Servicing Report – 3368 Carling Avenue

Project # 160401218

Prepared for:
Cardel Developments Ltd.

Prepared by:
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Sign-off Sheet

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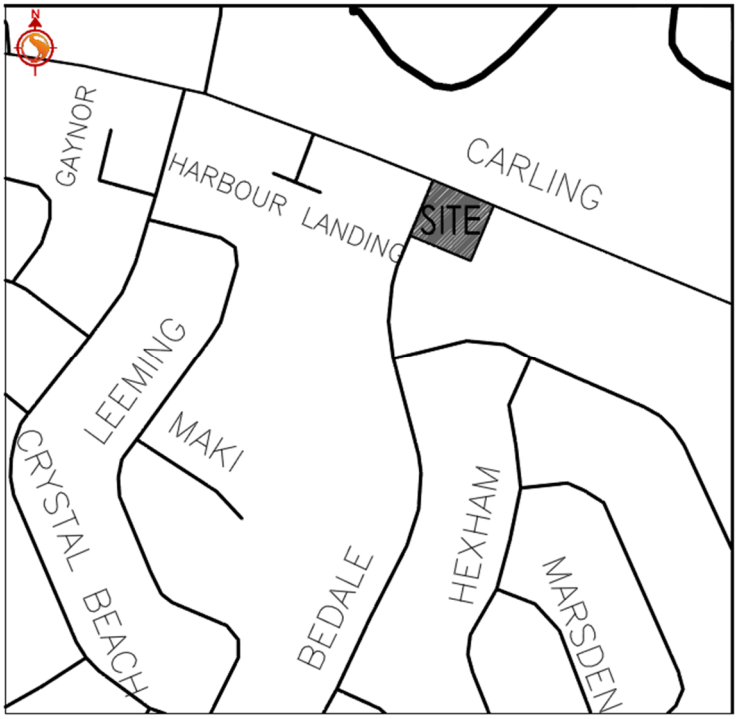
1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Cardel Developments Ltd. to prepare a servicing study in support of Site Plan Control submission of the proposed development located at 3368 Carling Avenue. The proposed development has been modified from past submissions to incorporate additional room for a hydro transformer pad located at the southwest of the property, and to address existing service laterals from the adjacent building at 3364 Carling that had previously passed through the development via easement at the southerly property line. Existing services to 3364 Carling have been removed based on prior correspondence with Cardel (see **Appendix E**). Service lateral stubs for the proposed development were previously installed for the development concurrently with reconstruction of the Bedale Drive sanitary sewer during 2016-2018.

The site is situated on the south side of Carling Avenue and southeast of the intersection of Bedale Drive and Carling Avenue within the City of Ottawa. The proposed infill development would replace an existing commercial property with a three-storey apartment complex comprising 15 total residential units, as well as one level of underground parking. The conceptual site development plan used for the purpose of this servicing brief is shown as **Figure 1**. The 0.101ha (0.249 acre) site was previously occupied by a single storey brick dwelling which has been previously demolished, and associated asphalt parking areas. The site is presently zoned Local Commercial, which permits the proposed development plan. 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 per consultation with City of Ottawa staff.

Figure 1: Location Plan



2.0 BACKGROUND

Documents referenced in preparation of the design for the 3368 Carling Avenue development include:

- Geotechnical Investigation – Proposed Multi-Storey Building – 3368 Carling Avenue, Patersongroup Consulting Engineers, January 6, 2015.
- Crystal Beach Drive Sanitary Sewer Construction (Drawings – As-built), Stantec Consulting Ltd., September 21, 2018.
- City of Ottawa Sewer Design Guidelines, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines – Water Distribution, City of Ottawa, July 2010.

3.0 WATER SUPPLY SERVICING

3.1 BACKGROUND

The proposed development comprises one three storey residential apartment building, complete with associated infrastructure and access areas. The site is located on the south side of Carling Avenue and southeast of the intersection with Bedale Drive. The site will be serviced via a previously installed 100mm building service connection to the existing 150mm dia. watermain within the Bedale Drive ROW at the western boundary of the site. The property is located within the City's Pressure Zone 1W. Ground elevations of the site are approximately 64.7m. Under normal operating conditions, hydraulic gradelines vary from approximately 105.4m to 117.6m as confirmed through boundary conditions as provided by the City of Ottawa (see **Appendix A.3**).

3.2 WATER DEMANDS

Water demands for the development were estimated using the Ministry of Environment's Design Guidelines for Drinking Water Systems (2008). A daily rate of 350 L/cap/day has been applied for the population of the proposed site. Population densities have been assumed as 1.8 pers./unit based on an average apartment unit layout. See **Appendix A.1** for detailed domestic water demand estimates.

The average day demand (AVDY) for the entire site was determined to be 0.11 L/s. The maximum daily demand (MXDY) is 2.5 times the AVDY (residential property), which equals 0.27 L/s. The peak hour demand (PKHR) is 2.2 times the MXDY, totaling 0.60 L/s.

Wood frame construction (structure entirely combustible) was considered in the assessment for fire flow requirements. No sprinkler system was assumed for construction of the proposed building. As no on-site private watermain is proposed, fire flow requirements were based on Office of the Fire Marshal (OFM) guidelines in support of the Ontario Building Code (OBC). Based on calculations per the OFM Guidelines (**Appendix A.2**), the maximum required fire flows for this development are 105 L/s (6,300L/min).

3.3 PROPOSED SERVICING

Per the boundary conditions provided by the City of Ottawa (based on a conservative fire flow demand of 13,000L/min), and based on an approximate elevation on-site of 64.7m, adequate domestic flows are available for the subject site, with pressures ranging from 40.7m (58 psi) to 52.9m (75 psi). This pressure range is within the guideline of 50-80 psi based on Ottawa's Design Guidelines for Water Distribution.

Boundary conditions for the proposed development under maximum day demands and fire flow requirements per the OFM methodology demonstrate that the system will maintain a residual pressure of approximately the required 140 kPa (20 psi). The above demonstrates that the existing watermain within Carling Avenue can provide adequate fire flows at or in excess of flow requirements for the subject site.

An existing hydrant is located approximately 70m east of the subject site on Carling Avenue, and a second hydrant is located on the west side of Bedale Drive within 35m of the proposed building's primary entrance. Both hydrant locations are within 90m per City of Ottawa standards.

3.4 SUMMARY OF FINDINGS

The proposed development is located in an area of the City's water distribution system that has sufficient capacity to provide both the required domestic and emergency fire flows. Based on boundary conditions as provided by City of Ottawa staff, fire flows are available for this development based on OFM guidelines and as per the City of Ottawa water distribution guidelines.

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The site will be serviced via a 600mm diameter sanitary sewer within Bedale Drive installed as part of recent infrastructure upgrades to the Crystal Beach area. The 600mm diameter sewer replaced a 375mm sanitary main situated within the Bedale Drive ROW at the western boundary of the site (see **Drawing SSP-1**). A 150mm connection to the 600mm diameter sewer was made available for the subject site as part of the reconstruction of sewers within the Bedale Drive ROW. It is proposed to connect to the existing 150mm diameter service lateral to service the proposed site.

4.2 DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP's 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 – 2.5m

4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 0.38 L/s with allowance for infiltration) to the proposed 600mm dia sanitary sewermain on Bedale Drive. The proposed drainage pattern is detailed on **Drawing SSP-1**. A sanitary sewer design sheet for the proposed service lateral is included in **Appendix B.1**. A backwater valve is to be installed on the proposed sanitary service within the site and on all sanitary branches in the underground parking level to prevent any surcharge from the downstream sanitary sewer from impacting the proposed property.

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The objective of this stormwater management plan is to determine the measures necessary to control the quantity/quality of stormwater released from the proposed development to criteria established during the pre-consultation/zoning process, and to provide sufficient detail for approval and construction.

5.2 SWM CRITERIA AND CONSTRAINTS

Criteria were established by combining current design practices outlined by the City of Ottawa Design Guidelines (2012), and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

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

Storm Sewer & Inlet Controls

- Size storm sewers to convey 5 year storm event under free-flow conditions using City of Ottawa I-D-F parameters (City of Ottawa).
- Quality/quantity control requirements for site discharge were not identified as a requirement for the subject site, provided discharge rates do not increase dramatically in the post-development scenario (City of Ottawa, RVCA).
- Proposed site to discharge to the existing 300mm diameter storm sewer within the Bedale Drive ROW at the western boundary of the subject site (City of Ottawa).
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.30m above the 100-year water level (City of Ottawa)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.30m (City of Ottawa)
- Provide adequate emergency overflow conveyance off-site (City of Ottawa)

5.3 STORMWATER MANAGEMENT

The Modified Rational Method was employed to assess the rate and volume of runoff generated during post-development conditions. The site was subdivided into subcatchments (subareas) tributary to stormwater controls as defined by the location of inlet control devices. A summary of subareas and runoff coefficients is provided in **Appendix C**, and **Drawing SD-1** indicates the stormwater management subcatchments.

5.3.1 Allowable Release Rate

Based on consultation with City of Ottawa staff, restrictions on the peak post-development discharge rate from the subject site are not required should the post development peak flowrate not increase dramatically beyond the 5-year event pre-development scenario calculated with a maximum runoff coefficient of 0.5. The predevelopment release rate for the area has been determined using the rational method based on the criteria above. A time of concentration for the predevelopment area (10 minutes) was assigned based on the relatively small site and its proximity to the existing drainage outlet for the site. C coefficient values have been increased by 25% for the post-development 100-year storm event based on MTO Drainage Manual recommendations. Peak flow rates have been calculated using the rational method as follows:

Q = 2.78 CiA
Where: Q = peak flow rate, L/s
A = drainage area, ha
I = rainfall intensity, mm/hr (per Ottawa IDF curves)
C = site runoff coefficient

Table 1: Target Release Rate

Design Storm	Target Flow Rate (L/s)
5-Year Event	14.5

5.3.2 Storage Requirements

It is proposed that rooftop storage via restricted roof release be used to reduce site peak outflow to reduce the impact on downstream infrastructure.

5.3.2.1 Rooftop Storage

It is proposed to retain stormwater on the building rooftops by installing restricted flow roof drains. The following calculations assume the roof will be equipped with standard Watts Model R1100 Accuflow Roof Drains.

Watts Drainage "Accutrol" roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the "Accutrol" weir has been used as an example only, and that other products may be specified for use, provided that the total roof drain 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. Proposed drain release rates have been calculated based on the Accutrol weir setting at ¼ open. Storage volume and controlled release rate are summarized in **Table 2**:

Table 2: Roof Control Area

Design Storm	Depth (mm)	Discharge (L/s)	Volume Stored (m^3)
5-Year	107	2.5	7.4
100-Year	147	2.5	18.6

5.3.2.2 Uncontrolled Release

The balance of the site is proposed to either drain to unrestricted catchbasins on-site, or release uncontrolled to the adjacent ROW tributary to the 300mm outlet sewer within the Bedale Drive ROW.

Table 3 summarizes the estimated uncontrolled storm release rates during the 5 and 100 year storm events.

Table 3: 5 and 100 Year Peak Uncontrolled Discharge Summary

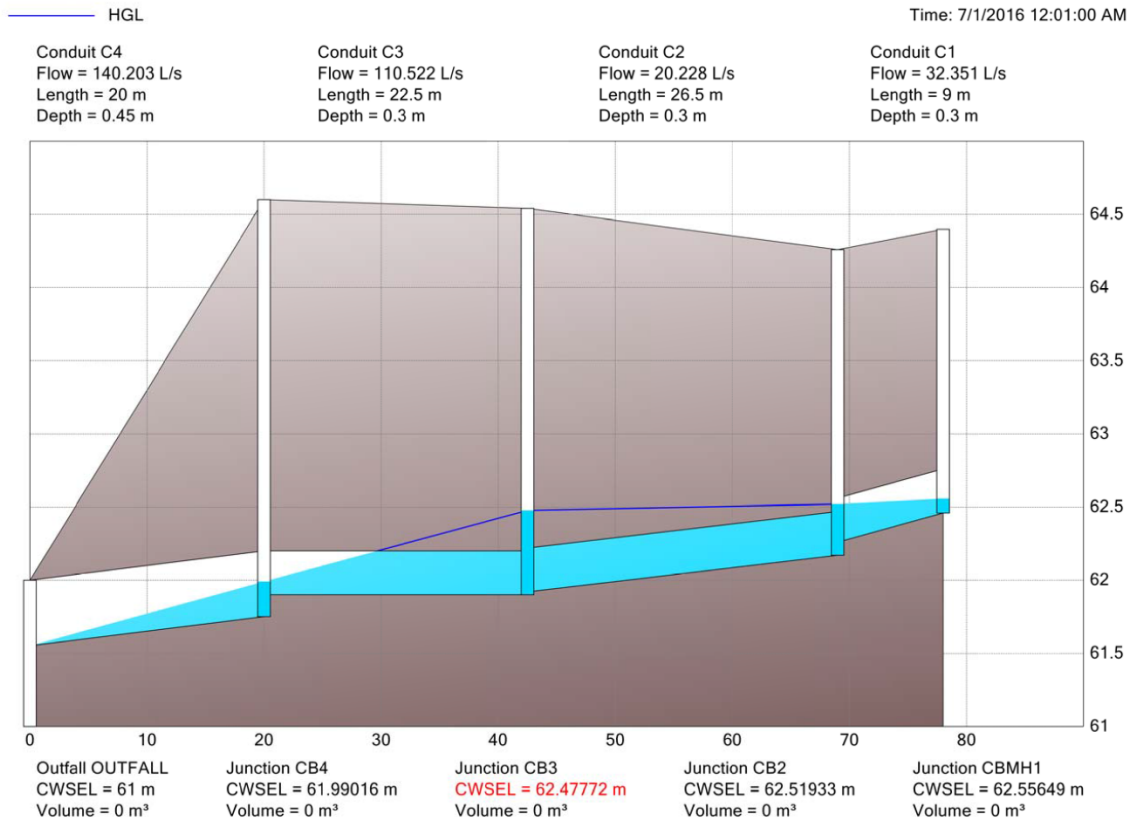
Drainage Area	5-Year Event Discharge (L/s)	100-Year Event Discharge (L/s)
UNC-1	6.9	14.9

5.3.3 Downstream Infrastructure

Although a peak outflow target for the site has not been set, it is required that peak discharge from the site will not have deleterious effect on the downstream 300mm storm sewer within Bedale up to its ultimate outlet north of Carling Avenue to the Ottawa River. External drainage areas for each downstream structure have been conservatively approximated based on topographical mapping for the area, as well as approximate location of downstream structures and adjacent buildings. As the downstream pipe crossing at Carling Avenue has been demonstrated on as-built drawings as being installed at 0% slope, a PCSWMM model of the receiving sewer was created to simulate a pressure flow scenario for the sewer. Inflows were modeled as constant baseline for each structure without inlet restriction as determined for the

peak discharge during the 100-year storm event and calculated by the rational method for each subarea. Refer to PCSWMM model input and output files included as part of **Appendix C** for details.

Figure 2: 100-Year Event HGL of Receiving Sewer



5.3.4 Results

Table 4 demonstrates that the proposed stormwater management plan provides adequate attenuation storage and demonstrates a minor increase (2.9L/s) beyond the pre-development 5-year storm peak discharge rate.

Table 4: Summary of Total 5 and 100-Year Event Release Rates

	5-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled	6.9	14.9
Roof	2.5	2.5
Total	**9.5**	**17.4**
Pre-Development (5yr, C=0.5)	**14.5**	**14.5**

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.101ha in area. The site slopes gently from southeast to northwest, with grades at property corners varying by approximately 0.4m across the site. Overland flow is generally being directed to the adjacent Bedale Drive ROW, which slopes from north to south at the boundary of the subject site. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy any stormwater management requirements, adhere to permissible grade raise restrictions (see **Section 10.0**) for the site, and provide for minimum cover requirements for storm and sanitary sewers where possible. A series of retaining walls have been proposed to account for grade change across the property to incorporate private terraces. Building entrance elevations vary, and are controlled by internal staircases/landings. Existing grades at the rear of the property have been maintained. Site grading has been established to provide emergency overland flow routes required for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes for flows deriving from storm events in excess of the maximum design event to the existing Carling Avenue and Bedale Drive ROWs as depicted in **Drawing GP-1.**

7.0 UTILITIES

As the subject site lies within a developed residential community, Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the proposed site. Exact size, location and routing of utilities, along with determination of any off-site works required for redevelopment, will be finalized after design circulation.

8.0 APPROVALS

It is not expected that Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act will be required by the Ontario Ministry of Environment (MOECC), as the proposed sewers will be approved under the building code act. Correspondence with the Rideau Valley Conservation Authority (RVCA) has confirmed that no quality control requirements for stormwater discharge will be required for the subject site. The Rideau Valley Conservation Authority will need to be consulted in order to obtain municipal approval for site development.

Requirement for a MOE Permit to Take Water (PTTW) may be required as a result of excavation for below grade parking. The geotechnical consultant shall confirm at the time of application requirements for any such PTTW.

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.

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

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

Refer to **Drawing EC-1** for the proposed location of silt fences, straw bales and other erosion control structures.

10.0 GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL ASSESSMENT

A geotechnical Investigation Report was prepared by Patersongroup on January 6, 2016. 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.

A subsurface investigation was conducted and concluded that the site is underlain by a native silty clay layer extending to depths of 10.7m to 12.2m below ground surface. Bedrock was encountered within 14.8m to 15.8m below ground surface. Groundwater elevations vary on site between 3.2m and 4.5m below ground surface. Grade raise fill restrictions across the site have been established at 1.5m. The grade raise restrictions were accounted for in the grading design of the property. Refer to Report #PG3682-1 for additional Geotechnical information.

The required pavement structure for proposed hard surfaced areas are outlined in **Table 5 and Table 6** below:

Table 5: Pavement Structure – Car Only Parking Areas

Thickness (mm)	Material Description
50	Wear Course – 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 6: Pavement Structure – Access Lanes

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

Based on the supplied boundary conditions for existing watermains and estimated domestic and fire flow demands for the subject site, it is anticipated that the proposed servicing in this development will provide sufficient capacity to sustain both the required domestic demands and emergency fire flow demands of the proposed site. Fire flows greater than those required per the OFM Guidelines are available for this development.

11.2 SANITARY SERVICING

The proposed sanitary sewer network is sufficiently sized to provide gravity drainage of the site. The proposed site will be serviced by a gravity sewer service lateral which will direct wastewater flows (approx. 0.38 L/s) to a 600mm dia. sanitary sewer to be constructed within the Bedale Drive ROW at the western boundary of the property. The proposed drainage outlet has sufficient capacity to receive sanitary discharge from the site based on pre-consultation through City of Ottawa staff, and through design of the off-site infrastructure improvements within the Crystal Beach area.

11.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa. An on-site storage pipe has been proposed to limit peak storm sewer inflows to downstream combined sewers to predevelopment levels as determined by City of Ottawa staff. The downstream receiving sewer has sufficient capacity to receive runoff volumes from the site based on a PCSWMM model developed for the downstream receiving sewer.

11.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the grade raise restrictions recommended in the Geotechnical Investigation Report prepared by Patersongroup on January 6, 2016. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

11.5 UTILITIES

Utility infrastructure exists within the existing Carling Avenue and Bedale Drive ROWs at the northern and western boundaries of the proposed site. It is anticipated that existing infrastructure

will be sufficient to provide a means of distribution for the proposed site. Exact size, location and routing of utilities will be finalized after design circulation.

11.6 APPROVALS/PERMITS

An MOE Environmental Compliance Approval is not expected to be required for the subject site as the on-site sewers are subject to the Building Code. A Permit to Take Water is anticipated to be required for pumping requirements for subsurface parking excavation. The Rideau Valley Conservation Authority will need to be consulted in order to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.