

**Servicing Report – 404 Daly
Avenue**

Project # 160401255



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Zeyer Developments Ltd.

Prepared by:
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Sign-off Sheet

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Table of Contents

1.0	INTRODUCTION	1.1
2.0	BACKGROUND.....	2.2
3.0	WATER SUPPLY SERVICING	3.3
3.1	BACKGROUND.....	3.3
3.2	WATER DEMANDS	3.3
3.3	PROPOSED SERVICING	3.3
3.4	SUMMARY OF FINDINGS	3.4
4.0	WASTEWATER SERVICING	4.5
4.1	BACKGROUND.....	4.5
4.2	DESIGN CRITERIA.....	4.5
4.3	PROPOSED SERVICING	4.5
5.0	STORMWATER MANAGEMENT.....	5.1
5.1	OBJECTIVES.....	5.1
5.2	SWM CRITERIA AND CONSTRAINTS	5.1
5.3	STORMWATER MANAGEMENT	5.2
5.3.1	Allowable Release Rate	5.2
5.3.2	Storage Requirements	5.3
5.3.3	Results.....	5.4
6.0	GRADING AND DRAINAGE	6.5
7.0	UTILITIES.....	7.1
8.0	APPROVALS.....	8.1
9.0	EROSION CONTROL DURING CONSTRUCTION	9.1
10.0	GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL ASSESSMENT	10.1
11.0	CONCLUSIONS.....	11.2
11.1	WATER SERVICING	11.2
11.2	SANITARY SERVICING	11.2
11.3	STORMWATER SERVICING.....	11.2
11.4	GRADING.....	11.2
11.5	UTILITIES	11.2
11.6	APPROVALS/PERMITS	11.3

SERVICING REPORT – 404 DALY AVENUE

LIST OF TABLES

Table 1: Target Release Rates5.3
Table 2: Roof Control Area5.3
Table 4: Summary of Total 5 and 100 Year Event Release Rates5.4
Table 5: Pavement Structure – Car Only Parking Areas10.1
Table 6: Pavement Structure – Access Lanes.....10.1

LIST OF FIGURES

Figure 1: Location Plan 1.1

LIST OF APPENDICES

APPENDIX A WATER SUPPLY SERVICING A.1
A.1 Domestic Water Demand Estimate A.1
A.2 Fire Flow Requirements Per FUS..... A.2
A.3 Boundary Conditions A.3

APPENDIX B WASTEWATER SERVICING B.4
B.1 Sanitary Sewer Design Sheet.....B.4

APPENDIX C STORMWATER MANAGEMENT C.5
C.1 Storm Sewer Design Sheet C.5
C.2 Rational Method Calculations..... C.6

APPENDIX D GEOTECHNICAL INVESTIGATION D.7

APPENDIX E DRAWINGS..... E.8

SERVICING REPORT – 404 DALY AVENUE

Introduction
August 10, 2018

1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Zeyer Developments Inc to prepare a servicing study in support of Site Plan Control submission of the proposed development located at 404 Daly Avenue. The site is situated southwest of the intersection of Charlotte Street and Daly Avenue within the City of Ottawa. The proposed infill development would replace a vacant property with a four-storey apartment unit comprising 16 total residential units. The conceptual site development plan used for the purpose of this servicing brief is shown as **Figure 1**. The 0.061ha (0.15 acre) site is presently zoned residential fourth density, subzone T, 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



SERVICING REPORT – 404 DALY AVENUE

Background
August 10, 2018

2.0 BACKGROUND

Documents referenced in preparation of the design for the 404 Daly Avenue development include:

- Geotechnical Investigation – Proposed Residential Building – 404 Daly Avenue, Paterson Group Consulting Engineers, June 14, 2016.
- City of Ottawa Sewer Design Guidelines, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines – Water Distribution, City of Ottawa, July 2010.

SERVICING REPORT – 404 DALY AVENUE

Water Supply Servicing
August 10, 2018

3.0 WATER SUPPLY SERVICING

3.1 BACKGROUND

The proposed development comprises one four storey residential apartment building, complete with associated infrastructure and access areas. The site is located on the south side of Daly Avenue immediately west of the intersection with Charlotte Street. The site will be serviced via a 25mm building service connection to the existing 200mm dia. watermain within the Daly Avenue ROW at the northern boundary of the site. The property is located within the City's Pressure Zone 1W. Average ground elevations of the site are approximately 71.0m. Under normal operating conditions, hydraulic gradelines vary from approximately 117.8m to 105.4m 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 1.4 pers./single room unit and 2.1 pers./room for 2 bedroom units. See **Appendix A.1** for detailed domestic water demand estimates.

The average day demand (AVDY) for the entire site was determined to be 0.12 L/s. The maximum daily demand (MXDY) is 2.5 times the AVDY (residential property), which equals 0.31 L/s. The peak hour demand (PKHR) is 2.2 times the MXDY, totaling 0.69 L/s.

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 credit was applied. A credit was applied as the proposed building will be fully equipped with a sprinkler system designed to meet NFPA 13. Based on calculations per the FUS Guidelines (**Appendix A.2**), the minimum required fire flows for this development are 183.3 L/s (11,000L/min).

3.3 PROPOSED SERVICING

Per the boundary conditions provided by the City of Ottawa and based on an approximate elevation on-site of 71.0m, adequate flows are available for the subject site with pressures ranging from 34.4m (48.9 psi) to 46.8m (66.5psi). This pressure range is within the guidelines of 40-80 psi based on Ottawa's Design Guidelines for Water Distribution.

Using boundary conditions for the proposed development under maximum day demands and a fire flow requirement of 11,000L/min per the FUS methodology, it can be confirmed that the

SERVICING REPORT – 404 DALY AVENUE

Water Supply Servicing
August 10, 2018

system will maintain a residual pressure of approximately 41.2 psi; which is in excess of the required 140 kPa (20 psi). The above demonstrates that the existing watermain within Daly Avenue can provide adequate fire and domestic flows in excess of flow requirements for the subject site. An existing hydrant is located approximately 5m west of the subject site, and is within 90m of the proposed building and 45m of the building fire department connection per OBC requirements and 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 FUS guidelines and as per the City of Ottawa water distribution guidelines.

SERVICING REPORT – 404 DALY AVENUE

Wastewater Servicing
August 10, 2018

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The site will be serviced via an existing 375mm diameter sanitary sewer situated within the Daly Avenue ROW at the northern boundary of the site (see **Drawing SP-1**). It is proposed to make one 135mm diameter service lateral connection directly to the existing sewer to service the proposed site.

4.2 DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines (2012) and the MOE'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 – 350L/cap/day
- Peak Factor – 4.0 (Harmon's)
- Extraneous Flow Allowance – 0.28 l/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m
- Population density for single-room apartments – 1.8 pers./apartment
- Population density for multi-room apartments (dorms) – 1.0 pers./bedroom

4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 0.52 L/s with allowance for infiltration) to the existing 375mm diameter sanitary sewer. The proposed drainage pattern is detailed on **Drawing SP-1**. A Sanitary sewer design sheet for the proposed service lateral is included in **Appendix B.1**. Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property.

SERVICING REPORT – 404 DALY AVENUE

Stormwater Management
August 10, 2018

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)
- The proposed site is not subject to quality control criteria due to the small site size and land usage of the development (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).
- Site discharge rates for each storm event to be restricted to 5-year storm event pre-development rates with a maximum pre-development C coefficient of 0.5.
- Proposed site to discharge the existing 300mm diameter storm sewer within the Daly Avenue ROW at the northern 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).

SERVICING REPORT – 404 DALY AVENUE

Stormwater Management
August 10, 2018

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.15m 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, the peak post-development discharge from the subject site is to be limited to that of the 5-year event discharge under pre-development conditions, to a maximum discharge coefficient C of 0.5. Based on historical photographs for the region, the site was previously occupied by a large townhome/apartment building prior to 2014, with considerable coverage by impervious surfaces. As such, the predevelopment release rate for the area has been determined using the maximum discharge coefficient of 0.5. A time of concentration for the development 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

SERVICING REPORT – 404 DALY AVENUE

Stormwater Management
August 10, 2018

The target release rate for the site is summarized in **Table 1** below:

Table 1: Target Release Rates

Design Storm	Target Flow Rate (L/s)
All Events	8.83

5.3.2 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that rooftop storage via restricted roof release in combination with a 900mm diameter underground storage pipe and associated ICD be used to reduce site peak outflow to target rates.

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	102	1.59	4.2
100-Year	137	1.81	10.2

5.3.2.2 Subsurface Storage

Per the modified rational method calculations included as part of **Appendix C**, the remainder of the site is to be directed towards a proposed 900mm diameter storage pipe and storm catchbasin complete with an IPEX Tempest LMF model 80 ICD sized to meet the target peak discharge rate for the during the 100-year event. In order to control peak discharge from the

SERVICING REPORT – 404 DALY AVENUE

Stormwater Management
August 10, 2018

subject site to within target levels, storage has been provided within the catch basin structure and 900mm diameter storage pipe in the amount of approximately 1.9m³. Storage volume and controlled release rate are summarized below:

Table 3: Controlled Tributary Area (CB500)

Design Storm	Design Head (m)	Discharge (L/s)	Static Ponding Depth (m)	V _{required} (m ³)	V _{available} (m ³)
5-Year	0.37	3.5	0.00	0.71	1.86
100-Year	0.89	5.4	0.00	1.84	1.86

5.3.3 Results

Table 4 demonstrates the proposed stormwater management plan and demonstrates adherence to target peak outflow rates for the site.

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	1.54	3.23
Controlled - Roof	1.59	1.81
Controlled - Subsurface	3.51	5.38
Total	5.05	8.83
Target	8.83	8.60

*Note: Roof drains directed to subsurface storage pipe

SERVICING REPORT – 404 DALY AVENUE

Grading and Drainage
August 10, 2018

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.061ha in area. The topography across the site is relatively flat, and currently drains from south to north, with overland flow generally being directed to the adjacent Daly Avenue ROW. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, adhere to geotechnical recommendations (see **Section 10.0**) for the site, and provide for minimum cover requirements for storm and sanitary sewers where possible. Site grading has been established to provide emergency overland flow routes required for stormwater management 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 Daly Avenue as depicted in **Drawing GP-1**.

SERVICING REPORT – 404 DALY AVENUE

Utilities

August 10, 2018

7.0 UTILITIES

As the subject site lies within a mature developed residential community, Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available within subsurface plant in the Daly Avenue ROW, as well as via overhead pole line at the north side of Daly Avenue. 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

As the site will be under single private ownership, is not industrial in nature, and discharges to a pre-existing separated sewer system Ontario Ministry of Environment (MOECP) Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act are not expected to be a requirement for the development to proceed. 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) is unlikely for the site as the majority of proposed works are above the groundwater elevations shown in the geotechnical report. The geotechnical consultant shall confirm at the time of application that a PTTW is not required.

SERVICING REPORT – 404 DALY AVENUE

Erosion Control During Construction
August 10, 2018

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.

SERVICING REPORT – 404 DALY AVENUE

Geotechnical Investigation and Environmental Assessment
August 10, 2018

10.0 GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL ASSESSMENT

A geotechnical Investigation Report was prepared by Paterson Group on June 14, 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 stiff silty clay layer of 1.8 to 3.0m below ground surface overlaid by approximately 0.5m of topsoil and 1.3m of silty sand with clay fill. Bedrock is anticipated to lie within 15m to 25m below ground surface. Groundwater elevations are anticipated to occur between 2.5m and 3.5m below ground surface. Refer to Report #PG3833-LET.01 for additional Geotechnical information.

The required pavement structure for proposed hard surfaced areas are outlined in **Tables 5 and 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 FUS 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. 0.52 L/s) to the existing 375mm dia. sanitary sewer within the Daly Avenue ROW at the northern 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.

11.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa. Rooftop storage, subsurface storage, and controlled roof release has been proposed to limit peak storm sewer inflows to downstream storm sewers to predevelopment levels as determined by City of Ottawa staff. Additional BMPs such as permeable pavers and rain gardens may be installed as necessary to further mitigate peak discharge from the proposed site. The downstream receiving sewer has sufficient capacity to receive runoff volumes from the site based on pre-consultation through City of Ottawa staff.

11.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects any restrictions recommended in the Geotechnical Investigation Report prepared by Patersongroup on June 14, 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 overhead lines within the Daly Avenue ROW at the northern boundary 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.

SERVICING REPORT – 404 DALY AVENUE

Conclusions
August 10, 2018

11.6 APPROVALS/PERMITS

An MOE Environmental Compliance Approval is not expected to be required for the subject site as site will remain private, under single ownership, does not have an industrial component, and is to discharge to a pre-existing storm sewer outlet. A Permit to Take Water is not anticipated to be required for pumping requirements for service lateral/building footing installation. 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.