Longfields Block 13 Commercial Plaza – Servicing and Stormwater Management Report

Project #160401336



Prepared for: Campanale Homes

Prepared by: Stantec Consulting Ltd.

November 20, 2017

Sign-off Sheet

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Introduction November 20, 2017

1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Campanale Homes to prepare a servicing study in support of Site Plan Control submission of the proposed Block 13 commercial development located in the Longfields subdivision. The site is on the northeast corner of Campanale Avenue and Modugno Place within the City of Ottawa. The property location is indicated in **Figure 1**. The proposed commercial development comprises approximately 0.42ha of land, and is proposed to contain 15 commercial units. 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 background studies noted in **Section 2.0**, and as per consultation with City of Ottawa staff.

T N SITE

Figure 1: Site Location



Background November 20, 2017

2.0 BACKGROUND

Documents referenced in preparation of the design for the Longfields Block 13 Development include:

- Geotechnical Investigation Proposed Commercial Development Longfields Drive, Patersongroup Consulting Engineers, November 8, 2017.
- City of Ottawa Sewer Design Guidelines, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines Water Distribution, City of Ottawa, July 2010.
- Longfields Subdivision, Campanale Homes City of Ottawa, Stantec Consulting Ltd., May 2011.
- Campanale Homes- Longfields Development, City of Ottawa, Stormwater Management Report (Revision #1), Stantec Consulting Ltd., February 4, 2011.
- Review and Update of Serviceability Study (February 1993) for Longfields/Davidson Heights, Erion Associates, Stanley Consulting Group Ltd., Ainley Graham and Associates, February, 1998.
- Longfields and Davidson Heights Amendment and Update of 1993 Serviceability Study, City of Ottawa, March 2002.
- Servicing Report for Longfields Development City of Ottawa (Formerly City of Nepean), David McManus Engineering Ltd., June 2007.
- Knollsbrook / Longfields Pedestrian Walkway, City of Nepean, Design Brief, Stanley Consulting, July 22, 1998.



Water Supply Servicing November 20, 2017

3.0 WATER SUPPLY SERVICING

3.1 BACKGROUND

The proposed development comprises 15 commercial units in one building and associated above ground parking areas. The site is bound by the existing Campanale and Modugno Avenues. The site will be serviced via an existing 150mm watermain stub that extends off of the 250mm watermain along Campanale Avenue, at the north end of unit 15. The Longfields Subdivision was originally developed as part of the 2W2C pressure zone of Ottawa. Recent construction of the Barrhaven 3C feedermain is to create the new 3C pressure zone which includes the Longfields Subdivision Block 13, and is accounted for in the proposed design. Proposed ground elevations of the site vary from approximately 93.07m to 93.91m. Under normal operating conditions, hydraulic gradelines as part of the 2WC pressure zone vary from approximately 133m to 120.1m in the future scenario, hydraulic gradelines will vary from 142.1 to 146.8 as confirmed through boundary conditions as provided by the City of Ottawa (see **Appendix A.3**).

3.2 WATER DEMANDS

Water demand may be estimated based on the City of Ottawa Watermain Distribution Guidelines, July 2010:

Demand Type	Amount	Units
Shopping Centres	2,500	L/(1000m2/d)
Hospitals	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks no Hook-Ups	340	L/(space/d)
Trailer Parks with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed- space/d)
Hotels	225	L/(bed- space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

Table 1: Commercial and Institutional Demands



Water Supply Servicing November 20, 2017

The proposed development is a commercial building of unknown type, therefore the "Other Commercial" category will be applied to the 1570 sq.m building.

The average day demand (AVDY) for the entire site was determined to be 0.052 L/s, The maximum daily demand (MXDY) is 1.5 times the AVDY for commercial properties, which totals 0.079 L/s and the peak hour demand (PKHR) is 1.8 times the MXDY, totaling 0.14 L/s. Detailed water demand calculations are included in **Appendix A**.

The structure is classified as a wood frame commercial construction per the Fire Underwriters Survey (FUS). The building is to be partitioned into 3 sections through the use of 2-hour firewalls to limit building floor area to a maximum of 600sq.m. No sprinkler system is proposed for the commercial building. Detailed calculations for required fire flows per the FUS guidelines, found in **Appendix A.2**, amount to a total required fire flow of 150 L/s (9,000 L/min) for the proposed building.

Per the boundary conditions provided by the City of Ottawa and based on an average site perimeter elevation on-site of 93.7m, adequate flows are available for the current subject site scenario with pressures ranging from 39.3m (55.88 psi) to 32.2m (45.93psi) as well as the future zoning scenario in which pressures would be ranging from 53.1m (75.51psi) to 52.2m (74.23psi). These values are within the normal operating pressure range as defined by MOECC and City of Ottawa design guidelines (desired 50 to 80 psi and not less than 40 psi).

Using boundary conditions for the proposed development under maximum day demands and a fire flow requirement of 10,000L/min per the FUS methodology, it can be confirmed that the system will maintain a residual pressure of approximately 37.54psi for the current pressure zone configuration, and 68.82psi for the future scenario; which is in excess of the required 140 kPa (20 psi). Hydrants currently exist on the north side of Modugno Place and the east side of Via Campanale Avenue adjacent to the proposed site, provide full coverage of parking areas, and lie within 90m of building principal entrances per City of Ottawa standards. As such, no additional fire hydrants are proposed for the current development.

3.3 SUMMARY OF FINDINGS

Based on the above, the proposed water servicing will provide sufficient capacity to sustain required domestic demands such that normal operating pressures remain within City of Ottawa required limits. The required fire flow for on-site buildings can be achieved at all locations while still maintaining the minimum residual pressure per City requirements.



Wastewater Servicing November 20, 2017

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The site will be serviced via an existing 200mm diameter sanitary stub that feeds into the municipal 200mm sanitary sewer along Campanale Avenue and ultimately to the East Barrhaven Trunk (EBHT) (see **Drawing SSP-1)**. This connection will service the entire proposed site.

For detailed information regarding the wastewater servicing for the area, please refer to the Longfields Subdivision Servicing Report (Stantec, 2011).

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
- Average Wastewater Generation 50,000 L/ha/day (commercial)
- Peaking Factor 1.5 (commercial)
- Extraneous Flow Allowance 0.28 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 wastewater flows (approx. 0.49 L/s with allowance for infiltration) to the existing 200mm diameter sanitary sewer within Campanale Avenue. A sanitary sewer design sheet for the proposed sewers is included in **Appendix B.1**. Full port backwater valves are to be installed on all sanitary services within the site to prevent any potential surcharge from the downstream sanitary sewer from impacting the proposed property.

4.4 LONGFIELDS DRIVE SEWER

The report "Longfields Subdivision, Campanale Homes – City of Ottawa (Revision #1)" prepared by Stantec Consulting and submitted to the City of Ottawa on May 4, 2011 indicated that sufficient capacity exists within the EBHT and the Longfields Drive sanitary sewers to accommodate the Longfields Community development. In the original report, the proposed site land use was considered as 'mixed use' and accounted for a peak discharge flow from the site of 5.6 L/s. The proposed site, due to its change in proposed use to entirely commercial property,



Wastewater Servicing November 20, 2017

provides a maximum sanitary contribution of only 0.49 L/s, and is therefore able to comply with the maximum allowed discharge for this area. Sanitary sewer design sheets for the proposed site and for on-site sanitary sewers are included in **Appendix B.1**.



Storm Servicing and Stormwater Management November 20, 2017

5.0 STORM SERVICING AND 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 by the Longfields Subdivision Stormwater Management Report (Stantec, May 2011) for the region, 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 July 1st 1979 event in lieu of traditional 100-year storm event outlined in the City of Ottawa Sewer Design Guidelines on major & minor drainage system (identified as the critical storm event within the Longfields Subdivision Stormwater Management Report).
- Water quality treatment for the proposed site provided by the existing end-of-pipe Clarke Bellinger Environmental Facility off Leikin Drive.

Storm Sewer & Inlet Controls

- The proposed site to discharge to the existing 300mm stormwater stub adjacent to the proposed parking lot on Modugno Place draining to a 450mm stormwater pipe along Modugno Place, as well as a second stormwater service connection to the existing 250mm stormwater stub adjacent to the proposed parking lot on Campanale Avenue draining to the municipal 525mm stormwater pipe along Campanale Avenue (City of Ottawa / Longfields Subdivision Stormwater Management Report).
- Minor system inflow to be restricted for the site to 23.5L/s (53L/s/ha) (Longfields Subdivision Stormwater Management Report).
- 100-year HGL boundary condition at the site outlet sewers of 90.35m and 90.47m (Longfields Subdivision Stormwater Management Report).
- 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).



Storm Servicing and Stormwater Management November 20, 2017

- Surface storage to be maximized where possible to provide a minimum of 110 m3/ha of storage (Longfields Subdivision Stormwater Management Report).
- Major system discharge from the site during the July 1st, 1979 event not to exceed 0.110m³/s (Longfields Subdivision Stormwater Management Report).
- Major system discharge from the site during the 5-year storm event not to exceed 0.079m³/s (Longfields Subdivision Stormwater Management Report).
- 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 background information, the peak post-development discharge from the subject site to the minor system is to be limited to 23.5L/s of contributing area. Peak release rates for the current site are summarized in **Table 2** below (see **Appendix C.3** for background report excerpts):

Table 2 : Target Release Rates

Discharge Point	Storm Event	Peak Flow Rate (L/s)
Minor System	All Design Events	23.5
Major System	5-Year Storm	79.0
Major System	July 1 st , 1979	110.0

A time of concentration of 10 minutes was assigned for each subcatchment area based on the highly impervious nature of the site land use. C coefficient values have been increased by 25% to a maximum of 1.00 for the post-development 100-year storm event (July 1st, 1979 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



Storm Servicing and Stormwater Management November 20, 2017

5.3.2 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that inlet-control devices in combination with surface storage be used to reduce site peak outflow to target rates.

5.3.2.1 Surface Storage

It is proposed to detain stormwater within parking and access areas tributary to catchbasins equipped with vortex orifice controls to reduce peak outflow from the proposed site. The catchbasins will release by gravity to the proposed storm sewer outlet for the site. Should catchbasin discharge orifices become blocked; flows will spill from catchbasin grates overland to each of their respective parking lot entrance/exits and onto Campanale Avenue or Modugno Place ROW off of the property, and ultimately to the Longfields Drive ROW. In areas where peak inflows exceed the available maximum static storage, estimated peak overland flow rates have been identified. Maximum surface storage elevations lie well below proposed building opening elevations to ensure adequate drainage of the property.

Surface storage volumes have been estimated based on surface models created via AutoCAD for the proposed grading plan. **Table 3** summarizes surface storage depths and volumes within the proposed site:

Drainage Area ID	Structure	Ponding Depth (m)	Ponding Area (m²)	Ponding Volume (m ³)
STM-101	CB200	0.35	327.9	38.3
	CBMH201	0.35	355.8	41.5
	Total	0.35	683.7	79.8
STM-102*	CBMH202/ CB203	0.35	475.4	55.5
Grand Total			1159.1	135.3

Table 3 : Surface Storage Volumes

*Ponding region encompasses all CBs within drainage area

The modified rational method was employed to determine the peak volume stored in catchbasins & surface storage areas. Inlet control devices were sized to fully utilize surface storage during the 100-year storm event. **Table 4** summarizes the estimated storm release rates and storage volumes for controlled subcatchments during the 5 and 100-Year (July 1st, 1979) events. Discharge curves are as provided by the manufacturer for the selected Vortex ICDs (see **Appendix C.4** for details)



Storm Servicing and Stormwater Management November 20, 2017

Event	Area ID	ICD	Ponding Depth (m)	Head (m)	Qrelease (L/s)	Vstored (m ³)	Qspill (L/s)
5-Year	STM-101	LMF 95	0.35	3.08	14.0	27.1	0.0
	STM-102	LMF 75	0.35	3.28	9.1	21.0	0.0
100-Year	STM-101	LMF 95	0.35	3.08	14.0	79.9	4.6
	STM-102	LMF 75	0.35	3.28	9.1	55.5	4.9

Table 4 : Peak Surface Volume and Controlled Discharge (5 and 100-Year Storm Event)

Major system discharge from the proposed site proceeds overland via the site parking access to the existing Modugno Place / Campanale Avenue roadway, and ultimately to Longfields Drive. Downstream water levels were considered to be fixed as per results of the 100-Year event HGL analysis within the overall Longfields Subdivision Stormwater Management Report. Refer to report excerpts included as part of **Appendix C.3** for details.

5.3.2.2 Rooftop Storage

The majority of the proposed building's roof is to be slanted and direct flow towards an eavestrough at the back of the building. The eavestrough will partition the flow towards the two separate site parking lots. No separate storage calculations have been made for rooftop storage for the proposed site, as the rooftop discharge to the proposed parking lots will then be captured and controlled by the parking lots' respective catchbasins and inlet control devices.

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.

Event	Peak Minor System Discharge (L/s)	Target Minor System Discharge (L/s)	Peak Major System Discharge (L/s)	Target Major System Discharge (L/s)
5-Year	23.1	23.5	0.0	79.0
100-Year (July 1979)	23.1	23.5	9.4	110.0

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



Storm Servicing and Stormwater Management November 20, 2017

5.4 WATER QUALITY CONTROL

Water quality treatment for the proposed development is provided at the end-of-pipe stormwater management facility off Leikin Drive; this facility has been previously designed to accommodate the site (and overall Longfields Subdivision development) and is known as the Clarke Bellinger Environmental Facility. No additional water quality treatment will be provided on-site.



Grading and Drainage November 20, 2017

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.42 ha in area. The topography across the site is relatively flat, and currently drains overland from North to South. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, adhere to permissible grade raise restrictions if applicable (see **Section 9.0**) for the site, and provide for minimum cover requirements for storm and sanitary and storm 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 northwest and southeast ends of the site to either the Campanale Avenue or Modugno Place ROW, see **Drawing GP-1**.



Approvals November 20, 2017

7.0 APPROVALS

Due to recent changes in the transfer of review process, the local MOECC office has indicated that they do not wish to be pre-consulted on projects where an MOE ECA is clearly not required. As this is a private site under singular ownership draining to an approved sewer outlet, does not discharge to a combined sewer, and is not intended to service industrial land or land uses, an MOECC ECA will not be required as the site meets the approval exemptions under O.Reg. 525/98. 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.



Erosion Control During Construction November 20, 2017

8.0 **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.



Geotechnical Investigation November 20, 2017

9.0 GEOTECHNICAL INVESTIGATION

A geotechnical Investigation Report was prepared by Patersongroup on November 8, 2017 for the Block 13 development. 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 to very stiff silty clay layer followed by a dense glacial till. Bedrock is anticipated to lie within 5m to 10m below ground surface. Groundwater was encountered within test pits at a depth of 1.8m and 3.2m below ground surface. Grade raise fill restrictions of 2.0m were identified for areas where silty clay is present below underside of footings as part of the geotechnical investigation. Refer to Report #PG2119-LET.02 for additional geotechnical information.

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

Thickness (mm) Material Description				
40	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete			
50	50 Binder Course – HL-8 or Superpave 19.0 Asphaltic Concrete			
150	Base – OPSS Granular A Crushed Stone			
450	Subbase – OPSS Granular B Type II			
-	Subgrade – Either fill, in situ soil, or OPSS Granular B Type II material placed over in situ soil or fill			

Table 6: Pavement Structure – Access Lanes

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 II material placed over in situ soil or fill			



Conclusions November 20, 2017

10.0 CONCLUSIONS

10.1 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 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.

10.2 SANITARY SERVICING

The proposed sanitary sewer network is sufficiently sized to provide gravity drainage of the site based on analysis of the sewer catchment area and population estimates per background studies. The proposed site will be serviced by a network of gravity sewers which will direct wastewater flows to the existing 200mm dia. sanitary sewer stub situated within Campanale Ave at the northwestern boundary of the site.

10.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa. The on-site storm sewer system has been designed to limit peak storm sewer inflows to downstream storm sewers to 23.5L/s as determined by background reports. The downstream receiving sewer has sufficient capacity to receive runoff volumes from the site based on the Longfields Campanale Subdivision Servicing report.

10.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the recommendations made 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.

10.5 APPROVALS/PERMITS

An MOECC Environmental Compliance Approval is not expected to be required for installation of the proposed storm and sanitary sewers within the site. A Permit to Take Water is not anticipated to be required for pumping requirements for sewer 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.

