Servicing Report – 966 and 968 Fisher Avenue

Project # 160401198

Prepared for:
Toscano Land Corporation

Prepared by:
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March 8, 2018

Sign-off Sheet

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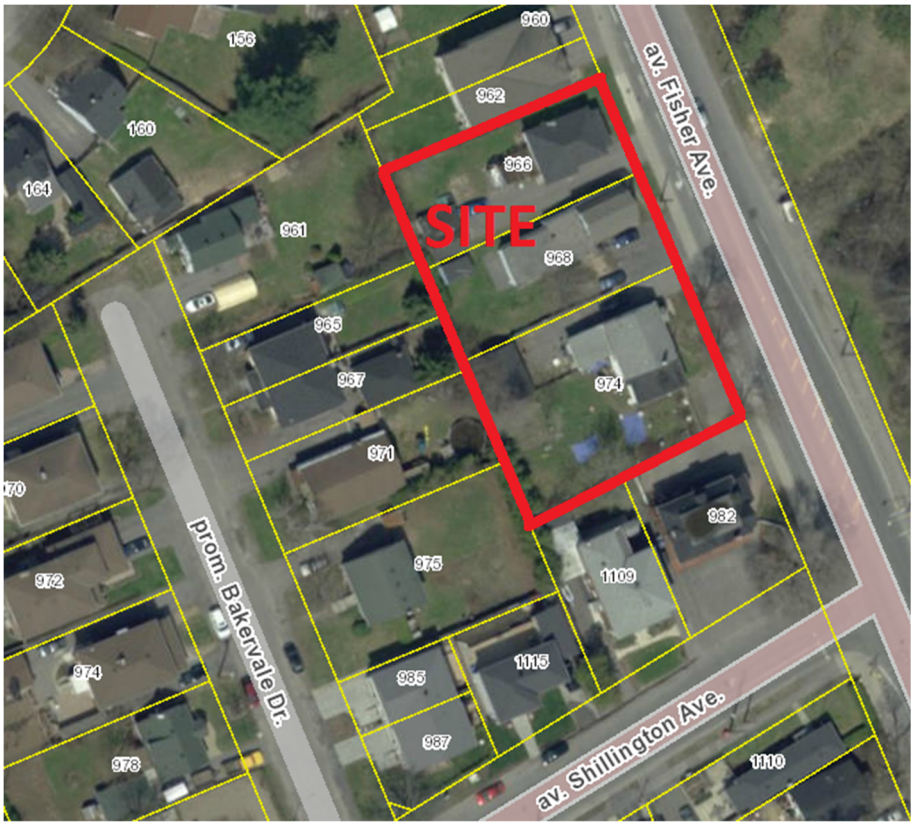
1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Toscano Land Corporation to prepare a servicing study in support of Site Plan Control submission of the proposed development located at 966 and 968 Fisher Avenue. The site is situated North of the intersection of Fisher Avenue and Shillington Avenue, on the west side of Fisher Avenue within the City of Ottawa as seen in **Figure 1**. The proposed infill development would replace an existing one storey and neighbouring two storey residential property with side by side three-storey apartment buildings comprising 38 total residential units. The 0.211ha (0.522 acre) site is currently occupied by two existing brick dwellings, and associated deck and amenity areas. The site is presently zoned residential second density, subzone F, and 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 826 High Street development include:

- Geotechnical Investigation – Proposed Residential Building – 826 High Street, Patersongroup Consulting Engineers, February 16, 2017.
- 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 two three storey residential apartment buildings, complete with associated infrastructure and access areas. The site is located north of the intersection of Fisher Avenue and Shillington Avenue on the west side of Fisher Avenue. The site will be serviced via one 50mm dia. building service connection per building (two total) to the existing 300mm dia. watermain within Fisher Avenue, each at a separate tie in location. The property is located within the City's Pressure Zone 2W. Ground elevations of the site are approximately 79.0m. Under normal operating conditions, hydraulic gradelines vary from approximately 120.6m to 137.3m 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./unit for single bedroom apartments and 2.1 pers./unit for two-bedroom apartments. See **Appendix A.1** for detailed domestic water demand estimates.

The average day demand (AVDY) for the entire site was determined to be 0.30 L/s. The maximum daily demand (MXDY) is 2.5 times the AVDY (residential property), which equals 0.76 L/s. The peak hour demand (PKHR) is 2.2 times the MXDY, totaling 1.67 L/s.

Ordinary 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 two-hour fire separation will be required on the northern side of the building and between the two proposed buildings to limit required fire flows. Based on calculations per the FUS Guidelines (**Appendix A.2**), the maximum required fire flows for this development are 167 L/s (10,000L/min).

3.3 PROPOSED SERVICING

Per the boundary conditions provided by the City of Ottawa and based on an approximate elevation on-site of 79.0m, adequate flows are available for the subject site with pressures ranging from 41.6m (59.15psi) to 58.3m (82.9psi). This pressure range is reaches above those listed by Ottawa's Design Guidelines for Water Distribution (40-80psi), as such, a pressure releasing valve will be required to stay within the designated pressure range per OBC requirements. No rehabilitation or reconstruction works are currently proposed by the City to decrease pressures in the region.

Using boundary conditions for the proposed development under maximum day demands and the calculated fire flow requirement of 10 000L/min per the FUS methodology, it can be confirmed that the system will maintain a residual pressure of 50.9psi, which is well above the required 140 kPa (20 psi). The above demonstrates that the existing watermain within Fisher Avenue can provide adequate fire and domestic flows in excess of flow requirements for the subject site. An existing hydrant is located approximately 25m southeast of the subject site northwest of the intersection of Fisher and Shillington Avenue, and is within 90m from the proposed building entrances.

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 with the added requirement of a pressure releasing valve. 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.

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The site will be serviced via an existing 225mm diameter sanitary sewer situated within the Fisher Avenue ROW at the northern boundary of the site (see **Drawing SP-1**). It is proposed to extend the sewer line into private property to avoid conflicts with existing storm sewers and underground utility plant in the region. The proposed buildings will make two 135mm diameter service lateral connections to the proposed sewer extension to service the proposed site.

4.2 DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines 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
- Apartment Population Density – 1.4 pers/unit (1 Bedroom)
- Apartment Population Density – 2.1 pers/unit (2 Bedroom)

4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 1.26 L/s with allowance for infiltration) to the existing 225mm diameter sanitary sewer. The proposed drainage pattern is detailed on **Drawing SP-1**. A sanitary sewer design sheet for the proposed sewer extension 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 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)
- The proposed site is not subject to quality control criteria due to the predominantly developed neighbourhood and distance from the storm sewer outfall (City of Ottawa).

Storm Sewer & Inlet Controls

- Size storm sewers to convey at minimum the 2 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 storm sewer within the Fisher Avenue ROW north 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 0.35m (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. 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

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	21.4

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 inlet-control devices in combination with subsurface pipe storage and surface sag storage 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 Areas (Buildings 1 and 2)

Design Storm	Depth (mm)	Discharge (L/s)	Volume Stored (m^3)
5-Year	97	1.56	4.4
100-Year	149	1.89	15.7

5.3.2.2 Surface/Subsurface Storage

It is proposed to detain stormwater within the rear amenity space tributary to a 600mm diameter HDPE superpipe and catchbasin equipped with an IPEX Type LMF 60 ICD to reduce peak outflow to the target rate from the proposed site. The catchbasin will release by gravity to the proposed 300mm diameter storm sewer to the north. Should the catchbasin discharge orifice become blocked, flows will spill from the catchbasin grate overland to the north of the property. It is proposed to maintain a separate building connection to the storm sewer for building foundation drains/weeping tile/roof leaders to ensure operation of the catchbasin does not impact perimeter drainage of the building foundation or pressurize internal plumbing.

The modified rational method was employed to determine the peak volume stored in the catchbasin & surface storage area. The Inlet control device was sized based on the available target release rate from the site during the 100-year storm event.

Table 3 summarizes the available surface and subsurface storage volumes available for the site.

Table 4 summarizes the estimated storm release rates and storage volumes during the 5 and 100 events.

Table 3: Available Storage Volumes

Storage Type	Area (m^2)	Depth (m) (Length for superpipe)	Volume (m^3)
Surface	75.3	0.15	3.8
Surface	50.2	0.15	2.5
Subsurface	0.283	18.0	5.1
		Total	**11.4**

Table 4: 5 and 100 Year Peak Surface Volume and Controlled Discharge Summary

Control Structure	ICD	5-Year Event			100-Year Event		
		Discharge (L/s)	Vrequired (m3)	Vavailable (m3)	Discharge (L/s)	Vrequired (m3)	Vavailable (m3)
CB	LMF 60	2.1	3.7	5.1	4.0	11.3	11.4

Outflows from the inlet control device (ICD) were designed based on head/discharge curves as provided by the manufacturer (IPEX). Downstream water levels were considered to be at the receiving sewer obvert immediately downstream of the proposed CB. Refer to calculations included as part of **Appendix C** for details.

5.3.3 Results

Table 5 demonstrates that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow rates for the site.

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

	5-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled	4.6	13.4
Controlled - Roof	3.2	3.8
Controlled –Subsurface	2.1	4.0
Total	**9.8**	**21.1**
Target	**21.4**	**21.4**

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.211 ha in area. The topography across the site is relatively flat, and currently drains from west to east, with overland flow roughly split between Fisher Avenue and rear yards to the southwest. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the 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. 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 based on existing drainage patterns as depicted in **Drawing GP-1.**

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. 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

Pre-consultation with Ontario Ministry of Environment (MOECC) staff concerning Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act is forthcoming. It is expected that a transfer of review submission ECA will be required for approval of the portion of the proposed storm sewer within Fisher Avenue. 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.

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 February 16, 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.

A subsurface investigation was conducted and concluded that the site is underlain by a loose silty sand to sandy silt followed by compact to dense glacial till. Bedrock is anticipated to lie within 5m to 10m below ground surface. Groundwater elevations are expected to occur below 2.5-3m in depth below ground surface, fluctuating seasonally. Grade raise fill restrictions were not identified as part of the geotechnical investigation. Refer to Report #PG4029-LET.01 for additional geotechnical information.

The required pavement structure for proposed hard surfaced areas are outlined in **Table 6 and Table 7** below:

Table 6: Pavement Structure – Parking Areas

Thickness (mm)	Material Description
50	Wear Course – Superpave 12.5 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 II material placed over in situ soil or fill.

Table 7: 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 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 with the addition of a pressure releasing valve. 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 via a proposed 200mm sanitary sewer extension by two gravity sewer service laterals (one per building) which will direct wastewater flows (approx. 1.26 L/s) to the existing 225mm dia. sanitary sewer on Fisher Avenue. 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. An on-site subsurface storage pipe, catchbasin and connected ICD has been proposed to limit peak storm sewer inflows to downstream storm 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 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 the grade raise restrictions recommended in the Geotechnical Investigation Report prepared by Patersongroup. 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 on Fisher where the site faces. 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 expected to be required for installation of the proposed storm sewers on Fisher Avenue. A Permit to Take Water is not anticipated to be required for pumping requirements for service lateral 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.