F1002A	-	-	10.92	
	Parking Deck	F1002B	-	-	11.88	
	Uncontrolled Areas	UNC-1	-	-	39.20	
		Total Block 8	**129.51**	**134.23**	**103.10**	

As can be seen in the above tables, the proposed ICDs and storage provided restrict post development peak flows from site areas to 58.14 L/s and 103.10 L/s in the 2-year and 100-year storm events respectively. The 99.5 L/s target release is exceeded by 3.6 L/s in a 100-year event, which is considered negligible.

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.75 ha in area. The site has significant grade change from the southwestern to the northeastern boundary of the site. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, to meet minimum cover requirements for storm and sanitary sewers, and to provide sufficient cover over top of the underground parking garage. Site grading has been established to provide emergency overland flow routes for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes to the existing Prestige Circle ROW and to the existing ravine as depicted on **Drawings GP-1** and **SD-1**.

7.0 UTILITIES

The subject site has existing plants within Prestige Circle to provide Hydro, Bell, Gas and Cable servicing for the proposed development as existing residential development to the west was constructed as part of Phase 1 and Phase 2. It is anticipated that existing infrastructure will be sufficient to provide the means of distribution for the proposed site. Detailed design of the required utility services will be further investigated as part of the composite utility planning process following design circulation.

8.0 APPROVALS

Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECAs, formerly Certificates of Approval C of A) under the Ontario Water Resources Act are not expected to be a requirement for the development to proceed as the site falls under a separate plan of condominium with one owner and will have a separate drainage and storm sewer system discharging to a pre-existing sewer system.

The proposed site is situated 120 m of the Petrie Island Provincially Significant Wetland, and as such, it is within the RVCA's regulatory jurisdiction. As a result, written approval from the RVCA is required under Ontario Regulation 174/06 "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation" under Section 28 of the Conservation Authorities Act.

Requirement for an MECP Permit to Take Water (PTTW) for pumping during construction of the underground parking levels will be confirmed by the geotechnical consultant.

9.0 EROSION CONTROL DURING CONSTRUCTION

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit extent of 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 plastic or synthetic mulches.
6. Provide sediment traps and basins during dewatering.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Plan construction at proper time to avoid flooding.
9. Installation of a mud matt to prevent mud and debris from being transported off site.
10. Installation of a silt fence to prevent sediment runoff.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

1. Verification that water is not flowing under silt barriers.
2. Clean and change silt traps at catch basins.

Refer to **Drawing EC-DS** for the proposed location of silt fences, and other erosion control structures.

10.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was completed by Paterson Group Ltd. in May 24, 2017. The report summarizes the existing soil conditions within the subject area and construction recommendations. For details which are not summarized below, please see the original Paterson report (Excerpts included in **Appendix D**).

Subsurface soil conditions within Block 8 were determined from 3 boreholes distributed across the proposed site. In general soil stratigraphy consisted of topsoil or fill underlain by a silty clay deposit layer.

Groundwater levels were measured on July 16, 2007 and on May 1, 2017 and vary in elevation from 4.4m to 5.5m below the original ground surface.

A permissible grade raise restriction of 2m is recommended within the Paterson Group report due to the encounter of deep silty clay deposits of up to a maximum depth of 30.4 m. The grade raise restrictions has been exceeded in some spots of the proposed development due to grading constraints and as a result, the proposed grading plan has been submitted to Paterson Group for review and recommendations will be included in the next submission.

The required pavement structure for the local roadways is outlined in Table 7 and Table 8 below:

Table 7: Pavement Structure – Car Only Parking Areas

Thickness (mm)	Material Description
50	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
300	Subbase - OPSS Granular B Type II
-	Subgrade – Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill.

Table 8: Pavement Structure – Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
40	Wear Course –Superpave 12.5 Asphaltic Concrete
50	Binder Course –Superpave 19.0 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
400	Subbase - OPSS Granular B Type II

Thickness (mm)	Material Description
-	Subgrade – Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill.

11.0 CONCLUSIONS

11.1 WATER SERVICING

The 200 mm diameter watermain on Prestige Circle provides adequate fire flow capacity as per the Fire Underwriters Survey. The service connections will also be capable of providing anticipated demand but exceeds the maximum objective pressure of 552 kPa (80 psi). Therefore, pressure reducing measures, such as a pressure reducing valve, will be required to service the proposed building per the Ontario Plumbing Code. The building will not require a booster pump to provide pressures greater than 40psi to the higher floors.

11.2 SANITARY SERVICING

The proposed sanitary sewer lateral is sufficiently sized to provide gravity drainage for the site. The proposed site will be serviced by a 200 mm diameter service lateral directing wastewater flows to the existing 300 mm dia. Prestige Circle sanitary sewer. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guidelines and will be coordinated with building mechanical engineers. The proposed sanitary drainage pattern is in accordance with the City of Ottawa Sewer Design guidelines.

11.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through the stormwater management section of IBI Group's Design Brief for Petrie's Landing and with the City of Ottawa Design guidelines. Rooftop, underground pipe, and surface storage in combination with ICDs are proposed to limit inflow from the site area into the minor system to the required target release rate.

The proposed building will have underground parking and as such, it is recommended that the proposed parking ramp be equipped with trench drains to capture the 100-year runoff. The proposed parking deck area F1002B will have a catchbasin connected to the internal plumbing of the building to capture the 100-year runoff In addition, it is recommended that the proposed building be equipped with a sump pump and a backwater valve.

11.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the overall recommendations provided in the Geotechnical Investigation. Further geotechnical recommendations will be included in the next submission.

Erosion and sediment control measures will be implemented during construction to reduce the impact on existing infrastructure.

11.5 UTILITIES

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the subject area. Exact size, location and routing of utilities will be finalized after design circulation.

11.6 APPROVAL / PERMITS

Ontario Ministry of the Environment, Conservation and Parks (MOECP) Environmental Compliance Approvals (ECA) are not expected to be required for the subject development as the site falls under a separate plan of condominium with one owner and will have a separate drainage and storm sewer system discharge to a pre-existing sewer system. Written approval from the Rideau Valley Conservation Authority (RVCA) is required under Ontario Regulation 174/06 "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation" under Section 28 of the Conservation Authorities Act for the portion of the site within 120 m of a significant wetland. A Permit to Take Water may be required for pumping requirements for construction of underground parking levels. No other approval requirements from other regulatory agencies are anticipated.

APPENDICES

Appendix A POTABLE WATER SERVICING ANALYSIS

Block 8 Petries Landing - Domestic Water Demand Estimates

Based on Site Statistics provided by Neuf Architectes Sencrl (2021-03-12)

Building ID	Units	Persons per unit[1]	Population	Daily Rate of Demand (L/p/d)	Avg Day Demand[2]		Max Day Demand[3]		Peak Hour Demand[3]	
					(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Studio	2	1.4	3	350	0.7	0.01	1.7	0.03	3.7	0.06
1 Bedroom	90	1.4	126	350	30.6	0.51	76.6	1.28	168.4	2.81
2 Bedrooms	16	2.1	34	350	8.2	0.14	20.4	0.34	44.9	0.75
3 Bedrooms	4	3.1	12	350	3.0	0.05	7.5	0.13	16.6	0.28
Total Site :	**112.0**		**175**		**42.5**	**0.7**	**106.2**	**1.8**	**233.7**	**3.9**

1 Population counts based on a conversion factor of 1.4 persons/ 1 Bedroom Apt., 2.1 Persons/ 2 Bedroom Apt, 3.1 Persons/ 3 Bedroom Apt.

2 Average day water demand for residential areas equal to 350 L/cap/d

3 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

Referenced from the City of Ottawa Sewer Design Guidelines (October 2012) and the Ottawa Design Guidelines: Water Distribution (July 2010)

FUS Fire Flow Calculation Sheet

Stantec Project #: 160401331
Project Name: Petries Landing Block 8
Date: 3/24/2021
Fire Flow Calculation #: 2
Description: Residential low rise

Notes:
1. 4-storey residential low-rise with 112 Residential units as provided by Neuf Architect(e)s dated Mar. 12, 2021.
2. A Firewall was provided dividing the building into two segments; Segment A (North) = 1756.23m^2, Segment B (South) = 1153.81m^2. The largest area has been adopted in the analysis below.

Step	Task	Notes						Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Wood Frame						1.5	-
2	Determine Ground Floor Area of One Unit	-						1756	-
	Determine Number of Adjoining Units	Includes adjacent wood frame structures separated by 3m or less						1	-
3	Determine Height in Storeys	Does not include floors >50% below grade or open attic space						4	-
4	Determine Required Fire Flow	(F = 220 x C x A$^{1/2}$). Round to nearest 1000 L/min						-	28000
5	Determine Occupancy Charge	Limited Combustible						-15%	23800
6	Determine Sprinkler Reduction	Conforms to NFPA 13						-30%	-9520
		Standard Water Supply						-10%	
		Not Fully Supervised or N/A						0%	
		% Coverage of Sprinkler System						100%	
7	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	-	-
		North	> 45	0	0	0-30	Wood Frame or Non-Combustible	0%	2380
		East	> 45	32	2	61-90	Wood Frame or Non-Combustible	0%	
		South	30.1 to 45	23	4	91-120	Wood Frame or Non-Combustible	5%	
		West	30.1 to 45	14	4	31-60	Wood Frame or Non-Combustible	5%	
8	Determine Final Required Fire Flow	**Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min**							**17000**
		Total Required Fire Flow in L/s							**283.3**
		Required Duration of Fire Flow (hrs)							**3.50**
		Required Volume of Fire Flow (m^3)							**3570**

Hydraulic Model Results - Average Day Analysis

Junction Results

ID	Demand	Elevation	Head	Pressure	
	(L/s)	(m)	(m)	(psi)	(Kpa)
10.00	0.00	52.00	115.00	89.56	617.50
11.00	0.00	55.06	115.00	85.21	587.51
12.00	0.00	55.06	115.00	85.21	587.51
13.00	0.00	51.90	115.00	89.70	618.46
14.00	0.00	52.10	115.00	89.42	616.53
16.00	0.70	52.20	115.00	89.27	615.50
BLDG1	0.29	55.71	115.00	84.28	581.09
BLDG2	0.29	56.60	115.00	83.02	572.41
BLDG3	0.67	56.70	115.00	82.87	571.37
BLDG6	0.49	57.30	115.00	82.02	565.51
BLDG7	0.57	56.50	115.00	83.16	573.37

Pipe Results

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	(mm)		(L/s)	(m/s)
1	1000	14	25.84	393	120	3.01	0.02
11	12	11	7.05	204	110	-0.06	0.00
12	12	16	78.14	204	110	-1.08	0.03
13	13	10	7.80	393	120	-1.78	0.01
15	16	13	10.83	204	110	-1.78	0.06
2	14	10	19.33	393	120	3.01	0.02
3	10	11	84.72	204	110	1.23	0.04
4	BLDG1	11	51.80	204	110	-1.17	0.04
5	BLDG2	BLDG1	32.66	204	110	-0.88	0.03
6	BLDG3	BLDG2	62.45	204	110	-0.59	0.02
7	BLDG3	BLDG6	72.85	204	110	-0.08	0.00
8	BLDG6	BLDG7	34.69	204	110	-0.57	0.02
9	BLDG7	12	82.99	204	110	-1.14	0.03

Hydraulic Model Results - Peak Hour Analysis

Junction Results

ID	Demand	Elevation	Head	Pressure	
	(L/s)	(m)	(m)	(psi)	(Kpa)
10.00	0.00	52.00	108.00	79.60	548.83
11.00	0.00	55.06	107.96	75.21	518.56
12.00	0.00	55.06	107.96	75.21	518.56
13.00	0.00	51.90	108.00	79.75	549.86
14.00	0.00	52.10	108.00	79.46	547.86
16.00	3.90	52.20	107.99	79.31	546.83
BLDG1	1.60	55.71	107.95	74.26	512.01
BLDG2	1.60	56.60	107.94	72.98	503.18
BLDG3	3.69	56.70	107.93	72.83	502.15
BLDG6	2.71	57.30	107.93	71.98	496.29
BLDG7	3.12	56.50	107.94	73.12	504.15

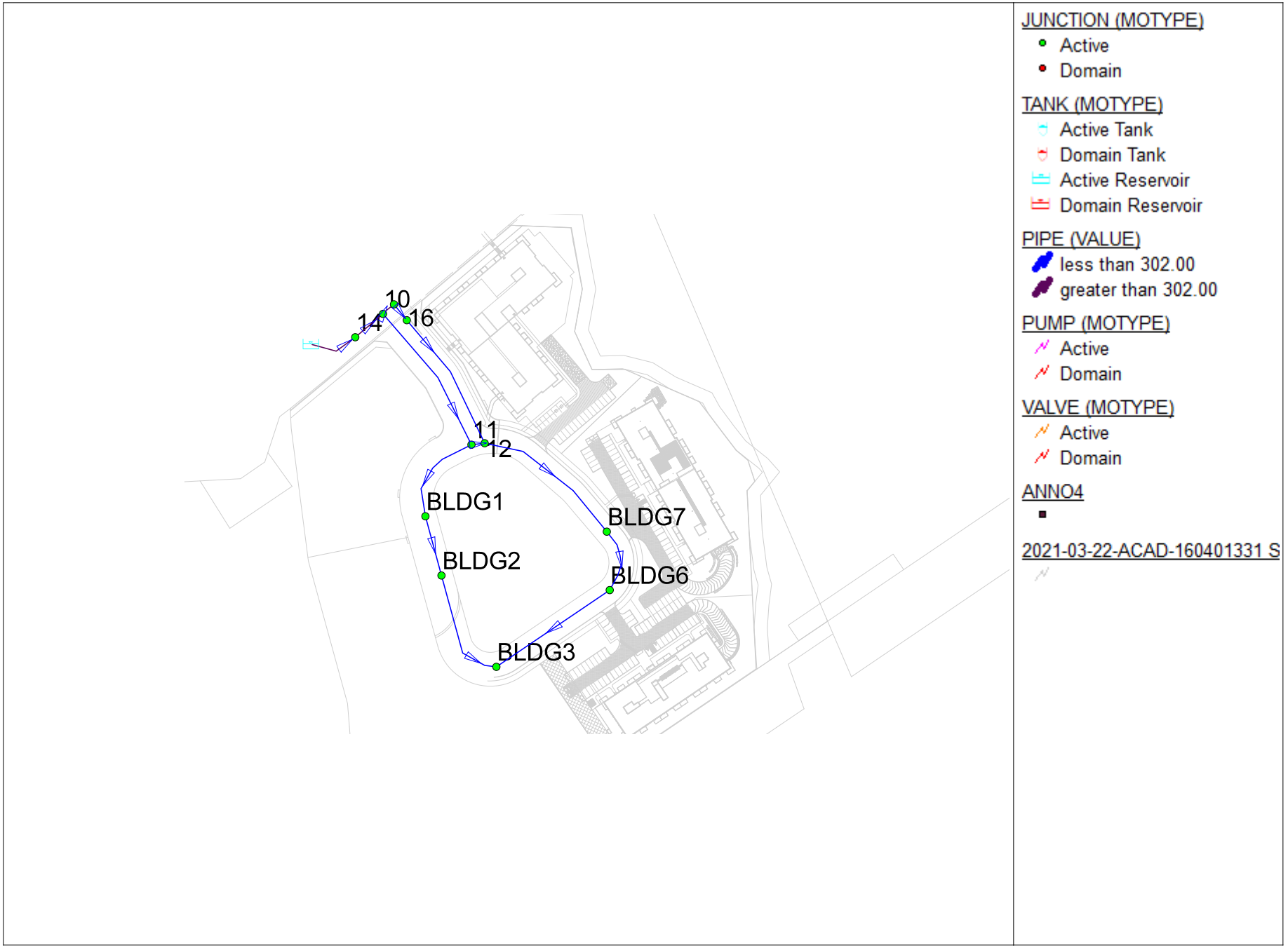
Pipe Results

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	(mm)		(L/s)	(m/s)
1	1000	14	25.84	393	120	16.62	0.14
11	12	11	7.05	204	110	-0.30	0.01
12	12	16	78.14	204	110	-5.97	0.18
13	13	10	7.80	393	120	-9.87	0.08
15	16	13	10.83	204	110	-9.87	0.30
2	14	10	19.33	393	120	16.62	0.14
3	10	11	84.72	204	110	6.75	0.21
4	BLDG1	11	51.80	204	110	-6.45	0.20
5	BLDG2	BLDG1	32.66	204	110	-4.85	0.15
6	BLDG3	BLDG2	62.45	204	110	-3.25	0.10
7	BLDG3	BLDG6	72.85	204	110	-0.44	0.01
8	BLDG6	BLDG7	34.69	204	110	-3.15	0.10
9	BLDG7	12	82.99	204	110	-6.27	0.19

Hydraulic Model Results -Fire Flow Analysis

ID	Static Demand	Static Pressure		Static Head	Fire-Flow Demand	Residual Pressure		Available Flow at Hydrant	Available Flow Pressure	
	(L/s)	(psi)	(Kpa)	(m)	(L/s)	(psi)	(Kpa)	L/s	(psi)	(Kpa)
16	1.8	82.16	566.48	110	283	76.54	527.73	1050.82	20	137.90
BLDG1	0.73	77.16	532.00	109.99	335	35.02	241.46	396.50	20	137.90
BLDG2	0.73	75.89	523.25	109.99	289	38.08	262.55	358.66	20	137.90
BLDG3	1.68	75.75	522.28	109.98	182	57.17	394.18	334.64	20	137.90
BLDG6	1.23	74.9	516.42	109.98	250	43.08	297.03	338.39	20	137.90
BLDG7	1.42	76.03	524.21	109.98	250	47.11	324.81	360.68	20	137.90

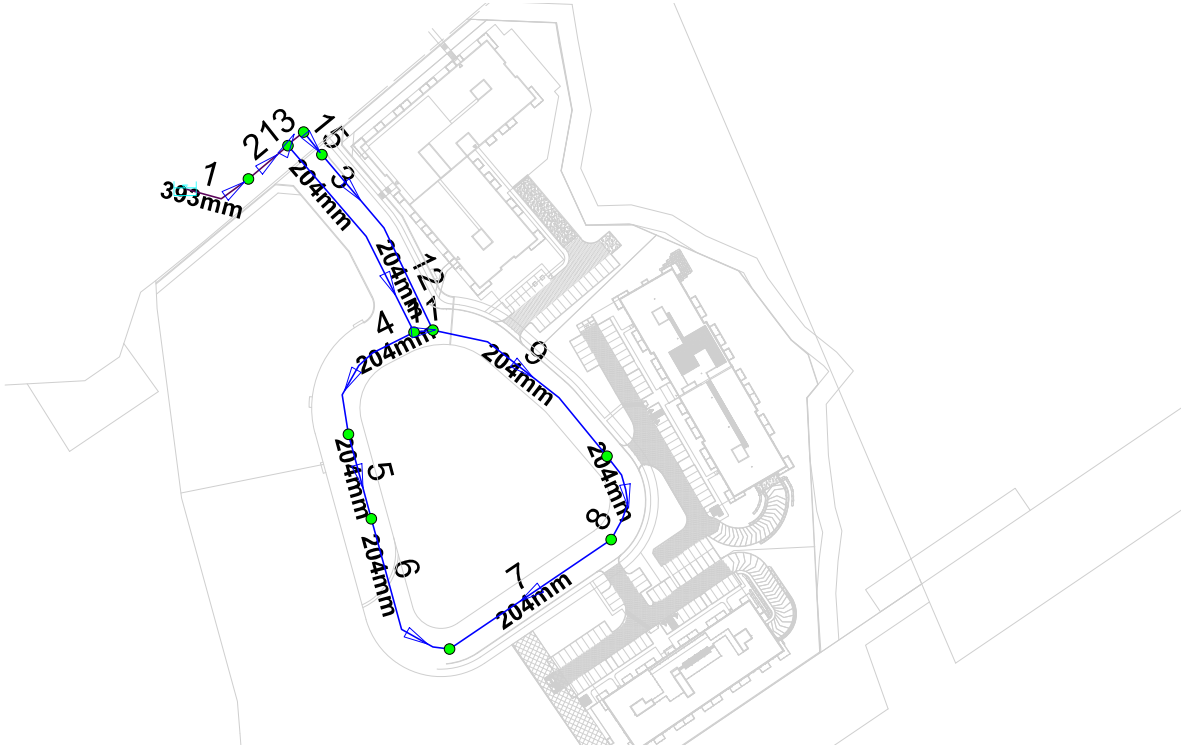
16041331-Blk8



Prepared By: N.Nwanise

Date: Wednesday, March 24, 2021

16041331-Blk8



JUNCTION (MOTYPE)
- Active
- Domain

TANK (MOTYPE)
- Active Tank
- Domain Tank
- Active Reservoir
- Domain Reservoir

PIPE (VALUE)
- less than 302.00
- greater than 302.00

PUMP (MOTYPE)
- Active
- Domain

VALVE (MOTYPE)
- Active
- Domain

ANNO3

2021-03-22-ACAD-160401331 S

ANNO5

Prepared By: N.Nwanise

Date: Wednesday, March 24, 2021

Appendix B SANITARY SEWER CALCULATIONS

Stantec

SUBDIVISION: **Petries Landing Block 8**

DATE: March 15, 2021
REVISION: 2
DESIGNED BY: NN
CHECKED BY: AMP

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401331

XML Conversion

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	28,000.00	L/ha/day	MAXIMUM VELOCITY	3.00	m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL	55,000.00	L/ha/day	MANNINGS n	0.013	
PEAKING FACTOR (COMM., INST.):	1.5	INSTITUTIONAL	50,000.00	L/ha/day	BEDDING CLASS	C	
PERSONS / 3 Bedroom apt.	3.1	INFILTRATION	0.33	L/s/ha	MINIMUM COVER	2.50	m
PERSONS / 2 bedroom apt.	2.1						
PERSONS /1 Bedroom apt.	1.4						

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INDUST		INSTIT		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	3 Bed	2 bed	UNITS 1 bed	Studio	POP.	CUMULATIVE AREA	POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	TOTAL FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)						(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(m)	(mm)			(%)	(L/s)	(%)	(m/s)	(m/s)
R100A, G100A	BLK 8	SAN100	0.460	4	16	90	2	175	0.46	175	4.00	2.27	0.00	0.00	0.00	0.00	0.00	0.00	0.290	0.29	0.00	0.750	0.75	0.25	2.51	3.2	200	PVC	SDR-35	1.00	33.31	7.55	1.05	0.52
	SAN100	EX. MH6	0.000	0	0	0	0	0	0.46	175	4.00	2.27	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.29	0.00	0.000	0.75	0.25	2.51	13.3	200	PVC	SDR-35	1.00	33.31	7.55	1.05	0.52
																											300							

Appendix C STORMWATER MANAGEMENT CALCULATIONS

Stormwater Management Calculations

File No: **160401331**
Project: **Petries Landing - Block 8**
Date: **24-Mar-21**
Revision **1**

SWM Approach:
Limit Site to 99.5 L/s

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
Controlled - Tributary	F1001A	Hard	0.043	0.9	0.038		
Parking		Soft	0.028	0.2	0.006		
		Subtotal		0.071		0.04402	0.620
Controlled - Tributary	F1001B	Hard	0.039	0.9	0.035		
Parking		Soft	0.016	0.2	0.003		
		Subtotal		0.055		0.0385	0.700
RAMP - Bldg	F1002A	Hard	0.022	0.9	0.020		
Uncontrolled - Tributary		Soft	0.000	0.2	0.000		
		Subtotal		0.022		0.0198	0.900
Parking Deck - Bldg	F1002B	Hard	0.008	0.9	0.008		
Uncontrolled - Tributary		Soft	0.058	0.2	0.012		
		Subtotal		0.066		0.01914	0.290
Roof	R1002A	Hard	0.291	0.9	0.262		
BLDG		Soft	0.000	0.2	0.000		
		Subtotal		0.291		0.2619	0.900
Uncontrolled - Non-Tributary	UNC-1	Hard	0.021	0.9	0.019		
		Soft	0.222	0.2	0.044		
		Subtotal		0.243		0.06318	0.260
Total				**0.748**		**0.447**	
Overall Runoff Coefficient= C:							**0.60**

Total Roof Areas	**0.291 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.214 ha**
Total Tributary Area to Outlet	**0.505 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.243 ha**
Total Site	**0.748 ha**

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 8
Modified Rational Method Calculatons 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

100 YEAR Target Release from Block 8

SWM Appoach: Limit site to 99.5 L/s
Area (ha): 0.748
C: 0.55

Qtarget(100 yr) (L/s)
99.50

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: F1001A — Controlled - Tributary
Area (ha): 0.071
C: 0.62

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	9.40	9.40	0.00	**0.00**
20	52.03	6.37	6.37	0.00	**0.00**
30	40.04	4.90	4.90	0.00	**0.00**
40	32.86	4.02	4.02	0.00	**0.00**
50	28.04	3.43	3.43	0.00	**0.00**
60	24.56	3.01	3.01	0.00	**0.00**
70	21.91	2.68	2.68	0.00	**0.00**
80	19.83	2.43	2.43	0.00	**0.00**
90	18.14	2.22	2.22	0.00	**0.00**
100	16.75	2.05	2.05	0.00	**0.00**
110	15.57	1.91	1.91	0.00	**0.00**
120	14.56	1.78	1.78	0.00	**0.00**

Storage: Surface Storage Above CB

Orifice Equation: $Q = CdA(2gh)^{0.5}$ Where C = 0.61

Orifice Diameter:	90.00	mm
Invert Elevation	53.11	m
T/G Elevation	54.49	m
Max Ponding Depth	0.00	m
Downstream W/L	0.00	m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Leve	54.49	1.38	20.19	0.00	4.10	OK

Project #160401331, Petries Landing - Block 8
Modified Rational Method Calculatons 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 Modified Rational Method for Entire Site

Subdrainage Area: F1001A — Controlled - Tributary
Area (ha): 0.071
C: 0.78

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	27.31	21.26	6.05	**3.63**
20	119.95	18.35	18.35	0.00	0.00
30	91.87	14.05	14.05	0.00	0.00
40	75.15	11.49	11.49	0.00	0.00
50	63.95	9.78	9.78	0.00	0.00
60	55.89	8.55	8.55	0.00	0.00
70	49.79	7.62	7.62	0.00	0.00
80	44.99	6.88	6.88	0.00	0.00
90	41.11	6.29	6.29	0.00	0.00
100	37.90	5.80	5.80	0.00	0.00
110	35.20	5.38	5.38	0.00	0.00
120	32.89	5.03	5.03	0.00	0.00

Storage: Surface Storage Above CB

Orifice Equation: $Q = CdA(2gh)^{0.5}$ Where C = 0.61

Orifice Diameter:	90.00	mm
Invert Elevation	53.11	m
T/G Elevation	54.49	m
Max Ponding Depth	0.15	m
Downstream W/L	51.45	m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Leve	54.64	1.53	21.26	3.63	4.10	OK
					0.47	

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: F1001B — Controlled - Tributary
Area (ha): 0.055
C: 0.70

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	8.22	5.78	2.44	**1.46**
20	52.03	5.57	5.57	0.00	0.00
30	40.04	4.29	4.29	0.00	0.00
40	32.86	3.52	3.52	0.00	0.00
50	28.04	3.00	3.00	0.00	0.00
60	24.56	2.63	2.63	0.00	0.00
70	21.91	2.35	2.35	0.00	0.00
80	19.83	2.12	2.12	0.00	0.00
90	18.14	1.94	1.94	0.00	0.00
100	16.75	1.79	1.79	0.00	0.00
110	15.57	1.67	1.67	0.00	0.00
120	14.56	1.56	1.56	0.00	0.00

Storage: Surface Storage Above CB

LMF: Vortex LMF 70
Invert Elevation 52.46 m
T/G Elevation 54.26 m
Max Ponding Depth 0.00 m
Downstream W/L 51.45 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Leve	54.26	1.80	5.78	1.46	13.73	OK

Subdrainage Area: F1002A — RAMP - Bldg
Area (ha): 0.022
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	4.23	4.23		
20	52.03	2.86	2.86		
30	40.04	2.20	2.20		
40	32.86	1.81	1.81		
50	28.04	1.54	1.54		
60	24.56	1.35	1.35		
70	21.91	1.21	1.21		
80	19.83	1.09	1.09		
90	18.14	1.00	1.00		
100	16.75	0.92	0.92		
110	15.57	0.86	0.86		
120	14.56	0.80	0.80		

Subdrainage Area: F1002B — Parking Deck - Bldg
Area (ha): 0.066
C: 0.29

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	4.09			
20	52.03	2.77			
30	40.04	2.13			
40	32.86	1.75			
50	28.04	1.49			
60	24.56	1.31			
70	21.91	1.17			
80	19.83	1.06			
90	18.14	0.97			
100	16.75	0.89			
110	15.57	0.83			
120	14.56	0.77			

Subdrainage Area: R1002A — Roof
Area (ha): 0.291 — Maximum Storage Depth: 150 mm
C: 0.900

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	55.92	9.82	46.10	27.66	91.4	0.00
20	52.03	37.88	10.29	27.59	33.11	98.3	0.00
30	40.04	29.15	10.35	18.80	**33.84**	99.2	0.00
40	32.86	23.93	10.26	13.67	32.80	97.9	0.00
50	28.04	20.42	10.10	10.31	30.94	95.6	0.00
60	24.56	17.88	9.91	7.97	28.70	92.7	0.00
70	21.91	15.95	9.70	6.26	26.28	89.7	0.00
80	19.83	14.44	9.48	4.96	23.80	86.6	0.00
90	18.14	13.21	9.26	3.95	21.31	83.5	0.00
100	16.75	12.19	9.05	3.14	18.86	80.4	0.00
110	15.57	11.34	8.84	2.49	16.46	77.4	0.00
120	14.56	10.60	8.62	1.98	14.25	74.3	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Leve	99.19	0.10	10.35	33.84	116.40	0.00

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.243
C: 0.26

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	13.49	13.49		
20	52.03	9.14	9.14		
30	40.04	7.03	7.03		
40	32.86	5.77	5.77		
50	28.04	4.93	4.93		
60	24.56	4.31	4.31		
70	21.91	3.85	3.85		
80	19.83	3.48	3.48		
90	18.14	3.19	3.19		
100	16.75	2.94	2.94		
110	15.57	2.73	2.73		
120	14.56	2.56	2.56		

SUMMARY TO OUTLET

Project #160401331, Petries Landing - Block 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: F1001B — Controlled - Tributary
Area (ha): 0.055
C: 0.88

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	23.89	6.02	17.87	10.72
20	119.95	16.05	6.02	10.02	**12.03**
30	91.87	12.29	6.02	6.27	11.28
40	75.15	10.05	6.02	4.03	9.67
50	63.95	8.56	6.02	2.53	7.60
60	55.89	7.48	6.02	1.45	5.24
70	49.79	6.66	6.02	0.64	2.68
80	44.99	6.02	6.02	0.00	0.00
90	41.11	5.50	5.50	0.00	0.00
100	37.90	5.07	5.07	0.00	0.00
110	35.20	4.71	4.71	0.00	0.00
120	32.89	4.40	4.40	0.00	0.00

Storage: Surface Storage Above CB

LMF: Vortex LMF 70
Invert Elevation 52.46 m
T/G Elevation 54.26 m
Max Ponding Depth 0.15 m
Downstream W/L 51.45 m

Pipe Storage:
Diameter (mm): 900
Length (m): 9.00
Area (m2): 0.64
Volume (m3): 5.73

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Leve	54.41	1.95	6.02	12.03	13.73	OK
					1.70	

Subdrainage Area: F1002A — RAMP - Bldg
Area (ha): 0.022
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	10.92	10.92		
20	119.95	7.34	7.34		
30	91.87	5.62	5.62		
40	75.15	4.60	4.60		
50	63.95	3.91	3.91		
60	55.89	3.42	3.42		
70	49.79	3.05	3.05		
80	44.99	2.75	2.75		
90	41.11	2.51	2.51		
100	37.90	2.32	2.32		
110	35.20	2.15	2.15		
120	32.89	2.01	2.01		

Subdrainage Area: F1002B — Parking Deck - Bldg
Area (ha): 0.066
C: 0.3625

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	11.88			
20	119.95	7.98			
30	91.87	6.11			
40	75.15	5.00			
50	63.95	4.25			
60	55.89	3.72			
70	49.79	3.31			
80	44.99	2.99			
90	41.11	2.73			
100	37.90	2.52			
110	35.20	2.34			
120	32.89	2.19			

Warning, max. volume may not have been reached.

Subdrainage Area: R1002A — Roof
Area (ha): 0.291 — Maximum Storage Depth: 150 mm
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	144.45	12.56	131.89	79.13	131.0	0.00
20	119.95	97.04	13.32	83.72	100.47	141.9	0.00
30	91.87	74.32	13.53	60.79	109.42	145.0	0.00
40	75.15	60.79	13.76	47.04	112.89	148.2	0.00
50	63.95	51.74	13.79	37.95	**113.84**	148.7	0.00
60	55.89	45.22	13.77	31.45	113.22	148.4	0.00
70	49.79	40.28	13.71	26.57	111.59	147.5	0.00
80	44.99	36.40	13.63	22.77	109.29	146.4	0.00
90	41.11	33.26	13.53	19.73	106.53	145.0	0.00
100	37.90	30.66	13.42	17.24	103.45	143.4	0.00
110	35.20	28.48	13.30	15.17	100.14	141.7	0.00
120	32.89	26.61	13.18	13.43	96.69	140.0	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Leve	148.70	0.15	13.79	113.84	116.40	0.00

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.243
C: 0.33

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	39.20	39.20		
20	119.95	26.34	26.34		
30	91.87	20.17	20.17		
40	75.15	16.50	16.50		
50	63.95	14.04	14.04		
60	55.89	12.27	12.27		
70	49.79	10.93	10.93		
80	44.99	9.88	9.88		
90	41.11	9.03	9.03		
100	37.90	8.32	8.32		
110	35.20	7.73	7.73		
120	32.89	7.22	7.22		

SUMMARY TO OUTLET

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 8
Modified Rational Method Calculatons for Storage

Tributary Area	0.505 ha
Total 2yr Flow to Sewer	45.3 L/s
Non-Tributary Area	0.243 ha
Total Uncontrolled 2yr Flow	13.5 L/s
Total 2year Flow	58.8 L/s
Target	99.5 L/s

Project #160401331, Petries Landing - Block 8
Modified Rational Method Calculatons for Storage

Tributary Area	0.505 ha
Total 100yr Flow to Sewer	63.9 L/s
Non-Tributary Area	0.243 ha
Total Uncontrolled 100yr Flow	39.2 L/s
Total 100year Flow	103.1 L/s
Target	99.5 L/s
	3.6 L/s

Project #160401331, Petries Landing - Block 8
Roof Drain Design Sheet, Area BLDG
Standard Watts Drainage Model R1100 Accuflow Roof Drains

Rating Curve				Volume Estimation				
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	Water Depth (m)
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0035	1	0.025	65	1	1	0.025
0.050	0.0006	0.0069	4	0.050	259	4	4	0.050
0.075	0.0008	0.0087	15	0.075	582	10	15	0.075
0.100	0.0009	0.0104	34	0.100	1035	20	34	0.100
0.125	0.0011	0.0121	67	0.125	1617	33	67	0.125
0.150	0.0013	0.0139	116	0.150	2328	49	116	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
3.8	543.6	3.8	0.15099
14.0	1180.3	10.2	0.47885
34.0	1915.4	19.9	1.0109
66.8	2706.7	32.9	1.76275
115.9	3533.1	49.0	2.74417

Rooftop Storage Summary

Total Building Area (sq.m)		2910
Assume Available Roof Area (sq.	80%	2328
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		11
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		116
Estimated 100 Year Drawdown Time (h)		2.7

* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).

From Watts Drain Catalogue

Head (m)	L/s Open	75%	**50%**	25%	Closed
0.025	0.3155	0.31545	**0.31545**	0.31545	0.31545
0.050	0.6309	0.6309	**0.6309**	0.6309	0.6309
0.075	0.9464	0.86749	**0.78863**	0.70976	0.6309
0.100	1.2618	1.10408	**0.94635**	0.78863	0.6309
0.125	1.5773	1.34067	**1.10408**	0.86749	0.6309
0.150	1.8927	1.57726	**1.2618**	0.94635	0.6309

* Note: Number of drains can be reduced if multiple-notch drain used.

Calculation Results	**5yr**	**100yr**	**Available**
Qresult (cu.m/s)	0.010	0.014	-
Depth (m)	0.099	0.149	0.150
Volume (cu.m)	33.8	113.8	116.4
Draintime (hrs)	1.0	2.7	

	VORTEX ICD OPENING SIZE								
Head (m)	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**
0.10	0.42	0.57	0.73	0.90	1.05	1.15	1.30	1.59	1.81
0.20	0.59	0.80	1.02	1.23	1.47	1.60	1.88	2.24	2.56
0.30	0.73	0.98	1.24	1.49	1.79	1.96	2.32	2.74	3.13
0.40	0.85	1.14	1.43	1.72	2.06	2.27	2.69	3.16	3.61
0.50	0.95	1.27	1.59	1.91	2.30	2.54	3.02	3.54	4.04
0.60	1.04	1.39	1.75	2.09	2.52	2.78	3.31	3.87	4.43
0.70	1.13	1.51	1.88	2.26	2.71	3.01	3.58	4.18	4.78
0.80	1.21	1.61	2.02	2.42	2.90	3.22	3.83	4.47	5.11
0.90	1.28	1.71	2.14	2.56	3.07	3.42	4.07	4.75	5.42
1.0	1.35	1.80	2.25	2.70	3.24	3.60	4.29	5.00	5.71
1.2	1.48	1.98	2.47	2.96	3.55	3.95	4.71	5.48	6.26
1.4	1.61	2.14	2.67	3.20	3.83	4.27	5.09	5.92	6.76
1.6	1.72	2.29	2.85	3.42	4.09	4.57	5.45	6.33	7.23
1.8	1.82	2.43	3.03	3.63	4.34	4.85	5.78	6.72	7.67
2.0	1.93	2.56	3.19	3.83	4.57	5.12	6.10	7.08	8.08
2.5	2.16	2.86	3.57	4.28	5.10	5.73	6.83	7.92	9.04
3.0	2.37	3.14	3.91	4.69	5.59	6.29	7.49	8.67	9.90
5	3.06	4.06	5.06	6.07	7.21	8.14	9.68	11.20	12.78
7	3.63	4.80	5.99	7.19	8.52	9.65	11.46	13.26	15.12
9	4.12	5.45	6.80	8.16	9.66	10.95	13.01	15.04	17.15
11	4.56	6.03	7.52	9.02	10.68	12.12	14.38	16.63	18.96
13	4.96	6.55	8.17	9.81	11.60	13.18	15.64	18.08	20.61
15	5.33	7.04	8.78	10.54	12.46	14.17	16.81	19.42	22.14

Stantec

Petries Landing Block 8

DATE: 2021-03-24
REVISION: 1
DESIGNED BY: NN
CHECKED BY: AMP

FILE NUMBER: **160401331**

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 (2YR) AxC (ha)	A x C (5-YEAR) (ha)	ACCUM. (5YR) AxC (ha)	A x C (10-YEAR) (ha)	ACCUM. (10YR) AxC (ha)	A x C (100-YEAR) (ha)	ACCUM. (100YR) AxC (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 DIAMETEI (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
R1002A, F1002A, F1002B	STM STUB	STM1000	0.00	0.00	0.00	0.09	0.29	0.00	0.00	0.00	0.44	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.039	10.00	76.81	104.19	122.14	178.56	13.80	13.8	33.1	2.0	250	250	CIRCULAR	PVC	-	1.00	60.4	**54.83%**	1.22	1.07	0.03
																				10.03																		
F1001A, F1001B	CBMH1001	STM1000	0.13	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.083	0.083	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	17.6	32.3	375	375	CIRCULAR	PVC	-	0.50	116.6	**15.10%**	1.11	0.66	0.82
																				10.82																		
	STM1000	EX. MH6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.083	0.000	0.000	0.000	0.000	0.000	0.039	10.82	73.79	100.05	117.26	171.39	0.0	13.8	49.3	14.3	375	375	CIRCULAR	PVC	-	0.50	116.6	**42.26%**	1.11	0.90	0.27
																				11.09									675									

Appendix D BACKGROUND REPORTS EXCERPTS

Site Servicing and Stormwater Management Brief – Petrie's Landing Block 6, 7 and 8 (D07-12-17-0093), Ottawa, ON

File: 160401331/83

Prepared for:
Brigil Homes

Prepared by:
Stantec Consulting Ltd.

September 19, 2018

Revision Record							
Revision	Description	Prepared by		Checked by		Approved by	
0	1st submission	A. Paerez	05/24/2017	K. Kilborn	05/24/2017	A. Paerez	05/24/2017
1	2nd submission	A. Paerez	01/12/2017	K. Kilborn	01/18/2018	A. Paerez	01/22/2018
2	3rd submission	A. Paerez	03/21/2018	K. Kilborn	03/22/2018	A. Paerez	03/23/2018
3	4th submission	A. Paerez	07/05/2018	K. Kilborn	07/05/2018	A. Paerez	07/05/2018
4	5th submission	A. Paerez	07/26/2018	K. Kilborn	07/26/2018	A. Paerez	07/26/2018
5	6th submission	A. Paerez	09/04/2018	K. Kilborn	09/05/2018	A. Paerez	09/05/2018
6	7th submission	A. Paerez	09/19/2018	K. Kilborn	09/19/2018	A. Paerez	09/19/2018

Sign-off Sheet

This document entitled Site Servicing and Stormwater Management Brief – Petrie's Landing Block 6, 7 and 8 (D07-12-17-0093), Ottawa, ON was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Brigil Homes (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Approved by 

(signature)

Ana M. Paerez, P. Eng.

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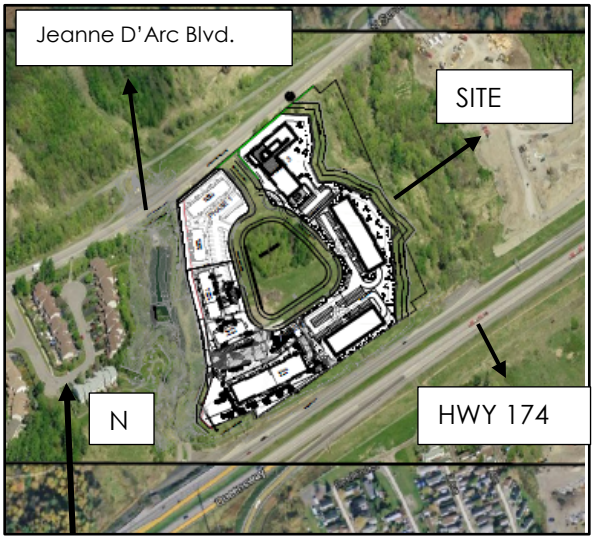
1.0 INTRODUCTION AND OBJECTIVE

The following site servicing and stormwater management (SWM) report has been revised to address City comments to the previous submission. A letter summarizing the City comments and Stantec's responses has been included in **Appendix F**. Specifically, the 4R plan has been revised to match the new property lines and a catchbasin has been added to ensure full capture of the 100-year runoff from area F201A. However, the results of the servicing analyses remain the same as those previously submitted. The drawings have been revised to reflect the revisions.

Stantec Consulting Ltd. has been retained by Brigil Homes to prepare the following site servicing and stormwater management (SWM) brief to satisfy the City of Ottawa Site Plan Control Application process. The 2.14 ha site is located on Prestige Circle, with the Highway 174 to the south, Jeanne D'Arc Boulevard to the north, a residential development to the east, and Brisebois Creek and its associated stormwater management (SWM) facility to the west in the city of Ottawa (see **Figure 1** below).

Block 6 of the proposed development makes up 0.61 ha of the proposed site and consists of a four-storey residential building with associated surface and underground parking, and landscaped areas. Block 7 of the proposed development makes up 0.76 ha of the proposed site and consists of a four-storey residential building with associated surface and underground parking, and landscaped areas. Similarly, Block 8 of the proposed development makes up 0.77 ha of the proposed site and consists of a four-storey residential building with associated surface and underground parking, and landscaped areas. A copy of the proposed site plan prepared by Neuf Architects Inc. can be found in **Appendix B**.

Figure 1: Site Location



1.1 BACKGROUND

Blocks 6 and 7 of the proposed development are within Phase 2 of the Petrie's Landing Development which was previously designed by IBI Group in February 2014 in support of a site plan application for phase 2 and subsequently approved by the City of Ottawa (see report excerpts in **Appendix E**). Phase 1 and Blocks 3, 4 and 5 within Phase 2 of the overall development have been built.

However, the site plan within Blocks 6 and 7 has changed and the proposed site plan for Block 8, previously referenced as Phase 3, has been added to the site plan application.

1.2 OBJECTIVE

This site servicing and SWM brief has been prepared to present a servicing scheme that is free of conflicts and which utilizes the existing infrastructure as obtained from available as-built drawings. Infrastructure requirements for water supply, sanitary and storm sewer services are presented in this report.

Criteria and constraints provided in the background documents have been used as a basis for the servicing design of the proposed development. Specific elements and potential development constraints to be addressed are as follows:

- Prepare a grading plan in accordance with the proposed site plan and existing grades
- Storm Sewer Servicing
    - Define major and minor conveyance systems in conjunction with the grade control plan
    - Determine the stormwater management storage requirements to meet the allowable release rates for the site
    - Size and design inlet control devices (ICDs) to restrict minor system peak flows and meet the target release rates from the site
- Wastewater Servicing
    - Size the sanitary service laterals
- Water Servicing
    - Provide feeds to the proposed buildings from the existing 200 mm diameter watermain along Prestige Circle
    - 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 40 to 80 psi (275 to 552 kPa)
    - Provide Fire Underwriter Survey (FUS) fire demand calculations and ensure fire demands for the proposed buildings are equal or below the values assumed in the hydraulic analysis presented in the background documents

The accompanying drawings included in the back of this report illustrate the internal servicing scheme for the site.

2.0 REFERENCES

The following background studies have been referenced during the servicing design of the proposed site:

- *Design Brief Petrie's Landing II Phase 2, IBI Group., February 7, 2014*
- *Geotechnical Investigation*, Proposed Multi-Storey Buildings Block 6, 7 and 8 – Petrie's Landing II, Ottawa, Ontario, Paterson group, May 24, 2017
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010
- *City of Ottawa Sewer Design Guidelines*, City of Ottawa, October 2012
- *Technical Bulletin ISDTB-2014-01,* City of Ottawa, February 2014
- *Technical Bulletin PIEDTB -2016-01,* City of Ottawa, September 6, 2016

3.0 WATER DISTRIBUTION

Given that the revised site plan has nearly the same proposed population (two units less in Block 7), same building floor space and water servicing layout, it is expected that the resulting water demands, and pressures will be practically the same as outlined in the previous submissions which are summarized in the sub-sections below.

3.1 BACKGROUND

The four-storey buildings within Blocks 6, 7 and 8 are proposed to be apartment buildings with underground parking. The proposed buildings in Block 6, 7 and 8 have total floor space of approximately 1,530 m^2 (0.15 ha), 1,970 m^2 (0.20 ha), and 2,360 m^2 (0.24 ha) respectively, and are proposed to connect to the existing 200 mm diameter watermain along Prestige Circle as shown on the Site Plan (see **Drawing SSP-1**).

A detailed hydraulic analysis for the overall Petrie's Landing Development was included in the 2014 Petrie's Landing Design Brief prepared by IBI (see **Appendix E**). However, the FUS calculations for the proposed buildings generated higher fire flow demands than the values assumed in IBI's hydraulic analysis. As a result, the hydraulic analysis for the overall development was revised using the same boundary conditions as per IBI's model, but with the revised water and fire flow demands for the proposed Blocks 6, 7 and 8 as shown in the following sections. Detailed calculations and the revised hydraulic model results have been included in **Appendix A**.

3.2 WATER DEMANDS

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (July 2010) to determine the typical operating pressures to be expected at the buildings. A daily rate of 350 L/cap/day has been applied for the population of the proposed site. Population densities have been assumed as 1.4 persons/unit for one-bedroom units and 2.1 persons/unit for two-bedroom units. The Maximum Day (MXDY) residential demand was determined by multiplying the Average Day (AVDY) demand by a factor of 2.5 and the Peak Hour (PKHR) residential demand was determined by multiplying the MXDY demand by a factor of 2.2. The estimated demands are summarized in **Table 1**.

Table 1: Estimated Water Demands

Building ID	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Block 6	122	0.49	1.23	2.17
Block 7	140	0.57	1.42	3.12
Block 8	141	0.57	1.43	3.15
Total	**403**	**1.63**	**4.08**	**8.98**

The fire flow requirements were calculated in accordance with the Fire Underwriters Survey (FUS) and determined to be approximately 15,000 L/min (250 L/s) for Block 6, 15,000 L/min (250 L/s) for Block 7, and 20,000 L/min (333 L/s) for Block 8. Wood frame construction was considered in the assessment for fire flow requirements according to the FUS Guidelines. The FUS Guidelines indicate that low hazard occupancies include apartments, dwellings, dormitories, hotels, and schools, and as such, a low hazard occupancy/ limited combustible building contents and sprinkler systems was applied to the calculations. A two-hour fire separation has been considered at the center of block 7 to reduce the fire flow requirements.

The boundary conditions listed below were provided by the City of Ottawa to IBI Group and used in their 2014 hydraulic analysis for the overall development, which included buildings one to eight. Since the number of apartment units has not drastically increased in the proposed site plan, the previous boundary conditions were considered reasonable and a conservative estimate and were used in the revised hydraulic analysis for the overall site (see model results in **Appendix A**).

Peak Hour = 108.0m

Max Day + Fire Flow = 110.0m

Average Day = 115.0m

3.3 HYDRAULIC MODEL RESULTS

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

A hydraulic model of the water supply system was created by Stantec to assess the proposed watermain layout under the above demands and during fire flow scenarios. Results of the hydraulic modeling demonstrate that adequate flows are available for the proposed buildings as shown in **Table 2**.

Table 2: Hydraulic Model Results Summary

Model Node ID	Average Day Analysis Pressure (psi)	Peak Hour Analysis Pressure (psi)
BLDG6	82.02	71.94
BLDG7	83.16	73.08
BLDG8	85.16	75.11

The above table shows that under normal operating conditions, pressures at ground level of the proposed buildings range from **72 psi** to **85 psi**. These values exceed the desired pressure range

of 80 psi as defined by MOECC and City of Ottawa design guidelines. As a result, it is recommended that pressure reducing valves be installed. Results of the hydraulic model analysis can be found in **Appendix A**.

A fire flow analysis was carried out using the hydraulic model to determine the anticipated amount of flow that could be provided for the proposed development under maximum day demands and fire flow requirements per the FUS methodology. Results of the modeling analysis indicate that flows in excess of the required fire flow rate can be delivered while still maintaining a residual pressure of 140 kPa (20 psi). Results of the hydraulic modeling are included for reference in **Appendix A**.

3.4 SUMMARY OF FINDINGS

Based on the results of the hydraulic analysis, it is recommended that pressure reducing valves be installed at each building to ensure normal operating pressures remain within City of Ottawa required limits. The hydraulic model also indicates that fire flow requirements can be achieved at all locations while still maintaining the minimum residual pressure per City requirements.

4.0 SANITARY SEWER

As illustrated on **Drawing SSP-1**, sanitary servicing for the proposed development will be provided through the existing 300 mm diameter sanitary sewer along Prestige Circle.

The proposed 2.14 ha development will consist of three four-storey apartment buildings, surface parking, underground parking, and associated access infrastructure. The anticipated wastewater peak flows generated from the proposed development are summarized in **Table 3** below:

Table 3: Estimated Wastewater Peak Flow

Block	Residential Units				Infiltration Flow (L/s)	Total Peak Flow (L/s)
	# of Units	Population	Peak Factor	Peak Flow (L/s)		
Block 6	79	142	4.0	2.30	0.16	2.46
Block 7	90	162	4.0	2.63	0.23	2.86
Block 8	93	167	4.0	2.71	0.21	2.92
				Overall Site Peak Flow:		**8.24**

1. Average residential flow based on 350 L/p/day
2. Peak factor for residential units calculated using Harmon's formula
3. The exact number of one and two-bedroom apartments is not available at this time and as such, an average population of 1.8 persons/unit was used in the calculations
4. Infiltration flow based on 0.28 L/s/ha.

The Prestige Circle sanitary sewer design was based on the applicable City of Ottawa Design Guidelines and a preliminary concept plan for the overall Prestige Circle Development which consisted of 248 apartments and 170 retirements units for a total of 418 units.

The current concept plan for the overall development consists of 418 units, broken-down as follows:

- Existing Phase 1: 40 units
- Existing Phase 2: 116 units
- Proposed Block 6: 79 units
- Proposed Block 7: 90 units
- Proposed Block 8: 93 units

A detailed sanitary sewer design sheet for the proposed development is included in **Appendix C**. A backflow preventer will be required for the proposed buildings in accordance with the Ottawa sewer design guidelines and will be coordinated with building mechanical engineers.

All underground parking drains should be connected to the internal building plumbing.

4.1 SANITARY SEWER DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines and the Ministry of the Environment and Climate Change's (MOECC) Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewers:

- 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
- 1.4 persons/residential unit (1 bedroom)
- 2.1 persons/residential unit (2 bedroom)
- 1.8 person/residential unit (when number of bedroom not available)
- Harmon's Formula for Peak Factor – Max = 4.0
- Extraneous Flow Allowance – 0.28 L/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5 m

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The objective of this stormwater management (SWM) plan is to determine the measures necessary to control the quantity of stormwater released from the proposed development to the required levels, and to provide sufficient detail for approval and construction.

5.2 SWM CRITERIA AND CONSTRAINTS

The stormwater management criteria for the proposed site are based on IBI's 2014 Petrie's Landing II Phase 2 Site Servicing Report and City of Ottawa Sewer Design Guidelines. The following summarizes the criteria used in the preparation of this stormwater management plan:

- Stormwater runoff from the proposed Blocks 6, 7, and 8 up to and including the 100-year event to be stored on site and released into the minor system at a maximum rate of 290.6 L/s
- Maximum 100-year water depth of 0.3 m in parking and access areas
- Provide adequate emergency overflow conveyance (overland flow route) off-site
- Size storm sewers to convey 2-year storm event, assuming only roof controls are imposed (i.e. provide capacity for system without inlet control devices installed)
- Size storm sewers using an inlet time of concentration (Tc) of 10 minutes
- Quality control of runoff from the proposed development to be provided in the downstream Brisebois Creek SWM Facility prior to discharge into the Ottawa River
- Post-development runoff coefficient (C) value based on proposed impervious areas as per site plan drawing (see **Appendix B**)

5.3 STORMWATER MANAGEMENT DESIGN

The proposed 2.14 ha residential development consists of three (3) four-storey buildings with underground parking, landscaped areas and associated servicing infrastructure. The overall imperviousness of the site is 54% (C = 0.58).

Stormwater runoff from the proposed development will be directed to the existing storm sewers on Prestige Circle which ultimately discharge into the Brisebois Creek SWM Facility. Sump pumps and backwater valves will be provided for foundation drainage of the proposed buildings. The

proposed site plan and existing storm sewer infrastructure on Prestige Circle are shown on **Drawing SSP-1**.

5.3.1 Design Methodology

The proposed stormwater management plan is designed to detain runoff on the rooftops, underground and on surface areas to ensure that peak flows after construction will not exceed the target release rates for the site.

Due to the proposed site plan layout and grading restrictions, a landscaped portion of the site backing into the existing ravine east of the site could not be graded to enter the site's storm system and as such it will sheet drain uncontrolled. Runoff from this uncontrolled area is included in the overall site discharge calculations.

5.3.2 Water Quantity Control

The Modified Rational Method was used to assess the quantity and volume of runoff generated during post development conditions. The site was subdivided into subcatchments (subareas) tributary to storm sewer inlets, as defined by the location of catchbasins / inlet grates and used in the storm sewer design (see **Appendix D**). A summary of subareas and runoff coefficients is provided in **Appendix D**, and **Drawing SD-1** indicates the stormwater management subcatchments.

5.3.3 Allowable Release Rate

IBI's 2014 Petrie's Landing II Phase 2 Site Servicing Report outlines the quantity control criteria for the overall site. The report outlines that the minor system target criteria for Phase 2 is 361.87 L/s and 99.5 L/s for Phase 3.
The existing portion of Phase 2 discharges 170.77 L/s in the 100-year storm based on the ICD schedule, 100-year minor system capture from a parking ramp area, and runoff from 0.35 ha of uncontrolled area. As a result, the minor system peak flow target from Block 6 and 7 which are within Phase 2 is 191.1 L/s (140 L/s/ha). Similarly, the minor system peak flow target for the proposed Block 8 which corresponds to Phase 3 is 99.5 L/s. Minor system peak flows from the overall proposed development will be restricted to 290.6 L/s.

5.3.4 Storage Requirements

The site requires quantity control measures to meet the stormwater release criteria. It is proposed that restricted release rooftop drains be used to reduce the peak outflow from the site. Additionally, pipe storage and surface storage on parking areas will be provided. **Drawing SD-1** indicates the design release rate from the rooftops. Stormwater management calculations are provided in **Appendix D**.

5.3.4.1 Rooftop Storage

It is proposed to retain stormwater on the rooftops by installing restricted flow roof drains. The following calculations assume the roof will be equipped with Watts drains fully open, see **Appendix D** for details.

Watts roof drain data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the "Watts" roof drain has been used as an example only and that other products may be specified for use, provided that the roof release rate is restricted to match the maximum rate of release indicated in **Table 4** and **Table 5** and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater.

Table 4 and **Table 5** provide details regarding the retention of stormwater on the proposed rooftop during the 2 and 100-year storm events. Refer to **Appendix D** for details.

Table 4: Peak Controlled (Rooftop) 2-Year Release Rate

Area ID	Area (ha)	Head (m)	$Q_{release}$ (L/s)	V_{stored} (m^3)
BLDG Block 6	0.153	0.10	6.23	16.5
BLDG Block 7	0.197	0.10	8.63	20.4
BLDG Block 8	0.236	0.09	10.67	24.1

Table 5: Peak Controlled (Rooftop) 100-Year Release Rate

Area ID	Area (ha)	Head (m)	$Q_{release}$ (L/s)	V_{stored} (m^3)
BLDG Block 6	0.153	0.15	9.28	54.6
BLDG Block 7	0.197	0.15	12.89	67.8
BLDG Block 8	0.236	0.14	16.00	79.9

5.3.4.2 Surface Storage

In addition to rooftop storage, it is proposed to detain stormwater on the surface parking lot areas and in two pipe sections using inlet control devices (ICDs) in the proposed drainage structures. The modified rational method was used to determine the peak volume requirement for the parking areas. **Table 6** and **Table 7** summarize the proposed ICD characteristics.

Table 6: 2-Year ICD Characteristics

Area ID	Structure ID	Orifice Type	Head (m)	Release Rate (L/s)
F100B	STM100A	120mm Diameter Orifice	1.70	35.39
F102B	CB102A	83mm Diameter Orifice	2.34	7.09

Area ID	Structure ID	Orifice Type	Head (m)	Release Rate (L/s)
F201A	CB200B	102mm Diameter Orifice	1.75	9.20
F201B	CBMH200C	LMF 105	1.71	12.80
F202B	CB202A	83mm Diameter Orifice	1.36	1.84
F200B	CB200A	LMF70	1.92	5.98
F300A	CB300A	LMF70	1.90	5.94

1. 2-year runoff from F100B, F102B, F201A and F202B is less than the ICD release rate at the shown head (i.e. the release rate shown is the uncontrolled 100-year runoff).

Table 7: 100-Year ICD Characteristics

Area ID	Structure ID	Orifice Type	Head (m)	Release Rate (L/s)
F100B	STM100A	120mm Diameter Orifice	1.92	42.34
F102B	CB102A	83mm Diameter Orifice	2.42	20.60
F201A	CB200B	102mm Diameter Orifice	1.75	26.72
F201B	CBMH200C	LMF 105	1.92	13.57
F202B	CB202A	83mm Diameter Orifice	1.36	5.34
F200B	CB200A	LMF70	2.12	6.28
F300A	CB300A	LMF70	2.10	6.25

1. 100-year runoff from F102B, F201A and F202B is less than the ICD release rate at the shown head (i.e. the release rate shown is the uncontrolled 100-year runoff from the catchment).

5.3.4.3 Pipe Storage

14.0 m^3 of pipe storage will be provided in area F100B through 20.4m of 900 mm diameter pipe connected to STM100A as shown on **Drawing SD-1**. Similarly, 13.4 m^3 of pipe storage will be provided in area F201B through 25.0m of 825 mm diameter pipe connected to CBMH200C as shown on **Drawing SD-1.**

5.3.5 Uncontrolled Area

A small portion of the site fronting Prestige Circle and backing onto the ravine (see areas UNC-1, UNC-2, and UNC-3 on **Drawing SD-1**) could not be graded to enter the site's storm system and as such it will sheet drain uncontrolled. However, as can be seen on the storm drainage plan prepared by IBI for the entire site in 2014 (see report excerpts in **Appendix E**), the area behind the proposed buildings was not included in the SWM calculations and was assumed to drain towards the ravine. **Table 8** and **Table 9** summarize the 2 and 100-year uncontrolled release rates from the proposed development.

Table 8: Peak Uncontrolled (Non-tributary) 2-Year Release Rate

Area ID	Area (ha)	Runoff 'C'	Tc (min)	$Q_{release}$ (L/s)
UNC-1	0.203	0.20	10	8.7
UNC-2	0.028	0.20	10	1.2
UNC-3	0.368	0.20	10	15.7

Table 9: Peak Uncontrolled (Non-tributary) 100-Year Release Rate

Area ID	Area (ha)	Runoff 'C'	Tc (min)	$Q_{release}$ (L/s)
UNC-1	0.203	0.25	10	25.2
UNC-2	0.028	0.25	10	3.5
UNC-3	0.368	0.25	10	45.7

5.3.6 Results

The proposed buildings will have underground parking and as such, it is proposed that the proposed parking ramps be equipped with trench drains to capture the 100-year runoff. In addition, it is recommended that the proposed buildings be equipped with sump pumps and backwater valves. **Table 10** and **Table 11** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflows for the site.

Table 10: Estimated Discharge from Site (2-Year)

Block	Area Type	Area ID	V_{stored} (m^3)	$Q_{release}$ (L/s)	Target (L/s)
BLOCK 6	Controlled – Surface (Includes Roof area)	F100B, F102B, R100A	16.5	48.7	**290.6**
	Parking Ramp Area	F102A	-	6.3	
	Total Block 6		**16.5**	**55.0**	
BLOCK 7	Controlled – Surface (Includes Roof area)	F201A, F201B, F200B, F202B, R200A	25.3	38.4	
	Parking Ramp Area	F202A	-	9.4	
	Uncontrolled Areas	UNC-1, UNC-2	-	9.9	
	Total Block 7		**25.3**	**57.7**	

Block	Area Type	Area ID	V_{stored} (m^3)	$Q_{release}$ (L/s)	Target (L/s)
BLOCK 8	Controlled – Surface (Includes Roof area)	F300A, R300A	36.2	16.6	
	Parking Ramp Area	F300B	-	5.8	
	Uncontrolled Areas	UNC-3	-	15.7	
	Total Block 8		**36.2**	**38.1**	

Table 11: Estimated Discharge from Site (100-Year)

Block	Area Type	Area ID	V_{stored} (m^3)	$Q_{release}$ (L/s)	Target (L/s)
BLOCK 6	Controlled – Surface (Includes Roof area)	F100B, F102B, R100A	90.9	72.2	**290.6**
	Parking Ramp Area	F102A	-	16.4	
	Total Block 6		**90.9**	**88.6**	
BLOCK 7	Controlled – Surface (Includes Roof area)	F201A, F201B, F200B, F202B, R200A	107.2	64.8	
	Parking Ramp Area	F202A	-	25.8	
	Uncontrolled Areas	UNC-2, UNC-3	-	28.7	
	Total Block 7		**107.2**	**119.3**	
BLOCK 8	Controlled – Surface (Includes Roof area)	F300A, R300A	128.8	22.3	
	Parking Ramp Area	F300B	-	14.9	
	Uncontrolled Areas	UNC-3	-	45.7	
	Total Block 8		**128.8**	**82.9**	

As can be seen in the above tables, the proposed ICDs and storage provided restrict post development peak flows from site areas to 150.8 L/s and 290.8 L/s in the 2-year and 100-year storm events respectively. It is important to note that the ICDs have been sized to keep the minimum release rate at 6 L/s as per previous City comments.

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 2.14 ha in area. The site has significant grade change from the southwestern property limit adjacent to Brisebois Creek to the northeastern limit adjacent to Jeanne D'Arc Boulevard. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, to meet minimum cover requirements for storm and sanitary sewers, and to provide sufficient cover over top of the underground parking garage. Site grading has been established to provide emergency overland flow routes for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes to the existing Prestige Circle ROW and to the existing ravine the east of the proposed development as depicted on **Drawings GP-1** and **SD-1**.

7.0 UTILITIES

The subject site has existing plants within Prestige Circle to provide Hydro, Bell, Gas and Cable servicing for the proposed development as existing residential development to the west was constructed as part of Phase 1. It is anticipated that existing infrastructure will be sufficient to provide the means of distribution for the proposed site. Detailed design of the required utility services will be further investigated as part of the composite utility planning process following design circulation.

8.0 APPROVALS

As each proposed block will fall under separate plan of condominium with one owner and will have a separate drainage and storm sewer system discharging to a pre-existing sewer system, Ontario Ministry of the Environment, Conservation and Parks (MOECP) Environmental Compliance Approval (ECAs, formerly Certificates of Approval (CofA) under the Ontario Water Resources Act are not expected to be a requirement for the development to proceed.

A portion of the proposed Block 8 is within 120 m of the Petrie Island Provincially Significant Wetland, and as such, it is within the RVCA's regulatory jurisdiction. As a result, written approval from the RVCA is required under Ontario Regulation 174/06 "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation" under Section 28 of the Conservation Authorities Act.

Requirement for an MOECP Permit to Take Water (PTTW) for pumping during construction of the underground parking levels will be confirmed by the geotechnical consultant.

9.0 EROSION CONTROL DURING CONSTRUCTION

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit extent of 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 plastic or synthetic mulches.
6. Provide sediment traps and basins during dewatering.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Plan construction at proper time to avoid flooding.
9. Installation of a mud matt to prevent mud and debris from being transported off site.
10. Installation of a silt fence to prevent sediment runoff.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

1. Verification that water is not flowing under silt barriers.
2. Clean and change silt traps at catch basins.

Refer to **Drawing EC-DS** for the proposed location of silt fences, and other erosion control structures.

10.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was completed by Paterson Group Ltd. in May 24, 2017. The report summarizes the existing soil conditions within the subject area and construction recommendations. For details which are not summarized below, please see the original Paterson report (Excerpts included in **Appendix E**).

Subsurface soil conditions within the subject area were determined from 6 boreholes distributed across the proposed site. In general soil stratigraphy consisted of topsoil or fill underlain by a silty clay deposit layer.

Groundwater levels were measured on July 16, 2007 and on May 1, 2017 and vary in elevation from 1.6 to 5.5 m below the original ground surface.

A permissible grade raise restriction is recommended within the Paterson Group report due to the encounter of deep silty clay deposits of up to a maximum depth of 30.4 m. A 2.0m grade raise restrictions was accounted for in the grading design of the property.

The required pavement structure for the local roadways is outlined in Table 12 and Table 13 below:

Table 12: Pavement Structure – Car Only Parking Areas

Thickness (mm)	Material Description
50	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
300	Subbase - OPSS Granular B Type II
-	Subgrade – Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill.

Table 13: Pavement Structure – Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
40	Wear Course –Superpave 12.5 Asphaltic Concrete
50	Binder Course –Superpave 19.0 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
400	Subbase - OPSS Granular B Type II
-	Subgrade – Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill.

11.0 CONCLUSIONS

11.1 WATER SERVICING

The 200 mm diameter watermain on Prestige Circle provides adequate fire flow capacity as per the Fire Underwriters Survey. The service connections will also be capable of providing anticipated demand but exceeds the maximum objective pressure of 552 kPa (80 psi). Therefore, pressure reducing measures, such as a pressure reducing valve, will be required to service the proposed buildings per the Ontario Plumbing Code. The minimum anticipated pressure of 496 kPa (72 psi) is sufficient to provide the highest floors with an acceptable equivalent pressure provided the internal plumbing is sized to minimize head loss, otherwise a booster pump could be required.

11.2 SANITARY SERVICING

The proposed sanitary sewer lateral is sufficiently sized to provide gravity drainage for the site. The proposed blocks will be serviced by a 200 mm diameter service lateral directing wastewater flows to the existing 300 mm dia. Prestige Circle sanitary sewer. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guidelines and will be coordinated with building mechanical engineers. The proposed sanitary drainage pattern is in accordance with the wastewater section of IBI Group's Design Brief for Petrie's Landing II Phase 2 and with the City of Ottawa Sewer Design guidelines.

11.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through the stormwater management section of IBI Group's Design Brief for Petrie's Landing and with the City of Ottawa Design guidelines. Rooftop, pipe, and surface storage in combination with ICDs are proposed to limit inflow from the site area into the minor system to the required target release rates.

The proposed buildings will have underground parking and as such, it is recommended that the proposed parking ramps be equipped with trench drains to capture the 100-year runoff. In addition, it is recommended that the proposed buildings be equipped with sump pumps and backwater valves.

11.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the overall recommendations provided in the Geotechnical Investigation. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing infrastructure.

11.5 UTILITIES

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the subject area. Exact size, location and routing of utilities will be finalized after design circulation.

11.6 APPROVAL / PERMITS

Ontario Ministry of the Environment, Conservation and Parks (MOECP) Environmental Compliance Approvals (ECA) are not expected to be required for the subject site as each proposed block will fall under separate plan of condominium with one owner and will have a separate drainage and storm sewer system discharging to a pre-existing sewer system. Written approval from the Rideau Valley Conservation Authority (RVCA) is required under Ontario Regulation 174/06 "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation" under Section 28 of the Conservation Authorities Act for the portion of the site within 120 m of a significant wetland. A Permit to Take Water may be required for pumping requirements for construction of underground parking level. No other approval requirements from other regulatory agencies are anticipated.

APPENDICES

Appendix A POTABLE WATER SERVICING ANALYSIS

Block 6-8 Petries Landing - Domestic Water Demand Estimates

Building ID	Units	Population	Daily Rate of Demand [1]	Avg Day Demand [2]		Max Day Demand [3]		Peak Hour Demand [3]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Block 6	79	122	350	29.6	0.49	74.0	1.23	162.8	2.71
Block 7	92	140	350	34.0	0.57	85.1	1.42	187.2	3.12
Block 8	93	141	350	34.4	0.57	85.9	1.43	189.0	3.15
Total Site :				**98.0**	**1.63**	**245.0**	**4.08**	**539.0**	**8.98**

Water demand criteria used to estimate peak demand rates for residential areas are as follows:

1 maximum day demand rate = 2.5 x average day demand rate

2 maximum hour demand rate = 2.2 x maximum day demand rate

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection*" by Fire Underwriters' Survey, 1999

Stantec Project #: 1604-01331
Project Name: Petries Landing
Date: June 12, 2017
Data input by: Thakshika Rathnasooriya
Notes:

Fire Flow Calculation #: 1
Building Type/Description/Name: Apartment Building - Block 6

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
		Framing Material						
1	**Choose Frame Used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Wood Frame	1.5	-	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (> 3 hrs)	0.6				
		Floor Space Area						
2	**Choose Type of Housing (if TH, Enter Number of Units Per TH Block)**	Type of Housing	Single Family	0	Other (Comm, Ind, Apt etc.)	1	Units	
			Townhouse - indicate # of units	0				
			Other (Comm, Ind, Apt etc.)	1				
2.2	**# of Storeys**	Number of Floors/Storeys in the Unit (do not include basement):			4	4	Storeys	
3	**Enter Ground Floor Area of One Unit**	Average Floor Area (A) based on fire resistive building design when vertical openings are inadequately protected:			1,533 Square Metres (m2)	6,132	Area in Square Meters (m^2)	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						**26,000**
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	**22,100**
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	**Choose Reduction Due to Presence of Sprinklers**	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	Adequate Sprinkler conforms to NFPA13	-0.3	N/A	**-6,630**
			None	0				
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is standard for sprinkler and fire dept. hose line	-0.1	N/A	**-2,210**
			Water supply is not standard or N/A	0				
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	**0**
			Sprinkler not fully supervised or N/A	0				
5.3	**Choose Separation Distance Between Units**	Exposure Distance Between Units	North Side	45.1m or greater	0	0.1	m	**2,210**
			East Side	30.1 to 45.0m	0.05			
			South Side	45.1m or greater	0			
			West Side	30.1 to 45.0m	0.05			
6	**Obtain Required Fire Flow, Duration & Volume**	***Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:***						**15,000**
		Total Required Fire Flow (above) in L/s:						**250**
		Required Duration of Fire Flow (hrs)						**3.25**
		Required Volume of Fire Flow (m^3)						**2,925**

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection*" by Fire Underwriters' Survey, 1999

Stantec Project #: 1604-01331
Project Name: Petries Landing
Date: June 12, 2017
Data input by: Thakshika Rathnasooriya
Notes:

Fire Flow Calculation #: 1
Building Type/Description/Name: Apartment Building - Block 7 - 1

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
		Framing Material						
1	**Choose Frame Used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Wood Frame	1.5	-	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (> 3 hrs)	0.6				
		Floor Space Area						
2	**Choose Type of Housing (if TH, Enter Number of Units Per TH Block)**	Type of Housing	Single Family	0	Other (Comm, Ind, Apt etc.)	1	Units	
			Townhouse - indicate # of units	0				
			Other (Comm, Ind, Apt etc.)	1				
2.2	**# of Storeys**	Number of Floors/Storeys in the Unit (do not include basement):			4	4	Storeys	
3	**Enter Ground Floor Area of One Unit**	Average Floor Area (A) based on fire resistive building design when vertical openings are inadequately protected:			1,178 Square Metres (m2)	4,712	Area in Square Meters (m^2)	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						**23,000**
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	**19,550**
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	**Choose Reduction Due to Presence of Sprinklers**	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	Adequate Sprinkler conforms to NFPA13	-0.3	N/A	**-5,865**
			None	0				
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is standard for sprinkler and fire dept. hose line	-0.1	N/A	**-1,955**
			Water supply is not standard or N/A	0				
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	**0**
			Sprinkler not fully supervised or N/A	0				
5.3	**Choose Separation Distance Between Units**	Exposure Distance Between Units	North Side	Fire Wall	0.1	0.15	m	**2,933**
			East Side	45.1m or greater	0			
			South Side	30.1 to 45.0m	0.05			
			West Side	45.1m or greater	0			
6	**Obtain Required Fire Flow, Duration & Volume**	***Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:***						**15,000**
		Total Required Fire Flow (above) in L/s:						**250**
		Required Duration of Fire Flow (hrs)						**3.25**
		Required Volume of Fire Flow (m^3)						**2,925**

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection*" by Fire Underwriters' Survey, 1999

Stantec Project #: 1604-01331
Project Name: Petries Landing
Date: June 12, 2017
Data input by: Thakshika Rathnasooriya

Fire Flow Calculation #: 1
Building Type/Description/Name: Apartment Building - Block 7-2

Notes:

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
1	**Choose Frame Used for Construction of Unit**	**Framing Material**						
		Coefficient related to type of construction (C)	Wood Frame	1.5	Wood Frame	1.5	-	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (> 3 hrs)	0.6				
2	**Choose Type of Housing (if TH, Enter Number of Units Per TH Block)**	**Floor Space Area**						
		Type of Housing	Single Family	0	Other (Comm, Ind, Apt etc.)	1	Units	
			Townhouse - indicate # of units	0				
			Other (Comm, Ind, Apt etc.)	1				
2.2	**# of Storeys**	Number of Floors/Storeys in the Unit (do not include basement):			4	4	Storeys	
3	**Enter Ground Floor Area of One Unit**	Average Floor Area (A) based on fire resistive building design when vertical openings are inadequately protected:			806 Square Metres (m2)	3,224	Area in Square Meters (m^2)	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						**19,000**
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	**16,150**
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	**Choose Reduction Due to Presence of Sprinklers**	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	Adequate Sprinkler conforms to NFPA13	-0.3	N/A	**-4,845**
			None	0				
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is standard for sprinkler and fire dept. hose line	-0.1	N/A	**-1,615**
			Water supply is not standard or N/A	0				
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	**0**
			Sprinkler not fully supervised or N/A	0				
5.3	**Choose Separation Distance Between Units**	Exposure Distance Between Units	North Side	30.1 to 45.0m	0.05	0.15	m	**2,423**
			East Side	45.1m or greater	0			
			South Side	Fire Wall	0.1			
			West Side	45.1m or greater	0			
6	**Obtain Required Fire Flow, Duration & Volume**	***Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:***						**12,000**
		Total Required Fire Flow (above) in L/s:						**200**
		Required Duration of Fire Flow (hrs)						**2.50**
		Required Volume of Fire Flow (m^3)						**1,800**

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection*" by Fire Underwriters' Survey, 1999

Stantec Project #: 1604-01331
Project Name: Petries Landing
Date: June 12, 2017
Data input by: Thakshika Rathnasooriya
Notes:

Fire Flow Calculation #: 1
Building Type/Description/Name: Apartment Building - Block 8

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
		Framing Material						
1	**Choose Frame Used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Wood Frame	1.5	-	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (> 3 hrs)	0.6				
		Floor Space Area						
2	**Choose Type of Housing (if TH, Enter Number of Units Per TH Block)**	Type of Housing	Single Family	0	Other (Comm, Ind, Apt etc.)	1	Units	
			Townhouse - indicate # of units	0				
			Other (Comm, Ind, Apt etc.)	1				
2.2	**# of Storeys**	Number of Floors/Storeys in the Unit (do not include basement):			4	4	Storeys	
3	**Enter Ground Floor Area of One Unit**	Average Floor Area (A) based on fire resistive building design when vertical openings are inadequately protected:			2,484 Square Metres (m2)	9,936	Area in Square Meters (m^2)	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						**33,000**
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	**28,050**
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	**Choose Reduction Due to Presence of Sprinklers**	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	Adequate Sprinkler conforms to NFPA13	-0.3	N/A	**-8,415**
			None	0				
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is standard for sprinkler and fire dept. hose line	-0.1	N/A	**-2,805**
			Water supply is not standard or N/A	0				
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	**0**
			Sprinkler not fully supervised or N/A	0				
5.3	**Choose Separation Distance Between Units**	Exposure Distance Between Units	North Side	45.1m or greater	0	0.1	m	**2,805**
			East Side	45.1m or greater	0			
			South Side	30.1 to 45.0m	0.05			
			West Side	30.1 to 45.0m	0.05			
6	**Obtain Required Fire Flow, Duration & Volume**	***Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:***						**20,000**
		Total Required Fire Flow (above) in L/s:						**333**
		Required Duration of Fire Flow (hrs)						**4.50**
		Required Volume of Fire Flow (m^3)						**5,400**

Hydraulic Model Results - Average Day Analysis

Junction Results

ID	Demand	Elevation	Head	Pressure	
	(L/s)	(m)	(m)	(psi)	(Kpa)
10	0.00	52.00	115	89.56	617.50
11	0.00	55.06	115	85.21	587.51
12	0.00	55.06	115	85.21	587.51
13	0.00	51.90	115	89.7	618.46
14	0.00	52.10	115	89.42	616.53
BLDG1	0.29	55.71	115	84.28	581.09
BLDG2	0.29	56.60	115	83.02	572.41
BLDG3	0.67	56.70	115	82.87	571.37
BLDG6	0.49	57.30	115	82.02	565.51
BLDG7	0.57	56.50	115	83.16	573.37
BLDG8	0.57	55.09	115	85.16	587.16

Pipe Results

ID	From Node	To Node	Length	Diameter	Roughness	Flow	Velocity
			(m)	(mm)		(L/s)	(m/s)
1	1000	14	25.84	900	130	2.88	0.00
10	BLDG8	12	28.03	200	110	-1.63	0.05
11	12	11	7.05	200	110	-0.20	0.01
12	12	13	88.97	200	110	-1.42	0.05
13	13	10	7.80	400	120	-1.42	0.01
2	14	10	19.33	400	120	2.88	0.02
3	10	11	84.72	200	110	1.46	0.05
4	BLDG1	11	51.80	200	110	-1.25	0.04
5	BLDG2	BLDG1	32.66	200	110	-0.96	0.03
6	BLDG3	BLDG2	62.45	200	110	-0.67	0.02
7	BLDG3	BLDG6	72.85	200	110	0.00	0.00
8	BLDG6	BLDG7	34.69	200	110	-0.49	0.02
9	BLDG7	BLDG8	55.50	200	110	-1.06	0.03

Hydraulic Model Results -Peak Hour Analysis

Junction Results

ID	Demand	Elevation	Head	Pressure	
	(L/s)	(m)	(m)	(psi)	(Kpa)
10	0.00	52.00	108.00	79.61	548.90
11	0.00	55.06	107.95	75.19	518.42
12	0.00	55.06	107.95	75.19	518.42
13	0.00	51.90	108.00	79.75	549.86
14	0.00	52.10	108.00	79.47	547.93
BLDG1	1.60	55.71	107.93	74.23	511.80
BLDG2	1.60	56.60	107.92	72.95	502.98
BLDG3	3.69	56.70	107.91	72.80	501.94
BLDG6	2.71	57.30	107.91	71.94	496.01
BLDG7	3.12	56.50	107.91	73.08	503.87
BLDG8	3.15	55.09	107.93	75.11	517.87

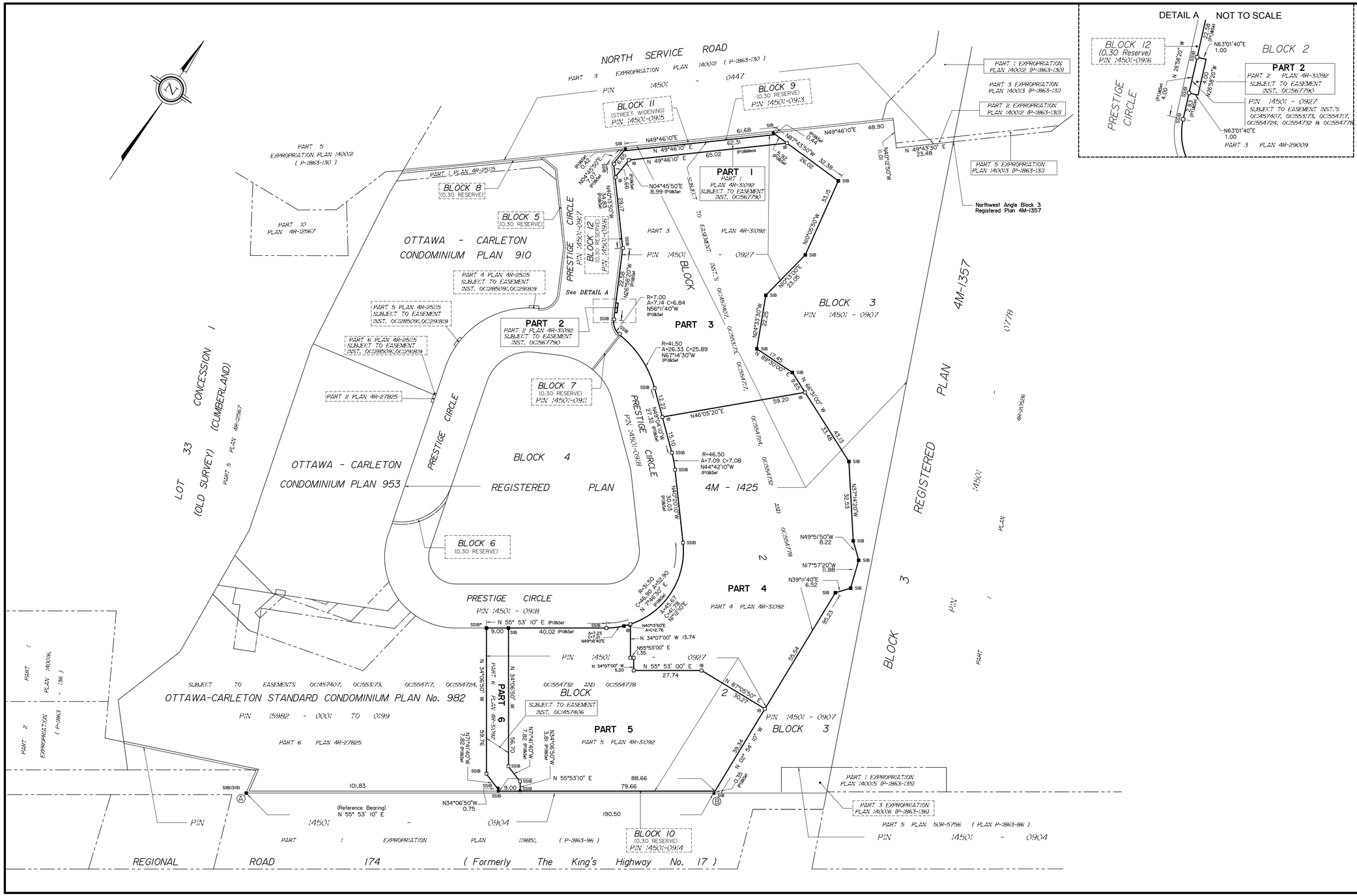
Pipe Results

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)
1	1000	14	25.84	900	130	15.87	0.02
10	BLDG8	12	28.03	200	110	-8.95	0.29
11	12	11	7.05	200	110	-1.13	0.04
12	12	13	88.97	200	110	-7.83	0.25
13	13	10	7.80	400	120	-7.83	0.06
2	14	10	19.33	400	120	15.87	0.13
3	10	11	84.72	200	110	8.04	0.26
4	BLDG1	11	51.80	200	110	-6.92	0.22
5	BLDG2	BLDG1	32.66	200	110	-5.32	0.17
6	BLDG3	BLDG2	62.45	200	110	-3.72	0.12
7	BLDG3	BLDG6	72.85	200	110	0.03	0.00
8	BLDG6	BLDG7	34.69	200	110	-2.68	0.09
9	BLDG7	BLDG8	55.50	200	110	-5.80	0.18

Hydraulic Model Results -Fire Flow Analysis

ID	Static Demand	Static Pressure		Static Head	Fire-Flow Demand	Residual Pressure		Available Flow at Hydrant	Available Flow Pressure	
	(L/s)	(psi)	(Kpa)	(m)	(L/s)	(psi)	(Kpa)	(L/s)	(psi)	(Kpa)
BLDG1	0.73	77.15	531.93	109.98	335	31.59	217.81	380.02	20	137.90
BLDG2	0.73	75.89	523.25	109.98	289	34.86	240.35	343.11	20	137.90
BLDG3	1.68	75.74	522.21	109.98	182	55.49	382.59	319.67	20	137.90
BLDG6	1.23	74.89	516.35	109.98	250	40.23	277.38	323.11	20	137.90
BLDG7	1.42	76.03	524.21	109.98	250	44.52	306.96	344.5	20	137.90
BLDG8	1.43	78.04	538.07	109.98	333	41.23	284.27	428.91	20	137.90

Appendix B PROPOSED SITE PLAN



I RE□UIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE:□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□

RICHARD R. GAUTHIER
ONTARIO LAND SURVE□OR

PLAN 4R□

RECEIVED AND DEPOSITED
DATE: □□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□

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

SCHEDULE

PART	BLOCK	PLAN	PIN
1			
2	PART OF 2	4M□1425	ALL OF 14501□0□2□
3			
4			
5			
6			

Parts 1 and 2: S□□ject to Ease□ent Inst. OC156□□□0.
Part 6: S□□ject to Ease□ent Inst. OC145□406.
Parts 1 to 6 incl□si□e: S□□ject to Ease□ent Inst.'s OC145□40□□ OC15531□3□OC1554□1□□OC1554□24□OC1554□32 and OC1554□□□.

PLAN OF SURVEY OF

PART OF BLOCK 2
REGISTERED PLAN 4M-1425
CITY OF OTTAWA

S□r□eyed □y Annis □O'S□lli□an □Volle□ekk Ltd.

Scale 1 : □50

30 22.5 15 □5 0 15 30 Metres

Metric

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

S□r□eyor's Certi□icate

I CERTIF□ THAT :

1. This s□r□ey and □lan are correct and in accordance with the S□r□eys Act□ the S□r□eyors Act and the Land Titles Act and the reg□lations □ade □nder the□.
2. The s□r□ey was co□□□leted on the □th day o□ Se□te□□e□ 201□.

□□□□□□□□□□ Date

□□□□□□□□□□□□□□□□□□□□ Richard R. Ga□thier Ontario Land S□r□eyor

NOTES AND LEGEND

—□—	denotes	S□r□ey Mon□□ent Planted
—■—	"	S□r□ey Mon□□ent Fo□nd
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
SSIB□	"	Short Standard Iron Bar 0.3 □etres Long
IB	"	Iron Bar
CLF	"	Chain Link Fence
BF	"	Board Fence
□AOG□□	"	Annis□O'S□lli□an□Volle□ekk Ltd.
□P1□	"	Plan 4R□2□00□

All □o□nd s□r□ey □on□□ents are □AOG□□nless otherwise noted.

All □earing and distances □etween □o□nd s□r□ey □on□□ents are □P1□□Meas □nless otherwise noted.

Distances shown on this □lan are gro□nd distances and can □e con□erted to grid distances □y □□lti□lying □y the co□□□ined scale □actor o□ 0.□□□□6□.

Bearings are grid□deri□ed fro□ Can□Net 3.0 Real Ti□e Network GPS o□ser□ations on re□erence □oints A and B□ shown hereon□ha□ing a bearing of N55°53'10"E and are referenced to Specified Control Points 01919680184 and 01919843476 1, MTM Zone 9 (76°30' West Longitude) NAD□3 □original□.

Coordinates are deri□ed fro□ Can□Net 3.0 Real Ti□e Network GPS o□ser□ations re□erenced to S□eci□ied Control Points 01□1□6□01□4 and 01919843476 1, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate □all□es are to □r□an acc□racy in accordance with O. Reg. 216/10.

□01□1□6□01□4	Northing	5040610.16	Easting	3□4□36.56
□01□1□□434□61	Northing	50361□□12	Easting	3□2436.11
□Point A	Northing	503□31□□2	Easting	3□3314.2□
□Point B	Northing	503□424.□1	Easting	3□34□2.21

Ca□tion□ Coordinates cannot□in the□sel□es□e □sed to re□esta□lish corners or □o□ndaries shown on this □lan.

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

Job No. 16109-15 Brigl PlBk 2 4M-1425 R D5 Sept10 2018 PL/dg

KEY PLAN

SCALE: 1:5000

2
A100

LEGEND

PROPERTY LINE

BOUNDARY OF PHASES

NOTE 1:
- Exterior lighting fixtures from Keene Conlyte, model: Silhouette Roadway Luminaire Types: A; A2 and A3. Metal Hollide (MA) 70W.
- To be installed on 18' poles (see plan for locations)

Informations herein as per Electrical Eng. preliminary documents. Please refer to annexe thechnical data sheets for further information.

Appendix A
PLZ Stage 2: RSAQ 6490 Zoning Compliance Chart
Site Plan : 79 units - BLOCK 6, 140 Prestige Circle

Applicable sections from Bylaw 2008-250	Requirement	Provided
Assumes that Prestige Circle is front lot line.		
Property area Phase 2		**20 006,9 m²**
Property area Block 6		**6 136,5 m²**
Table 164A - Apartment dwelling, low rise, Stacked		
Minimum Lot Width (m)	18,0	> 18,0 m
Minimum Lot Area (m²)	5402,0 m²	> 540 m²
Maximum Building Height (storeys) - exception RSAQ 4090	60	6
Minimum Front Yard Setback (m)	6,0 m	> 6,0 m
Minimum Corner Yard Setback (m)	4,5 m	n.a. m
Minimum Interior Side Yard Setback (m)	3,0 m	> 3,0 m
Minimum Rear Yard Setback (m) - exception RSAQ 4090	7,5 m	> 7,5 m
Minimum Setback from North Service Road (m) - exception RSAQ 4090	100,0 m	n.a. m
Minimum distance between apartment dwellings under 7 storeys and OSL zone (m)	7,5 m	> 7,5 m
Minimum required building spacing - exception RSAQ 4090	3,0	> 3,0 m
Table 164A - 'H' Planed unit development		
Minimum Lot Width (m)	18,0	> 18,0 m
Minimum Lot Area (m²)	1400,0 m²	> 1400,0 m²
Maximum Building Height (storeys) - exception RSAQ 4090	60	6
Minimum Front Yard Setback (m)	6,0 m	> 6,0 m
Minimum Corner Yard Setback (m)	4,5 m	n.a. m
Minimum Interior Side Yard Setback (m) *	3,0 m	> 3,0 m
Minimum Rear Yard Setback (m) - exception RSAQ 4090	7,5 m	> 7,5 m
Minimum Setback from North Service Road (m) - exception RSAQ 4090	100,0 m	n.a. m
Minimum distance between apartment dwellings under 7 storeys and OSL zone (m)	7,5 m	> 7,5 m
Minimum required building spacing - exception RSAQ 4090	3,0	> 3,0 m
Section 163(9)		
Minimum landscape area (% of site)	30,0%	47,0%
Section 101 and 102		
Minimum No. of parking spaces (total)	(ratio = 1,2) = 95	95
Minimum No. of visitor parking spaces (total)	(ratio = 0,1) = 16	16
Section 106		
Parking space width (m) per section 106 (3)(a)ii - applicable to 50% of resident spaces	2,4 min	2,4 min
Parking space width (m)	2,6 min 2,75 max	2,6
Minimum parking space depth (m)	5,2	5,2
Section 107		
Driveway access - min width (m) one way	3,0 m	n.a. m
Driveway access - min width (m) two way	6,7 m	6,7 m
Section 110		
Minimum landscape area of parking lot (15%)	15 %	34,1%
Minimum landscape buffer width of parking lot not abutting street (m)	3,0 m	3,0 m
...1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1,5/3 m	3,0 m
Minimum landscape buffer width of parking lot abutting street (m)	3,0 m	3,0 m
Section 111		
Bicycle Parking Space Requirement (Total)	(ratio =0,5) = 39	39
Section 131 (PUD)		
Min. width of private way Table 131 (1)	6,0 m	6,0 m
Min. setback of res. building to private way Table 131 (2)	1,8 m	n.a. m
Min. setback for any garage Table 131 (3)	5,2 m	n.a. m
Min. sep distance between bldgs less than 7 storeys in height Table 131 (4)	1,2 m	n.a. m
Section 137		
Total amenity area (n.sq. m per unit) (min 6m²/unit)	474 m²	1054,5 m²
Communal amenity area: 50% of total required Total amenity area (m sq.m.) Total	237 m²	270,6 m² rooftop terrace
Section 55 (Accessory Buildings)		
Min. Required Setback from an Int. Side Lot Line or Rear Lot Line not abutting a street		
- rear yard (m)	0,6 m	0,6 m

Appendix A
PLZ Stage 2: RSAQ 6490 Zoning Compliance Chart
Site Plan : 93 units - BLOCK 8, 180 Prestige Circle

Applicable sections from Bylaw 2008-250	Requirement	Provided
Assumes that Prestige Circle is front lot line.		
Property area Phase 3		**7 498,2 m²**
Property area Block 8		**7 498,2 m²**
Table 164A - Apartment dwelling, low rise, Stacked		
Minimum Lot Width (m)	18,0	> 18,0 m
Minimum Lot Area (m²)	5402,0 m²	> 540 m²
Maximum Building Height (storeys) - exception RSAQ 4090	60	6
Minimum Front Yard Setback (m)	6,0 m	> 6,0 m
Minimum Corner Yard Setback (m)	4,5 m	n.a. m
Minimum Interior Side Yard Setback (m)	3,0 m	> 3,0 m
Minimum Rear Yard Setback (m) - exception RSAQ 4090	7,5 m	> 7,5 m
Minimum Setback from North Service Road (m) - exception RSAQ 4090	100,0 m	> 100 m
Minimum distance between apartment dwellings under 7 storeys and OSL zone (m)	7,5 m	> 7,5 m
Minimum required building spacing - exception RSAQ 4090	3,0	> 3,0 m
Table 164A - 'H' Planed unit development		
Minimum Lot Width (m)	18,0	> 18,0 m
Minimum Lot Area (m²)	1400,0 m²	> 1400,0 m²
Maximum Building Height (storeys) - exception RSAQ 4090	60	6
Minimum Front Yard Setback (m)	6,0 m	> 6,0 m
Minimum Corner Yard Setback (m)	4,5 m	n.a. m
Minimum Interior Side Yard Setback (m) *	3,0 m	> 3,0 m
Minimum Rear Yard Setback (m) - exception RSAQ 4090	7,5 m	> 7,5 m
Minimum Setback from North Service Road (m) - exception RSAQ 4090	100,0 m	> 100 m
Minimum distance between apartment dwellings under 7 storeys and OSL zone (m)	7,5 m	> 7,5 m
Minimum required building spacing - exception RSAQ 4090	3,0	> 3,0 m
* For a yard abutting a lot, the yard setback is 6 m for the first 21 m back from a street lot line. In all other circumstances, the yard setback is 3 m. Notwithstanding the foregoing, for any yard adjacent to an apartment dwelling, mid-high rise and apartment dwelling, low rise or stacked dwelling within a planned unit development, the yard setback provisions for that use apply.		
Section 163(9)		
Minimum landscape area (% of site)	30,0%	51,6%
Section 101 and 102		
Minimum No. of parking spaces (total)	(ratio = 1,2) = 108	108
Minimum No. of visitor parking spaces (total)	(ratio = 0,1) = 18	18
Section 106		
Parking space width (m) per section 106 (3)(a)ii - applicable to 50% of resident spaces	2,4 min	2,4 min
Parking space width (m)	2,6 min 2,75 max	2,6
Minimum parking space depth (m)	5,2	5,2
Section 107		
Driveway access - min width (m) one way	3,0 m	n.a. m
Driveway access - min width (m) two way	6,7 m	6,7 m
Section 110		
Minimum landscape area of parking lot (15%)	15 %	37,6%
Minimum landscape buffer width of parking lot not abutting street (m)	3,0 m	3,0 m
...1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1,5/3 m	3,0 m
Minimum landscape buffer width of parking lot abutting street (m)	3,0 m	3,0 m
Section 111		
Bicycle Parking Space Requirement (Total)	(ratio =0,5) = 46	46
Section 131 (PUD)		
Min. width of private way Table 131 (1)	6,0 m	6,0 m
Min. setback of res. building to private way Table 131 (2)	1,8 m	n.a. m
Min. setback for any garage Table 131 (3)	5,2 m	n.a. m
Min. sep distance between bldgs less than 7 storeys in height Table 131 (4)	1,2 m	n.a. m
Section 137		
Total amenity area (n.sq. m per unit) (min 6m²/unit)	552 m²	1187,1 m²
Communal amenity area: 50% of total required Total amenity area (m sq.m.) Total	276 m²	596,6 m² common lounge and terrace
Section 55 (Accessory Buildings)		
Min. Required Setback from an Int. Side Lot Line or Rear Lot Line not abutting a street		
- rear yard (m)	0,6 m	0,6 m

Appendix A
PLZ Stage 2: RSAQ 6490 Zoning Compliance Chart
Site Plan : 90 units - BLOCK 7, 160 Prestige Circle

Applicable sections from Bylaw 2008-250	Requirement	Provided
Assumes that Prestige Circle is front lot line.		
Property area Phase 2		**20 006,9 m²**
Property area Block 7		**7 858,8 m²**
Table 164A - Apartment dwelling, low rise, Stacked		
Minimum Lot Width (m)	18,0	> 18,0 m
Minimum Lot Area (m²)	5402,0 m²	> 540 m²
Maximum Building Height (storeys) - exception RSAQ 4090	60	6
Minimum Front Yard Setback (m)	6,0 m	> 6,0 m
Minimum Corner Yard Setback (m)	4,5 m	n.a. m
Minimum Interior Side Yard Setback (m)	3,0 m	> 6,0 m
Minimum Rear Yard Setback (m) - exception RSAQ 4090	7,5 m	> 7,5 m
Minimum Setback from North Service Road (m) - exception RSAQ 4090	100,0 m	n.a. m
Minimum distance between apartment dwellings under 7 storeys and OSL zone (m)	7,5 m	> 7,5 m
Minimum required building spacing - exception RSAQ 4090	3,0	> 3,0 m
Table 164A - 'H' Planed unit development		
Minimum Lot Width (m)	18,0	> 18,0 m
Minimum Lot Area (m²)	1400,0 m²	> 1400,0 m²
Maximum Building Height (storeys) - exception RSAQ 4090	60	6
Minimum Front Yard Setback (m)	6,0 m	> 6,0 m
Minimum Corner Yard Setback (m)	4,5 m	n.a. m
Minimum Interior Side Yard Setback (m) *	3,0 m	> 6,0 m
Minimum Rear Yard Setback (m) - exception RSAQ 4090	7,5 m	> 7,5 m
Minimum Setback from North Service Road (m) - exception RSAQ 4090	100,0 m	> 100 m
Minimum distance between apartment dwellings under 7 storeys and OSL zone (m)	7,5 m	> 7,5 m
Minimum required building spacing - exception RSAQ 4090	3,0	> 3,0 m
* For a yard abutting a lot, the yard setback is 6 m for the first 21 m back from a street lot line. In all other circumstances, the yard setback is 3 m. Notwithstanding the foregoing, for any yard adjacent to an apartment dwelling, mid-high rise and apartment dwelling, low rise or stacked dwelling within a planned unit development, the yard setback provisions for that use apply.		
Section 163(9)		
Minimum landscape area (% of site)	30,0%	51,6%
Section 101 and 102		
Minimum No. of parking spaces (total)	(ratio = 1,2) = 108	108
Minimum No. of visitor parking spaces (total)	(ratio = 0,1) = 18	18
Section 106		
Parking space width (m) per section 106 (3)(a)ii - applicable to 50% of resident spaces	2,4 min	2,4 min
Parking space width (m)	2,6 min 2,75 max	2,6
Minimum parking space depth (m)	5,2	5,2
Section 107		
Driveway access - min width (m) one way	3,0 m	n.a. m
Driveway access - min width (m) two way	6,7 m	6,7 m
Section 110		
Minimum landscape area of parking lot (15%)	15 %	37,6%
Minimum landscape buffer width of parking lot not abutting street (m)	3,0 m	3,0 m
...1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1,5/3 m	3,0 m
Minimum landscape buffer width of parking lot abutting street (m)	3,0 m	3,0 m
Section 111		
Bicycle Parking Space Requirement (Total)	(ratio =0,5) = 46	46
Section 131 (PUD)		
Min. width of private way Table 131 (1)	6,0 m	6,0 m
Min. setback of res. building to private way Table 131 (2)	1,8 m	n.a. m
Min. setback for any garage Table 131 (3)	5,2 m	n.a. m
Min. sep distance between bldgs less than 7 storeys in height Table 131 (4)	1,2 m	n.a. m
Section 137		
Total amenity area (n.sq. m per unit) (min 6m²/unit)	552 m²	1187,1 m²
Communal amenity area: 50% of total required Total amenity area (m sq.m.) Total	276 m²	596,6 m² common lounge and terrace
Section 55 (Accessory Buildings)		
Min. Required Setback from an Int. Side Lot Line or Rear Lot Line not abutting a street		
- rear yard (m)	0,6 m	0,6 m

ENTIRE SITE STATISTICS - BRIGIL

UNIT STATISTICS		
Phase 1 Block 1 & 2	40	
Phase 2 Block 3 & 4	96	
Phase 2 Block 5	79	
Phase 2 Block 6	93	
Phase 2 Block 7	92	
Phase 3	93	
TOTAL:	420	Units

Area of Entire site m²	42 834	m²
Unit Density - Provided	98,00	units/ha
Unit Density - Minimum	78,00	units/ha
Unit Density - Maximum	100,00	units/ha

CAR PARKING / Ratio min 1:1.4	Requirement		Provided	
	Ratio	Qty.	Ratio	Qty.
Phase 1 Block 1 & 2	1,40	56	1,5	58
Phase 2 Block 3 & 4	1,40	96	1,5	68
Phase 2 Block 5	1,40	111	1,7	134
Phase 2 Block 6	1,40	130	1,4	130
Phase 2 Block 7	1,40	129	1,4	130
Phase 3 Block 8	0,93	87	0,92	86
TOTAL		609		571

BIKE PARKING / Ratio min 0.5 PHA SE 2	Requirement	Provided
Phase 2 Block 3 & 4	20	21
Phase 2 Block 5	39	39
Phase 2 Block 6	39,5	39
Phase 2 Block 7	46	46
Phase 3	23,25	34
TOTAL	167	178

Echelle/Scale 1:500

0 5 25 50 75 p/ft

0 1 5 10 15 20 25 m

LEGEND
- Bicycle parking
- New fence
- New stone retaining wall
- Fire truck path

PROPERTY INFORMATION
PIN 14501-0605
PART OF BLOCK 2
REGISTERED PLAN 4M-1425
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

SITE PLAN

SCALE: 1:500

1
A100

NOTES GÉNÉRALES General Notes

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COUSINEAU
LICENCE
6219

NEUF
ARCHITECT(E)S

BRIGIL

CLIENT Client

OUVRAGE Project

PETRIES LANDING
BLOCK 6, 7 & 8

EMPLACEMENT Location
ORLEANS ON

NO PROJET No.
104 03

NO	RÉVISION	DATE aa
A	CIT VALIDATION	2016 12 15
B	Site lan re ision	2017 03 2
C	Site Plan A lication	2017 06 13
D	For client re iew	2017 0 20
E	Site lan control 1st re iew	2017 01 23
F	Site lan control 2nd re iew	2017 03 23
G	Iss ed or lding er it	2017 06 01
H	Site Plan A lication 3rd re iew	2017 06 06
J	Re angled arking 3 set ack	2017 0 16
K	Radi s or arking island od.	2017 1
L	Site Plan A lication 4th re iew	2017 0 0

DESSINÉ PAR Drawn by
A.B.

VERIFIÉ PAR Checked by
ANT. C.

DATE aa
1 0 0

ÉCHELLE Scale
INDIQUÉE

TITRE DU DESSIN Drawing Title

Site Plan

RÉVISION Revision
L

NO. DESSIN Dwg N er
A100

CITY OF OTTAWA FILE NUMBER: D0 12 1 00 3

15546

I:\P 10400 104 03 CAD 104 03 A100 Site Plan.dwg

Appendix C SANITARY SEWER CALCULATIONS

Stantec

SUBDIVISION:

SUBDIVISION: Petries Landing Block 6-8

DATE: September 4, 2018
REVISION: 4
DESIGNED BY: MJS
CHECKED BY: AP

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 1604-01331

XML Conversion

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	350	L/p/day	MINIMUM VELOCITY	0.60	m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	0.60	L/s/ha	MAXIMUM VELOCITY	3.00	m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL	0.40	L/s/ha	MANNINGS n	0.013	
PEAKING FACTOR (COMM., INST.):	1.5	INSTITUTIONAL	0.60	L/s/ha	BEDDING CLASS	C	
PERSONS / 2 Bedroom apt.	2.1	INFILTRATION	0.28	L/s/ha	MINIMUM COVER	2.50	m
PERSONS / 1 bedroom apt.	1.4						
PERSONS / average apt.	1.8						

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INDUST		INSTIT		GREEN / UNUSED		C+I+I	INFILTRATION				PIPE								
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	UNITS 2 bed	1 bed	avg	POP.	CUMULATIVE AREA	POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	TOTAL FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(m)	(mm)			(%)	(L/s)	(%)	(m/s)	(m/s)
R1A , G1A	BLK 6	SAN1	0.153	0	0	79	142	0.15	142	4.00	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.404	0.40	0.00	0.557	0.56	0.16	2.46	4.8	200	PVC	SDR-28	1.00	33.31	7.39	1.05	0.52
	SAN1	PROP.MH	0.000	0	0	0	0	0.15	142	4.00	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.40	0.00	0.000	0.56	0.16	2.46	27.0	200	PVC	SDR-35	1.00	33.31	7.39	1.05	0.52
R2A , G2A	BLK 7	SAN2	0.197	0	0	90	162	0.20	162	4.00	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.640	0.64	0.00	0.837	0.84	0.23	2.86	3.2	200	PVC	SDR-28	1.00	33.31	8.58	1.05	0.54
	SAN2	EX.MH21A	0.000	0	0	0	0	0.20	162	4.00	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.64	0.00	0.000	0.84	0.23	2.86	15.7	200	PVC	SDR-35	1.00	33.31	8.58	1.05	0.54
R3A , G3A	BLK 8	SAN3	0.236	0	0	93	167	0.24	167	4.00	2.71	0.00	0.00	0.00	0.00	0.00	0.00	0.511	0.51	0.00	0.747	0.75	0.21	2.92	8.5	200	PVC	SDR-28	1.00	33.31	8.77	1.05	0.54
	SAN3	EX.MH6A	0.000	0	0	0	0	0.24	167	4.00	2.71	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.51	0.00	0.000	0.75	0.21	2.92	22.9	200	PVC	SDR-35	1.00	33.31	8.77	1.05	0.54

Appendix D STORMWATER MANAGEMENT CALCULATIONS

Stantec

Brigil - Petrie's Landing II - Block 6, 7, and 8

DATE: 5-Sep-2018
REVISION: 5
DESIGNED BY: MJS
CHECKED BY: AMP

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 1604-01231

DESIGN PARAMETERS

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

	1:2 yr	1:100 yr
a =	732.951	1735.688
b =	6.199	6.014
c =	0.810	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 (100-YEAR) (ha)	AREA (ROOF) (ha)	C (-)	ACCUM. AREA (2YR) (ha)	A x C (2-YEAR)	ACCUM. AxC (2YR) (ha)	ACCUM. AREA (100YR) (ha)	A x C (100-YEAR)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ ROOF (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)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
BLOCK 6																														
F100B	STM100A	STM 100	0.255	0.000	0.000	0.65	0.255	0.166	0.166	0.000	0.000	0.000	10.00	76.81	178.56	0.0	0.0	35.4	23.8	300	300	CIRCULAR	PVC	-	1.00	96.2	**36.8%**	1.37	1.06	0.37
													10.37																	
F102B	CB102A	STM 102	0.166	0.000	0.000	0.20	0.166	0.033	0.033	0.000	0.000	0.000	10.00	76.81	178.56	0.0	0.0	7.1	14.3	200	200	CIRCULAR	PVC	-	1.00	33.3	**21.3%**	1.05	0.69	0.34
F102A	STM102	STM 101	0.000	0.033	0.000	0.90	0.166	0.000	0.033	0.033	0.030	0.030	10.34	75.51	175.47	0.0	0.0	21.4	29.7	300	300	CIRCULAR	PVC	-	0.35	56.9	**37.7%**	0.81	0.64	0.78
	STM101	STM 100	0.000	0.000	0.000	0.00	0.166	0.000	0.033	0.033	0.000	0.030	11.12	72.74	168.90	0.0	0.0	20.6	36.0	300	300	CIRCULAR	PVC	-	0.35	56.9	**36.3%**	0.81	0.63	0.95
													12.08																	
R100A	BLOCK 6	STM 100	0.000	0.000	0.153	0.90	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	178.56	9.3	9.3	9.3	2.3	250	250	CIRCULAR	PVC	-	1.00	60.4	**15.4%**	1.22	0.74	0.05
													10.05																	
	STM 100	STM 1A	0.000	0.000	0.000	0.00	0.421	0.000	0.199	0.033	0.000	0.030	12.08	69.65	161.56	0.0	9.3	61.1	27.8	300	300	CIRCULAR	PVC	-	0.50	68.0	**89.9%**	0.97	0.99	0.47
													12.55																	
BLOCK 7																														
F202B	CB202A	STM 202	0.043	0.000	0.000	0.20	0.043	0.009	0.009	0.000	0.000	0.000	10.00	76.81	178.56	0.0	0.0	1.8	13.2	200	200	CIRCULAR	PVC	-	1.00	33.3	**5.5%**	1.05	0.46	0.48
F202A	STM 202	STM 201	0.000	0.052	0.000	0.85	0.043	0.000	0.009	0.052	0.044	0.044	10.48	75.02	174.32	0.0	0.0	23.2	28.6	200	200	CIRCULAR	PVC	-	0.80	29.8	**77.9%**	0.94	0.92	0.52
F201A, F201B	STM 201	STM 200	0.166	0.000	0.000	0.73	0.209	0.121	0.130	0.052	0.000	0.044	11.00	73.18	169.95	0.0	0.0	47.2	50.2	375	375	CIRCULAR	PVC	-	0.25	87.7	**53.9%**	0.79	0.69	1.21
													12.21																	
F200B	CB 200A	STM 200	0.071	0.000	0.000	0.68	0.071	0.048	0.048	0.000	0.000	0.000	10.00	76.81	178.56	0.0	0.0	10.3	16.4	200	200	CIRCULAR	PVC	-	1.00	33.3	**30.9%**	1.05	0.78	0.35
													10.35																	
R200A	BLOCK 7	STM 200	0.000	0.000	0.197	0.90	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	178.56	12.9	12.9	12.9	1.7	250	250	CIRCULAR	PVC	-	1.00	60.4	**21.4%**	1.22	0.80	0.04
													10.04																	
	STM 200	STUB	0.000	0.000	0.000	0.00	0.280	0.000	0.178	0.052	0.000	0.044	12.21	69.26	160.63	0.0	12.9	66.9	9.8	375	375	CIRCULAR	PVC	-	1.00	175.3	**38.1%**	1.59	1.25	0.13
													12.34																	
BLOCK 8																														
F300B	TRENCH DRAIN 8	STM 301	0.000	0.030	0.000	0.90	0.000	0.000	0.000	0.030	0.027	0.027	10.00	76.81	178.56	0.0	0.0	13.4	17.6	200	200	CIRCULAR	PVC	-	1.00	33.3	**40.2%**	1.05	0.83	0.35
	STM 301	STM 300	0.000	0.000	0.000	0.00	0.000	0.000	0.000	0.030	0.000	0.027	10.35	75.48	175.41	0.0	0.0	13.2	18.0	250	250	CIRCULAR	PVC	-	0.50	42.7	**30.8%**	0.86	0.64	0.47
													10.82																	
F300A	CB 300A	STM 300	0.139	0.000	0.000	0.80	0.139	0.111	0.111	0.000	0.000	0.000	10.00	76.81	178.56	0.0	0.0	23.7	15.8	200	200	CIRCULAR	PVC	-	1.00	33.3	**71.2%**	1.05	0.99	0.26
													10.26																	
R300A	BLOCK 8	STM 300	0.000	0.000	0.236	0.90	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	178.56	16.0	16.0	16.0	6.8	250	250	CIRCULAR	PVC	-	1.00	60.4	**26.5%**	1.22	0.85	0.13
													10.13																	
	STM 300	EX.MH	0.000	0.000	0.000	0.00	0.139	0.000	0.111	0.030	0.000	0.027	10.82	73.78	171.37	0.0	16.0	51.6	22.4	375	375	CIRCULAR	PVC	-	1.00	175.3	**29.5%**	1.59	1.16	0.32
													11.15																	

Stormwater Management Calculations

File No: **160401331**
Project: **Petries Landing - Block 6, 7 and 8**

Date: **05-Sep-18**

SWM Approach:

Limit site to 191.1 L/s for Blocks 6 and 7 and 99.5 L/s for Block 8

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Block ID	Runoff Coefficient Table								
	Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Phase 2 - Block 6	Controlled - Tributary	Parking Block 6 (F100B)	Hard	0.164		0.9	0.148		
			Soft	0.091		0.2	0.018		
			Subtotal		0.255			0.166	0.65
	100-year Capture - Tributary	Parking Ramp Block 6 (F102A)	Hard	0.033		0.9	0.030		
			Soft	0.000		0.2	0.000		
			Subtotal		0.033			0.030	0.90
	Roof - Tributary	BLDG Block 6 (R100A)	Hard	0.153		0.9	0.138		
			Soft	0.000		0.2	0.000		
			Subtotal		0.153			0.138	0.90
	Controlled - Tributary	Landscaped Area Block 6 (F102B)	Hard	0.000		0.9	0.000		
			Soft	0.166		0.2	0.033		
			Subtotal		0.166			0.033	0.20
		Total Block 6 =		**0.607 ha**		**0.60**			
Phase 2 - Block 7	Controlled - Tributary	Parking Block 7 (F201A)	Hard	0.045		0.9	0.040		
			Soft	0.014		0.2	0.003		
			Subtotal		0.059			0.043	0.73
	Controlled - Tributary	Parking Block 7 (F201B)	Hard	0.081		0.9	0.073		
			Soft	0.026		0.2	0.005		
			Subtotal		0.107			0.078	0.73
	Controlled - Tributary	Parking Block 7 (F200B)	Hard	0.049		0.9	0.044		
			Soft	0.022		0.2	0.004		
			Subtotal		0.071			0.048	0.68
	100-year Capture - Tributary	Parking Ramp Block 7 (F202A)	Hard	0.048		0.9	0.043		
			Soft	0.004		0.2	0.001		
			Subtotal		0.052			0.044	0.85
	Roof - Tribuatry	BLDG Block 7 (R200A)	Hard	0.197		0.9	0.177		
			Soft	0.000		0.2	0.000		
			Subtotal		0.197			0.177	0.90
	Controlled - Tributary	Landscaped Area Block 7 (F202B)	Hard	0.000		0.9	0.000		
			Soft	0.043		0.2	0.009		
			Subtotal		0.043			0.009	0.20
	Uncontrolled - Non Tributary	Uncontrolled Block 7 (UNC-1)	Hard	0.000		0.9	0.000		
		Subtotal	Soft	0.203		0.2	0.041		
					0.203			0.041	0.20
	Uncontrolled - Non Tributary	Uncontrolled Block 7 (UNC-2)	Hard	0.000		0.9	0.000		
		Subtotal	Soft	0.028		0.2	0.006		
					0.028			0.006	0.20
		Total Block 7 =		**0.760 ha**		**0.59**			
Phase 3 - Block 8	Controlled - Tributary	Parking Block 8 (F300A)	Hard	0.119		0.9	0.107		
			Soft	0.020		0.2	0.004		
			Subtotal		0.139			0.111	0.80
	100-year Capture - Tributary	Parking Ramp Block 8 (F300B)	Hard	0.030		0.9	0.027		
			Soft	0.000		0.2	0.000		
			Subtotal		0.030			0.027	0.90
	Roof	BLDG Block 8 (R300A)	Hard	0.236		0.9	0.212		
			Soft	0.000		0.2	0.000		
			Subtotal		0.236			0.212	0.90
	Uncontrolled - Non Tributary	Uncontrolled Block 8 (UNC-3)	Hard	0.000		0.9	0.000		
		Subtotal	Soft	0.368		0.2	0.074		
					0.368			0.074	0.20
		Total Block 8 =		**0.773 ha**		**0.55**			
	Total				**2.140**			**1.237**	
	Overall Runoff Coefficient= C:								**0.58**

Total Roof Areas	**0.586 ha**
Total Parking Ramp Areas	**0.115 ha**
Total Surface Areas (Controlled)	**0.840 ha**
Total Surface Areas (Uncontrolled)	**0.599 ha**
Total Site Area	**2.140 ha**
Area to Sewer	**1.541 ha**

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

2 yr Intensity
City of Ottawa

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

a =	732.951
b =	6.199
c =	0.810

t (min)	I (mm/hr)
5	103.57
10	76.81
15	61.77
20	52.03
25	45.17
30	40.04
35	36.06
40	32.86
45	30.24
50	28.04
55	26.17
60	24.56

Target Release from Blocks 6 and 7

SWM Approach: Limit site to 191.1 L/s for Blocks 6 and 7 and 99.5 L/s for Block 8

Area (ha): 1.367
C: 0.59

Qtarget (L/s)	Qtarget (L/s/ha)
191.10	**140**

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: BLDG Block 6 (R100A) — Roof - Tributary
Area (ha): 0.153 — Maximum Storage Depth: 150 mm
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	29.45	5.86	23.60	14.16	92.8	0.00
20	52.03	19.95	6.23	13.72	**16.47**	98.7	0.00
30	40.04	15.35	6.22	9.13	16.44	98.6	0.00
40	32.86	12.60	6.09	6.51	15.62	96.6	0.00
50	28.04	10.75	5.91	4.84	14.52	93.7	0.00
60	24.56	9.42	5.72	3.70	13.31	90.7	0.00
70	21.91	8.40	5.52	2.88	12.09	87.6	0.00
80	19.83	7.60	5.33	2.27	10.90	84.5	0.00
90	18.14	6.96	5.15	1.81	9.76	81.6	0.00
100	16.75	6.42	4.98	1.45	8.68	78.9	0.00
110	15.57	5.97	4.81	1.16	7.65	76.2	0.00
120	14.56	5.58	4.63	0.95	6.85	73.4	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	98.70	0.10	6.23	16.47	57.30	0.00

Subdrainage Area: Parking Block 6 (F100B) — Controlled - Tributary
Area (ha): 0.255
C: 0.65

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	
10	76.81	35.39	35.39	0.00	0.00	
20	52.03	23.98	35.39	0.00	0.00	
30	40.04	18.45	35.39	0.00	0.00	
40	32.86	15.14	35.39	0.00	0.00	
50	28.04	12.92	35.39	0.00	0.00	
60	24.56	11.32	35.39	0.00	0.00	
70	21.91	10.10	35.39	0.00	0.00	
80	19.83	9.14	35.39	0.00	0.00	
90	18.14	8.36	35.39	0.00	0.00	
100	16.75	7.72	35.39	0.00	0.00	
110	15.57	7.17	35.39	0.00	0.00	
120	14.56	6.71	35.39	0.00	0.00	

Storage: Surface Storage Above CB100AA

Orifice Equation: $Q = CdA(2gh)^{0.5}$

Invert Elevation	120.00	m
Invert Elevation	55.33	m
T/G Elevation	56.98	m
Max Ponding Depth	0.05	m
Downstream W/L	53.91	m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	57.03	1.70	35.39	0.00	37.18	OK

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons 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)
5	242.70
10	178.56
15	142.89
20	119.95
25	103.85
30	91.87
35	82.58
40	75.15
45	69.05
50	63.95
55	59.62
60	55.89

Target Release from Block 8

SWM Approach: Limit site to 191.1 L/s for Blocks 6 and 7 and 99.5 L/s for Block 8

Area (ha): 0.773
C: 0.55

Qtarget (L/s)	Qtarget (L/s/ha)
99.50	**129**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: BLDG Block 6 (R100A) — Roof - Tributary
Area (ha): 0.153 — Maximum Storage Depth: 150 mm
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	76.08	8.37	67.70	40.62	132.7	0.00
20	119.95	51.11	9.02	42.09	50.50	143.0	0.00
30	91.87	39.14	9.24	29.90	53.83	146.4	0.00
40	75.15	32.02	9.28	22.73	**54.56**	147.2	0.00
50	63.95	27.25	9.25	18.00	54.00	146.6	0.00
60	55.89	23.81	9.17	14.65	52.74	145.3	0.00
70	49.79	21.21	9.06	12.16	51.06	143.5	0.00
80	44.99	19.17	8.93	10.24	49.14	141.6	0.00
90	41.11	17.52	8.80	8.72	47.08	139.4	0.00
100	37.90	16.15	8.66	7.49	44.95	137.2	0.00
110	35.20	15.00	8.52	6.48	42.79	135.0	0.00
120	32.89	14.02	8.37	5.64	40.62	132.7	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	147.16	0.15	9.28	54.56	57.30	0.00

Subdrainage Area: Parking Block 6 (F100B) — Controlled - Tributary
Area (ha): 0.255
C: 0.81

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	
10	178.56	102.85	42.34	60.50	36.30	
20	119.95	69.09	42.34	26.75	32.10	
30	91.87	52.91	42.34	10.57	19.03	
40	75.15	43.28	42.34	0.94	2.25	
50	63.95	36.84	42.34	0.00	0.00	
60	55.89	32.19	42.34	0.00	0.00	
70	49.79	28.68	42.34	0.00	0.00	
80	44.99	25.91	42.34	0.00	0.00	
90	41.11	23.68	42.34	0.00	0.00	
100	37.90	21.83	42.34	0.00	0.00	
110	35.20	20.28	42.34	0.00	0.00	
120	32.89	18.95	42.34	0.00	0.00	

Storage: Surface Storage Above CB100AA

Orifice Equation: $Q = CdA(2gh)^{0.5}$ — Where C = 0.61

Orifice Diameter:	120.00	mm
Invert Elevation	55.33	m
T/G Elevation	56.98	m
Max Ponding Depth	0.27	m
Downstream W/L	53.91	m

Pipe Storage		
Length	Size	Volume
20.4	900	13.98

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	57.25	1.92	42.34	36.30	37.18	OK
					0.88	

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: Parking Ramp Block 6 (F102A) — 100-year Capture - Tributary
Area (ha): 0.033
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	76.81	6.34	6.34	0.00	0.00	0.00
20	52.03	4.30	4.30	0.00	0.00	0.00
30	40.04	3.31	3.31	0.00	0.00	0.00
40	32.86	2.71	2.71	0.00	0.00	0.00
50	28.04	2.32	2.32	0.00	0.00	0.00
60	24.56	2.03	2.03	0.00	0.00	0.00
70	21.91	1.81	1.81	0.00	0.00	0.00
80	19.83	1.64	1.64	0.00	0.00	0.00
90	18.14	1.50	1.50	0.00	0.00	0.00
100	16.75	1.38	1.38	0.00	0.00	0.00
110	15.57	1.29	1.29	0.00	0.00	0.00
120	14.56	1.20	1.20	0.00	0.00	0.00

Subdrainage Area: Landscaped Area Block 6 (F102B) — Controlled - Tributary
Area (ha): 0.166
C: 0.20

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	7.09	7.09	0.00	0.00
20	52.03	4.80	4.80	0.00	0.00
30	40.04	3.70	3.70	0.00	0.00
40	32.86	3.03	3.03	0.00	0.00
50	28.04	2.59	2.59	0.00	0.00
60	24.56	2.27	2.27	0.00	0.00
70	21.91	2.02	2.02	0.00	0.00
80	19.83	1.83	1.83	0.00	0.00
90	18.14	1.67	1.67	0.00	0.00
100	16.75	1.55	1.55	0.00	0.00
110	15.57	1.44	1.44	0.00	0.00
120	14.56	1.34	1.34	0.00	0.00

Storage: Surface Storage Above CB102A

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 83.00 mm
Invert Elevation: 54.30 m
T/G Elevation: 56.64 m
Max Ponding Depth: 0.00 m
Downstream W/L: 53.91 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	56.64	2.34	7.09	0.00	0.50	OK

Block 6 Peak Flow Summary

Total Area = 0.607 ha — **Volume Used =** 16.47 m³
Q target = 84.9 L/s
Q unc = 0.0 L/s
Qramp = 6.3 L/s
Qroof = 6.2 L/s
Qpark = 42.5 L/s
Qtotal = 55 L/s

Subdrainage Area: BLDG Block 7 (R200A) — Roof - Tributary
Area (ha): 0.197 — Maximum Storage Depth: 150 mm
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	37.86	8.17	29.69	17.81	92.5	0.00
20	52.03	25.65	8.63	17.02	**20.42**	97.7	0.00
30	40.04	19.74	8.57	11.17	20.10	97.0	0.00
40	32.86	16.20	8.35	7.85	18.84	94.5	0.00
50	28.04	13.82	8.07	5.75	17.26	91.4	0.00
60	24.56	12.10	7.77	4.33	15.59	88.0	0.00
70	21.91	10.80	7.48	3.32	13.94	84.7	0.00
80	19.83	9.77	7.20	2.57	12.35	81.5	0.00
90	18.14	8.94	6.93	2.01	10.85	78.5	0.00
100	16.75	8.25	6.68	1.57	9.43	75.7	0.00
110	15.57	7.67	6.40	1.28	8.44	72.4	0.00
120	14.56	7.18	6.12	1.06	7.63	69.3	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	97.69	0.10	8.63	20.42	72.80	0.00

Subdrainage Area: Parking Ramp Block 7 (F202A) — 100-year Capture - Tributary
Area (ha): 0.052
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	76.81	9.44	9.44	0.00	0.00	0.00
20	52.03	6.39	6.39	0.00	0.00	0.00
30	40.04	4.92	4.92	0.00	0.00	0.00
40	32.86	4.04	4.04	0.00	0.00	0.00
50	28.04	3.45	3.45	0.00	0.00	0.00
60	24.56	3.02	3.02	0.00	0.00	0.00
70	21.91	2.69	2.69	0.00	0.00	0.00
80	19.83	2.44	2.44	0.00	0.00	0.00
90	18.14	2.23	2.23	0.00	0.00	0.00
100	16.75	2.06	2.06	0.00	0.00	0.00
110	15.57	1.91	1.91	0.00	0.00	0.00
120	14.56	1.79	1.79	0.00	0.00	0.00

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: Parking Ramp Block 6 (F102A) — 100-year Capture - Tributary
Area (ha): 0.033
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	178.56	16.38	16.38	0.00	0.00	0.00
20	119.95	11.00	11.00	0.00	0.00	0.00
30	91.87	8.43	8.43	0.00	0.00	0.00
40	75.15	6.89	6.89	0.00	0.00	0.00
50	63.95	5.87	5.87	0.00	0.00	0.00
60	55.89	5.13	5.13	0.00	0.00	0.00
70	49.79	4.57	4.57	0.00	0.00	0.00
80	44.99	4.13	4.13	0.00	0.00	0.00
90	41.11	3.77	3.77	0.00	0.00	0.00
100	37.90	3.48	3.48	0.00	0.00	0.00
110	35.20	3.23	3.23	0.00	0.00	0.00
120	32.89	3.02	3.02	0.00	0.00	0.00

Subdrainage Area: Landscaped Area Block 6 (F102B) — Controlled - Tributary
Area (ha): 0.166
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	20.60	20.60	0.00	0.00
20	119.95	13.84	13.84	0.00	0.00
30	91.87	10.60	10.60	0.00	0.00
40	75.15	8.67	8.67	0.00	0.00
50	63.95	7.38	7.38	0.00	0.00
60	55.89	6.45	6.45	0.00	0.00
70	49.79	5.74	5.74	0.00	0.00
80	44.99	5.19	5.19	0.00	0.00
90	41.11	4.74	4.74	0.00	0.00
100	37.90	4.37	4.37	0.00	0.00
110	35.20	4.06	4.06	0.00	0.00
120	32.89	3.80	3.80	0.00	0.00

Storage: Surface Storage Above CB102A

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 83.00 mm
Invert Elevation: 54.30 m
T/G Elevation: 56.64 m
Max Ponding Depth: 0.08 m
Downstream W/L: 53.91 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	56.72	2.42	20.60	0.00	0.50	OK
					0.50	

Block 6 Peak Flow Summary

Total Area = 0.607 ha — **Volume Used =** 90.86 m³
Q target = 84.9 L/s
Q unc = 0.0 L/s
Qramp = 16.4 L/s
Qroof = 9.3 L/s
Qparking = 62.9 L/s
Qtotal = 89 L/s — 3.73 L/s

Subdrainage Area: BLDG Block 7 (R200A) — Roof - Tributary
Area (ha): 0.197 — Maximum Storage Depth: 150 mm
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	97.79	11.73	86.06	51.64	132.8	0.00
20	119.95	65.69	12.59	53.10	63.72	142.6	0.00
30	91.87	50.31	12.86	37.45	67.41	145.6	0.00
40	75.15	41.15	12.89	28.26	**67.83**	145.9	0.00
50	63.95	35.03	12.81	22.22	66.66	145.0	0.00
60	55.89	30.61	12.66	17.95	64.62	143.3	0.00
70	49.79	27.27	12.48	14.79	62.11	141.3	0.00
80	44.99	24.64	12.28	12.36	59.33	139.0	0.00
90	41.11	22.51	12.07	10.45	56.41	136.6	0.00
100	37.90	20.76	11.85	8.90	53.42	134.2	0.00
110	35.20	19.28	11.64	7.64	50.43	131.8	0.00
120	32.89	18.02	11.42	6.59	47.46	129.3	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	145.95	0.15	12.89	67.83	72.80	0.00

Subdrainage Area: Parking Ramp Block 7 (F202A) — 100-year Capture - Tributary
Area (ha): 0.052
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	178.56	25.81	25.81	0.00	0.00	0.00
20	119.95	17.34	17.34	0.00	0.00	0.00
30	91.87	13.28	13.28	0.00	0.00	0.00
40	75.15	10.86	10.86	0.00	0.00	0.00
50	63.95	9.25	9.25	0.00	0.00	0.00
60	55.89	8.08	8.08	0.00	0.00	0.00
70	49.79	7.20	7.20	0.00	0.00	0.00
80	44.99	6.50	6.50	0.00	0.00	0.00
90	41.11	5.94	5.94	0.00	0.00	0.00
100	37.90	5.48	5.48	0.00	0.00	0.00
110	35.20	5.09	5.09	0.00	0.00	0.00
120	32.89	4.76	4.76	0.00	0.00	0.00

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: Uncontrolled Block 7 (UNC-1) — Uncontrolled - Non Tributary
Area (ha): 0.203
C: 0.20

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	76.81	8.67	8.67	0.00	0.00	0.00
20	52.03	5.87	5.87	0.00	0.00	0.00
30	40.04	4.52	4.52	0.00	0.00	0.00
40	32.86	3.71	3.71	0.00	0.00	0.00
50	28.04	3.16	3.16	0.00	0.00	0.00
60	24.56	2.77	2.77	0.00	0.00	0.00
70	21.91	2.47	2.47	0.00	0.00	0.00
80	19.83	2.24	2.24	0.00	0.00	0.00
90	18.14	2.05	2.05	0.00	0.00	0.00
100	16.75	1.89	1.89	0.00	0.00	0.00
110	15.57	1.76	1.76	0.00	0.00	0.00
120	14.56	1.64	1.64	0.00	0.00	0.00

Subdrainage Area: Uncontrolled Block 7 (UNC-2) — Uncontrolled - Non Tributary
Area (ha): 0.028
C: 0.20

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	76.81	1.20	1.20	0.00	0.00	0.00
20	52.03	0.81	0.81	0.00	0.00	0.00
30	40.04	0.62	0.62	0.00	0.00	0.00
40	32.86	0.51	0.51	0.00	0.00	0.00
50	28.04	0.44	0.44	0.00	0.00	0.00
60	24.56	0.38	0.38	0.00	0.00	0.00
70	21.91	0.34	0.34	0.00	0.00	0.00
80	19.83	0.31	0.31	0.00	0.00	0.00
90	18.14	0.28	0.28	0.00	0.00	0.00
100	16.75	0.26	0.26	0.00	0.00	0.00
110	15.57	0.24	0.24	0.00	0.00	0.00
120	14.56	0.23	0.23	0.00	0.00	0.00

Subdrainage Area: Parking Block 7 (F201A) — Controlled - Tributary
Area (ha): 0.059
C: 0.73

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	9.20	9.20	0.00	0.00
20	52.03	6.23	9.20	0.00	0.00
30	40.04	4.79	9.20	0.00	0.00
40	32.86	3.93	9.20	0.00	0.00
50	28.04	3.36	9.20	0.00	0.00
60	24.56	2.94	9.20	0.00	0.00
70	21.91	2.62	9.20	0.00	0.00
80	19.83	2.37	9.20	0.00	0.00
90	18.14	2.17	9.20	0.00	0.00
100	16.75	2.01	9.20	0.00	0.00
110	15.57	1.86	9.20	0.00	0.00
120	14.56	1.74	9.20	0.00	0.00

Storage: Surface Storage Above CB200B

Orifice Equation: Q = CdA(2gh)^0.5
Orifice Diameter: 102.00 mm
Invert Elevation 54.66 m
T/G Elevation 56.41 m
Max Ponding Depth 0.00 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	56.41	1.75	9.20	0.00	0.00	OK

Subdrainage Area: Parking Block 7 (F201B) — Controlled - Tributary
Area (ha): 0.107
C: 0.73

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	16.68	12.80	3.87	2.32
20	52.03	11.30	12.80	0.00	0.00
30	40.04	8.70	12.80	0.00	0.00
40	32.86	7.14	12.80	0.00	0.00
50	28.04	6.09	12.80	0.00	0.00
60	24.56	5.33	12.80	0.00	0.00
70	21.91	4.76	12.80	0.00	0.00
80	19.83	4.31	12.80	0.00	0.00
90	18.14	3.94	12.80	0.00	0.00
100	16.75	3.64	12.80	0.00	0.00
110	15.57	3.38	12.80	0.00	0.00
120	14.56	3.16	12.80	0.00	0.00

Storage: Surface Storage Above CBMH200C

Orifice Equation: LMF105

Invert Elevation 54.67 m
T/G Elevation 56.38 m
Max Ponding Depth 0.00 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	56.38	1.71	12.80	2.32	23.76	OK

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: Uncontrolled Block 7 (UNC-1) — Uncontrolled - Non Tributary
Area (ha): 0.203
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	178.56	25.19	25.19	0.00	0.00	0.00
20	119.95	16.92	16.92	0.00	0.00	0.00
30	91.87	12.96	12.96	0.00	0.00	0.00
40	75.15	10.60	10.60	0.00	0.00	0.00
50	63.95	9.02	9.02	0.00	0.00	0.00
60	55.89	7.89	7.89	0.00	0.00	0.00
70	49.79	7.02	7.02	0.00	0.00	0.00
80	44.99	6.35	6.35	0.00	0.00	0.00
90	41.11	5.80	5.80	0.00	0.00	0.00
100	37.90	5.35	5.35	0.00	0.00	0.00
110	35.20	4.97	4.97	0.00	0.00	0.00
120	32.89	4.64	4.64	0.00	0.00	0.00

Subdrainage Area: Uncontrolled Block 7 (UNC-2) — Uncontrolled - Non Tributary
Area (ha): 0.028
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	178.56	3.47	3.47	0.00	0.00	0.00
20	119.95	2.33	2.33	0.00	0.00	0.00
30	91.87	1.79	1.79	0.00	0.00	0.00
40	75.15	1.46	1.46	0.00	0.00	0.00
50	63.95	1.24	1.24	0.00	0.00	0.00
60	55.89	1.09	1.09	0.00	0.00	0.00
70	49.79	0.97	0.97	0.00	0.00	0.00
80	44.99	0.88	0.88	0.00	0.00	0.00
90	41.11	0.80	0.80	0.00	0.00	0.00
100	37.90	0.74	0.74	0.00	0.00	0.00
110	35.20	0.69	0.69	0.00	0.00	0.00
120	32.89	0.64	0.64	0.00	0.00	0.00

Subdrainage Area: Parking Block 7 (F201A) — Controlled - Tributary
Area (ha): 0.059
C: 0.91

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	26.72	26.72	0.00	0.00
20	119.95	17.95	26.72	0.00	0.00
30	91.87	13.75	26.72	0.00	0.00
40	75.15	11.25	26.72	0.00	0.00
50	63.95	9.57	26.72	0.00	0.00
60	55.89	8.37	26.72	0.00	0.00
70	49.79	7.45	26.72	0.00	0.00
80	44.99	6.73	26.72	0.00	0.00
90	41.11	6.15	26.72	0.00	0.00
100	37.90	5.67	26.72	0.00	0.00
110	35.20	5.27	26.72	0.00	0.00
120	32.89	4.92	26.72	0.00	0.00

Storage: Surface Storage Above CB200B

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 102.00 mm
Invert Elevation 54.66 m
T/G Elevation 56.41 m
Max Ponding Depth 0.00 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	56.41	1.75	26.72	0.00	0.00	OK
					0.00	

Subdrainage Area: Parking Block 7 (F201B) — Controlled - Tributary
Area (ha): 0.107
C: 0.91

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	48.47	13.57	34.90	20.94
20	119.95	32.56	13.57	18.99	22.79
30	91.87	24.94	13.57	11.37	20.46
40	75.15	20.40	13.57	6.83	16.39
50	63.95	17.36	13.57	3.79	11.37
60	55.89	15.17	13.57	1.60	5.77
70	49.79	13.51	13.57	0.00	0.00
80	44.99	12.21	13.57	0.00	0.00
90	41.11	11.16	13.57	0.00	0.00
100	37.90	10.29	13.57	0.00	0.00
110	35.20	9.56	13.57	0.00	0.00
120	32.89	8.93	13.57	0.00	0.00

Storage: Surface Storage Above CBMH200C

Orifice Equation: LMF105

Invert Elevation 54.67 m
T/G Elevation 56.38 m
Max Ponding Depth 0.21 m
Downstream W/L 52.93 m

Pipe Storage		
Length	Size	Volume
25.0	825	13.36

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	56.59	1.92	13.57	22.79	23.76	OK
					0.98	

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: Parking Block 7 (F200B) — Controlled - Tributary
Area (ha): 0.071
C: 0.68

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	10.31	5.98	4.33	2.60
20	52.03	6.98	5.98	1.01	1.21
30	40.04	5.37	5.37	0.00	0.00
40	32.86	4.41	4.41	0.00	0.00
50	28.04	3.76	3.76	0.00	0.00
60	24.56	3.30	3.30	0.00	0.00
70	21.91	2.94	2.94	0.00	0.00
80	19.83	2.66	2.66	0.00	0.00
90	18.14	2.44	2.44	0.00	0.00
100	16.75	2.25	2.25	0.00	0.00
110	15.57	2.09	2.09	0.00	0.00
120	14.56	1.95	1.95	0.00	0.00

Storage: Surface Storage Above CB200A

Orifice Equation: LMF70
Invert Elevation 54.41 m
T/G Elevation 56.23 m
Max Ponding Depth 0.10 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	56.33	1.92	5.98	2.60	33.30	OK

Subdrainage Area: Landscaped Area Block 7 (F202B) — Controlled - Tributary
Area (ha): 0.043
C: 0.20

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	1.84	1.84	0.00	0.00
20	52.03	1.24	1.24	0.00	0.00
30	40.04	0.96	0.96	0.00	0.00
40	32.86	0.79	0.79	0.00	0.00
50	28.04	0.67	0.67	0.00	0.00
60	24.56	0.59	0.59	0.00	0.00
70	21.91	0.52	0.52	0.00	0.00
80	19.83	0.47	0.47	0.00	0.00
90	18.14	0.43	0.43	0.00	0.00
100	16.75	0.40	0.40	0.00	0.00
110	15.57	0.37	0.37	0.00	0.00
120	14.56	0.35	0.35	0.00	0.00

Storage: Surface Storage Above CB202A

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 83.00 mm
Invert Elevation 53.47 m
T/G Elevation 54.83 m
Max Ponding Depth 0.00 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	54.83	1.36	1.84	0.00	0.00	

Block 7 Peak Flow Summary

Total Area = 0.760 ha — **Volume =** 25.34 m³
Q target = 106.2 L/s
Q unc = 9.9 L/s
Qramp = 9.4 L/s
Qroof = 8.6 L/s
Qparking = 29.8 L/s

Qtotal = 58 L/s

Subdrainage Area: Parking Block 8 (F300A) — Controlled - Tributary
Area (ha): 0.139
C: 0.80

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	23.74	5.94	17.80	10.68
20	52.03	16.08	5.94	10.14	12.17
30	40.04	12.38	5.94	6.43	11.58
40	32.86	10.16	5.94	4.21	10.12
50	28.04	8.67	5.94	2.72	8.17
60	24.56	7.59	5.94	1.65	5.93
70	21.91	6.77	5.94	0.83	3.48
80	19.83	6.13	5.94	0.19	0.89
90	18.14	5.61	5.61	0.00	0.00
100	16.75	5.18	5.18	0.00	0.00
110	15.57	4.81	4.81	0.00	0.00
120	14.56	4.50	4.50	0.00	0.00

Storage: Surface Storage Above CB300A

Orifice Equation: LMF70
Invert Elevation 52.97 m
T/G Elevation 54.77 m
Max Ponding Depth 0.10 m
Downstream W/L 51.46 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	54.87	1.90	5.94	12.17	56.01	OK

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: Parking Block 7 (F200B) — Controlled - Tributary
Area (ha): 0.071
C: 0.85

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	29.96	6.28	23.67	14.20
20	119.95	20.12	6.28	13.84	16.61
30	91.87	15.41	6.28	9.13	16.43
40	75.15	12.61	6.28	6.32	15.18
50	63.95	10.73	6.28	4.45	13.34
60	55.89	9.38	6.28	3.09	11.14
70	49.79	8.35	6.28	2.07	8.70
80	44.99	7.55	6.28	1.27	6.07
90	41.11	6.90	6.28	0.61	3.32
100	37.90	6.36	6.28	0.08	0.46
110	35.20	5.91	5.91	0.00	0.00
120	32.89	5.52	5.52	0.00	0.00

Storage: Surface Storage Above CB200A

Orifice Equation: LMF70
Invert Elevation 54.41 m
T/G Elevation 56.23 m
Max Ponding Depth 0.30 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	56.53	2.12	6.28	16.61	33.30	OK

Subdrainage Area: Landscaped Area Block 7 (F202B) — Controlled - Tributary
Area (ha): 0.043
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	5.34	5.34	0.00	0.00
20	119.95	3.58	3.58	0.00	0.00
30	91.87	2.75	2.75	0.00	0.00
40	75.15	2.25	2.25	0.00	0.00
50	63.95	1.91	1.91	0.00	0.00
60	55.89	1.67	1.67	0.00	0.00
70	49.79	1.49	1.49	0.00	0.00
80	44.99	1.34	1.34	0.00	0.00
90	41.11	1.23	1.23	0.00	0.00
100	37.90	1.13	1.13	0.00	0.00
110	35.20	1.05	1.05	0.00	0.00
120	32.89	0.98	0.98	0.00	0.00

Storage: Surface Storage Above CB202A

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 83.00 mm
Invert Elevation 53.47 m
T/G Elevation 54.83 m
Max Ponding Depth 0.00 m
Downstream W/L 52.93 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	54.83	1.36	5.34	0.00	0.00	

Block 7 Peak Flow Summary

Total Area = 0.760 ha — **Volume =** 107.23 m³
Q target = 106.2 L/s
Q unc = 28.7 L/s
Qramp = 25.8 L/s
Qroof = 12.9 L/s
Qparking = 51.9 L/s

Qtotal = 119 L/s — 13.06 L/s

Subdrainage Area: Parking Block 8 (F300A) — Controlled - Tributary
Area (ha): 0.139
C: 0.91

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	62.96	6.25	56.71	34.03
20	119.95	42.30	6.25	36.04	43.25
30	91.87	32.39	6.25	26.14	47.05
40	75.15	26.50	6.25	20.24	48.59
50	63.95	22.55	6.25	16.30	48.89
60	55.89	19.71	6.25	13.46	48.44
70	49.79	17.56	6.25	11.30	47.47
80	44.99	15.86	6.25	9.61	46.13
90	41.11	14.50	6.25	8.24	44.51
100	37.90	13.36	6.25	7.11	42.67
110	35.20	12.41	6.25	6.16	40.65
120	32.89	11.60	6.25	5.35	38.49

Storage: Surface Storage Above CB300A

Orifice Equation: LMF70
Invert Elevation 52.97 m
T/G Elevation 54.77 m
Max Ponding Depth 0.30 m
Downstream W/L 51.46 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	55.07	2.10	6.25	48.89	56.01	OK
					7.12	

Stormwater Management Calculations

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: BLDG Block 8 (R300A) — Roof
Area (ha): 0.236 — Maximum Storage Depth: 150 mm
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	45.35	10.15	35.20	21.12	89.4	0.00
20	52.03	30.72	10.67	20.05	**24.06**	94.0	0.00
30	40.04	23.64	10.58	13.07	23.52	93.1	0.00
40	32.86	19.41	10.29	9.12	21.88	90.6	0.00
50	28.04	16.56	9.93	6.62	19.87	87.5	0.00
60	24.56	14.50	9.56	4.94	17.77	84.2	0.00
70	21.91	12.94	9.20	3.74	15.70	81.0	0.00
80	19.83	11.71	8.85	2.86	13.71	78.0	0.00
90	18.14	10.71	8.52	2.19	11.83	75.0	0.00
100	16.75	9.89	8.12	1.77	10.63	71.5	0.00
110	15.57	9.19	7.75	1.45	9.55	68.2	0.00
120	14.56	8.60	7.41	1.19	8.56	65.2	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	93.96	0.09	10.67	24.06	94.40	0.00

Subdrainage Area: Parking Ramp Block 8 (F300B) — 100-year Capture - Tributary
Area (ha): 0.030
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	76.81	5.76	5.76	0.00	0.00	0.00
20	52.03	3.91	3.91	0.00	0.00	0.00
30	40.04	3.01	3.01	0.00	0.00	0.00
40	32.86	2.47	2.47	0.00	0.00	0.00
50	28.04	2.10	2.10	0.00	0.00	0.00
60	24.56	1.84	1.84	0.00	0.00	0.00
70	21.91	1.64	1.64	0.00	0.00	0.00
80	19.83	1.49	1.49	0.00	0.00	0.00
90	18.14	1.36	1.36	0.00	0.00	0.00
100	16.75	1.26	1.26	0.00	0.00	0.00
110	15.57	1.17	1.17	0.00	0.00	0.00
120	14.56	1.09	1.09	0.00	0.00	0.00

Subdrainage Area: Uncontrolled Block 8 (UNC-3) — Uncontrolled - Non Tributary
Area (ha): 0.368
C: 0.20

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	76.81	15.71	15.71	0.00	0.00	0.00
20	52.03	10.65	10.65	0.00	0.00	0.00
30	40.04	8.19	8.19	0.00	0.00	0.00
40	32.86	6.72	6.72	0.00	0.00	0.00
50	28.04	5.74	5.74	0.00	0.00	0.00
60	24.56	5.02	5.02	0.00	0.00	0.00
70	21.91	4.48	4.48	0.00	0.00	0.00
80	19.83	4.06	4.06	0.00	0.00	0.00
90	18.14	3.71	3.71	0.00	0.00	0.00
100	16.75	3.43	3.43	0.00	0.00	0.00
110	15.57	3.19	3.19	0.00	0.00	0.00
120	14.56	2.98	2.98	0.00	0.00	0.00

Block 8 Peak Flow Summary

Total Area = **0.773** **ha** — **Volume =** **36.23** **m³**
Q target = 99.5 L/s

Q unc = 15.7 L/s
Qramp = 5.8 L/s
Qroof = 10.7 L/s
Qparking = 5.9 L/s

Q total = **38** **L/s**

Overall Site Release Rate
Q target = 290.6 L/s
Q total = 150.9 L/s

Project #160401331, Petries Landing - Block 6, 7 and 8
Modified Rational Method Calculatons for Storage

Subdrainage Area: BLDG Block 8 (R300A) — Roof
Area (ha): 0.236 — Maximum Storage Depth: 150 mm
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	117.15	14.68	102.46	61.48	129.3	0.00
20	119.95	78.70	15.69	63.00	75.61	138.2	0.00
30	91.87	60.27	15.99	44.29	79.72	140.8	0.00
40	75.15	49.30	16.00	33.30	**79.92**	140.9	0.00
50	63.95	41.96	15.88	26.08	78.24	139.8	0.00
60	55.89	36.67	15.69	20.98	75.54	138.1	0.00
70	49.79	32.67	15.46	17.21	72.28	136.1	0.00
80	44.99	29.52	15.20	14.32	68.72	133.9	0.00
90	41.11	26.97	14.94	12.04	65.00	131.5	0.00
100	37.90	24.87	14.67	10.20	61.21	129.1	0.00
110	35.20	23.10	14.39	8.70	57.43	126.8	0.00
120	32.89	21.58	14.11	7.47	53.81	124.2	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	140.90	0.14	16.00	79.92	94.40	0.00

Subdrainage Area: Parking Ramp Block 8 (F300B) — 100-year Capture - Tributary
Area (ha): 0.030
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	178.56	14.89	14.89	0.00	0.00	0.00
20	119.95	10.00	10.00	0.00	0.00	0.00
30	91.87	7.66	7.66	0.00	0.00	0.00
40	75.15	6.27	6.27	0.00	0.00	0.00
50	63.95	5.33	5.33	0.00	0.00	0.00
60	55.89	4.66	4.66	0.00	0.00	0.00
70	49.79	4.15	4.15	0.00	0.00	0.00
80	44.99	3.75	3.75	0.00	0.00	0.00
90	41.11	3.43	3.43	0.00	0.00	0.00
100	37.90	3.16	3.16	0.00	0.00	0.00
110	35.20	2.94	2.94	0.00	0.00	0.00
120	32.89	2.74	2.74	0.00	0.00	0.00

Subdrainage Area: Uncontrolled Block 8 (UNC-3) — Uncontrolled - Non Tributary
Area (ha): 0.368
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Qspill (L/s)
10	178.56	45.67	45.67	0.00	0.00	0.00
20	119.95	30.68	30.68	0.00	0.00	0.00
30	91.87	23.50	23.50	0.00	0.00	0.00
40	75.15	19.22	19.22	0.00	0.00	0.00
50	63.95	16.36	16.36	0.00	0.00	0.00
60	55.89	14.30	14.30	0.00	0.00	0.00
70	49.79	12.73	12.73	0.00	0.00	0.00
80	44.99	11.51	11.51	0.00	0.00	0.00
90	41.11	10.51	10.51	0.00	0.00	0.00
100	37.90	9.69	9.69	0.00	0.00	0.00
110	35.20	9.00	9.00	0.00	0.00	0.00
120	32.89	8.41	8.41	0.00	0.00	0.00

Block 8 Peak Flow Summary

Total Area = **0.773** **ha** — **Volume =** **128.81** **m³**
Q target = 99.5 L/s

Q unc = 45.7 L/s
Qramp = 14.9 L/s
Qroof = 16.0 L/s
Q parking = 6.3 L/s

Q total = **82.8** **L/s** — **-16.69 L/s**

Overall Site Release Rate
Q target = 290.6 L/s
Q total = 290.7 L/s

Project #160401331, Petries Landing - Block 6, 7 and 8
Roof Drain Design Sheet, Area R100A Block 6
Standard Watts Drainage Model R1100 Accuflow Roof Drains

Rating Curve				Volume Estimation				
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	Water Depth (m)
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0016	0	0.025	32	0	0	0.025
0.050	0.0006	0.0032	2	0.050	127	2	2	0.050
0.075	0.0009	0.0047	7	0.075	287	5	7	0.075
0.100	0.0013	0.0063	17	0.100	509	10	17	0.100
0.125	0.0016	0.0079	33	0.125	796	16	33	0.125
0.150	0.0019	0.0095	57	0.150	1146	24	57	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.9	588.7	1.9	0.16353
6.9	1065.3	5.0	0.45943
16.7	1555.8	9.8	0.8916
32.9	2052.0	16.2	1.46161
57.0	2551.0	24.1	2.17022

Rooftop Storage Summary

Total Building Area (sq.m)		1433	Excludes known areas with no roof storage available
Assume Available Roof Area (sq.m)	80%	1146	
Roof Imperviousness		0.99	
Roof Drain Requirement (sq.m/Notch)		232	
Number of Roof Notches*		5	
Max. Allowable Depth of Roof Ponding (m)		0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		57	
Estimated 100 Year Drawdown Time (h)		2.1	

From Watts Drain Catalogue

Head (m)	L/s Open	75%	50%	25%	Closed
0.025	**0.3155**	0.31545	0.31545	0.31545	0.31545
0.050	**0.6309**	0.6309	0.6309	0.6309	0.6309
0.075	**0.9464**	0.86749	0.78863	0.70976	0.6309
0.100	**1.2618**	1.10408	0.94635	0.78863	0.6309
0.125	**1.5773**	1.34067	1.10408	0.86749	0.6309
0.150	**1.8927**	1.57726	1.2618	0.94635	0.6309

* Note: Number of drains can be reduced if multiple-notch drain used.

Calculation Results	2yr	100yr	Available
Qresult (cu.m/s)	0.006	0.009	-
Depth (m)	0.099	0.147	0.150
Volume (cu.m)	16.5	54.6	57.3
Draintime (hrs)	0.883	2.097	

Project #160401331, Petries Landing - Block 6, 7 and 8
Roof Drain Design Sheet, Area BLDG Block 7
Standard Watts Drainage Model R1100 Accuflow Roof Drains

Rating Curve				Volume Estimation				
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	Water Depth (m)
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0022	0	0.025	40	0	0	0.025
0.050	0.0006	0.0044	3	0.050	162	2	3	0.050
0.075	0.0009	0.0066	9	0.075	364	6	9	0.075
0.100	0.0013	0.0088	22	0.100	647	12	22	0.100
0.125	0.0016	0.0110	42	0.125	1011	21	42	0.125
0.150	0.0019	0.0132	73	0.150	1456	31	73	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
2.4	534.2	2.4	0.14839
8.8	966.7	6.4	0.41691
21.2	1411.9	12.5	0.80909
41.8	1862.1	20.6	1.32635
72.5	2314.9	30.7	1.96939

Rooftop Storage Summary

Total Building Area (sq.m)		1820	Excludes known areas with no roof storage available
Assume Available Roof Area (sq.m)	80%	1456	
Roof Imperviousness		0.99	
Roof Drain Requirement (sq.m/Notch)		232	
Number of Roof Notches*		7	
Max. Allowable Depth of Roof Ponding (m)		0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		73	
Estimated 100 Year Drawdown Time (h)		1.9	

* Note: Number of drains can be reduced if multiple-notch drain used.

From Watts Drain Catalogue

Head (m)	L/s Open	75%	50%	25%	Closed
0.025	**0.3155**	0.31545	0.31545	0.31545	0.31545
0.050	**0.6309**	0.6309	0.6309	0.6309	0.6309
0.075	**0.9464**	0.86749	0.78863	0.70976	0.6309
0.100	**1.2618**	1.10408	0.94635	0.78863	0.6309
0.125	**1.5773**	1.34067	1.10408	0.86749	0.6309
0.150	**1.8927**	1.57726	1.2618	0.94635	0.6309

Calculation Results	2yr	100yr	Available
Qresult (cu.m/s)	0.009	0.013	-
Depth (m)	0.098	0.146	0.150
Volume (cu.m)	20.4	67.8	72.8
Draintime (hrs)	0.789	1.872	

Project #160401331, Petries Landing - Block 6, 7 and 8
Roof Drain Design Sheet, Area BLDG Block 8
Standard Watts Drainage Model R1100 Accuflow Roof Drains

Rating Curve				Volume Estimation				
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	Water Depth (m)
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0028	0	0.025	52	0	0	0.025
0.050	0.0006	0.0057	3	0.050	210	3	3	0.050
0.075	0.0009	0.0085	12	0.075	472	8	12	0.075
0.100	0.0013	0.0114	28	0.100	839	16	28	0.100
0.125	0.0016	0.0142	55	0.125	1311	27	55	0.125
0.150	0.0019	0.0170	94	0.150	1888	40	94	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
3.1	538.8	3.1	0.14966
11.4	974.9	8.3	0.42048
27.5	1423.9	16.2	0.81601
54.2	1878.0	26.7	1.33769
94.0	2334.7	39.8	1.98622

Rooftop Storage Summary

Total Building Area (sq.m)		2360	Excludes known areas with no roof storage available
Assume Available Roof Area (sq.m)	80%	1888	
Roof Imperviousness		0.99	
Roof Drain Requirement (sq.m/Notch)		232	
Number of Roof Notches*		9	
Max. Allowable Depth of Roof Ponding (m)		0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		94	
Estimated 100 Year Drawdown Time (h)		1.8	

* Note: Number of drains can be reduced if multiple-notch drain used.

From Watts Drain Catalogue

Head (m)	Open	75%	50%	25%	Closed
L/s					
0.025	**0.3155**	0.31545	0.31545	0.31545	0.31545
0.050	**0.6309**	0.6309	0.6309	0.6309	0.6309
0.075	**0.9464**	0.86749	0.78863	0.70976	0.6309
0.100	**1.2618**	1.10408	0.94635	0.78863	0.6309
0.125	**1.5773**	1.34067	1.10408	0.86749	0.6309
0.150	**1.8927**	1.57726	1.2618	0.94635	0.6309

Calculation Results	2yr	100yr	Available
Qresult (cu.m/s)	0.011	0.016	-
Depth (m)	0.094	0.141	0.150
Volume (cu.m)	24.1	79.9	94.4
Draintime (hrs)	0.748	1.757	

3223701 CANADA INC
C/O BRIGIL HOMES

DESIGN BRIEF
PETRIE'S LANDING II
PHASE 2

31464.5.2.2

REVISED AUGUST 2012
REVISED OCTOBER 2012
REVISED NOVEMBER 2012
REVISED AUGUST 2013
REVISED NOVEMBER 2013
REVISED FEBRUARY 7, 2014

- Pavement Structure:

Layer		Thickness (mm)	
		Car Parking Areas	Local Streets & Heavy Traffic Areas (Fire Route)
Wear Course:	Superpave 12.5 Asphaltic Concrete	50	40
Binder Course:	Superpave 19.0 Asphaltic Concrete		50
Base:	OPSS Granular "A" Crushed Stone	150	150
Sub-Base:	OPSS Granular "B" Type II	300	400

- Minimum Performance Grade (PG) 58-34 asphalt cement should be used;
- 3.0 m long sub-drain should be installed at each catchbasin.

The geotechnical report also provides guidelines regarding the permissible maximum grade raise(s) for the property without additional construction measures such as pre-loading, raft foundation, deep foundations or others approved alternatives such as light weight fill. The maximum grade raises vary between 1.8 m to 4.0 m depending on the building type and percentage of consolidation considered.

It should be noted that a copy of the proposed grading for the subject site has been forwarded to Paterson Group for its review and confirmation of its compliance with the grade raise recommendations.

2. MUNICIPAL SERVICES

As the Prestige Circle sewers and watermain were designed to accommodate the anticipated development along its perimeter, a simple extension of the main-line services into each sub-block will provide servicing for each of the buildings. The main design parameters for the various municipal services were designed as per the applicable City of Ottawa requirements and have been summarized in the sub-sections below.

2.1 Water Distribution

Prior to the detailed design of Prestige Circle, boundary conditions for the watermain at the intersection of Tenth Line Road and North Service Road were provided by City staff. Based on the proposed concept plan, grading and the existing boundary conditions, a 200mm diameter watermain loop complete with hydrants was proposed. The supporting hydraulic analysis demonstrated that the following municipal requirements and Fire Underwriters recommended flows for protection will be exceeded:

- Average daily demand — 350 l/cap/day (residential)
  15,000 l/Ha/day (institutional)
- Peak daily demand — 875 l/cap/day (residential)
  22,500 l/Ha/day (institutional)
- Peak hour demand — 1,925 l/cap/day (residential)
  40,500 l/Ha/day (institutional)
- Fire flow rate — 8,000 l/min (townhouses & 3-storey apartments)
  15,000 l/min (institutional)
- Minimum hydraulic grade line during max hour – 275 kPa
- Minimum hydraulic grade line during max day and fire flows – 140 kPa

Hence, the water servicing to Phase 2 will simply be accomplished through a number of connections to the 200mm diameter watermain along Prestige Circle.

Refer to Appendix C for the hydraulic analysis.

2.2 Wastewater

2.2.1 EXISTING CONDITIONS

In 2002 the 900mm diameter Ottawa River Sub Trunk sanitary sewer was constructed by the City of Ottawa to accommodate the Petrie's Landing II lands as well as additional lands upstream.

The sub-trunk detailed design was prepared by Stantec Consulting Ltd. It included a flow allowance of 50,000 l/Ha/d with a peaking factor of 1.5 for the Petrie's Landing II property.

The Prestige Circle sanitary sewer design was based on the applicable City of Ottawa Design Guidelines and the preliminary concept plan which originally proposed 248 apartments and 170 retirement units for a total of 418 units.

The current concept plan for the overall development is now proposing a total of 405 units. The breakdown is as follows:

- Existing Phase 1: 40 units
- Phase 2 (subject phase): 268 units
- Future Phase 3: 97 units

Thus, the number of units is within the allocated number as based on the original concept plan and associated sanitary sewer design.

It should also be noted that the distribution of the population along the perimeter of Prestige Circle will have no negative impact on the sanitary sewer as it has a significant level of residual capacity distributed along its entire length which provides flexibility in the design of the locations for the proposed block connections. Refer to Appendix D for Petrie's Landing design sheet and drawing.

2.2.2 DESIGN CRITERIA

The sanitary flows for Block 2 were determined based on the following design criteria which includes, but is not limited to the following:

- Population: 1.8 persons per apartment/condo unit
- Domestic Flow: 350 l/cap per day
- Domestic Peak Factor: Harmon Formula
- Institutional: 50,000 l/d/Ha
- Institutional Peak Factor: 1.5
- Extraneous Flow: 0.28 l/s/Ha
- Minimum Pipe Size: 200 mm diameter
- Maximum Velocity 3.0 m/s
- Minimum Velocity 0.6 m/s

Refer to Appendix D for the resulting sanitary design sheet and drawing.

2.3 Storm Sewer

2.3.1 EXISTING CONDITIONS

In 1995, *McNeely Engineering Consultants Ltd.* was commissioned by the former Township of Cumberland to prepare a Master Drainage Plan (MDP) for the area surrounding and including the Petrie's Landing II lands. The report states that stormwater flows from the development are to be directed to the Brisebois Creek SWM facility prior to its discharge to the Ottawa River. This will ensure that quality control constraints are met. The report also recommended that post-development flows from the proposed Petrie's Landing II lands site be limited to 150 l/s/ha in order to insure that the downstream SWM facility meets its design targets.

With the above-noted constraints in mind, the overall stormwater management design for the subdivision took into account the two proposed phases within the development. Hence, both phases 1 and 2 were allocated 61.6 L/s and 461.35L/s respectively.

However, Phase 2 has subsequently been reduced in size and a third phase has been created. Thus, the initial allocation of 461.35 L/s for Phase 2 has been distributed proportionally based on the areas of the new Phases 2 and 3. The resulting flow allocation for Phase 2 is 361.87 L/s.

2.3.2 DESIGN PARAMETERS

The rational method in combination with the following parameters was used in the sizing of the storm sewer minor system for Block 2:

- **Design Storms**

  The 5 year design storm event was used in the evaluation of the site, consistent with the City of Ottawa Sewer Design Guidelines (November, 2004).

- **Run-Off Coefficients**

  The run-off coefficients utilized for the minor system design were derived from analysis of representative samples of drainage areas within the proposed Phase. Coefficients of 0.20 and 0.90 were utilized in the analysis to represent landscaped versus hard surface areas.

- **Time of Concentration**

  Inlet times of 10 min. for parking/hard surface areas were utilized as per the City of Ottawa Sewer Design Guidelines (November 2004).

3. STORMWATER MANAGMENT

Phase 2 is 2.91 Ha in size and as previously noted was reallocated 361.87 L/s as minor system flow as a result of its new area.

Of the 2.91 Ha design area, a total of 0.55 Ha has been left to discharge uncontrolled from the site due to grading or other constraints that do not feasibly allow for collection and control of runoff. Based on a 100-year event, where the runoff coefficient of the uncontrolled area is equal to an average of 0.30, the uncontrolled flow rate can be determined as follows:

- $\mathbf{Q_{Uncontrolled}} = 2.78*C*i_{100yr}*A$, where:

  C = Average site runoff coefficient uncontrolled area
  = 0.30

  $\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)
  = $1735.688 * (T_c + 6.014)^{-0.820}$
  = 178.56 mm/hr; where T_c = 20 minutes

  A = Uncontrolled Area (Ha)
  = 0.55 ha

  Therefore,

- $\mathbf{Q_{Uncontrolled}}$ = 2.78 X 0.30 X 119.95mm/hr X 0.55 Ha = 55.02 L/s

Additionally, an area of the site equivalent to 0.27 Ha is taken up by depressed parking ramps, which must accommodate the 100-year flow. This flow rate can also be calculated as:

$Q_{parking}$ = **$2.78*C*i_{100yr}*A$**

= 2.78 * 0.80 * 119.95 * 0.27

= **107.22 L/s**

The maximum allowable release rate from the remainder of the site can then be determined as:

$Q_{max\ allowable}$ = $Q_{restricted} - Q_{uncontrolled} - Q_{parking}$

= 361.87 L/s – 55.02 L/s – 107.22 L/s

= **199.62 L/s**

Restricting flow into the minor system from the controlled portion of the site will be achieved through the use of inlet control devices and surface ponding. The size and type of each inlet control device was determined via the Modified Rational Method and are a function of the size of the drainage area and the amount of surface storage available on-site.

Any runoff generated from storms in excess of the site's release rate will be stored on-site and gradually released into the minor system so as not to surcharge the proposed sewers. Ponding storage will be provided at specific locations. Overland flow routes have been provided in the grading and surface designs to permit emergency overflow drainage from the site.

Refer to Appendix E for the modified rational method calculations, inlet control device sizing and ponding plan.

4. GRADING

As per standard practice, the design of the site grading takes into account a number of factors. Efforts are made to ensure that the proposed grading will tie in well with the surrounding areas. This includes matching the existing grades at controlling areas, such as property lines, existing roadways and geotechnical restraint lines, where no modification of the existing grades is permissible.

Other factors, such as stormwater management and geotechnical grade raise limitations also play a part in the grading of the site. Major overflow routes have been provided in order to ensure that emergency overflow can be conveyed from the site when required. Where possible, some areas have been graded to maximize on-site ponding. The depth of water has been limited to a maximum of 0.30 m at all locations.

5. UTILITIES

As part of Prestige Circle's second and final phase of construction, all utility purveyors will be extending their current plant within the Right-of-Way in order to provide servicing to Phase 2 and future Phase 3. As part of the detail design for Phase 2, servicing designs from Hydro One, Rogers, Bell and Enbridge have been requested.

FUS WATER SUPPLY FOR PUBLIC FIRE PROTECTION 1991

EXAMPLES OF REQUIRED FIRE FLOWS (REVISED)

For convenience in making general estimates some examples of required fire flows in typical buildings are provided below. In establishing fire flows for areas of a Municipality as yet undeveloped, but where a broad range of commercial, institutional, residential and industrial occupancies may be expected to be created under modern building code requirements, an outside design figure of 15,000 L/min appears likely to be suitable. When very large or high fire load buildings are probable, 25,000 L/min is more appropriate. It should be noted particularly that the tendency to install automatic sprinkler protection in large area and high hazard industrial and commercial buildings is a key factor in keeping required fire flows within ecomonically acceptable limits in many cases.

The following examples suppose no significant exposures to other buildings nor sprinkler protection unless specified. Where areas are given they are ground areas unless specified.

DETACHED DWELLINGS (TOTAL FLOOR AREAS)

— Under 100 m² = 2,000 L/min
101 m² — 200 m² = 3,000 L/min
Over 200 m² = 4,000 L/min

— Add for exposures to similar buildings on both sides:

Over 30 m	- nil
30 — 10 m	add 1,000 L/min
10 — 3 m	add 2,000 L/min
less than 3 m	see Note "D", if Frame. Brick, add 3,000 L/min.

— If wood shingle or shake roofs are prevalent,add 2,000 to 4,000 L/min.

— Modern residential subdivisions of 1 and 2 storey single family homes detached 3 to 6 m require usually 4,000 to 5,000 L/min.

— Old congested two and three family tenements detached less than 3 m and running the length of the block may require 15,000 to 25,000 L/min and should be calculated according to Note "D".

— Modern Row or Town House groups may require 6,000 to 10,000 L/min including adjoining exposures, providing required fire separations are adequate.

APARTMENT BUILDINGS

— 3 storeys, frame, 300 m² = 7,000 L/min and exposure coverage.

— 4 storeys, brick, 2,000 m² = 15,000 L/min and exposure coverage.

— 3 or more storeys, fire resistive, 5,600 m² with cut off shafts and stairs = 10,000 L/min and exposure coverage.

INSTITUTIONAL BUILDINGS

— 1 storey, fire resistive school of 2,300 m² = 5,000 L/min

— 3 storey, brick ordinary school of 2,300 m² = 15,000 L/min

— 3 or more storey, fire resistive hospital with adequate floor separations 1,000 m², no exposures = 4,000 L/min.

INDUSTRIAL BUILDINGS

— Typical industrial park, 1 storey ordinary, area 3,700 m² with average combustible contents fire load =14,000 L/min.

— Frame warehouse 1 storey, moderate contents fire load 3,700 m² = 20,000 L/min.

— Warehouse high fire load contents, brick non-combustible, 1 storey, 14,000 m² = 25,000 L/min. With full adequate automatic sprinkler protection (item 3, P.13) 13,000 L/min.

— Traditional 3 storey brick , ordinary factory with high fire load. 9,300 m² = 35,000 L/min.

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : PETRIE'S LANDING II - PHASE 2
LOCATION : CITY OF OTTAWA
DEVELOPER : BRIGIL PLATINUM

FILE: 31464.5.7
DATE: 2013-11-28
DESIGN: RPK
PAGE : 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	UNITS		GROSS RES. (ha)	POP'N	INDTRL (ha.)	COMM. (ha.)	INST. (ha.)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
	TH	APT															
BLK1		40		72				0.29	0.00	0.29	0.73	0.00	0.73	1.60	0.00	1.60	8,000
BLK2		40		72				0.29	0.00	0.29	0.73	0.00	0.73	1.60	0.00	1.60	8,000
BLK3A		92		166				0.67	0.00	0.67	1.68	0.00	1.68	3.69	0.00	3.69	8,000
BLK5		76		137				0.55	0.00	0.55	1.39	0.00	1.39	3.05	0.00	3.05	8,000
BLK6		76		137				0.55	0.00	0.55	1.39	0.00	1.39	3.05	0.00	3.05	8,000
BLK7		0		0				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8,000
BLK8		88		158				0.64	0.00	0.64	1.60	0.00	1.60	3.53	0.00	3.53	15,000
TOTALS	**0**	**412**	**0**	**742**	**0.00**	**0.00**	**0.00**	**2.99**	**0.00**	**2.99**	**7.52**	**0.00**	**7.52**	**16.52**	**0.00**	**16.52**	

ASSUMPTIONS

RESIDENTIAL DENSITIES

- Townhouse (TH) 2.7 p / p / u
- Apartment (APT) 1.8 p / p / u

AVG. DAILY DEMAND

- Residential 350 l / cap / day
- Institutional 15,000 l / ha / day

MAX. DAILY DEMAND

- Residential 875 l / cap / day
- Institutional 22,500 l / ha / day

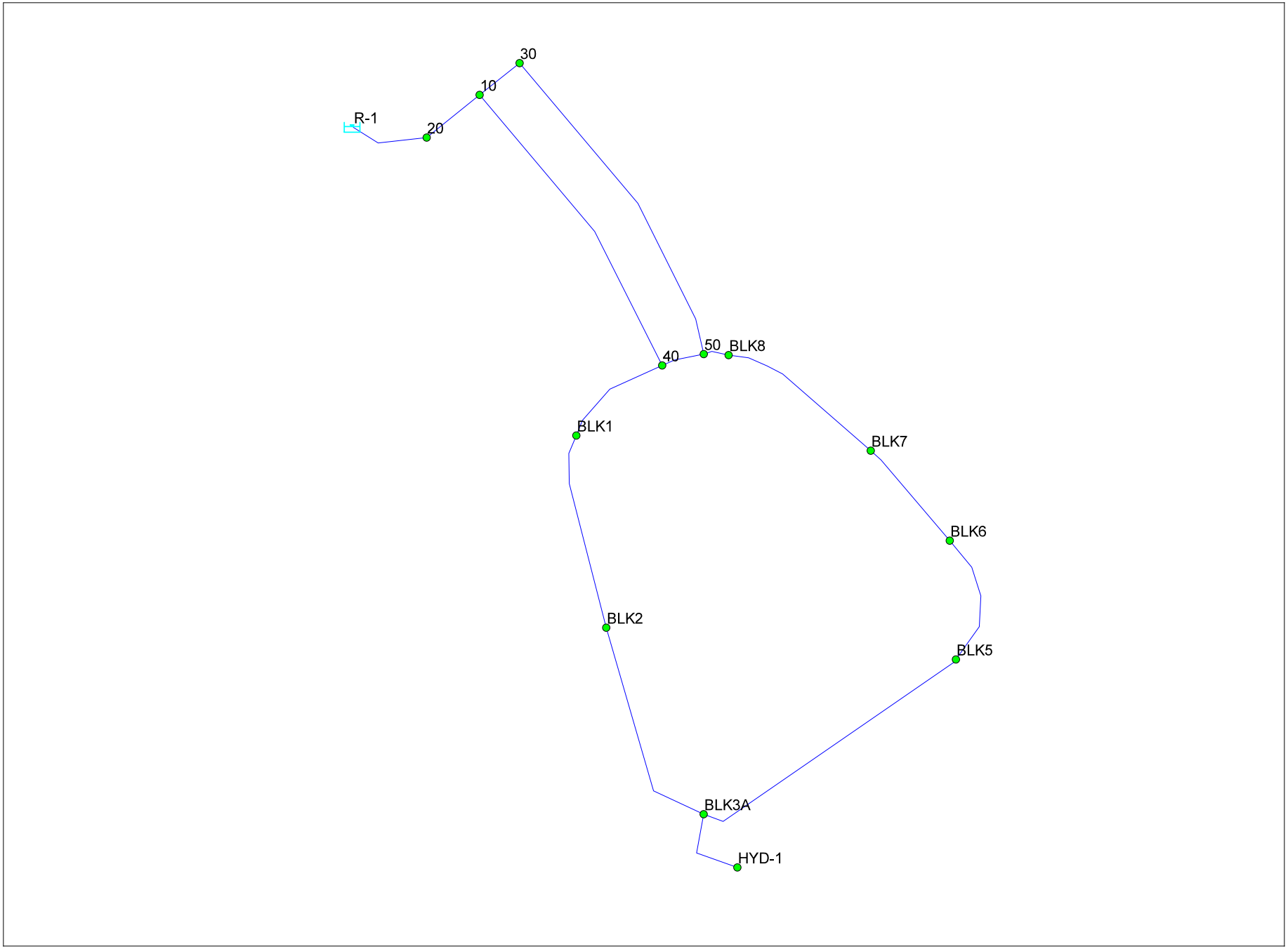
MAX. HOURLY DEMAND

- Residential 1,925 l / cap / day
- Institutional 40,500 l / ha / day

FIRE FLOW

- Townhouses 8,000 l / min
- 3-Storey Apartments 8,000 l / min
- Institutional 15,000 l / min

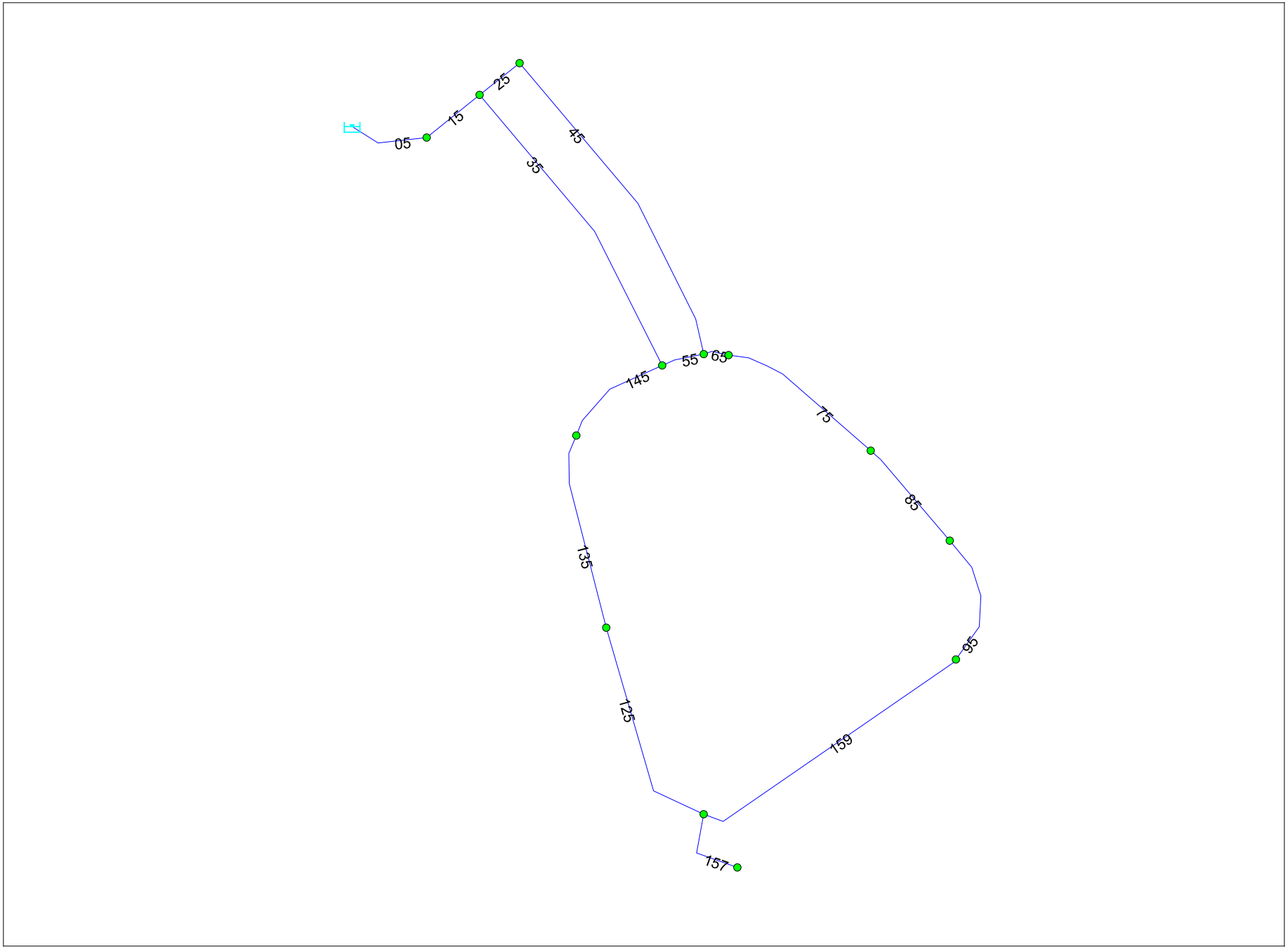
Petrie's Landing II - Node ID's



Prepared By: IBI Group

Date: Thursday, November 28, 2013

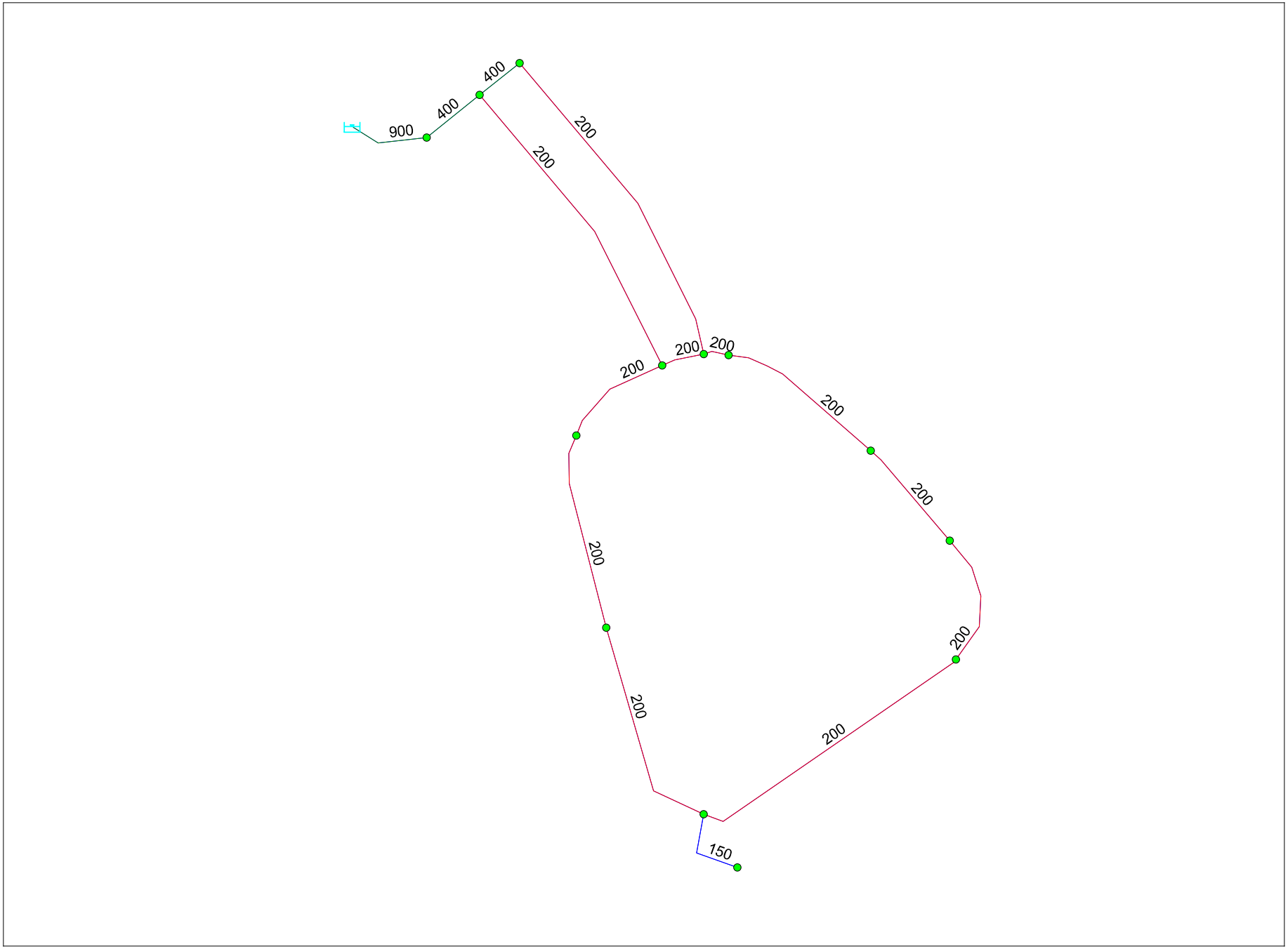
Petrie's Landing II - Pipe ID's



Prepared By: IBI Group

Date: Thursday, November 28, 2013

Petrie's Landing II - Pipe Sizes



Prepared By: IBI Group

Date: Thursday, November 28, 2013

Average Day (High Presure Check) - Junction Report (HGL = 115.00m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	51.75	115.00	619.78
2		20	0.00	52.00	115.00	617.35
3		30	0.00	51.60	115.00	621.25
4		40	0.00	55.05	115.00	587.42
5		50	0.00	55.05	115.00	587.42
6		BLK1	0.29	55.20	114.99	585.94
7		BLK2	0.29	56.70	114.99	571.24
8		BLK3A	0.67	57.00	114.99	568.30
9		BLK5	0.55	57.10	114.99	567.32
10		BLK6	0.55	56.60	114.99	572.22
11		BLK7	0.00	55.65	114.99	581.53
12		BLK8	0.64	55.00	115.00	587.91
13		HYD-1	0.00	57.10	114.99	567.32

Average Day (High Presure Check) - Pipe Report (HGL = 115.00m)

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)
1		05	R-1	20	0.10	900.00	130.00	2.99	0.00	0.00
2		125	BLK3A	BLK2	57.74	200.00	110.00	-0.67	0.02	0.000
3		135	BLK2	BLK1	50.89	200.00	110.00	-0.96	0.03	0.000
4		145	BLK1	40	29.62	200.00	110.00	-1.25	0.04	0.000
5		15	20	10	800.00	400.00	120.00	2.99	0.02	0.00
6		157	BLK3A	HYD-1	21.20	150.00	100.00	0.00	0.00	0.00
7		159	BLK3A	BLK5	81.61	200.00	110.00	0.00	0.000	0.00
8		25	10	30	13.11	400.00	120.00	1.47	0.01	0.00000
9		35	10	40	84.27	200.00	110.00	1.52	0.05	0.00
10		45	30	50	89.46	200.00	110.00	1.47	0.05	0.00
11		55	40	50	11.11	200.00	110.00	0.27	0.01	0.0000
12		65	50	BLK8	6.59	200.00	110.00	1.74	0.06	0.000
13		75	BLK8	BLK7	44.78	200.00	110.00	1.10	0.03	0.000
14		85	BLK7	BLK6	30.74	200.00	110.00	1.10	0.03	0.000
15		95	BLK6	BLK5	34.82	200.00	110.00	0.55	0.02	0.000

Average Day (High Presure Check) - Pipe Report (HGL = 115.00m)

		ID	HL/1000 (m/km)
1		05	0.00
2		125	0.01
3		135	0.01
4		145	0.02
5		15	0.00
6		157	0.00
7		159	0.00
8		25	0.000
9		35	0.03
10		45	0.03
11		55	0.00
12		65	0.03
13		75	0.01
14		85	0.01
15		95	0.00

Max Day + Fire - Fireflow Report (HGL = 110.00m)

		ID	Total Demand (L/s)	Critical Node 1 ID	Critical Node 1 Pressure (kPa)	Critical Node 1 Head (m)	Adjusted Fire-Flow (L/s)	Available Flow @Hydrant (L/s)	Critical Node 2 ID	Critical Node 2 Pressure (kPa)	Critcal Node 2 Head (m)	Adjusted Available Flow (L/s)	Design Flow (L/s)
1		BLK1	134.06	HYD-1	448.81	101.00	345.12	335.18	BLK1	139.96	69.48	335.18	335.18
2		BLK2	134.06	BLK2	426.82	100.26	289.16	289.18	BLK2	139.96	70.98	289.18	289.16
3		BLK5	134.72	BLK5	415.09	99.46	276.06	276.08	BLK5	139.96	71.38	276.08	276.06
4		BLK6	134.72	BLK6	427.07	100.18	289.25	289.27	BLK6	139.96	70.88	289.27	289.25
5		BLK7	133.33	BLK5	438.59	100.41	318.44	310.34	BLK7	139.96	69.93	310.34	310.34
6		BLK8	251.60	BLK5	335.27	89.21	375.48	378.29	BLK6	134.64	68.74	375.44	375.44
7		HYD-1	133.33	HYD-1	304.50	88.17	182.43	182.43	HYD-1	139.96	71.38	182.43	182.43

Peak Hour - Junction Report (HGL = 108.00m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	51.75	107.95	550.69
2		20	0.00	52.00	108.00	548.76
3		30	0.00	51.60	107.95	552.16
4		40	0.00	55.05	107.89	517.83
5		50	0.00	55.05	107.89	517.82
6		BLK1	1.60	55.20	107.88	516.23
7		BLK2	1.60	56.70	107.87	501.39
8		BLK3A	3.69	57.00	107.86	498.37
9		BLK5	3.05	57.10	107.86	497.39
10		BLK6	3.05	56.60	107.86	502.32
11		BLK7	0.00	55.65	107.87	511.74
12		BLK8	3.53	55.00	107.89	518.26
13		HYD-1	0.00	57.10	107.86	497.39

APPENDIX D

IBI Group
400 - 333 Preston Street
Ottawa, ON
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: PETRIE'S LANDING II - PHASE 2
LOCATION: CITY OF OTTAWA
DEVELOPER: BRIGIL PLATINUM

JOB: 31464.5.7
DATE: 2013-11-28
DESIGN: RPK

LOCATION				INDIVIDUAL		CUMULATIVE		DESIGN FLOW					SEWER DATA					
FROM MH	TO MH	TH (#)	APT (#)	POP.	AREA (Ha)	POP.	AREA (Ha)	PEAK FACTOR	POP. FLOW (L/s)	INFILT. FLOW (L/s)	OFFSITE FLOW (L/s)	PEAK FLOW (L/s)	CAP. (L/s)	VELOCITY (FULL) (m/s)	LENGTH (m)	PIPE (mm)	SLOPE (%)	AVAIL. CAP. (%)
19A	*1A*			*0.0*	*0.27*	*0*	*0.27*	*4.00*	*0.00*	*0.08*		***0.08***	***22.47***	*1.23*	*12.49*	*150*	*2.00*	*99.64%*
STUB	*18A*			***17.10 L/s from off-site lands south of Regional Road No. 174***							*17.10*	***17.10***	***67.64***	*0.93*	*2.00*	*300*	*0.45*	*74.72%*
18A	*17A*			*0.0*	*0.00*	*0*	*0.00*	*4.00*	*0.00*	*0.00*	*17.10*	***17.10***	***67.64***	*0.93*	*6.91*	*300*	*0.45*	*74.72%*
17A	*1A*			*0.0*	*0.00*	*0*	*0.00*	*4.00*	*0.00*	*0.00*	*17.10*	***17.10***	***67.64***	*0.93*	*68.70*	*300*	*0.45*	*74.72%*
BLK 5	200A		76	136.8	0.25	137	0.25	4.00	2.22	0.07		**2.29**	**22.47**	1.23	32.98	150	2.00	89.81%
200A	CAP			0.0	0.00	137	0.25	4.00	2.22	0.07		**2.29**	**67.64**	0.93	2.05	300	0.45	96.61%
CAP	22A			0.0	0.00	137	0.25	4.00	2.22	0.07		**2.29**	**67.64**	0.93	8.31	300	0.45	96.61%
22A	*1A*			0.0	0.00	137	0.25	4.00	2.22	0.07		**2.29**	**67.64**	0.93	24.22	300	0.45	96.61%
1A	*2A*			*0.0*	*0.07*	*137*	*0.59*	*4.00*	*2.22*	*0.17*	*17.10*	***19.49***	***67.64***	*0.93*	*51.00*	*300*	*0.45*	*71.19%*
300A	CAP		76	136.8	0.64	137	0.64	4.00	2.22	0.18		**2.40**	**28.41**	0.88	15.27	200	0.69	91.55%
CAP	*2A*			0.0	0.00	137	0.64	4.00	2.22	0.18		**2.40**	**28.41**	0.88	10.00	200	0.69	91.55%
2A	*3A*			*0.0*	*0.02*	*274*	*1.25*	*4.00*	*4.43*	*0.35*	*17.10*	***21.88***	***67.64***	*0.93*	*13.41*	*300*	*0.45*	*67.65%*
3A	*4A*			*0.0*	*0.02*	*274*	*1.27*	*4.00*	*4.43*	*0.36*	*17.10*	***21.89***	***67.64***	*0.93*	*11.07*	*300*	*0.45*	*67.64%*
4A	*21A*			*0.0*	*0.07*	*274*	*1.34*	*4.00*	*4.43*	*0.38*	*17.10*	***21.91***	***67.64***	*0.93*	*15.67*	*300*	*0.45*	*67.61%*
401A	*CAP*		76	136.8	0.75	137	0.75	4.00	2.22	0.21		**2.43**	**34.21**	1.06	25.51	200	1.00	92.90%
CAP	*21A*			0.0	0.00	137	0.75	4.00	2.22	0.21		**2.43**	**34.21**	1.06	10.00	200	1.00	92.90%

Q = Average daily per capita flow 350 l/cap/d
I = Unit of peak extraneous flow 0.28 l/sec/Ha
M = Peaking factor = 1+(14/(4+P)^0.5)), P=pop. IN 1000'S, max. of 4
Q(p) = Peak population flow (l/s)
Q(i) = Peak extraneous flow (l/s)
Population = 2.7 per townhouse (TH) unit, 1.8 per apartment (APT) unit
Coeff. of friction (n) = 0.013

IBI Group
400 - 333 Preston Street
Ottawa, ON
K1S 5N4

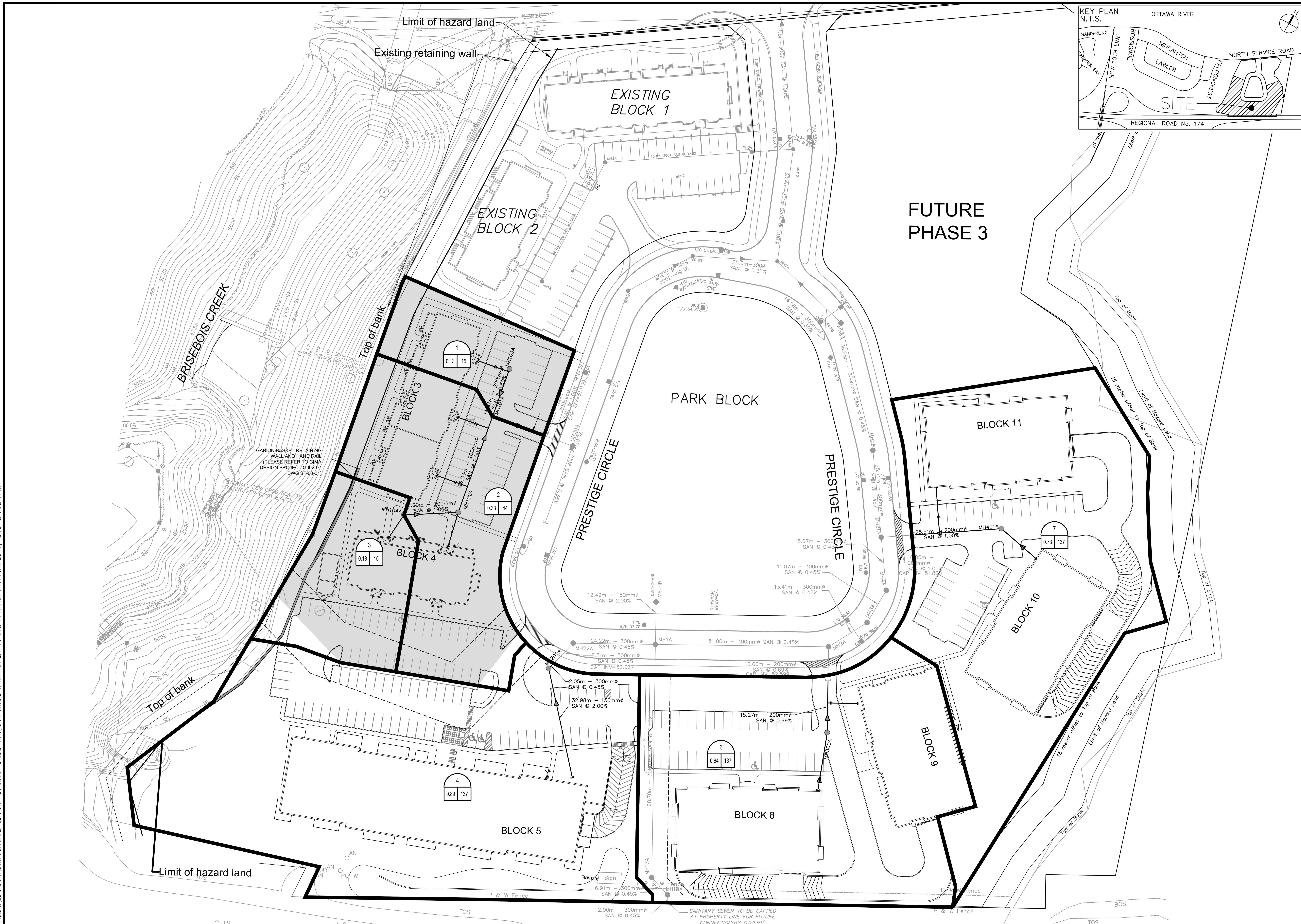
SANITARY SEWER DESIGN SHEET

PROJECT: PETRIE'S LANDING II - PHASE 2
LOCATION: CITY OF OTTAWA
DEVELOPER: BRIGIL PLATINUM

JOB: 31464.5.7
DATE: 2013-11-28
DESIGN: RPK

LOCATION				INDIVIDUAL		CUMULATIVE		DESIGN FLOW					SEWER DATA					
FROM MH	TO MH	TH (#)	APT (#)	POP.	AREA (Ha)	POP.	AREA (Ha)	PEAK FACTOR	POP. FLOW (L/s)	INFILT. FLOW (L/s)	OFFSITE FLOW (L/s)	PEAK FLOW (L/s)	CAP. (L/s)	VELOCITY (FULL) (m/s)	LENGTH (m)	PIPE (mm)	SLOPE (%)	AVAIL. CAP. (%)
21A	*5A*			*0.0*	*0.07*	*410*	*2.16*	*4.00*	*6.65*	*0.60*	*17.10*	***24.35***	***67.64***	*0.93*	*25.71*	*300*	*0.45*	*64.00%*
5A	*6A*			*0.0*	*0.00*	*410*	*2.16*	*4.00*	*6.65*	*0.60*	*17.10*	***24.35***	***67.64***	*0.93*	*38.68*	*300*	*0.45*	*64.00%*
	6A		*81*	*145.8*	*0.57*	*146*	*0.57*	*4.00*	*2.36*	*0.16*		***2.52***						
6A	*7A*			*0.0*	*0.04*	*556*	*2.77*	*3.95*	*8.90*	*0.78*	*17.10*	***26.78***	***62.97***	*0.86*	*26.08*	*300*	*0.39*	*57.47%*
10A	*20A*			*0.0*	*0.16*	*0*	*0.16*	*4.00*	*0.00*	*0.04*		***0.04***	***59.69***	*0.82*	*41.00*	*300*	*0.35*	*99.93%*
104A	102A		8	14.4	0.12	14	0.12	4.00	0.23	0.03		**0.26**	**34.21**	1.06	16.00	200	1.00	99.24%
102A	101A		24	43.2	0.27	58	0.39	4.00	0.93	0.11		**1.04**	**24.19**	0.75	26.33	200	0.50	95.70%
103A	101A		8	14.6	0.13	15	0.13	4.00	0.24	0.04		**0.28**	**24.19**	0.75	14.87	200	0.50	98.84%
101A	*CAP*			0.0	0.00	72	0.52	4.00	1.17	0.15		**1.32**	**34.21**	1.06	15.15	200	1.00	96.14%
CAP	*20A*			0.0	0.00	72	0.52	4.00	1.17	0.15		**1.32**	**34.21**	1.06	10.00	200	1.00	96.14%
20A	*9A*			*0.0*	*0.03*	*72*	*0.71*	*4.00*	*1.17*	*0.20*		***1.37***	***59.69***	*0.82*	*48.80*	*300*	*0.35*	*97.70%*
	9A		*40*	*72.0*	*0.61*	*72*	*0.61*	*4.00*	*1.17*	*0.17*		***1.34***						
9A	*8A*			*0.0*	*0.03*	*144*	*1.35*	*4.00*	*2.34*	*0.38*		***2.72***	***79.46***	*1.09*	*21.08*	*300*	*0.62*	*96.58%*
8A	*7A*			*0.0*	*0.03*	*144*	*1.38*	*4.00*	*2.34*	*0.39*		***2.73***	***68.44***	*0.94*	*25.19*	*300*	*0.46*	*96.01%*
7A	*13A*			*0.0*	*0.09*	*700*	*4.24*	*3.89*	*11.05*	*1.19*	*17.10*	***29.34***	***101.35***	*1.39*	*33.06*	*300*	*1.01*	*71.05%*
13A	*14A*			*0.0*	*0.11*	*700*	*4.35*	*3.89*	*11.05*	*1.22*	*17.10*	***29.37***	***104.85***	*1.44*	*51.59*	*300*	*1.08*	*71.99%*
14A	*15A*			*0.0*	*0.00*	*700*	*4.35*	*3.89*	*11.05*	*1.22*	*17.10*	***29.37***	***100.91***	*1.38*	*23.00*	*300*	*1.00*	*70.90%*
15A	*EX 10A*			*0.0*	*0.00*	*700*	*4.35*	*3.89*	*11.05*	*1.22*	*17.10*	***29.37***	***100.91***	*1.38*	*34.90*	*300*	*1.00*	*70.90%*

Q = Average daily per capita flow 350 l/cap/d
I = Unit of peak extraneous flow 0.28 l/sec/Ha
M = Peaking factor = 1+(14/(4+P)^0.5)), P=pop. IN 1000'S, max. of 4
Q(p) = Peak population flow (l/s)
Q(i) = Peak extraneous flow (l/s)
Population = 2.7 per townhouse (TH) unit, 1.8 per apartment (APT) unit
Coeff. of friction (n) = 0.013



APPROVAL DATE ______________ **2014**

Felice Petti, P. Eng., Manager
Development Review, Suburban Services

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8	REVISED PER CITY COMMENTS	RPK	14:02:06
7	REVISED PER CITY COMMENTS	RPK	13:11:26
6	REVISED BLOCK 5	RPK	13:08:19
5	RE-ISSUED FOR SITE PLAN APPROVAL	TRB	12:11:19
4	RE-ISSUED FOR SITE PLAN APPROVAL	RPK	12:10:19
3	RE-ISSUED FOR SITE PLAN APPROVAL	RPK	12:08:27
2	ISSUED FOR SITE PLAN APPROVAL	RPK	12:04:12
1	ISSUED FOR REVIEW	RPK	12:03:07

LE GROUPE BRIGIL CONSTRUCTION

IBI GROUP
333 Preston Street
Tower 1, Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
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Project Title

PETRIE'S LANDING II

PHASE 2

LICENSED PROFESSIONAL ENGINEER
R.P. KENNEDY
100086734
2014/02/06
PROVINCE OF ONTARIO

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale 1:500

Design: RPK	Date: FEB. 2012
Drawn: DD	Checked: TRB
Project No.: 31464	Drawing No.: 501

APPENDIX E

IBI Group
400 - 333 Preston Street
Ottawa, ON
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: PETRIE'S LANDING II - PHASE 2
LOCATION: CITY OF OTTAWA
DEVELOPER: BRIGIL PLATINUM

JOB: 31464.5.7
DATE: 2013-11-28
DESIGN: RPK

		AREA (Ha)									DESIGN FLOW							SEWER DATA						
FROM MH	TO MH	C= 0.10	C= 0.20	C= 0.30	C= 0.70	C= 0.75	C= 0.80	C= 0.90	INDIV. 2.78AC	CUM. 2.78AC	INLET (min)	TIME IN PIPE	TOTAL	$i_{5\text{-year}}$ (mm/hr)	$i_{100\text{-year}}$ (mm/hr)	PEAK FLOW (L/s) IND	PEAK FLOW (L/s) TOTAL	CAP. (L/s)	LENGTH (m)	PIPE (mm)	SLOPE (%)	n	VEL. (m/s)	AVAIL. CAP. (%)
CBMH 17	MH 1		0.270						0.15	0.15	10.00	0.11	10.11	104.20		**15.63**	**15.63**	**142.65**	12.49	300	2.00	0.013	1.96	89.04%
MH 1	MH 2								0.00	0.15	10.11	0.62	10.73	103.60		**15.54**	**15.54**	**78.15**	40.05	300	0.60	0.013	1.07	80.11%
GAR 8	MH 303								0.00	0.00	10.00			104.20		**0.00**	**0.00**							
							0.070		0.16	0.16	10.00	0.27	10.27		178.60	**28.58**	**28.58**	**34.21**	16.77	200	1.00	0.013	1.06	16.48%
MH 303	MH 301								0.00	0.00	10.27			102.80		**0.00**	**0.00**							
									0.00	0.16	10.27	0.17	10.43		176.20	**28.19**	**28.19**	**34.21**	10.50	200	1.00	0.013	1.06	17.60%
GAR 9	MH 301								0.00	0.00	10.00			104.20		**0.00**	**0.00**							
							0.050		0.11	0.11	10.00	0.26	10.26		178.60	**19.65**	**19.65**	**34.21**	16.69	200	1.00	0.013	1.06	42.58%
MH 301	MH 300				0.040			0.100	0.33	0.33	10.43			102.00		**33.66**	**33.66**							
									0.00	0.27	10.43	0.33	10.76		174.70	**47.17**	**80.83**	**114.99**	31.40	300	1.30	0.013	1.58	29.71%
CB 302	CBMH 32				0.120				0.23	0.23	10.00	0.24	10.24	104.20		**23.97**	**23.97**	**65.83**	28.85	200	3.70	0.013	2.03	63.59%
CBMH 32	MH 300				0.110				0.21	0.21	10.00	0.06	10.06	104.20		**21.88**	**21.88**	**138.74**	10.31	250	5.00	0.013	2.74	84.23%
MH 300	MH 2							0.100	0.25	0.79	10.76			100.30		**79.24**	**79.24**							
									0.00	0.27	10.76	0.32	11.08		171.90	**46.41**	**125.65**	**151.97**	25.18	375	0.69	0.013	1.33	17.32%
MH 2	MH 3				0.120				0.23	1.17	11.08			98.80		**115.60**	**115.60**							
									0.00	0.27	11.08	0.19	11.26		169.30	**45.71**	**161.31**	**218.51**	14.76	450	0.54	0.013	1.33	26.18%
MH 3	MH 4								0.00	1.17	11.26			98.00		**114.66**	**114.66**							
									0.00	0.27	11.26	0.10	11.36		167.80	**45.31**	**159.97**	**361.78**	9.29	525	0.65	0.013	1.62	55.78%
MH 4	MH 21								0.00	1.17	11.36			97.50		**114.08**	**114.08**							
									0.00	0.27	11.36	0.22	11.58		167.00	**45.09**	**159.17**	**429.62**	19.81	600	0.45	0.013	1.47	62.95%
RYCB 43	MH 404			0.050					0.04	0.04	15.00	0.21	15.21	83.60		**3.34**	**3.34**	**87.71**	21.28	250	2.00	0.013	1.73	96.19%
MH 404	MH 403							0.100	0.25	0.29	15.21	0.12	15.33	82.90		**24.04**	**24.04**	**124.09**	18.24	250	4.00	0.013	2.45	80.63%
MH 403	MH 401				0.140				0.27	0.56	15.33	0.21	15.54	82.50		**46.20**	**46.20**	**87.71**	21.57	250	2.00	0.013	1.73	47.33%
GAR 10	MH 405								0.00	0.00	10.00			104.20		**0.00**	**0.00**							
							0.070		0.16	0.16	10.00	0.23	10.23		178.60	**28.58**	**28.58**	**34.21**	14.23	200	1.00	0.013	1.06	16.48%
MH 405	MH 402								0.00	0.00	10.23			103.00		**0.00**	**0.00**							
									0.00	0.16	10.23	0.33	10.56		176.50	**28.24**	**28.24**	**34.21**	21.06	200	1.00	0.013	1.06	17.46%
GAR 11	MH 402								0.00	0.00	10.00			104.20		**0.00**	**0.00**							
							0.050		0.11	0.11	10.00	0.29	10.29		178.60	**19.65**	**19.65**	**34.21**	18.11	200	1.00	0.013	1.06	42.58%
MH 402	MH 401				0.060				0.12	0.12	10.56			101.30		**12.16**	**12.16**							
									0.00	0.27	10.56	0.34	10.90		173.60	**46.87**	**59.03**	**114.99**	32.30	300	1.30	0.013	1.58	48.67%
MH 401	MH 21							0.100	0.25	0.93	15.54			81.90		**76.17**	**76.17**							
									0.00	0.27	15.54	0.26	15.79		140.00	**37.80**	**113.97**	**182.87**	24.70	375	1.00	0.013	1.60	37.68%
MH 21	MH 5				0.080				0.16	2.26	15.79			81.10		**183.29**	**183.29**							
									0.00	0.54	15.79	0.26	16.05		138.60	**74.84**	**258.13**	**410.07**	21.89	600	0.41	0.013	1.41	37.05%

Q = 2.78AIC, where:
Q = Peak Flow in Litres per Second (l/s)
A = Area in Hectares (ha.)
I = Rainfall Intensity in Millimeters per Hour (mm/hr)

I=998.071/(TC+6.053)^0.814

IBI Group
400 - 333 Preston Street
Ottawa, ON
K1S 5N4

STORM SEWER DESIGN SHEET
PROJECT: PETRIE'S LANDING II - PHASE 2
LOCATION: CITY OF OTTAWA
DEVELOPER: BRIGIL PLATINUM

JOB: 31464.5.7
DATE: 2013-11-28
DESIGN: RPK

		AREA (Ha)									DESIGN FLOW							SEWER DATA						
FROM MH	TO MH	C= 0.10	C= 0.20	C= 0.30	C= 0.70	C= 0.75	C= 0.80	C= 0.90	INDIV. 2.78AC	CUM. 2.78AC	INLET (min)	TIME IN PIPE	TOTAL	$i_{5\text{-year}}$ (mm/hr)	$i_{100\text{-year}}$ (mm/hr)	PEAK FLOW (L/s) IND	PEAK FLOW (L/s) TOTAL	CAP. (L/s)	LENGTH (m)	PIPE (mm)	SLOPE (%)	n	VEL. (m/s)	AVAIL. CAP. (%)
	MH 5					0.330			0.69	0.69	11.00													
MH 5	MH 6								0.00	2.95	16.05			80.30		**236.89**	**236.89**							
									0.00	0.54	16.05	0.53	16.58		137.30	**74.14**	**311.03**	**389.64**	42.06	600	0.37	0.013	1.34	20.18%
	MH 6					0.570			1.19	1.19	11.50													
MH 6	MH 7				0.120				0.23	4.37	16.58			78.80		**344.36**	**344.36**							
									0.00	0.54	16.58	0.32	16.90	78.80	134.70	**72.74**	**417.09**	**488.33**	25.46	675	0.31	0.013	1.32	14.59%
MH 12	MH 7				0.090				0.18	0.18	10.00	0.31	10.31	104.20		**18.76**	**18.76**	**172.61**	27.98	375	0.89	0.013	1.51	89.13%
PARK	MH 7	0.360							0.10	0.10	10.00	0.21	10.21	104.20		**10.42**	**10.42**	**62.02**	15.60	250	1.00	0.013	1.22	83.20%
MH 7	MH 8				0.120				0.23	4.88	16.90			77.90		**380.15**	**380.15**							
									0.00	0.54	16.90	0.37	17.27		133.10	**71.87**	**452.03**	**580.53**	27.87	750	0.25	0.013	1.27	22.14%
	MH 8					0.610			1.27	1.27	11.50													
MH 8	MH 9								0.00	6.15	17.27			76.90		**472.94**	**472.94**							
									0.00	0.54	17.27	0.23	17.50		131.40	**70.96**	**543.89**	**706.40**	21.72	750	0.37	0.013	1.55	23.01%
MH 9	MH 20				0.060				0.12	6.27	17.50			76.30		**478.40**	**478.40**							
									0.00	0.54	17.50	0.58	18.08		130.30	**70.36**	**548.76**	**819.98**	51.50	825	0.30	0.013	1.49	33.08%
CB 10	MH 101				0.100				0.19	0.19	10.00	0.15	10.15	104.20		**19.80**	**19.80**	**72.58**	20.33	200	4.50	0.013	2.24	72.72%
CB 102	MH 101				0.130				0.25	0.25	10.00	0.10	10.10	104.20		**26.05**	**26.05**	**83.80**	16.02	200	6.00	0.013	2.58	68.91%
MH 101	MH 20								0.00	0.44	10.10	0.27	10.37	103.70		**45.63**	**45.63**	**100.91**	22.15	300	1.00	0.013	1.38	54.78%
MH 20	MH 10				0.130				0.25	6.96	18.08			74.80		**520.61**	**520.61**							
									0.00	0.54	18.08	0.45	18.53		127.70	**68.96**	**589.57**	**819.98**	40.50	825	0.30	0.013	1.49	28.10%
MH 10	MH 11								0.00	6.96	18.53			73.60		**512.26**	**512.26**							
									0.00	0.54	18.53	0.08	18.61		125.80	**67.93**	**580.19**	**1,527.39**	12.48	825	1.04	0.013	2.77	62.01%
MH 11	MH 13								0.00	6.96	18.61			73.50		**511.56**	**511.56**	**0.00**						
									0.00	0.54	18.61	0.28	18.89		125.50	**67.77**	**579.33**	**1,037.39**	32.06	825	0.48	0.013	1.88	44.16%
MH 13	MH 14								0.00	6.96	18.89			72.80		**506.69**	**506.69**							
									0.00	0.54	18.89	0.43	19.32		124.30	**67.12**	**573.81**	**886.20**	41.69	825	0.35	0.013	1.61	35.25%
CB 21	MH 200				0.140				0.27	0.27	10.00	0.34	10.34	104.20		**28.13**	**28.13**	**34.21**	21.47	200	1.00	0.013	1.06	17.77%
ECB 1	MH 200			0.020					0.02	0.02	10.00	0.10	10.10	104.20		**2.08**	**2.08**	**62.02**	7.29	250	1.00	0.013	1.22	96.64%
RYCB 22	MH 200			0.070					0.06	0.06	15.00	0.24	15.24	83.60		**5.02**	**5.02**	**34.21**	14.99	200	1.00	0.013	1.06	85.34%
GAR 5	MH 200								0.00	0.00	10.00			104.20		**0.00**	**0.00**							
							0.030		0.07	0.07	10.00	0.03	10.03		178.60	**12.50**	**12.50**	**34.21**	2.10	200	1.00	0.013	1.06	63.46%

Q = 2.78AIC, where:
Q = Peak Flow in Litres per Second (l/s)
A = Area in Hectares (ha.)
I = Rainfall Intensity in Millimeters per Hour (mm/hr)

I=998.071/(TC+6.053)^0.814

IBI Group
400 - 333 Preston Street
Ottawa, ON
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: PETRIE'S LANDING II - PHASE 2
LOCATION: CITY OF OTTAWA
DEVELOPER: BRIGIL PLATINUM

JOB: 31464.5.7
DATE: 2013-11-28
DESIGN: RPK

		AREA (Ha)									DESIGN FLOW							SEWER DATA						
FROM MH	TO MH	C= 0.10	C= 0.20	C= 0.30	C= 0.70	C= 0.75	C= 0.80	C= 0.90	INDIV. 2.78AC	CUM. 2.78AC	INLET (min)	TIME IN PIPE	TOTAL	$i_{5\text{-year}}$ (mm/hr)	$i_{100\text{-year}}$ (mm/hr)	PEAK FLOW (L/s) IND	PEAK FLOW (L/s) TOTAL	CAP. (L/s)	LENGTH (m)	PIPE (mm)	SLOPE (%)	n	VEL. (m/s)	AVAIL. CAP. (%)
MH 200	CBMH 201								*0.00*	0.35	15.24			82.80		**28.98**	**28.98**							
									0.00	0.07	15.24	0.72	15.96		141.60	**9.91**	**38.89**	**43.88**	37.59	250	0.50	0.013	0.87	11.37%
CBMH 201	MH 202								*0.00*	0.35	15.96			80.60		**28.21**	**28.21**							
				0.120					*0.10*	0.17	15.96	1.70	17.66		137.80	**23.43**	**51.64**	**67.64**	94.49	300	0.45	0.013	0.93	23.66%
RYCB 23	MH 202			0.020					*0.02*	0.02	15.00	0.05	15.05	83.60		**1.67**	**1.67**	**48.38**	4.65	200	2.00	0.013	1.49	96.54%
RYCB 24	MH 202			0.080					*0.07*	0.07	15.00	0.13	15.13	83.60		**5.85**	**5.85**	**34.21**	8.31	200	1.00	0.013	1.06	82.90%
MH 202	MH 203								*0.00*	0.44	17.66			75.80		**33.35**	**33.35**							
									0.00	0.17	17.66	0.54	18.20		129.60	**22.03**	**55.38**	**67.64**	29.98	300	0.45	0.013	0.93	18.12%
MH 203	MH 204								*0.00*	0.44	18.20			74.50		**32.78**	**32.78**							
									0.00	0.17	18.20	0.32	18.51		127.20	**21.62**	**54.40**	**67.64**	17.58	300	0.45	0.013	0.93	19.57%
CB 24	MH 204				0.140				*0.27*	0.27	10.00	0.24	10.24	104.20		**28.13**	**28.13**	**48.38**	21.56	200	2.00	0.013	1.49	41.85%
MH 204	*MH 14*								*0.00*	0.71	18.51			73.70		**52.33**	**52.33**							
									0.00	0.17	18.51	0.11	18.62		125.90	**21.40**	**73.73**	**100.91**	8.98	300	1.00	0.013	1.38	26.94%
CB 206	MH 207				0.210				*0.41*	0.41	10.00	0.14	10.14	104.20		**42.72**	**42.72**	**72.35**	19.23	200	4.47	0.013	2.23	40.95%
MH 207	*MH 14*								*0.00*	0.41	10.14	0.11	10.25	103.40		**42.39**	**42.39**	**87.71**	11.08	250	2.00	0.013	1.73	51.67%
MH 14	*MH 15*								*0.00*	*8.08*	*19.32*			*71.80*		***580.14***	***580.14***							
									0.00	*0.71*	*19.32*	*0.18*	*19.50*		122.60	***87.05***	***667.19***	***1,519.67***	*29.14*	*825*	*1.03*	*0.013*	*2.75*	56.10%
MH 15	*HW*								*0.00*	*8.08*	*19.50*			*71.40*		***576.91***	***576.91***							
									0.00	*0.71*	*19.50*	*0.18*	*19.68*		121.90	***86.55***	***663.46***	***1,519.67***	*29.14*	*825*	*1.03*	*0.013*	*2.75*	56.34%
		0.360	**0.270**	**0.360**	**1.910**	**1.510**	**0.270**	**0.400**		**9.02**														

Q = 2.78AIC, where:
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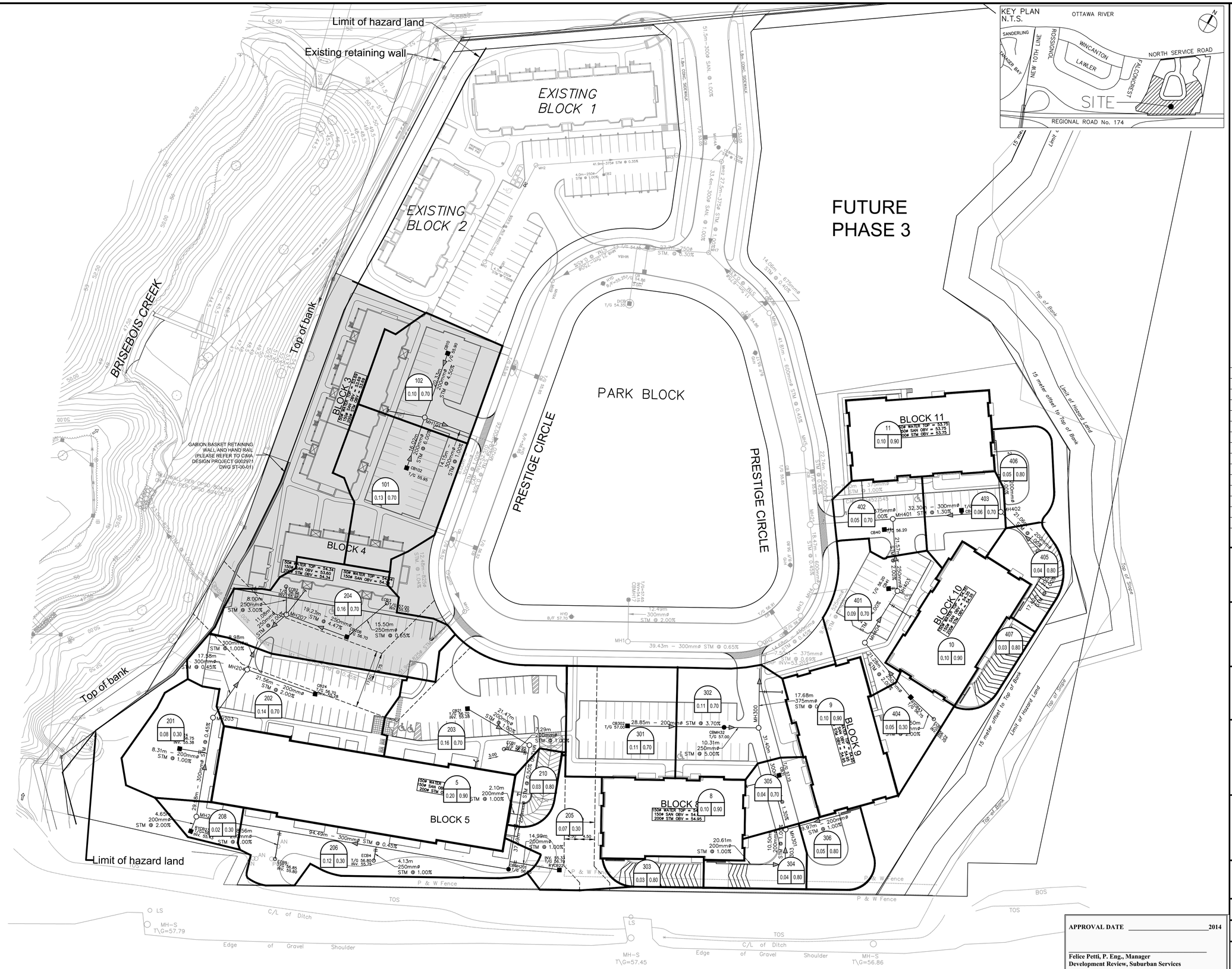
A = Area in Hectares (ha.)
I = Rainfall Intensity in Millimeters per Hour (mm/hr)

I=998.071/(TC+6.053)^0.814



LEGEND :

406 | 0.03 | 0.80 — AREA IDENTIFICATION; RUNOFF COEFFICIENT; AREA IN HECTARES

MAJOR FLOW ROUTE

MINOR FLOW ROUTE

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8	REVISED PER CITY COMMENTS	RPK	14: 02: 06
7	REVISED PER CITY COMMENTS	RPK	13: 11: 26
6	REVISED BLOCK 5	RPK	13: 08: 19
5	RE-ISSUED FOR SITE PLAN APPROVAL	TRB	12: 11: 19
4	RE-ISSUED FOR SITE PLAN APPROVAL	RPK	12: 10: 19
3	RE-ISSUED FOR SITE PLAN APPROVAL	RPK	12: 08: 27
2	ISSUED FOR SITE PLAN APPROVAL	RPK	12: 04: 12
1	ISSUED FOR REVIEW	RPK	12: 03: 07

LE GROUPE BRIGIL CONSTRUCTION

IBI GROUP
333 Preston Street
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Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
Fax (613)225-9868

Project Title

PETRIE'S LANDING II

PHASE 2

LICENSED PROFESSIONAL ENGINEER
R.P. KENNEDY
100086 ?04
2014/02/06
PROVINCE OF ONTARIO

Drawing Title

STORM DRAINAGE AREA PLAN

Scale: 1:500

Design	Date
RPK	FEB. 2012
Drawn: DD	Checked: TRB
Project No.: 31464	Drawing No.: 500

APPROVAL DATE _____ 2014

Felice Petti, P. Eng., Manager
Development Review, Suburban Services

11.1 Brisbois Creek

11.1.1 Quantity Control

On-site detention storages consisting of parking lot and rooftop storage for all future commercial/business park developments are required to ensure that capacities of culverts at Hwy. 17 and the North Service Road are not exceeded. The release rate for the on-site storage is the 5 year post-development peak flow which is 150 l/s/ha. The required storage volume for quantity control is 160 m^3/ha.

For mitigation of possible reductions in baseflows, roof drains should be discharged on grassed areas or into a drainage pit. Recharge of approximately two-thirds of the yearly average rainfall from roof areas would be sufficient to balance hard surface recharge loss. During the detailed design, however, the natural groundwater baseflow from the surficial sands should be verified to assess what ultimate mitigation measures, if any, are required.

11.1.2 Quality Control

The storage volume for quality control required in the valley upstream of the NSR is 5,300 m^3. Figure 11.2 gives the stage-storage characteristics of the existing valley.

The proposed pond will have a permanent pool about 1.2 m deep near the outlet. The active storage volume for quality control of 5,300 m^3 is available at elevation 47.3 m. The outlet of the quality control storage is to be sized to give a detention time of 72 hours in accordance with MNR's guidelines.

To avoid excessive velocities through the pond, a 1.8 m x 3.5 m bypass sewer as shown in Figures 11.3 and 11.4 or an increase in the cross-sectional area of the pond (Figures D3.3 and D3.4) is proposed. The preferred option will be determined at the detailed design stage.

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

PROJECT: Petrie's Landing II - 2
DATE: 2013-11-28
FILE: 31464.5.7
REV #: 4
DESIGNED BY: RPK
CHECKED BY: TRB

STORMWATER MANAGEMENT

Formulas and Descriptions

i_{5yr} = 1:5 year Intensity = $998.071 / (T_c+6.053)^{0.814}$
i_{10yr} = 1:10 year Intensity = $1174.184 / (T_c+6.014)^{0.816}$
i_{100yr} = 1:100 year Intensity = $1735.688 / (T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Site Area

Area =	2.91 Ha

Restricted Flowrate (based on "Servicing Design Brief - Petrie's Landing II" 2010-03-15)

$Q_{restricted}$ =	361.87 L/s

Uncontrolled Release (Q = 2.78CiA)
C = 0.30
100-year design flow
T_c = 20 min
$A_{uncontrolled}$ = 0.55 Ha

$Q_{uncontrolled}$ =	55.02 L/s

Garage Ramps (Q = 2.78CiA)
C = 0.80
100-year design flow
T_c = 10 min
A_{garage} = 0.27 Ha

Q_{garage} =	107.22 L/s

Maximum Allowable Release Rate
$Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled} - Q_{garage}$

$Q_{max\ allowable}$ =	199.62 L/s

Total Proposed Release Rate
(not including $Q_{uncontrolled} + Q_{garage}$)

$Q_{proposed}$ =	155.00 L/s

MODIFIED RATIONAL METHOD (100-Year & 5-Year Ponding)

Drainage Area	***101***
Area (Ha)	0.130
C =	0.70

Restricted Flow Q_r (L/s)= 12.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
10	178.56	45.17	12.00	33.17	19.90	2.5	173.95	44.01	12.00	32.01	4.80	
15	142.89	36.15	12.00	24.15	21.73	5	141.18	35.72	12.00	23.72	7.11	
20	119.95	30.35	12.00	18.35	22.01	7.5	119.59	30.25	12.00	18.25	8.21	
25	103.85	26.27	12.00	14.27	**21.41**	10	104.19	26.36	12.00	14.36	**8.62**	**Required Storage**
30	91.87	23.24	12.00	11.24	20.23	12.5	92.61	23.43	12.00	11.43	8.57	
35	82.58	20.89	12.00	8.89	18.67	15	83.56	21.14	12.00	9.14	8.22	
40	75.15	19.01	12.00	7.01	16.82	17.5	76.26	19.29	12.00	7.29	7.66	
45	69.05	17.47	12.00	5.47	14.76	20	70.25	17.77	12.00	5.77	6.93	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	21.41	31.74	0.00	overflows to Area 102

Drainage Area	***102***
Area (ha)	0.100
C =	0.70

Restricted Flow Q_r (L/s)= 12.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
0	398.62	77.57	12.00	65.57	0.00	0	230.48	44.85	12.00	32.85	0.00	
5	242.70	47.23	12.00	35.23	10.57	2.5	173.95	33.85	12.00	21.85	3.28	
10	178.56	34.75	12.00	22.75	13.65	5	141.18	27.47	12.00	15.47	4.64	
15	142.89	27.81	12.00	15.81	**14.23**	7.5	119.59	23.27	12.00	11.27	**5.07**	**Required Storage**
20	119.95	23.34	12.00	11.34	13.61	10	104.19	20.28	12.00	8.28	4.97	
25	103.85	20.21	12.00	8.21	12.31	12.5	92.61	18.02	12.00	6.02	4.52	
30	91.87	17.88	12.00	5.88	10.58	15	83.56	16.26	12.00	4.26	3.83	
35	82.58	16.07	12.00	4.07	8.55	17.5	76.26	14.84	12.00	2.84	2.98	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	14.23	38.79	0.00	overflows to Prestige Circle

Drainage Area	***201***
Area (Ha)	0.080
C =	0.30

Restricted Flow Q_r (L/s)= 6.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
7	211.67	14.12	6.00	8.12	3.41	2	182.69	12.19	6.00	6.19	0.74	
8	199.20	13.29	6.00	7.29	3.50	3	166.09	11.08	6.00	5.08	0.91	
9	188.25	12.56	6.00	6.56	3.54	4	152.51	10.18	6.00	4.18	1.00	
10	178.56	11.91	6.00	5.91	**3.55**	5	141.18	9.42	6.00	3.42	**1.03**	**Required Storage**
11	169.91	11.34	6.00	5.34	3.52	6	131.57	8.78	6.00	2.78	1.00	
12	162.13	10.82	6.00	4.82	3.47	7	123.30	8.23	6.00	2.23	0.94	
13	155.11	10.35	6.00	4.35	3.39	8	116.11	7.75	6.00	1.75	0.84	
14	148.72	9.92	6.00	3.92	3.30	9	109.79	7.33	6.00	1.33	0.72	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	3.55	27.91	0.00	overflows to Brisebois Creek

Drainage Area	**202**
Area (ha)	0.140
C =	0.70

Restricted Flow Q_r (L/s)= 15.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
0	398.62	108.60	15.00	93.60	0.00	6	131.57	35.84	15.00	20.84	7.50	
5	242.70	66.12	15.00	51.12	15.34	7	123.30	33.59	15.00	18.59	7.81	
10	178.56	48.65	15.00	33.65	20.19	8	116.11	31.63	15.00	16.63	7.98	
15	142.89	38.93	15.00	23.93	**21.54**	9	109.79	29.91	15.00	14.91	**8.05**	**Required Storage**
20	119.95	32.68	15.00	17.68	21.22	10	104.19	28.39	15.00	13.39	8.03	
25	103.85	28.29	15.00	13.29	19.94	11	99.19	27.02	15.00	12.02	7.94	
30	91.87	25.03	15.00	10.03	18.05	12	94.70	25.80	15.00	10.80	7.78	
35	82.58	22.50	15.00	7.50	15.75	13	90.63	24.69	15.00	9.69	7.56	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	21.54	82.61	0.00	overflows to Area 203

Drainage Area	**203**
Area (ha)	0.160
C =	0.70

Restricted Flow Q_r (L/s)= 15.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	75.57	15.00	60.57	18.17	2.5	173.95	54.16	15.00	39.16	5.87	
10	178.56	55.60	15.00	40.60	24.36	5	141.18	43.96	15.00	28.96	8.69	
15	142.89	44.49	15.00	29.49	26.54	7.5	119.59	37.23	15.00	22.23	10.01	
20	119.95	37.35	15.00	22.35	**26.82**	10	104.19	32.44	15.00	17.44	**10.46**	**Required Storage**
25	103.85	32.33	15.00	17.33	26.00	12.5	92.61	28.84	15.00	13.84	10.38	
30	91.87	28.60	15.00	13.60	24.49	15	83.56	26.02	15.00	11.02	9.91	
35	82.58	25.71	15.00	10.71	22.49	17.5	76.26	23.75	15.00	8.75	9.18	
40	75.15	23.40	15.00	8.40	20.15	20	70.25	21.87	15.00	6.87	8.25	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	26.82	67.07	0.00	overflows to Prestige Circle

Drainage Area	**204**
Area (ha)	0.160
C =	0.70

Restricted Flow Q_r (L/s)= 15.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	75.57	15.00	60.57	18.17	8	116.11	36.15	15.00	21.15	10.15	
10	178.56	55.60	15.00	40.60	24.36	9	109.79	34.19	15.00	19.19	10.36	
15	142.89	44.49	15.00	29.49	26.54	10	104.19	32.44	15.00	17.44	10.46	
20	119.95	37.35	15.00	22.35	**26.82**	11	99.19	30.88	15.00	15.88	**10.48**	**Required Storage**
25	103.85	32.33	15.00	17.33	26.00	12	94.70	29.48	15.00	14.48	10.43	
30	91.87	28.60	15.00	13.60	24.49	13	90.63	28.22	15.00	13.22	10.31	
35	82.58	25.71	15.00	10.71	22.49	14	86.93	27.07	15.00	12.07	10.14	
40	75.15	23.40	15.00	8.40	20.15	15	83.56	26.02	15.00	11.02	9.91	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	26.82	102.49	0.00	overflows to Prestige Circle

Drainage Area	205
Area (ha)	0.070
C =	0.30

Restricted Flow Q_r (L/s)= 6.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	14.17	6.00	8.17	2.45	1	203.51	11.88	6.00	5.88	0.35	
6	226.01	13.19	6.00	7.19	2.59	2	182.69	10.67	6.00	4.67	0.56	
7	211.67	12.36	6.00	6.36	2.67	3	166.09	9.70	6.00	3.70	0.67	
8	199.20	11.63	6.00	5.63	**2.70**	4	152.51	8.90	6.00	2.90	**0.70**	**Required Storage**
9	188.25	10.99	6.00	4.99	2.69	5	141.18	8.24	6.00	2.24	0.67	
10	178.56	10.42	6.00	4.42	2.65	6	131.57	7.68	6.00	1.68	0.61	
11	169.91	9.92	6.00	3.92	2.59	7	123.30	7.20	6.00	1.20	0.50	
12	162.13	9.47	6.00	3.47	2.50	8	116.11	6.78	6.00	0.78	0.37	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	2.70	4.26	0.00	overflows to ditch

Drainage Area	206
Area (ha)	0.120
C =	0.30

Restricted Flow Q_r (L/s)= 17.87 *

**** 100-year unrestricted flow collected rear yard perforated pipe network***

Drainage Area	208
Area (ha)	0.020
C =	0.30

Restricted Flow Q_r (L/s)= 6.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
0	398.62	6.65	6.00	0.65	**0.00**	0	230.48	3.84	6.00	-2.16	**0.00**	**Required Storage**
1	351.38	5.86	6.00	-0.14	-0.01	1	203.51	3.39	6.00	-2.61	-0.16	
2	315.00	5.25	6.00	-0.75	-0.09	2	182.69	3.05	6.00	-2.95	-0.35	
3	286.05	4.77	6.00	-1.23	-0.22	3	166.09	2.77	6.00	-3.23	-0.58	
4	262.41	4.38	6.00	-1.62	-0.39	4	152.51	2.54	6.00	-3.46	-0.83	
5	242.70	4.05	6.00	-1.95	-0.59	5	141.18	2.35	6.00	-3.65	-1.09	
6	226.01	3.77	6.00	-2.23	-0.80	6	131.57	2.19	6.00	-3.81	-1.37	
7	211.67	3.53	6.00	-2.47	-1.04	7	123.30	2.06	6.00	-3.94	-1.66	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	0.00	4.41	0.00	overflows to ditch

Drainage Area	**305**
Area (ha)	0.040
C =	0.70

Restricted Flow Q_r (L/s)= 6.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	18.89	6.00	12.89	3.87	3	166.09	12.93	6.00	6.93	1.25	
7.5	205.22	15.97	6.00	9.97	4.49	4	152.51	11.87	6.00	5.87	1.41	
10	178.56	13.90	6.00	7.90	4.74	5	141.18	10.99	6.00	4.99	1.50	
12.5	158.53	12.34	6.00	6.34	**4.76**	6	131.57	10.24	6.00	4.24	**1.53**	**Required Storage**
15	142.89	11.12	6.00	5.12	4.61	7	123.30	9.60	6.00	3.60	1.51	
17.5	130.31	10.14	6.00	4.14	4.35	8	116.11	9.04	6.00	3.04	1.46	
20	119.95	9.34	6.00	3.34	4.00	9	109.79	8.55	6.00	2.55	1.38	
22.5	111.26	8.66	6.00	2.66	3.59	10	104.19	8.11	6.00	2.11	1.27	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	4.76	24.70	0.00	overflows to Area 302

Drainage Area	**302**
Area (ha)	0.220
C =	0.70

Restricted Flow Q_r (L/s)= 20.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	103.91	20.00	83.91	25.17	8	116.11	49.71	20.00	29.71	14.26	
10	178.56	76.44	20.00	56.44	33.87	9	109.79	47.00	20.00	27.00	14.58	
15	142.89	61.18	20.00	41.18	37.06	10	104.19	44.61	20.00	24.61	14.76	
20	119.95	51.35	20.00	31.35	**37.62**	11	99.19	42.47	20.00	22.47	**14.83**	**Required Storage**
25	103.85	44.46	20.00	24.46	36.69	12	94.70	40.54	20.00	20.54	14.79	
30	91.87	39.33	20.00	19.33	34.80	13	90.63	38.80	20.00	18.80	14.66	
35	82.58	35.35	20.00	15.35	32.24	14	86.93	37.22	20.00	17.22	14.46	
40	75.15	32.17	20.00	12.17	29.21	15	83.56	35.77	20.00	15.77	14.20	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	37.62	148.18	0.00	overflows to Prestige Circle

Drainage Area	**401**
Area (ha)	0.090
C =	0.70

Restricted Flow Q_r (L/s)= 12.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
0	398.62	69.81	12.00	57.81	0.00	0	230.48	40.37	12.00	28.37	0.00	
5	242.70	42.51	12.00	30.51	9.15	2.5	173.95	30.47	12.00	18.47	2.77	
10	178.56	31.27	12.00	19.27	11.56	5	141.18	24.73	12.00	12.73	3.82	
15	142.89	25.03	12.00	13.03	**11.72**	7.5	119.59	20.94	12.00	8.94	**4.03**	**Required Storage**
20	119.95	21.01	12.00	9.01	10.81	10	104.19	18.25	12.00	6.25	3.75	
25	103.85	18.19	12.00	6.19	9.28	12.5	92.61	16.22	12.00	4.22	3.17	
30	91.87	16.09	12.00	4.09	7.36	15	83.56	14.63	12.00	2.63	2.37	
35	82.58	14.46	12.00	2.46	5.17	17.5	76.26	13.36	12.00	1.36	1.42	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	11.72	24.95	0.00	overflows to Area 402

Drainage Area	**403**
Area (ha)	0.060
C =	0.70

Restricted Flow Q_r (L/s)= 12.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
0	398.62	46.54	12.00	34.54	0.00	1	203.51	23.76	12.00	11.76	0.71	
2.5	299.75	35.00	12.00	23.00	3.45	2	182.69	21.33	12.00	9.33	1.12	
5	242.70	28.34	12.00	16.34	4.90	3	166.09	19.39	12.00	7.39	1.33	
7.5	205.22	23.96	12.00	11.96	**5.38**	4	152.51	17.81	12.00	5.81	**1.39**	**Required Storage**
10	178.56	20.85	12.00	8.85	5.31	5	141.18	16.48	12.00	4.48	1.35	
12.5	158.53	18.51	12.00	6.51	4.88	6	131.57	15.36	12.00	3.36	1.21	
15	142.89	16.68	12.00	4.68	4.22	7	123.30	14.40	12.00	2.40	1.01	
17.5	130.31	15.22	12.00	3.22	3.38	8	116.11	13.56	12.00	1.56	0.75	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	5.38	24.95	0.00	overflows to Area 402

Drainage Area	**402**
Area (ha)	0.050
C =	0.70

Restricted Flow Q_r (L/s)= 12.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
0	398.62	38.79	12.00	26.79	0.00	0	230.48	22.43	12.00	10.43	0.00	
2.5	299.75	29.17	12.00	17.17	2.57	1	203.51	19.80	12.00	7.80	0.47	
5	242.70	23.62	12.00	11.62	3.48	2	182.69	17.78	12.00	5.78	0.69	
7.5	205.22	19.97	12.00	7.97	**3.59**	3	166.09	16.16	12.00	4.16	**0.75**	**Required Storage**
10	178.56	17.37	12.00	5.37	3.22	4	152.51	14.84	12.00	2.84	0.68	
12.5	158.53	15.43	12.00	3.43	2.57	5	141.18	13.74	12.00	1.74	0.52	
15	142.89	13.90	12.00	1.90	1.71	6	131.57	12.80	12.00	0.80	0.29	
17.5	130.31	12.68	12.00	0.68	0.71	7	123.30	12.00	12.00	0.00	0.00	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	3.59	24.96	0.00	overflows to Prestige Circle

Drainage Area	**404**
Area (ha)	0.050
C =	0.30

Restricted Flow Q_r (L/s)= 6.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
2	315.00	13.14	6.00	7.14	0.86	0	230.48	9.61	6.00	3.61	0.00	
3	286.05	11.93	6.00	5.93	1.07	1	203.51	8.49	6.00	2.49	0.15	
4	262.41	10.94	6.00	4.94	1.19	2	182.69	7.62	6.00	1.62	**0.19**	
5	242.70	10.12	6.00	4.12	**1.24**	3	166.09	6.93	6.00	0.93	0.17	**Required Storage**
6	226.01	9.42	6.00	3.42	1.23	4	152.51	6.36	6.00	0.36	0.09	
7	211.67	8.83	6.00	2.83	1.19	5	141.18	5.89	6.00	-0.11	-0.03	
8	199.20	8.31	6.00	2.31	1.11	6	131.57	5.49	6.00	-0.51	-0.18	
9	188.25	7.85	6.00	1.85	1.00	7	123.30	5.14	6.00	-0.86	-0.36	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	1.24	1.62	0.00	overflows to Creek

GARAGE RAMPS

Drainage Area	***210***		
Area (ha)	0.030		
C =	0.80	Restricted Flow Q_r (L/s)=	11.91 *

**** 100-year unrestricted flow collected by garage drain***

Drainage Area	***303***		
Area (ha)	0.030		
C =	0.80	Restricted Flow Q_r (L/s)=	11.91 *

**** 100-year unrestricted flow collected by garage drain***

Drainage Area	***304***		
Area (ha)	0.040		
C =	0.80	Restricted Flow Q_r (L/s)=	15.88 *

**** 100-year unrestricted flow collected by garage drain***

Drainage Area	***306***		
Area (ha)	0.050		
C =	0.80	Restricted Flow Q_r (L/s)=	19.86 *

**** 100-year unrestricted flow collected by garage drain***

Drainage Area	***405***		
Area (ha)	0.040		
C =	0.80	Restricted Flow Q_r (L/s)=	15.88 *

**** 100-year unrestricted flow collected by garage drain***

Drainage Area	***406***		
Area (ha)	0.050		
C =	0.80	Restricted Flow Q_r (L/s)=	19.86 *

**** 100-year unrestricted flow collected by garage drain***

Drainage Area	***407***		
Area (ha)	0.030		
C =	0.80	Restricted Flow Q_r (L/s)=	11.91 *

**** 100-year unrestricted flow collected by garage drain***

BUILDINGS

Building	***5***
Area (ha)	0.200
C =	0.90
Restricted Flow Q_r (L/s)=	20.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	121.45	20.00	101.45	30.43	5	141.18	70.65	20.00	50.65	15.19	
10	178.56	89.35	20.00	69.35	41.61	7.5	119.59	59.84	20.00	39.84	17.93	
15	142.89	71.50	20.00	51.50	46.35	10	104.19	52.14	20.00	32.14	19.28	
20	119.95	60.02	20.00	40.02	**48.03**	12.5	92.61	46.34	20.00	26.34	**19.76**	**Required Storage**
25	103.85	51.97	20.00	31.97	47.95	15	83.56	41.81	20.00	21.81	19.63	
30	91.87	45.97	20.00	25.97	46.75	17.5	76.26	38.16	20.00	18.16	19.07	
35	82.58	41.32	20.00	21.32	44.78	20	70.25	35.15	20.00	15.15	18.18	
40	75.15	37.60	20.00	17.60	42.25	22.5	65.20	32.63	20.00	12.63	17.05	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	48.03	375.00	0.00	controlled on roof

Building	***8***
Area (ha)	0.100
C =	0.90
Restricted Flow Q_r (L/s)=	10.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	60.72	10.00	50.72	15.22	5	141.18	35.32	10.00	25.32	7.60	
10	178.56	44.68	10.00	34.68	20.81	7.5	119.59	29.92	10.00	19.92	8.96	
15	142.89	35.75	10.00	25.75	23.18	10	104.19	26.07	10.00	16.07	9.64	
20	119.95	30.01	10.00	20.01	**24.01**	12.5	92.61	23.17	10.00	13.17	**9.88**	**Required Storage**
25	103.85	25.98	10.00	15.98	23.97	15	83.56	20.91	10.00	10.91	9.82	
30	91.87	22.99	10.00	12.99	23.37	17.5	76.26	19.08	10.00	9.08	9.54	
35	82.58	20.66	10.00	10.66	22.39	20	70.25	17.58	10.00	7.58	9.09	
40	75.15	18.80	10.00	8.80	21.12	22.5	65.20	16.31	10.00	6.31	8.52	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	24.01	168.75	0.00	controlled on roof

Building	***9***
Area (ha)	0.100
C =	0.90
Restricted Flow Q_r (L/s)=	10.00

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	60.72	10.00	50.72	15.22	5	141.18	35.32	10.00	25.32	7.60	
10	178.56	44.68	10.00	34.68	20.81	7.5	119.59	29.92	10.00	19.92	8.96	
15	142.89	35.75	10.00	25.75	23.18	10	104.19	26.07	10.00	16.07	9.64	
20	119.95	30.01	10.00	20.01	**24.01**	12.5	92.61	23.17	10.00	13.17	**9.88**	**Required Storage**
25	103.85	25.98	10.00	15.98	23.97	15	83.56	20.91	10.00	10.91	9.82	
30	91.87	22.99	10.00	12.99	23.37	17.5	76.26	19.08	10.00	9.08	9.54	
35	82.58	20.66	10.00	10.66	22.39	20	70.25	17.58	10.00	7.58	9.09	
40	75.15	18.80	10.00	8.80	21.12	22.5	65.20	16.31	10.00	6.31	8.52	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	24.01	168.75	0.00	controlled on roof

Building	10										
Area (ha)	0.100										
C =	0.90	Restricted Flow Q_r (L/s)=		10.00							

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	60.72	10.00	50.72	15.22	5	141.18	35.32	10.00	25.32	7.60	
10	178.56	44.68	10.00	34.68	20.81	7.5	119.59	29.92	10.00	19.92	8.96	
15	142.89	35.75	10.00	25.75	23.18	10	104.19	26.07	10.00	16.07	9.64	
20	119.95	30.01	10.00	20.01	**24.01**	12.5	92.61	23.17	10.00	13.17	**9.88**	**Required Storage**
25	103.85	25.98	10.00	15.98	23.97	15	83.56	20.91	10.00	10.91	9.82	
30	91.87	22.99	10.00	12.99	23.37	17.5	76.26	19.08	10.00	9.08	9.54	
35	82.58	20.66	10.00	10.66	22.39	20	70.25	17.58	10.00	7.58	9.09	
40	75.15	18.80	10.00	8.80	21.12	22.5	65.20	16.31	10.00	6.31	8.52	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	24.01	168.75	0.00	controlled on roof

Building	11										
Area (ha)	0.100										
C =	0.90	Restricted Flow Q_r (L/s)=		10.00							

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)	
5	242.70	60.72	10.00	50.72	15.22	5	141.18	35.32	10.00	25.32	7.60	
10	178.56	44.68	10.00	34.68	20.81	7.5	119.59	29.92	10.00	19.92	8.96	
15	142.89	35.75	10.00	25.75	23.18	10	104.19	26.07	10.00	16.07	9.64	
20	119.95	30.01	10.00	20.01	**24.01**	12.5	92.61	23.17	10.00	13.17	**9.88**	**Required Storage**
25	103.85	25.98	10.00	15.98	23.97	15	83.56	20.91	10.00	10.91	9.82	
30	91.87	22.99	10.00	12.99	23.37	17.5	76.26	19.08	10.00	9.08	9.54	
35	82.58	20.66	10.00	10.66	22.39	20	70.25	17.58	10.00	7.58	9.09	
40	75.15	18.80	10.00	8.80	21.12	22.5	65.20	16.31	10.00	6.31	8.52	

Storage (m^3)

Overflow	Required	Available	Balance	
0.00	24.01	168.75	0.00	controlled on roof

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

patersongroup

Geotechnical Investigation

Proposed Multi-Storey Buildings
Blocks 6, 7 and 8 - Petrie's Landing II
8466 Jeanne D'Arc Boulevard
Ottawa, Ontario

Prepared For

Construction Brigil

May 24, 2017

Report: PG4112-1

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Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Construction Brigil to conduct a geotechnical investigation for Blocks 6, 7 and 8 at Petrie's Landing II residential development located at 8466 Jeanne D'Arc Boulevard in the City of Ottawa (refer to Figure 1 - Key Plan presented in Appendix 2).

The objective of the investigation was to:

- ❏ determine the subsoil and groundwater conditions at this site by means of test holes and existing soils information.
- ❏ provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

2.0 Proposed Development

It is understood that the current phases of the residential development will consist of three (3) residential multi-storey buildings with slab-on-grade construction, pathways, landscaping and paved parking areas with local access roadways and will be serviced by municipal services.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out on April 24 and 25, 2017 which consisted of extending a total of six (6) boreholes (BH 1-17 to BH 6-17) to a maximum depth of 30.4 m below existing ground surface. The borehole locations were distributed in a manner to provide general coverage of the subject site at the proposed buildings footprints area and taking into consideration site features. The locations of the boreholes are shown on Drawing PG4112-1 - Test Hole Location Plan included in Appendix 2.

The boreholes were drilled using a track-mounted auger drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The drilling procedure consisted of augering to the required depths at the selected locations, sampling and testing the overburden.

Sampling and In Situ Testing

Soil samples were recovered from a 50 mm diameter split-spoon or the auger flights. The split-spoon and auger samples were classified on site and placed in sealed plastic bags. All samples were transported to our laboratory. The depths at which the split-spoon and auger samples were recovered from the boreholes are presented as SS and AU, respectively, on the Soil Profile and Test Data sheets.

Standard Penetration Tests (SPT) were conducted and recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split-spoon sample 300 mm into the soil after the initial penetration of 150 mm using a 63.5 kg hammer falling from a height of 760 mm.

Undrained shear strength testing, using a vane apparatus, was carried out at regular intervals of depth in cohesive soils.

Dynamic Cone Penetration Tests (DCPT) were also carried out at BH 3-17 location. The DCPT is a continuous test which utilized a dropping weight to drive a 45 degree cone and rod into the ground. The number of blows for each 300 mm penetration was recorded. The rods consisted of the same 44.4 mm diameter rods used for the SPT, and the drive weight of fall and the hammer weight were the same as the SPT.

The subsurface conditions observed in the boreholes were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets in Appendix 1.

Groundwater

Flexible polyethylene standpipes were installed in boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

3.2 Field Survey

The borehole locations and ground surface elevations at the borehole locations were provided by Annis, O'Sullivan Vollebekk Ltd. The borehole locations and the ground surface elevation at the borehole locations are presented on Drawing PG4112-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples recovered from the subject site were visually examined in our laboratory to review the field logs.

3.4 Analytical Testing

One (1) soil sample was submitted for analytical testing to assess the potential for exposed ferrous metals and the sulphate potential against subsurface concrete structures. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity and the pH of the soil. The results are discussed further in Subsection 6.7.

4.0 Observations

4.1 Surface Conditions

The subject property is bordered to the north by Jeanne D'Arc Boulevard North, to the east by a treed area and Taylor creek, to the south by Regional Road 174, and to the west by Prestige Circle and two (2) residential dwellings located within the southwest portion of the site.

The site is relatively flat and grass covered. Some existing fill piles containing organic and construction debris were observed near the central portion of the site adjacent to Prestige Circle. The site trailer was located near the south side of Prestige Circle.

4.2 Subsurface Profile

Generally, the soil conditions encountered at the test holes locations consist of topsoil or fill overlying silty clay deposit. The silty clay deposit was not fully penetrated at any of the current borehole locations, which extended to a maximum depth of 30.4 m below existing grade.

Based on available geological mapping and previous investigations conducted by Paterson in the area, interbedded limestone and dolomite bedrock of the Gull River formation is present in this area with a drift thickness of 40 to 50 m.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profiles encountered at each test hole location.

Silty Clay

A weathered silty clay crust varying in depths between 1.8 and 3.4 m was encountered at the boreholes. In situ shear vane field testing was carried out in the lower portion of the weathered crust yielded undrained shear strength values ranging from approximately 55 to 159 kPa. These values are indicative of a stiff to very stiff consistency.

Grey silty clay which was encountered below the weathered crust at all borehole locations, did not reach refusal at a maximum depth of 30.4 m. In situ shear vane field testing carried out in the grey silty clay yielded undrained shear strength values ranging between 41 and 104 kPa. These values are indicative of a firm to stiff consistency.

4.3 Groundwater

The measured groundwater levels in the boreholes are presented in Table 1 below.

Table 1
Summary of Groundwater Level Readings

Borehole Number	Ground Elevation (m)	Groundwater Levels (m)		Recording Date
		Depth	Elevation	
BH 1-17	56.90	3.09	53.81	May 1, 2017
BH 2-17	55.71	4.69	51.02	May 1, 2017
BH 3-17	53.88	1.55	52.33	May 1, 2017
BH 4-17	53.84	dry	-	May 1, 2017
BH 5-17	52.45	4.35	48.10	May 1, 2017
BH 6-17	52.59	5.48	47.11	May 1, 2017
BH 8-07	56.10	dry	-	July 16, 2007

Note: The groundwater level at each current borehole location is referenced to the borehole ground surface elevation, as provided by Annis, O'Sullivan Vollebekk Ltd.

It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater level could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered satisfactory for the proposed multi-storey buildings. Based on the results of the field program, it is expected that the proposed buildings will be founded on conventional shallow footings placed on the undisturbed stiff silty clay bearing surface.

A permissible grade raise restriction is required for the subject site due to the presence of a deep silty clay deposit. If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction total and differential settlements.

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

5.2 Site Grading and Preparation

Stripping Depth

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

Fill Placement

Fill used for grading beneath the building footprints, unless otherwise specified, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill should be tested and approved prior to delivery to the site. It should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the building area should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD. Site-excavated soils are not suitable for use as backfill against foundation walls due to the frost heave potential of the site excavated soils below settlement sensitive areas, such as concrete sidewalks and exterior concrete entrance areas.

5.3 Foundation Design

Spread Footing Foundations

Footings founded on an undisturbed, stiff silty clay bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**.

An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of the concrete for the footings.

Settlement

Footings designed using the above-noted bearing resistance value at SLS will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to silty clay or engineered fill when a plane extending down and out from the bottom edges of the footing, at a minimum of 1.5H:1V, passes only through in situ soil of the same or higher capacity as the bearing medium soil.

Permissible Grade Raise Restriction

Due to the presence of the silty clay layer, the subject site will be subjected to a permissible grade restriction. A permissible grade raise restriction of **2.0 m** is recommended for the subject site.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class E** as defined in the Ontario Building Code 2012 (OBC 2012; Table 4.1.8.4.A) for the foundations considered at this site. The soils underlying the proposed shallow foundations are not susceptible to liquefaction for the local seismicity.

5.5 Slab on Grade Construction

With the removal of all topsoil and deleterious materials, within the footprint of the proposed buildings, the native soil or engineered fill surface will be considered to be an acceptable subgrade surface on which to commence backfilling for the floor slab. The upper 150 mm of sub-slab fill should consist of an OPSS Granular A crushed stone. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose lifts and compacted to at least 98% of its SPMDD.

Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab.

5.6 Pavement Design

Car only parking areas, access lanes and heavy truck parking areas are anticipated at this site. The proposed pavement structures are shown in Tables 2 and 3.

Table 2 - Recommended Pavement Structure - Car Only Parking Areas

Thickness (mm)	Material Description
50	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
	SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill

Table 3 - Recommended Pavement Structure
Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
	SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill

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.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing its load carrying capacity.

Due to the impervious nature of the subgrade materials consideration should be given to installing subdrains during the pavement construction. These drains should be installed at each catch basin, be at least 3 m long and should extend in four orthogonal directions or longitudinally when placed along a curb. Along local streets, the drains should be placed along the edges of the pavement. The subdrain inverts should be approximately 300 mm below subgrade level. The subgrade surface should be crowned to promote water flow to the drainage lines.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

It is recommended that a perimeter foundation drainage system be provided for the proposed structures. The system should consist of a 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structures. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials, such as clean sand or OPSS Granular B Type I granular material. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls. A drainage geocomposite, such as Miradrain G100N or Delta Drain 6000, connected to the perimeter foundation drainage system is recommended.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover (or equivalent) should be provided in this regard.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the structure proper and require additional protection, such as soil cover of 2.1 m or a combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

The side slopes of excavations in the soil and fill overburden materials should either be cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications & Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

At least 150 mm of OPSS Granular A should be used for bedding for sewer and water pipes when placed on soil subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to a minimum of 95% of the material's SPMDD.

Generally, it should be possible to re-use the moist, not wet, silty clay above the cover material if the excavation and filling operations are carried out in dry weather conditions. The wet silty clay should be given a sufficient drying period to decrease its moisture content to an acceptable level to make compaction possible prior to being re-used.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

6.5 Groundwater Control

Groundwater Control for Building Construction

It is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations.

Permit to Take Water

A temporary Ministry of the Environment and Climate Change (MOECC) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MOECC.

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

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project.

The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a non aggressive to slightly aggressive corrosive environment.

6.8 Landscaping Considerations

Tree Planting Restrictions

The proposed development is located in an area of medium sensitive silty clay deposits for tree planting. It is recommended that trees placed within 4.5 m of the foundation wall consist of low water demanding trees with shallow roots systems that extend less than 1.5 m below ground surface. Trees placed greater than 4.5 m from the foundation wall may consist of typical street trees, which are typically moderate water demand species with roots extending to a maximum 2 m depth.

It is well documented in the literature, and is our experience, that fast-growing trees located near buildings founded on cohesive soils that shrink on drying can result in long-term differential settlements of the structures. Tree varieties that have the most pronounced effect on foundations are seen to consist of poplars, willows and some maples (i.e. Manitoba Maples) and, as such, they should not be considered in the landscaping design.

Swimming Pools

The in-situ soils are considered to be acceptable for swimming pools. Above ground swimming pools must be placed at least 4 m away from the residence foundation and neighbouring foundations. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer`s requirements.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that the following material testing and observation program be performed by the geotechnical consultant.

- ❑ Review of the grading plan once available
- ❑ Observation of all subgrades prior to backfilling.
- ❑ 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 the completion of a satisfactory inspection program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. We request that we be permitted to review the grading plan once available and our recommendations when the drawings and specifications are complete.

A geotechnical investigation of this nature is a limited sampling of a site. The recommendations are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around the test locations. The extent of the limited area depends on the soil, bedrock and groundwater conditions, as well the history of the site reflecting natural, construction, and other activities. Should any conditions at the site be encountered which differ from those at the test locations, we request notification immediately in order to permit reassessment of our recommendations.

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 Construction Brigil 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.

May 24, 2017

LICENSED PROFESSIONAL ENGINEER
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

David J. Gilbert, P.Eng.

Carlos P. Da Silva, P.Eng.

Report Distribution:

- ❏ Construction Brigil (3 copies)
- ❏ Paterson Group (1 copy)

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG4112-1 - TEST HOLE LOCATION PLAN

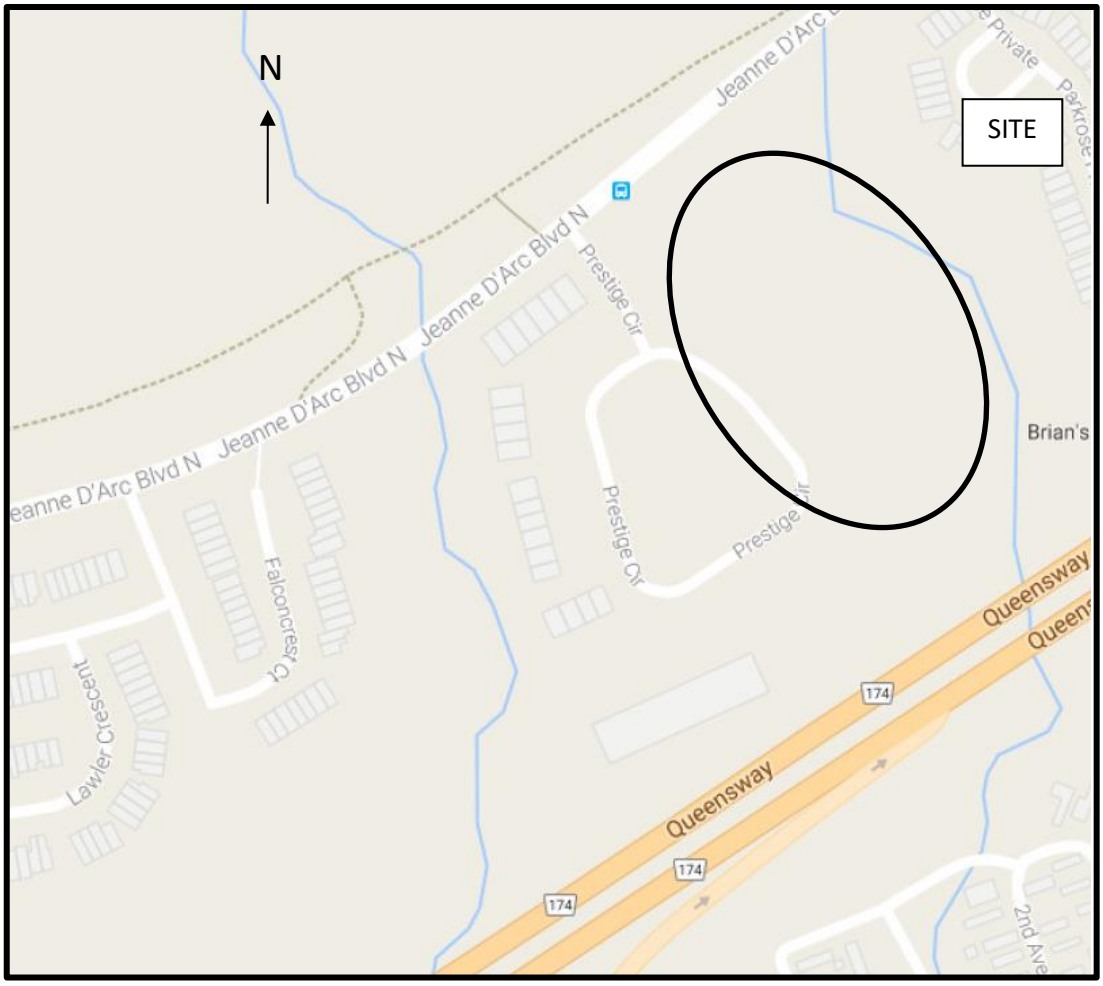
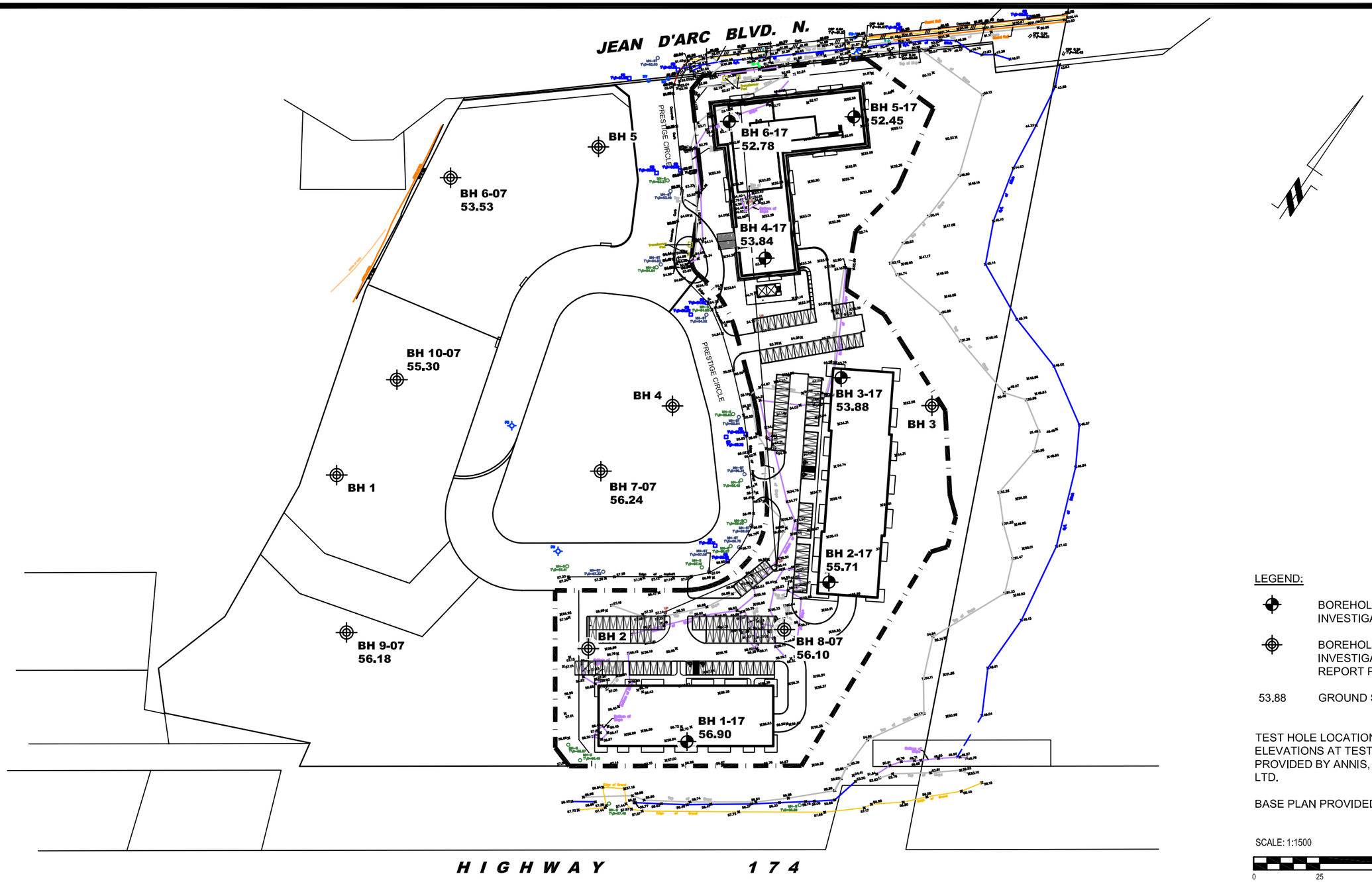


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG0448
- 53.88 GROUND SURFACE ELEVATION (m)

TEST HOLE LOCATIONS AND GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

BASE PLAN PROVIDED BY NEUF ARCHITECTS.

SCALE: 1:1500

0 25 50 75 100m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

CONTRUCTION BRIGIL

GEOTECHNICAL INVESTIGATION
PROP. MULTI-STOREY BUILDINGS - 8466 JEAN D'ARC BLVD.
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1500	Date: 05/2017
Drawn by: MPG	Report No.: PG4112-1
Checked by: SM	Dwg. No.: PG4112-1
Approved by: DJG	Revision No.: 0

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Appendix E PROPOSED SITE PLAN

KEY PLAN

SCALE: 1:5000

2
A100

LEGEND

PROPERTY LINE

BOUNDRY OF PHASES

NOTE 1:
– Exterior lighting fixtures from Keene Conlyte, model: Silhouette Roadway Luminaire Types: A: A2 and A3. Metal Halide (MA) 70W.
– To be installed on 18' poles (see plan for locations)

Informations herein as per Electrical Eng. preliminary documents. Please refer to annexe thechnical data sheets for further information.

Appendix A
PLZ Stage 2: RSAQ1490 Zoning Compliance Chart
Site Plan : 78 units - BLOCK 6, 140 Prestige Circle

Applicable sections from Bylaw 2008-250	Requirement	Provided
Assume that Prestige Circle is front lot line.		
Property area Phase 2		**20,006.0 m²**
Property area Block 6		**6,136.5 m²**
Table 164A - Apartment dwelling, low rise, Stacked		
Minimum Lot Width (m)	18.0	> 18.0 m
Minimum Lot Area (m²)	5400 m²	> 540 m²
Maximum Building Height (storeys) - exception R5A[1409]	30	4
Minimum Front Yard Setback (m)	6.0 m	> 6.0 m
Minimum Corner Yard Setback (m)	4.5 m	n.a. m
Minimum Interior Side Yard Setback (m)	3.0 m	> 3.0 m
Minimum Rear Yard Setback (m) - exception R5A[1409]	7.5 m	> 7.5 m
Minimum Setback from North Service Road (m) - exception R5A[1409]	100.0 m	n.a. m
Minimum distance between apartment dwellings under 7 storeys and OS1 zone (m)	7.5 m	> 7.5 m
Minimum required building spacing - exception R5A[1409]	3.0	> 3.0 m
Table 164A - IV Planed unit development		
Minimum Lot Width (m)	18.0	> 18.0 m
Minimum Lot Area (m²)	14000 m²	> 1400.0 m²
Maximum Building Height (storeys) - exception R5A[1409]	30	4
Minimum Front Yard Setback (m)	6.0 m	> 6.0 m
Minimum Corner Yard Setback (m)	4.5 m	n.a. m
Minimum Interior Side Yard Setback (m) *	3.0 m	> 3.0 m
Minimum Rear Yard Setback (m) - exception R5A[1409]	7.5 m	> 7.5 m
Minimum Setback from North Service Road (m) - exception R5A[1409]	100.0 m	n.a. m
Minimum distance between apartment dwellings under 7 storeys and OS1 zone (m)	7.5 m	> 7.5 m
Minimum required building spacing - exception R5A[1409]	3.0	> 3.0 m
* For a yard abutting a lot, the yard setback is 6 m from the front lot line/from a street lot line, in all other circumstances, the yard setback is 6 m. Notwithstanding the foregoing, for any yard adjacent to an apartment dwelling, mid-high rise and apartment dwelling, low rise or stacked dwelling within a planned unit development, the yard setback provisions for that use apply.		
Section 163(9)		
Minimum landscape area (% of site)	30.0%	47.2%
Section 101 and 102		
Minimum No. of parking spaces (total)	(ratio = 1.2) = 93	95
Minimum No. of visitor parking spaces (total)	(ratio = 0.2) = 16	16
Total Parking (visitor and residential)		111
Section 106		
Parking space width (m) per section 106 (3)(a)ii - applicable to 50% of resident spaces	2.4 min	2.4 min
Parking space width (m)	2.6 min 2.75 max	2.6
Minimum parking space depth (m)	5.2	5.2
Section 107		
Driveway access - min width (m) one way	3.0 m	n.a. m
Driveway access - min width (m) two way	6.7 m	6.7 m
Section 110		
Minimum landscape area of parking lot (15%)	15 %	34.1%
Minimum landscape buffer width of parking lot not abutting street (m)	3.0 m	3.0 m
- 1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1.5/3 m	3.0 m
Minimum landscape buffer width of parking lot abutting street (m)	3.0 m	3.0 m
Section 111		
Bicycle Parking Space Requirement (Total)	(ratio =0.5) = 39	39
Section 131 (PUD)		
Min. width of private way- Table 131 (1)	6.0 m	6.0 m
Min. setback from any garage- Table 131 (2)	5.2 m	n.a. m
Min. setback for any garage Table 131 (3)	5.2 m	n.a. m
Min. sep distance between bldgs less than 7 storeys in height Table 131 (4)	1.2 m	n.a. m
Section 137		
Total amenity area in sq. m per unit (min 6m²/unit)	47m²	1054.5 m²
Communal amenity area: 50% of total required Total amenity area (in sq.m.) Total)	235² m²	270.6 m² rooftop terrace
Section 55 (Accessory Buildings)		
Min. Required Setback from an Int. Side Lot Line or Rear Lot Line not abutting a street		
- rear yard (m)	0.6 m	0.6 m

Appendix A
PLZ Stage 2: RSAQ1490 Zoning Compliance Chart
Site Plan : 112 units - BLOCK 8, 180 Prestige Circle

Applicable sections from Bylaw 2008-250	Requirement	Provided
Assume that Prestige Circle is front lot line.		
Property area Phase 3		**7,495.2 m²**
Property area Block 8		**7,495.2 m²**
Table 164A - Apartment dwelling, low rise, Stacked		
Minimum Lot Width (m)	18.0	> 18.0 m
Minimum Lot Area (m²)	5400 m²	> 540 m²
Maximum Building Height (storeys) - exception R5A[1409]	30	4
Minimum Front Yard Setback (m)	6.0 m	> 6.0 m
Minimum Corner Yard Setback (m)	4.5 m	n.a. m
Minimum Interior Side Yard Setback (m)	3.0 m	> 3.0 m
Minimum Rear Yard Setback (m) - exception R5A[1409]	7.5 m	> 7.5 m
Minimum Setback from North Service Road (m) - exception R5A[1409]	100.0 m	> 100 m
Minimum distance between apartment dwellings under 7 storeys and OS1 zone (m)	7.5 m	> 7.5 m
Minimum required building spacing - exception R5A[1409]	3.0	> 3.0 m
Table 164A - IV Planed unit development		
Minimum Lot Width (m)	18.0	> 18.0 m
Minimum Lot Area (m²)	14000 m²	> 1400.0 m²
Maximum Building Height (storeys) - exception R5A[1409]	30	4
Minimum Front Yard Setback (m)	6.0 m	> 6.0 m
Minimum Corner Yard Setback (m)	4.5 m	> 4.5 m
Minimum Interior Side Yard Setback (m) *	3.0 m	> 3.0 m
Minimum Rear Yard Setback (m) - exception R5A[1409]	7.5 m	> 7.5 m
Minimum Setback from North Service Road (m) - exception R5A[1409]	100.0 m	> 100 m
Minimum distance between apartment dwellings under 7 storeys and OS1 zone (m)	7.5 m	> 7.5 m
Minimum required building spacing - exception R5A[1409]	3.0	> 3.0 m
* For a yard abutting a lot, the yard setback is 6 m from the front lot line/from a street lot line, in all other circumstances, the yard setback is 6 m. Notwithstanding the foregoing, for any yard adjacent to an apartment dwelling, mid-high rise and apartment dwelling, low rise or stacked dwelling within a planned unit development, the yard setback provisions for that use apply.		
Section 163(9)		
Minimum landscape area (% of site)	30.0%	52.6%
Section 101 and 102		
Minimum No. of parking spaces (total)	(ratio = 1.2) = 106	106
Minimum No. of visitor parking spaces (total)	(ratio = 0.2) = 18	18
Section 106		
Parking space width (m) per section 106 (3)(a)ii - applicable to 50% of resident spaces	2.4 min	2.4 min
Parking space width (m)	2.6 min 2.75 max	2.6
Minimum parking space depth (m)	5.2	5.2
Section 107		
Driveway access - min width (m) one way	3.0 m	n.a. m
Driveway access - min width (m) two way	6.7 m	6.7 m
Section 110		
Minimum landscape area of parking lot (15%)	15 %	37.6%
Minimum landscape buffer width of parking lot not abutting street (m)	3.0 m	3.0 m
- 1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1.5/3 m	3.0 m
Minimum landscape buffer width of parking lot abutting street (m)	3.0 m	3.0 m
Section 111		
Bicycle Parking Space Requirement (Total)	(ratio =0.5) = 46	46
Section 131 (PUD)		
Min. width of private way- Table 131 (1)	6.0 m	6.0 m
Min. setback from any garage- Table 131 (2)	5.2 m	n.a. m
Min. setback for any garage Table 131 (3)	5.2 m	n.a. m
Min. sep distance between bldgs less than 7 storeys in height Table 131 (4)	1.2 m	n.a. m
Section 137		
Total amenity area in sq. m per unit (min 6m²/unit)	552 m²	1187.1 m²
Communal amenity area: 50% of total required Total amenity area (in sq.m.) Total)	276 m²	336.4 m² common hangar and terrace
Section 55 (Accessory Buildings)		
Min. Required Setback from an Int. Side Lot Line or Rear Lot Line not abutting a street		
- rear yard (m)	0.6 m	0.6 m

Appendix A
PLZ Stage 2: RSAQ1490 Zoning Compliance Chart
Site Plan : 89 units - BLOCK 7, 160 Prestige Circle

Applicable sections from Bylaw 2008-250	Requirement	Provided
Assume that Prestige Circle is front lot line.		
Property area Phase 2		**20,006.0 m²**
Property area Block 7		**7,858.6 m²**
Table 164A - Apartment dwelling, low rise, Stacked		
Minimum Lot Width (m)	18.0	> 18.0 m
Minimum Lot Area (m²)	5400 m²	> 540 m²
Maximum Building Height (storeys) - exception R5A[1409]	30	4
Minimum Front Yard Setback (m)	6.0 m	> 6.0 m
Minimum Corner Yard Setback (m)	4.5 m	n.a. m
Minimum Interior Side Yard Setback (m)	3.0 m	> 3.0 m
Minimum Rear Yard Setback (m) - exception R5A[1409]	7.5 m	> 7.5 m
Minimum Setback from North Service Road (m) - exception R5A[1409]	100.0 m	n.a. m
Minimum distance between apartment dwellings under 7 storeys and OS1 zone (m)	7.5 m	> 7.5 m
Minimum required building spacing - exception R5A[1409]	3.0	> 3.0 m
Table 164A - IV Planed unit development		
Minimum Lot Width (m)	18.0	> 18.0 m
Minimum Lot Area (m²)	14000 m²	> 1400.0 m²
Maximum Building Height (storeys) - exception R5A[1409]	30	4
Minimum Front Yard Setback (m)	6.0 m	> 6.0 m
Minimum Corner Yard Setback (m)	4.5 m	> 4.5 m
Minimum Interior Side Yard Setback (m) *	3.0 m	> 3.0 m
Minimum Rear Yard Setback (m) - exception R5A[1409]	7.5 m	> 7.5 m
Minimum Setback from North Service Road (m) - exception R5A[1409]	100.0 m	> 100 m
Minimum distance between apartment dwellings under 7 storeys and OS1 zone (m)	7.5 m	> 7.5 m
Minimum required building spacing - exception R5A[1409]	3.0	> 3.0 m
* For a yard abutting a lot, the yard setback is 6 m from the front lot line/from a street lot line, in all other circumstances, the yard setback is 6 m. Notwithstanding the foregoing, for any yard adjacent to an apartment dwelling, mid-high rise and apartment dwelling, low rise or stacked dwelling within a planned unit development, the yard setback provisions for that use apply.		
Section 163(9)		
Minimum landscape area (% of site)	30.0%	52.6%
Section 101 and 102		
Minimum No. of parking spaces (total)	(ratio = 1.2) = 106	106
Minimum No. of visitor parking spaces (total)	(ratio = 0.2) = 18	18
Section 106		
Parking space width (m) per section 106 (3)(a)ii - applicable to 50% of resident spaces	2.4 min	2.4 min
Parking space width (m)	2.6 min 2.75 max	2.6
Minimum parking space depth (m)	5.2	5.2
Section 107		
Driveway access - min width (m) one way	3.0 m	n.a. m
Driveway access - min width (m) two way	6.7 m	6.7 m
Section 110		
Minimum landscape area of parking lot (15%)	15 %	37.6%
Minimum landscape buffer width of parking lot not abutting street (m)	3.0 m	3.0 m
- 1.5 if fewer than 100 spaces; 3 meters if more than 100 spaces	1.5/3 m	3.0 m
Minimum landscape buffer width of parking lot abutting street (m)	3.0 m	3.0 m
Section 111		
Bicycle Parking Space Requirement (Total)	(ratio =0.5) = 46	46
Section 131 (PUD)		
Min. width of private way- Table 131 (1)	6.0 m	6.0 m
Min. setback from any garage- Table 131 (2)	5.2 m	n.a. m
Min. setback for any garage Table 131 (3)	5.2 m	n.a. m
Min. sep distance between bldgs less than 7 storeys in height Table 131 (4)	1.2 m	n.a. m
Section 137		
Total amenity area in sq. m per unit (min 6m²/unit)	552 m²	1187.1 m²
Communal amenity area: 50% of total required Total amenity area (in sq.m.) Total)	276 m²	336.4 m² common hangar and terrace
Section 55 (Accessory Buildings)		
Min. Required Setback from an Int. Side Lot Line or Rear Lot Line not abutting a street		
- rear yard (m)	0.6 m	0.6 m

ENTIRE SITE STATISTICS - BRIGIL

UNIT STATISTICS		
Phase 1 - Block 1 & 2	40	
Phase 2 - Block 3 & 4	40	
Phase 2 - Block 5	76	
Phase 2 - Block 6	78	
Phase 2 - Block 7	89	
Phase 3 - Block 8	112	
TOTAL	435	Units
Area of Entire site m²	**42,834**	m²
Unit Density - Provided	**101.55**	units/ha
Unit Density - Minimum	**78.00**	units/ha
Unit Density - Maximum	**100.00**	units/ha

CAR PARKING / Ratio min 1:1.4	Requirement		Provided	
	Ratio	Qty.	Ratio	Qty.
Phase 1 - Block 1 & 2	1.40	56		58
Phase 2 - Block 3 & 4	1.40	56		68
Phase 2 - Block 5	1.20	106		130
Phase 2 - Block 6	1.20	94		97
Phase 2 - Block 7	1.20	125		137
Phase 3 - Block 8	1.20	157		152
TOTAL		643		

BIKE PARKING / Ratio 0.5 PHA SE 2	Requirement	Provided
Phase 2 - Block 3 & 4	20	21
Phase 2 - Block 5	39	39
Phase 2 - Block 6	39	39
Phase 2 - Block 7	45	45
Phase 3 - Block 8	56	56
TOTAL	199	200

Echelle/Scale 1:500

0 1 5 10 15 20 25 m

0 5 25 50 75 pi/ft

LEGEND
Bicycle parking
New fence
New stone retaining wall
Fire truck path

PROPERTY INFORMATION
PIN 14501-0695
PART OF BLOCK 2
REGISTERED PLAN 4M-1425
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

SITE PLAN

SCALE: 1:500

1
A100

I:\P_10400\10498.03(CAD)\049803_A100_Site_Plan.dwg

#15546

CITY OF OTTAWA FILE NUMBER: D07-12-17-0093

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2. Les dimensions apparaissant aux documents devront être vérifiées par l'entrepreneur avant le début des travaux. / All dimensions which appear on the documents must be verify by the contractor before starting the work.
3. Veuillez aviser l'architecte de toute dimension erreur etou divergences entre ces documents et ceux des autres professionnels. / The architect must be notified of all errors, omissions and discrepancies between these documents and those of other professionals.
4. Les dimensions sur ces documents doivent être lues et non mesurées. / The dimensions on these documents must be read and not measured.

ARCHITECTURE DE PAYSAGE Landscape architect
Levstek Consultants
5871 Hugh Crescent, Ottawa, ON K0A 2W0
T 613 826 0518 larocquelevstek.com

CIVIL Civil
Stantec
400 - 1331 Clyde Avenue, Ottawa ON K2C 3G4
T 613 724 4337 stantec.com

ARCHITECTES Architect
NEUF architect(e)s
630, boul. René-Lévesque O. 32e étage, Montréal QC H3B 1S6
T 514 847 1117 NEUFarchitectes.com

SCEAU Seal

ASSOCIATION OF ARCHITECTS ORDRE DES ARCHITECTES COUSINEAU LICENCE 6219

NEUF ARCHITECT(E)S

BRIGIL

CLIENT Client

OUVRAGE Project

PETRIE'S LANDING BLOCK 6, 7 & 8

EMPLACEMENT Location
ORLEANS, ON

NO PROJET No.
10498.03

NO	RÉVISION	DATE (aa.mm.jj)
A	CITY VALIDATION	2016-12-15
B	Site plan revision	2017-03-27
C	Site Plan Application	2017-06-13
D	For client review	2017-09-20
E	Site plan control_1st review	2018-01-23
F	Site plan control_2nd review	2018-03-23
G	Issued for building permit	2018-06-01
H	Site Plan Application_3rd review	2018-06-06
J	Rev. angled parking & 3m setback	2018-07-16
K	Radius for parking island mod.	2018-07-17
L	Site Plan Application_4th review	2018-09-07
M	Site Plan_New Transformers	2018-11-14
1	Issued for construction Block 6	2019-03-19
2	Issued for foundation constr. Block 7	2019-10-08
3	Issued for Complete Construction BK7	2019-12-09
4	Parking added & table updated	2020-11-11

DESSINÉ PAR Drawn by
A.B.

VERIFIÉ PAR Checked by
ANT. C.

DATE (aa.mm.jj)
21.01.28

ÉCHELLE Scale
INDIQUÉE

TITRE DU DESSIN Drawing Title

Site Plan

RÉVISION Revision
4

NO. DESSIN Dwg Number
A100

Appendix F CITY COMMENTS AND RESPONSE LETTER

REVIEW COMMENTS (partial)

Zoning By-law amendment / Site Plan Control

Combined applications - File Nos. D02-02-19-0147 / D07-12-19-0212
8466 Jeanne-d'arc Boulevard North

Note:
- Comments provided are not complete
- Public information session to be held at a date to be determined
- Technical comments provided to you as received

ENGINEERING COMMENTS

Contact: William Curry
613-580-2424, ext. 16214
William.Curry@ottawa.ca

A. List of Drawing(s):

Site Plan, A-001, prepared by Rossmann Architecture, Project# 19-01, revision 5, dated December 13 2019.

A1. Provide appropriate clearance from the 2 Hydro Transformers and the proposed Building. Please, just confirm with a response that this has been considered and addressed.

A2. It is not clear how the common area of the roof terrace is protected from stationary Mechanical noise.

A3. Provide a Topographical Survey.

Notes and Legends, NL-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2020.

A4. Sewer bedding should be as per 6.4 of the Geotech.

Site Servicing Plan, **SSP-1,** prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019

A5. RAMP: Provide a Stormwater Backwater Valve as per Sewer Detail S18 and S17.

A6. Provide an ICD table on the plan. Include the Controlled roof Drains.

A7. STORM 1004 MH should have an s28.1 cover. Please revise.

A8. Your ICD table should include depth of ponding.

A9. Revise the water servicing to the building. You need a DMA chamber just inside the property line with a Proposed Water Meter (W32.1). Determine Chamber size. Consider one 203 mm Ø water service instead of two. The DMA, then a 200 or 150 to the building. Then a 100 off the building service

to the Siamese connection. Consider changing the location of the water service. See the sketch.

A10. Connect the proposed 200 mm Ø sanitary sewer to MH6a in the ROW. Adjust or modify the benching. Move the SAN MH 100, closer to the building up in the soft area beside the storm pipe.
Provide the above or provide the below:
Design Criteria: When a sewer connects to the mainline and it is equal or greater than half the Ø of the mainline sewer then you need to provide a new MH on the mainline sewer.

Grading Plan, GP-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019

A11. Please regrade along Jeanne d Arc Blvd from the property line to the back of sidewalk, positive drainage. No culvert pipes or ditches wanted. Tie into back of sidewalk. The current roadside ditch is almost non-existent all the way just past the hydrant. Regrade at least past the hydrant. Revise.

A12. You can't let block 7 drain to block 8. Are you prepared to have your client enter into a JUMA with CONDO Corp (Block 7) at their cost to accommodate water across 2 property owners, plus you will need an ECA as it services more than one property? Set grades so the surface water stays within Block 7 via a raised berm or curb on the property line….etc.. Coordinate with Landscaping requirements. Revise.

A13. The HP at the ramp entrance is deemed a building opening. A 300mm difference in the maximum 100 year ponding and the HP is required. 8.3.3.9 of the SDG. Please review and revise.

A14. Clearly show the slope of the ramp and say Heat Traced. Review and revise.

A15. The proposed major spill drainage to the Bellevue Creek was not part of the Master Drainage Plan.

A16. You are **not** permitted to spill proposed major flows to the Bellevue Creek. Remove the proposed rip-rap. Areas uncontrolled, will sheet flow there and appear to be small but you can't spill major flow there. Revise.

A17. Your Prestige Circle control spill point at the property line is 55.06 m. This means if you spill your 100 Year it means it must spill at 55.06 m to the ROW and not higher than the required 100-year ponding elevation. Review.
Consider spilling to Jeanne d Arc Blvd directly adjacent to one side of the Fire Hydrant via scupper…etc. Water would then be directed towards the creek via the small portion of the roadside ditch or swale that remains. Parking area must spill at 100-year to ROW, not higher. Rip-Rap would not be required as this would be infrequent spills. Review and revise.

A18. The toe wall requires structural details stamped by structural P. Eng. Please provide.

A19. What safety measures do you propose between the parking area and the chain-link fence. Maybe provide a detail section for clarity. Best I can tell is

there is approximately 3 metres difference in elevation between the top of parking curb and nearby chain-link fence. Review and revise.

Erosion Control Plan and Detail Sheet, EC/DS-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019

A20. Fix the line weights for the MUD MAT detail. Revise.
A21. Terrafix does not work with round frame and cover. Consider a Stormsock

Storm Drainage Plan, SD-1, prepared by Stantec Consulting Ltd., revision 0, dated December 12, 2019

A22. Revise to keep drainage from Block 7 separate from Block 8. Revise.

Sanitary Drainage Plan, SAN-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019

A23. No comments.

Landscape Plan, L1.01, prepared by Levstek Consultants Inc., revision 1, dated June 14, 2017

A27. Please show the 3 Hydro Transformers on your plan so that planting does not conflict.
A28. The proposed Snow storage will not be permitted on the steep bank. Please remove the text. Revise.
The proposed SOD between the fence and parking toe wall will be very difficult to reach or maintain. Consider changing this to River Stone with Filter Fabric or something that requires no access to maintain.

B. List of Report(s):

Site Servicing & Storm Water Management Brief, prepared by Stantec Consulting Ltd., Project # 160401331, dated December 13, 2019

B1. Revise the report to reflect the requested changes in the previous drawing comments.

Geotechnical Investigation – Proposed Multi-Storey Buildings, prepared by Paterson Group, Project # PG4112-1, dated May 24, 2017.

B2. No Comments.

“Please provide a resubmission which addresses each of the comments or issues listed above.

HYDRO ONE

Contact: Mark Beaudette
Supervising Distribution Engineering Technician
Orleans Ops Centre
Bell: 613-835-3686 Ext 3202
Cell: 613-913-2266
Fax: 613-835-9962
Email : mark.beaudette@hydroone.com

"Hi Evode
I have looked over this application and have some comments and concerns. Please advise the developer of these items.
Hydro One does have plant in the proximity of this project that must be respected. The drawings provided do not show all of Hydro Ones infrastructure. We have an overhead high voltage pole line crossing on Jeanne D'Arc North that feeds cables that supply transformers and Kiosks along the north edge of this project and then along the east side of Prestige Circle. All clearances to Hydro One equipment must follow Hydro One Standards and ESA rules. No grade changes shall be made within 1.5m of any of the kiosks, pole(s), anchor(s), or along the existing cable trench. Please ensure that no underground infrastructure is undermined or disturbed without Hydro Ones notification, approval, and inspection. I have attached some of the documents that the developer will need to determine and avoid conflicts. Locates must be obtained to ensure clearances and grading is not compromised where Hydro One plant exists. If bollard are required to protect Hydro Ones equipment, they shall be placed at the developers expense.

The developers landscape plan is showing trees in the vicinity of this equipment, so ESA guidelines to planting shall be observed which will affect the proposed trees in those locations. I have attached that document as well."

RVCA

Contact:
Jamie Batchelor, MCIP, RPP
Jamie.batchelor@rvca.ca

The RVCA has reviewed the above noted applications and offers the following comments for your consideration:

Natural Hazards

As part of the plan of subdivision process, the limit of hazard lands was delineated for the site adjacent Bellevue Creek. This was based on the report "Preliminary Geotechnical Investigation – Proposed Development, 8465 North Service Road, Ottawa, Ontario" dated August 3rd, 2005. The limit of hazard lands is shown on the site plan. The proposed development respects the previously approved setbacks for the

subdivision. However, we note that the report was completed nearly 15 years ago. Therefore, there is a potential for the conditions and assumptions to have changed since the original report. Prior to these applications moving forward, confirmation should be obtained that the findings in the original report are still valid.

We will defer any comments in relation to the chosen Seismic Class to the City to determine its appropriateness.

Natural Heritage

The required setbacks from Bellevue Creek were established as part of the draft plan of subdivision. Therefore the Conservation authority has no further comments in that regard.

Conservation Authority Regulations

A portion of the property including the area in which the proposed tower is within the RVCA's regulation limit. Therefore, the prior written approval of the RVCA will be required under Ontario Regulation 174/06 "*Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation*" under Section 28 of the *Conservation Authorities Act*.

Conclusion

While the Conservation Authority has no objections to these applications in principle, confirmation from a P.Eng that the slope stability considerations in the original report are still valid should be provided prior to these applications moving forward.

RESIDENTS' COMMENTS (summary) - sic -

- Owners on Prestige Circle all bought their condos with the understanding, sold to them by Brigil, that Prestige Circle, when finished, would consist of eight buildings, seven of them condo residences and the eighth a retirement residence on the corner at 8466 Jeanne d'Arc.

  Brigil's proposal claims that market changes have made their requested rezoning necessary. There may be a business case for that, but it is not consistent with prior sales pitches, with purchases made in good faith, and with legitimate rights of existing residents, all of which trump a developer's commercial self-interest

- I … and object to *"increase the number of residents in the broader development beyond the the density limit*" as is proposed for the development at 8466 Jeanne-d'arc Blvd N (better known as Prestige Circle.

The traffic and congestion is mounting with every development and there are a number of lots still to be built along Jeanne D'Arc N.

At present the noise is borderline acceptable.

I fear that more residents coupled with increases in student numbers from the Cité Collégiale, driving to and parking along the road and wherever they can, the traffic noise will become unbearable. NOT WHAT WE BOUGHT INTO!

- My property backs onto Jeanne-d'Arc Blvd. North and as such I will be directly impacted by the proposed building. This company's plan to increase the unit density and to reduce the road setback requirements came as a complete shock. For some time, there has been a sign at the building site showing plans for a four storey retirement residence. This would fit in with the rest of the units that have been built on Prestige Circle.

- Increasing the unit density at this site would have a negative impact on road traffic, noise, light and views. It is not in keeping with the protection of wildlife and the development of the recreation trails that border the Ottawa River. A single tower, at the entrance of the development does not make sense from a visual perspective.

- My house has a setback which follows city guidelines. I am sure these rules are in place for many reasons (traffic safety, snow removal, drainage to name a few). Why would this developer be exempted from following established rules?

- Owners and investors bought into this development on the basis of a City of Ottawa approved site development plan. To approve this dramatic change at the last minute is unfair to the existing owners and residents and breaks the implicit contract under which they made their investment. It essentially means that a City Of Ottawa approved site development plan is a worthless document on which to make a decision.
- The proposed ten story apartment building is out of proportion to the existing and planned development by a factor of 250%. This substantially and negatively changes the character and appearance of this neighborhood. In particular, my property in deep shade summer and winter.

  I believe this building will negatively affect the value of the my units.

- the amended zoning proposal of December 2019 is far too drastic a change for this site

- there will be a major impact on the volume of traffic if we allow for an increase in unit density. Homeowners in the Parkrose neighbourhood purchased their properties to be close to nature and to enjoy a peaceful, tranquil way of living.

There will be an increase in noise created by traffic as well as by the heating and cooling systems and maintenance vehicles servicing the apartment building

- increase in the number of units and subsequently residents would also significantly increase noise nuisances in the neighbourhood

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Planning comments will be provided later.

Evode Rwagasore

Evode.Rwagasore@ottawa.ca

613-580-2424, ext. 16483

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue, Ottawa ON K2C 3G4

March 25, 2021
File: 160401331

Attention: Will Curry
City of Ottawa
Planning, Infrastructure and Economic Development

Dear Will Curry,

Reference: Petries Landing Block 8 Submission 1 (D02-02-19-0147 / D07-12-19-0212) City Comments and Response Civil

Below is a summary of the comments received from the City of Ottawa, Geotechnical, Landscape comment responses will be under separate cover.

List of Drawing(s):

Site Plan, A-001, prepared by Rossmann Architecture, Project# 19-01, revision 5, dated December 13 2019.

A1. Provide appropriate clearance from the 2 Hydro Transformers and the proposed Building. Please, just confirm with a response that this has been considered and addressed.
(Stantec, March 2021): Clearance is ok as per table 1B Minimum horizontal clearances prepared by Hydro One, a minimum of 1m to 3m clearance is required from the building. There is over 4.5m clearance provided.

A2. It is not clear how the common area of the roof terrace is protected from stationary Mechanical noise.
(Stantec, March 2021): This will be provided as part of noise study report.

A3. Provide a Topographical Survey.
(Stantec, March 2021): Will be provided.

Notes and Legends, NL-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2020.

A4. Sewer bedding should be as per 6.4 of the Geotech.
(Stantec, March 2021): Revised to include reference to Geotech report.

Site Servicing Plan, SSP-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019.

A5. RAMP: Provide a Stormwater Backwater Valve as per Sewer Detail S18 and S17.
(Stantec, March 2021): this will be part of the building design and not connected to the external storm system. The building storm sewer connection will have a backwater valve.

Reference: **Petries Landing Block 8 Submission 1 (D02-02-19-0147 / D07-12-19-0212) City Comments and Response Civil**

A6. Provide an ICD table on the plan. Include the Controlled roof Drains.
(Stantec, March 2021): Tables have been added to the drawings.

A7. STORM 1004 MH should have an s28.1 cover. Please revise.
(Stantec, March 2021): Storm configuration has changed from original design and comment is no longer applicable.

A8. Your ICD table should include depth of ponding.
(Stantec, March 2021): Additional information has been added to the table

A9. Revise the water servicing to the building. You need a DMA chamber just inside the property line with a Proposed Water Meter (W32.1). Determine Chamber size. Consider one 203 mm Ø water service instead of two. The DMA, then a 200 or 150 to the building. Then a 100 off the building service to the Siamese connection. Consider changing the location of the water service. See the sketch.
(Stantec, March 2021): Water servicing has been revised.

A10. Connect the proposed 200 mm Ø sanitary sewer to MH6a in the ROW. Adjust or modify the benching. Move the SAN MH 100, closer to the building up in the soft area beside the storm pipe.
Provide the above or provide the below:

- Design Criteria: When a sewer connects to the mainline and it is equal or greater than half the Ø of the mainline sewer then you need to provide a new MH on the mainline sewer.
(Stantec, March 2021): Connection has been made to MH 6A. Benching note has been added.

Grading Plan, GP-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019.

A11. Please regrade along Jeanne d Arc Blvd from the property line to the back of sidewalk, positive drainage. No culvert pipes or ditches wanted. Tie into back of sidewalk. The current roadside ditch is almost non-existent all the way just past the hydrant. Regrade at least past the hydrant. Revise.
(Stantec, March 2021): Acknowledged, ditch will be filled in across the frontage as requested. Culverts will be removed. Hydrant flange will be adjusted as necessary.

A12. You can't let block 7 drain to block 8. Are you prepared to have your client enter into a JUMA with CONDO Corp (Block 7) at their cost to accommodate water across 2 property owners, plus you will need an ECA as it services more than one property? Set grades so the surface water stays within Block 7 via a raised berm or curb on the property line….etc.. coordinate with Landscaping requirements. Revise.
(Stantec, March 2021): Cut off swale added to control flow from Block 7 flowing across Block 8.

A13. The HP at the ramp entrance is deemed a building opening. A 300mm difference in the maximum 100 year ponding and the HP is required. 8.3.3.9 of the SDG. Please review and revise.

Reference: **Petries Landing Block 8 Submission 1 (D02-02-19-0147 / D07-12-19-0212) City Comments and Response Civil**

(Stantec, March 2021):Design has been revised to provide adequate freeboard from the maximum 100yr ponding elevation.

A14. Clearly show the slope of the ramp and say Heat Traced. Review and revise.
(Stantec, March 2021): Slopes have been added to the U/G parking ramp. Reference to ramp being heated has been added to the drawings.

A15. The proposed major spill drainage to the Bellevue Creek was not part of the Master Drainage Plan.
(Stantec, March 2021): Due to proposed site layout and grading restrictions to match existing grades along Prestige Circle, emergency overland flows from the site will be directed to the creek. However, as mentioned above these will only occur during extremen storm events (i.e. above 100-year storm) and/or during emergency situations (i.e. catchbasin is clogged).

A16. You are not permitted to spill proposed major flows to the Bellevue Creek. Remove the proposed rip-rap. Areas uncontrolled, will sheet flow there and appear to be small but you can't spill major flow there. Revise.
(Stantec, March 2021): The major system overland flow spill from parking areas F1001A and F1001B will only occur during extreme storm events above the 100-year storm or under emergency conditions (i.e., 100-year peak flows will be contained on-site). Emergency overland flows from the site cannot be redirected to the street due to grading constraints.

A17. Your Prestige Circle control spill point at the property line is 55.06 m. This means if you spill your 100 Year it means it must spill at 55.06 m to the ROW and not higher than the required 100-year ponding elevation. Review.
(Stantec, March 2021): The site plan has been revised and this comment no longer applies.
Consider spilling to Jeanne d Arc Blvd directly adjacent to one side of the Fire Hydrant via scupper…etc. Water would then be directed towards the creek via the small portion of the roadside ditch or swale that remains. Parking area must spill at 100-year to ROW, not higher. Rip-Rap would not be required as this would be infrequent spills. Review and revise.
(Stantec, March 2021): Back parking lot has been removed from site plan. The site will sheet drain as it does naturally with a smaller area contributing flow to the creek.

A18. The toe wall requires structural details stamped by structural P. Eng. Please provide.
(Stantec, March 2021): Noted, stamped designs will be provided prior to final site plan approval.

A19. What safety measures do you propose between the parking area and the chain-link fence. Maybe provide a detail section for clarity. Best I can tell is there is approximately 3 metres difference in elevation between the top of parking curb and nearby chain-link fence. Review and revise.
(Stantec, March 2021): Handrails will be added around the parking structure where grade difference is greater than 0.60m.

Reference: **Petries Landing Block 8 Submission 1 (D02-02-19-0147 / D07-12-19-0212) City Comments and Response Civil**

Erosion Control Plan and Detail Sheet, EC/DS-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019

A20. Fix the line weights for the MUD MAT detail. Revise.
(Stantec, March 2021): Revised.

A21. Terrafix does not work with round frame and cover. Consider a Stormsock
(Stantec, March 2021): Stormsock detail has been added to drawings and called out on the plans where the Terrafix product does not work.

Storm Drainage Plan, SD-1, prepared by Stantec Consulting Ltd., revision 0, dated December 12, 2019

A22. Revise to keep drainage from Block 7 separate from Block 8. Revise.
(Stantec, March 2021): Cutoff swale has been added to maintain drainage to respective Blocks

Sanitary Drainage Plan, SAN-1, prepared by Stantec Consulting Ltd., revision 0, dated December 13, 2019.

A23. No comments.

B. List of Report(s):

Site Servicing & Storm Water Management Brief, prepared by Stantec Consulting Ltd., Project # 160401331, dated December 13, 2019

B1. Revise the report to reflect the requested changes in the previous drawing comments.
(Stantec, March 2021): The report has been revised accordingly.

Regards,

Stantec Consulting Ltd.

Kris Kilborn
Senior Associate, Community Development

Phone: (613) 724-4337
Fax: (613) 722-2
kris.kilborn@stantec.com

Appendix G DRAWINGS