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SITE SERVICING AND STORMWATER MANAGEMENT

FOR

MATTINO DEVELOPMENTS INC.
285 MOUNTSHANNON DRIVE–BLOCK 1

CITY OF OTTAWA

PROJECT NO.: 17-975
CITY APPLICATION NO.: D07-12-19-0004

AUGUST 2019 – REV 4

SITE SERVICING AND STORMWATER MANAGEMENT
FOR
285 MOUNTSHANNON DRIVE–BLOCK 1

MATTINO DEVELOPMENTS INC.

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Mattino Developments Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 285 Mountshannon Drive, Block 1.

The subject property is located within the City of Ottawa urban boundary, in the Barrhaven ward. As illustrated in ***Figure 1***, below, the subject property is located northwest of the intersection of Mountshannon Drive and Longfields Drive. The subject property measures approximately ***0.21 ha*** and is zoned residential Fourth density (R4A).

Figure 1: Site Location

The proposed SPC would allow for the development of a 3-storey residential stacked townhome building fronting onto Mountshannon Drive. The townhome is comprised of approximately ***20 units***. A copy of the proposed site plan, prepared by Pierre J. Tabet Architect, is included in ***Drawings/Figures***.

The subject site was previously contemplated within the ***Longfields Central Site Servicing and Stormwater Management Study*** (***2014 MSS***) prepared by Novatech Engineering Consultants Ltd. and was contemplated as residential lands consisting of 16 stacked residential units.

The objective of this report is to provide sufficient detail to demonstrate that the proposed development is supported by existing municipal services.

1.1 Existing Conditions

The existing site includes a gravel staging area used in the construction of the Longfield's Central Development. The elevations range between 93.56 m and 92.66 m with a minimal grade change of approximately 1.20% from the Northeast to the Southwest corner of the property.

As indicated by the Topographic Surveys prepared by Stantec, dated November 2017 and July 2018, there is an existing easement located within the subject site. The easement, in favour of the City of Ottawa, provides access to the existing 2250 mm diameter storm sewer trunk and 750 mm diameter sanitary sewer crossing the southern portion of the subject site, near the Mountshannon Drive and Longfields Drive intersection.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways:

Mountshannon Drive:

- 400 mm diameter PVC watermain;
- 525 mm diameter concrete storm sewer outletting to the **Clarke Bellinger Environmental Facility** (***CBEF***)**,** formerly the Longfields/Davidson Heights Stormwater Management Facility;
- 250 mm diameter PVC sanitary sewer tributary to the Barrhaven Trunk Collector.

Longfields Drive:

- 2250 mm diameter concrete storm sewer trunk outletting to the ***CBEF***;
- 750 mm diameter concrete sanitary sewer tributary to the Barrhaven Trunk Collector.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)
  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)
  - **Technical Bulletin ISTB-2018-03**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-03*)
- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)
  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)
  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)
  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (*ISDTB-2018-02*)
- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)
- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)
- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **Geotechnical Investigation**
  Paterson Group, PG2306-1, January 31, 2013.
  (*Geotechnical Investigation*)

    - **Geotechnical Responses to City Comments**
      Paterson Group, PG2306-MEMO.06, July 18, 2019.

- **Longfields Central Site Servicing and Stormwater Management Study**
  Novatech Engineering Consultants Ltd, April 3, 2014.
  (*2014 MSS*)

- **Longfields/Davidson Heights Serviceability Study**
  Oliver, Mangione, McCalla & Associates and Planners, February 1993.
  (1993 MSS)

- **City of Nepean Design Guidelines Longfields / Davidson Heights**
  Erion Associates, Stanley Consulting Group Ltd., Ainley Graham and Associates, February 1998.
  (1998 MSS)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2W2C pressure zone, as shown by the Pressure Zone map included in ***Appendix B***. A local 406 mm diameter watermain, located within the Mountshannon Drive right-of-way, is available to service the development.

3.2 Water Supply Servicing Design

It is proposed that the development will connect to the existing 406 mm watermain located within the Mountshannon Drive right-of-way via a 100 mm diameter watermain. A detailed layout is indicated by drawing ***SSP-1***, submitted along with this report. Units will be serviced by the proposed watermain via 25 mm diameter service laterals.

As coordinated with Fire Services, the existing fire hydrants along Mountshannon Drive and Longfields Drive are to be used to provide adequate fire protection coverage, in accordance with ***Water Supply Guidelines*** and the ***OBC***.

Table 1, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Townhouse	2.7 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	4.9 x Average Daily *
Residential Maximum Hourly	7.4 x Average Daily *
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
*** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons. -Table updated to reflect ISD-2010-2*	

Table 2, below, summarizes the estimated water supply demand and boundary conditions for the proposed development, based on the ***Water Supply Guidelines*** and the site statistics provided by Pierre J. Tabet Architect.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Estimated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	10.7	39.7 / 389.8
Max Day + Fire Flow	52.4 + 10,000 = 10,052.4	32.7 / 321.2
Peak Hour	79.1	31.3 / 307.4

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 93.16m. See ***Appendix B.***

Fire flow requirements are to be determined in accordance with City of Ottawa ***Water Supply Guidelines*** and the Ontario Building Code.

Fire flow requirements were estimated per City of Ottawa Technical Bulletin ***ISTB-2018-02***. The following assumptions were assumed:

- Type of construction - Ordinary Construction;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Non-sprinklered System.

The above assumptions result in an estimated fire flow of approximately ***10,000 L/min***, noting that actual building materials selected will affect the estimated flow.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix B***.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands as indicated by the correspondence in ***Appendix B***. As shown by ***Table 2***, the minimum and maximum pressures fall within the required range identified in ***Table 1***.

A ***0.031 kPa*** pressure loss along the proposed 100 mm diameter watermain was estimated using the Darcy-Weisbach equation, as shown by the calculation included in ***Appendix B***. As a result, the pressures within the proposed building connections are within the required range outlined by the ***Water Supply Guidelines***.

3.3 Water Supply Conclusion

As demonstrated by ***Table 2***, based on the boundary conditions provided by the City of Ottawa, sufficient water supply is available based on the max day plus ***10,000 L/min*** fire flow demand as estimated by City of Ottawa Technical Bulletin ***ISTB-2018-02***.

A pressure loss analysis was prepared to evaluate pressures along the internal watermain. Based on the Darcy-Weisbach equation, pressures are within the required pressure range specified by the ***Water Supply Guidelines***.

DSEL employed a daily consumption rate of 280 L/person/day to align with the revised wastewater rates identified by City of Ottawa Technical Bulletin ***ISTB-2018-03***. As a result, DSEL is submitting for a deviation from the ***Water Supply Guidelines***.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Barrhaven Trunk Collector Sewer catchment area, as shown by the City sewer mapping included in ***Appendix C***. An existing 250 mm diameter sanitary sewer located within the Mountshannon Drive right-of-way and an existing 750 mm diameter sanitary sewer located within the South side of the site are available to service the proposed development.

The existing 250 mm diameter sanitary sewer is tributary to the Barrhaven Trunk Collector sewer, located approximately 170 m downstream of the site.

As indicated by the ***2014 MSS***, the subject site was contemplated to be serviced via the 250 mm diameter sanitary sewer within the Mountshannon Drive right-of-way (section MS1-MS3). The subject site is located within area A15, as illustrated by the *Longfields Central Sanitary Sewer Design Sheet* and the *Sanitary Drainage Area Plan* included in ***Appendix C***.

4.2 Wastewater Design

It is proposed that the development will be serviced by the existing 250 mm sanitary sewer within the Mountshannon Drive right-of-way via a 200 mm diameter internal sanitary sewer network. Units within the proposed development will be serviced via 135 mm diameter sanitary laterals to the internal 200 mm diameter sanitary sewer, and to the existing 250 mm diameter sanitary sewer within Mountshannon Drive.

Table 4, below, summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 3
Wastewater Design Criteria

Design Parameter	Value
Residential Townhouse	2.7 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Average Daily Demand	280 L/d/per (Proposed) 350 L/d/per (***2014 MSS***)
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon's Correction Factor 0.8 (Proposed) Harmon's Correction Factor 1.0 (***2014 MSS***)
Infiltration and Inflow Allowance	0.05 L/s/ha (Proposed Dry Weather) 0.28 L/s/ha (Proposed Wet Weather & ***2014 MSS***) 0.33 L/s/ha (Proposed Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 5, below, demonstrates the estimated peak flow from the proposed development based on the development statistics provided by Pierre J. Tabet Architect. See ***Appendix C*** for associated calculations.

Table 4
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	**0.19**
Estimated Peak Dry Weather Flow	**0.65**
Estimated Peak Wet Weather Flow	**0.71**

As demonstrated by ***Table 5***, the estimated peak wet weather sanitary flow for the proposed development is ***0.71 L/s***.

Based on the *Sanitary Sewer Design Sheet* included in the ***2014 MSS***, the previously contemplated development had an estimated peak wet weather flow of ***0.81 L/s***, a 13% reduction in peak wet weather sanitary flow. In addition, as indicated by Section 7.0 of the 2014 MSS, the existing 250 mm diameter sanitary sewer within the Mountshannon Driver right-of-way has an available capacity of approximately ***34 L/s***. Relevant excerpts from the ***2014 MSS*** are included in ***Appendix C***.

The analysis above, included in the ***2014 MSS***, indicates that sufficient capacity is available in the local sewers to accommodate the proposed development.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Barrhaven Trunk Collector sewer; based on the sanitary analysis included in the ***2014 MSS***, sufficient capacity is available to accommodate the estimated ***0.71 L/s*** peak wet weather flow from the proposed development.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Barrhaven Creek sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Lower Rideau watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix A***.

Stormwater released from the proposed development to the existing stormwater infrastructure on Mountshannon Drive will ultimately be conveyed to the existing stormwater management facility located southwest of the Prince of Wales Drive / Waterbridge Drive intersection. This facility provides quality treatment prior to discharging treated stormwater to the Rideau River.

Major system flows, those in excess of the minor system inlet capacity, are directed overland to the existing dry pond located within Utman Park (SWM Park 959). This facility provides attenuation prior to discharging to the minor system within Mountshannon Drive.

The infrastructure in the area surrounding the subject property was design and constructed in accordance with the ***Longfields/Davidson Heights Serviceability Study*** (***1993 MSS***) recommendations.

A conceptual servicing layout was prepared by Novatech Engineering in support of the ***2014 MSS***. As indicated by the *Block 1 – Proposed Servicing Layout*, included in ***Appendix D***, four service trenches within Mountshannon Drive were contemplated to service the development.

The ***2014 MSS*** analyzed storage requirements and flow conveyance for the Mattino Development lands. The ***2014 MSS*** refers to the subject site as area 29 within the catchment and as Block 1. Relevant excerpts have been included in ***Appendix D*** of the report.

5.2 Post-development Stormwater Management Objectives

The underlying principle for stormwater management in the Longfields / Davidson-Heights Subdivision is to restrict flow entering the minor system to ***28.8 L/s/ha***, while a major storm drainage system was established to convey storm events in excess of the minor system capacity. Industrial and Commercial lands were required to contain the 100-year event, while other development areas were to direct flow in excess of the minor system to the major system.

Based on the ***2014 MSS***, major system flow from the subject site, up to ***94.3 L/s***, is to be conveyed to the municipal right-of-ways and stored as surface storage by the existing SWM Park 959. As indicated by the ***2014 MSS***, ***100 m^3/ha*** or storage is to be provided onsite.

Stormwater management requirements for the proposed development were outlined by the ***2014 MSS***. Where the site is required to:

- Meet an allowable minor system flow of ***28.8 L/s/ha*** and a major system flow rate towards Mountshannon Drive of ***94.3 L/s*** for all storms up to an including the 100-year storm event;
- Provide ***100 m^3/ha*** of surface/sub-surface storage onsite;
- Quality controls are not required for the proposed development due to downstream stormwater facility; correspondence with the RVCA is included in ***Appendix A***.

Based on the above parameters outlined in the ***2014 MSS***, the allowable release rate for the proposed development is ***6.0 L/s***, providing ***20.8 m^3*** of storage. Relevant excerpts from the ***2014 MSS*** are included in ***Appendix D***.

5.3 Proposed Stormwater Management System

It is proposed that the stormwater outlet from the proposed development will be to the existing 525 mm diameter storm sewer within the Mountshannon Drive right-of-way. To meet the stormwater objectives the proposed development will utilize surface and subsurface storage.

The private stormwater sewer system has been sized to convey an uncontrolled 5-year storm runoff rate in accordance with the ***2014 MSS***. Detailed layout and sizing is illustrated by ***SSP-1*** included with this report and the sewer calculation sheet in ***Appendix D***.

The private stormwater sewer layout has been designed in accordance with the ***2014 MSS***. As indicated by drawing ***SSP-1,*** three service trenches are proposed within Mountshannon Drive.

Runoff from the parking areas will be directed to a catchbasin system; approximately ***33.3 m^3*** of storage will be provided by surface ponding and catchbasins. The private storm sewer system and underground storage system will attenuate flow using a ***Tempest LMF40 ICD*** or an approved equivalent located on the outlet side of CB1 and a ***Tempest LMF65 ICD*** or an approved equivalent located on the outlet side of CB4. Detailed calculations are included in ***Appendix D***.

Area ***U1***, represents the unattenuated area contributing stormwater to the major system flow from the site. Based on the ***2014 MSS***, major system flow must not exceed ***94.3 L/s*** during a 100-year event. The 100-year release rate from ***U1*** is estimated to be ***4.2 L/s.***

Please refer to drawing ***SWM-1***, accompanying this report, and the detailed calculations included in ***Appendix D***.

Table 6, below, summarizes post-development flow rates during a 5-year storm event. Storms in excess of a 5-year storm are proposed to be directed towards the municipal right-of-ways per the ***2014 MSS***.

Table 5
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage Required	Available Storage
	(L/s)	(m^3)	(m^3)
Area A1 (CB1)	4.2	9.4	10.0
Area A2 (CB4/CB5)	1.8	23.2	28.2
Total	**6.0**	**32.6**	**38.2**

It is estimated that approximately ***32.6 m^3*** of surface storage will be required on site to attenuate flow to the established release rate of ***6.0 L/s***; storage calculations are contained within ***Appendix D***. Based on ***Table 6***, sufficient storage is provided on site to satisfy the storage requirements outlined by the ***2014 MSS***.

5.4 Hydraulic Grade Line Analysis

Based on the ***Update to Longfields/Davidson-Heights model*** memorandum prepared by Stantec Engineering Consultants Ltd. for each of the storm events models, the subject site is tributary to Node 209 with an estimated HGL of 90.6571 m. The minimum freeboard between the underside of footing elevation and the HGL will be 0.30 m, as a result, the proposed USF must be a minimum elevation of 90.96 m. Relevant excerpts are included in ***Appendix D***.

5.5 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 5-year storm in accordance with the ***2014 MSS***. The post-development allowable release rate was calculated as ***6.0 L/s*** in which ***38.2 m^3*** of surface storage is provided.

Based on consultation with the RVCA, stormwater quality controls are not required due to its outlet to the **CBEF**.

The proposed stormwater design conforms to the requirements outlined by the ***2014 MSS***.

6.0 UTILITIES

Gas and Hydro services currently exist within the Mountshannon Drive and Longfields Drive right-of-ways. Utility servicing will be coordinated with the individual utility companies prior to site development.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

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

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

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

- Verification that water is not flowing under silt barriers; and
- Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Mattino Developments Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for a Site Plan Control (SPC) at 285 Mountshannon Drive, Block 1. The preceding report outlines the following:

- Based on boundary conditions provided by the City and water modelling results the existing municipal water infrastructure is capable of providing the proposed development with water within the City's required pressure range;
- The FUS method for estimating fire flow indicated ***10,000 L/min*** is required for the proposed development. Based on the boundary conditions provided by the City, sufficient flow from the municipal infrastructure is available,
- The proposed development is estimated to have a peak wet weather flow of ***0.71 L/s***. Based on the sanitary analysis included in the ***2014 MSS***, the development was previously contemplated to have a peak wet weather flow of ***0.81 L/s***; as a result, the existing infrastructure has sufficient capacity to support the development;
- Based on ***2014 MSS*** the proposed development will be required to attenuate post development flows to the minor system and to an equivalent release rate of ***28.8 L/s/ha*** (***6.0 L/s***) providing ***100 m^3/ha (20.8 m^3)*** of storage;
- It is proposed that stormwater objectives may be met through storm water retention via ICD control and surface storage in which ***38.2 m^3*** of storage is provided to meet the established release rate above;
- Based on consultation with the RVCA, stormwater quality controls are not required due to its outlet to the **CBEF**.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Alison J. Gosling, EIT.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Steve J. Pichette, P.Eng

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

17-975 06/05/2019

4.1 General Content

☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures, EX-1
☒	Plan showing the site and location of all existing services.	Figure 1, EX-1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0, Section 5.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3, Appendix A
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1, EX-1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	Drawings/Figures

4.2 Development Servicing Report: Water

☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2, Appendix B
☒	Confirmation of adequate domestic supply and pressure	Section 3.2, 3.2.1, 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2, Appendix B
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.2.1, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Section 3.2, SSP-1
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2, Appendix B
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Section 3.2.1, Appendix B

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☒	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1, EX-1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2, Appendix C
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2, SSP-1
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☒	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 5.3, 5.5
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3, Appendix D
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☒	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.3
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☒	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Section 5.4
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☒	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

MEMO

Date: 07-05-2018

To / Destinataire	Melanie, Gervais	
From / Expéditeur	Golam Sharif, Project Manager, Infrastructure Approvals	
Subject / Objet	**Pre-Application Consultation** **651 Longfields Dr, Ward No 3,** *3.5 storey stacked townhouse in two blocks of Longfields Subdivision - 20 units and 16 units.*	File No. PC2018-0122

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 and ISTB-2018-01
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)

- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

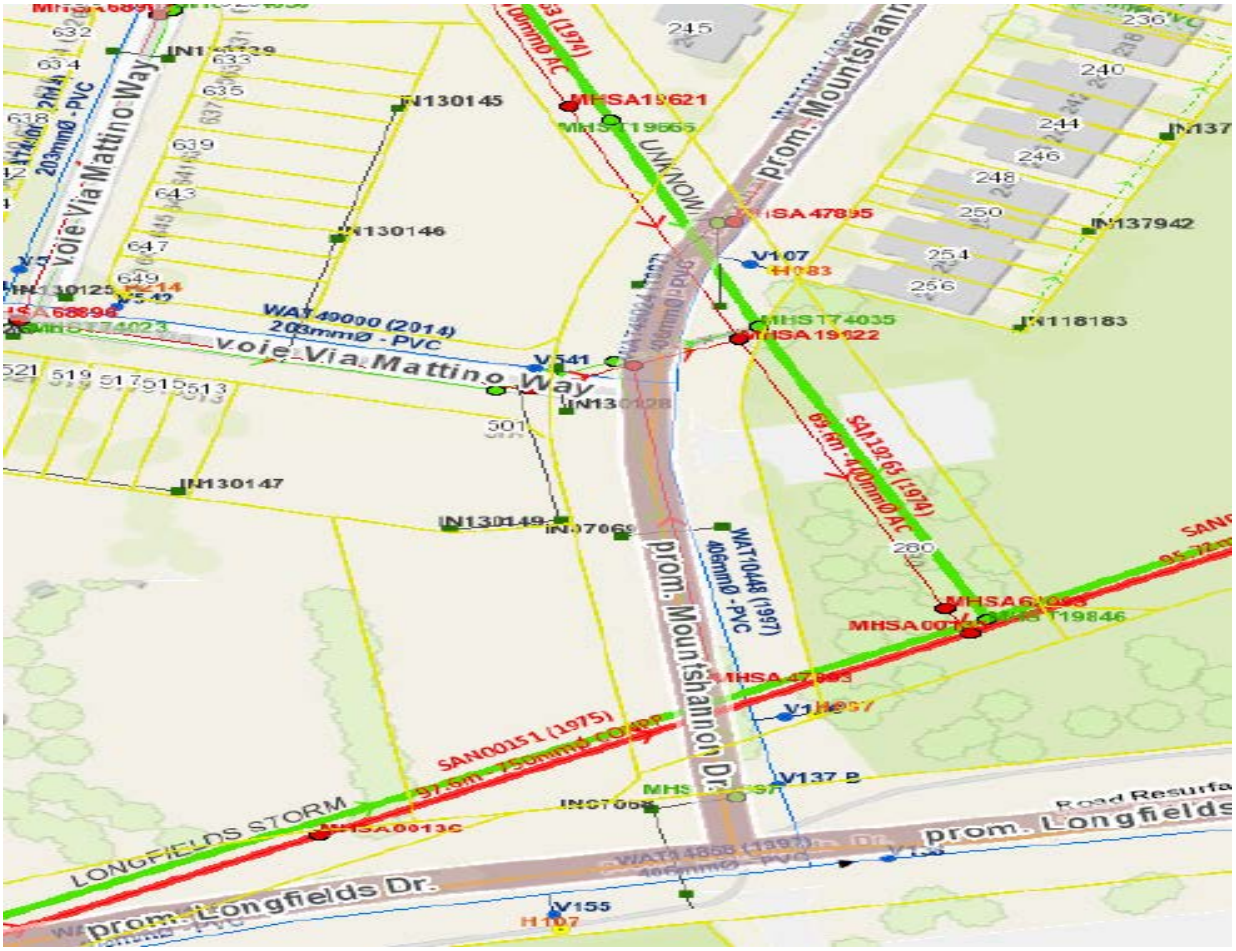
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

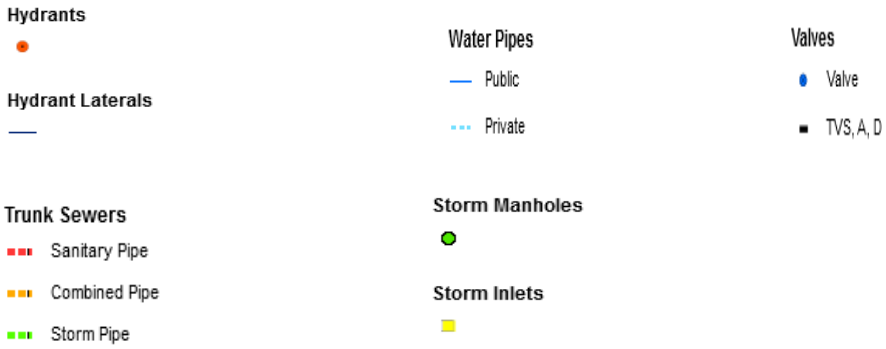
4. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   i. The approved Longfields Davidson Stromwater Management Study criteria must be followed to design stormwater management for this site.

   ii. Major and minor system must be control on site as per Longfields Davidson SWM study.

5. Deep Services (Storm, Sanitary & Water Supply)





i. A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:

   a. Mattino Way

      i. Sanitary – 200 mm.

      ii. Storm – 200 mm.

      iii. Water – 203 mm.

   b. Mountshannon Drive

      i. Sanitary – 250 mm.

      ii. Storm – 525 mm.

      iii. Water – 406 mm.

ii. As per City's Sewer Design guideline a monitoring manhole shall be required just inside the property line located in an accessible location (ie. Not in a parking area) for all non-residential and multi residential buildings connections from a private sewer to a public sewer.

iii. As per City's Sewer Design guideline it is expected that the alternative of a high level sewer in a public right-of-way and connected to the collector sewer is the preferred method of servicing properties.

iv. Provide a common access area to design the condominium servicing for future maintenance requirement.

6. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

    i. Location of service

    ii. Type of development and the amount of fire flow required (as per FUS, 1999).

    iii. Average daily demand: ___ l/s.

    iv. Maximum daily demand: ___l/s.

    v. Maximum hourly daily demand: ___ l/s.

    vi. Hydrant location and spacing to meet City's Water Design guidelines.

7. General comments –

    i. Longfields Storm Trunk and Barrhaven Sanitary Trunk are crossing the south part of the Block 1 (20 Unites site). Therefore, any construction must follow with caution.

    ii. There is very limited capacity available at Longfields Strom Trunk. Therefore, please follow the quantity and quality criteria from the Longfields Davidson SWM study and provide reference in the site servicing report clearly.

    iii. Site-specific Geotechnical brief/ report is required apart from the Subdivision report.

    iv. Site-specific Noise study is required apart from the Subdivision report.

    v. The forecasted timeline of road resurfacing works on Longfields Dr. is 2018 season.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 20763 or by email at sharif.sharif@ottawa.ca.

Golam Sharif
Project Manager – Infrastructure Approvals
Development Review, South Branch

Charlotte Kelly

From: Alison Gosling
Sent: August 2, 2018 1:15 PM
To: Charlotte Kelly
Subject: FW: 17-976 255 Mountshannon Drive - RVCA

FYI

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

From: Eric Lalande [mailto:eric.lalande@rvca.ca]
Sent: Thursday, August 2, 2018 12:27 PM
To: Alison Gosling <AGosling@dsel.ca>
Subject: RE: 17-976 255 Mountshannon Drive - RVCA

Hi Alison,

The end of pipe stormwater facility is providing quality control protection and supports the proposed lot. No on-site quality controls measures are required, however, best management practices and opportunities for on-site infiltration are encouraged where possible.

Thanks,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

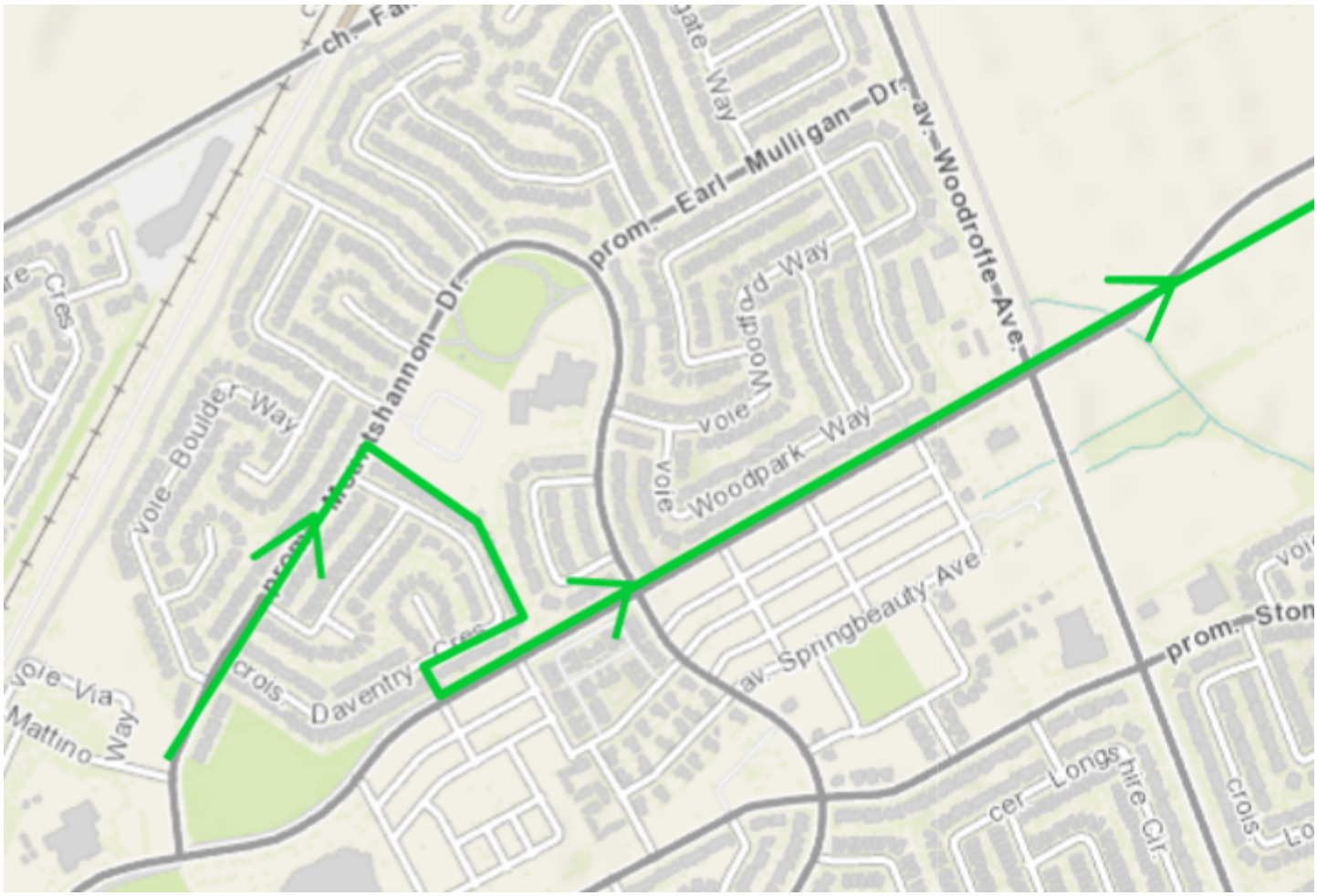
From: Alison Gosling <AGosling@dsel.ca>
Sent: Monday, July 30, 2018 1:50 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Charlotte Kelly <CKelly@dsel.ca>
Subject: 17-976 255 Mountshannon Drive - RVCA

Good afternoon Jamie,

We wanted to touch base with you regarding a development we are working on located at 255 Mountshannon Drive, Barrhaven.

The subject site is currently vacant consisting of gravel and grassed areas. The development proposes to construct a stacked townhouse with associated above ground parking. The development will discharge stormwater to the existing 375 mm diameter storm sewer within Mountshannon Drive and will travel approximately 3km to the end-of-pipe stormwater management facility, **Clarke Bellinger Environmental Facility**, as shown by below.

It is our assumption that stormwater quality controls will not be required for the development due to the outlet. Can you please confirm our assumption?



Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

APPENDIX B

Water Supply

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand INTERNAL

Type of Housing	**Per / Unit**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7	12	33
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	**Avg. Daily**		**Max Day †**		**Peak Hour ‡**	
		m^3/d	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
Total Domestic Demand	33	9.2	6.4	45.3	31.4	68.4	47.5

Domestic Demand MOUNTSHANNON DRIVE

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7	8	22
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	**Avg. Daily**		**Max Day †**		**Peak Hour ‡**	
		m^3/d	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
Total Domestic Demand	22	6.2	4.3	30.2	21.0	45.6	31.7

Institutional / Commercial / Industrial Demand

	Avg. Daily		**Max Day**		**Peak Hour**	
Total Demand	**15.4**	**10.7**	**75.5**	**52.4**	**114.0**	**79.1**

† Max Day Peaking Factor = 4.9
‡ Peak Hour Peaking Factor = 7.4

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$$F = 220C\sqrt{A}$$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	2279.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	10502.6	L/min	
	11000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**9350.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%	
Reduction	**0**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Ordinary - Unprotected Openings	10.1m-20m	18	3	54	11%	
S	Ordinary - Unprotected Openings	>45m		0	0	0%	
E	Ordinary - Unprotected Openings	>45m		0	0	0%	
W	Ordinary - Unprotected Openings	>45m		0	0	0%	
		% Increase				**11%**	*value not to exceed 75%*

Increase	**1028.5**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	10378.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	10000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by Pierre J. Tabet architect.
-Calculations based on Fire Underwriters Survey - Part II

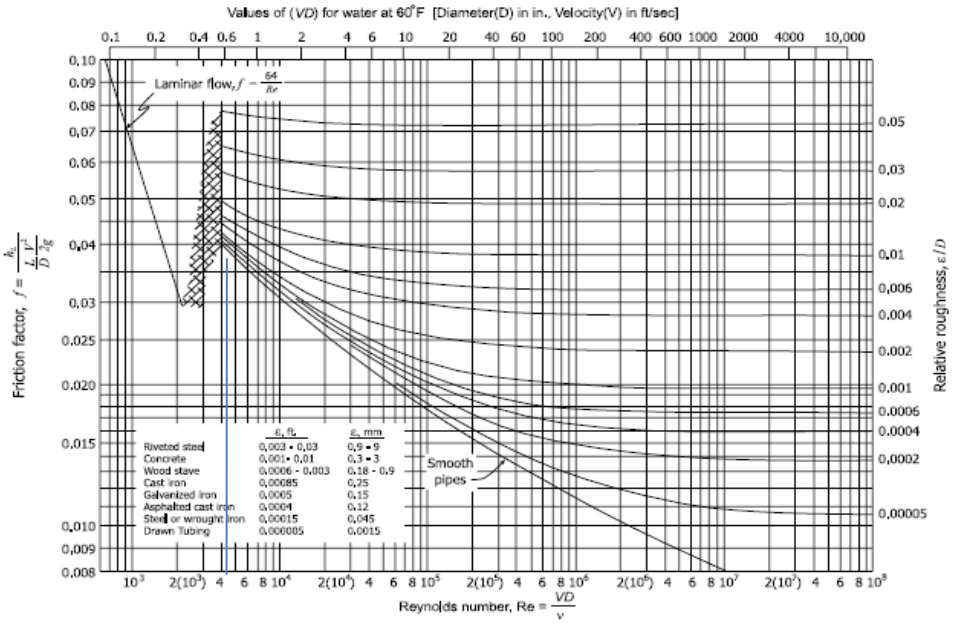
Boundary Conditions Unit Conversion

Grnd Elev 93.16

	Node	Ground Elevation		
	m H_2O	**m H_2O**	**PSI**	**kPa**
Avg. Day	**132.9**	**39.7**	56.5	389.8
Peak Hour	**125.9**	**32.7**	46.6	321.2
Max Day + FF	**124.5**	**31.3**	44.6	307.4

Estimated Head Loss per Darcy-Weisbach

Service Size	100	mm
Service Length	88.12	m
Peak Demand	1.06	L/s
Relative Roughness	0.0013	
Kinematic Viscosity @ 4^{O}C, v	0.00000151	m^2/s
Velocity, V	0.13	m/s
Re	8,938	



Friction Factor, f 0.038 (From Moody Diagram)

Head Loss

$$h_f = \frac{fL}{D}\frac{V^2}{2g}$$

h_f	3.11E-02	m H_2O
h_f	3.05E-01	kPa

BOUNDARY CONDITIONS

Boundary Conditions For: 18-975 B – 285 Mounshannon Dr.

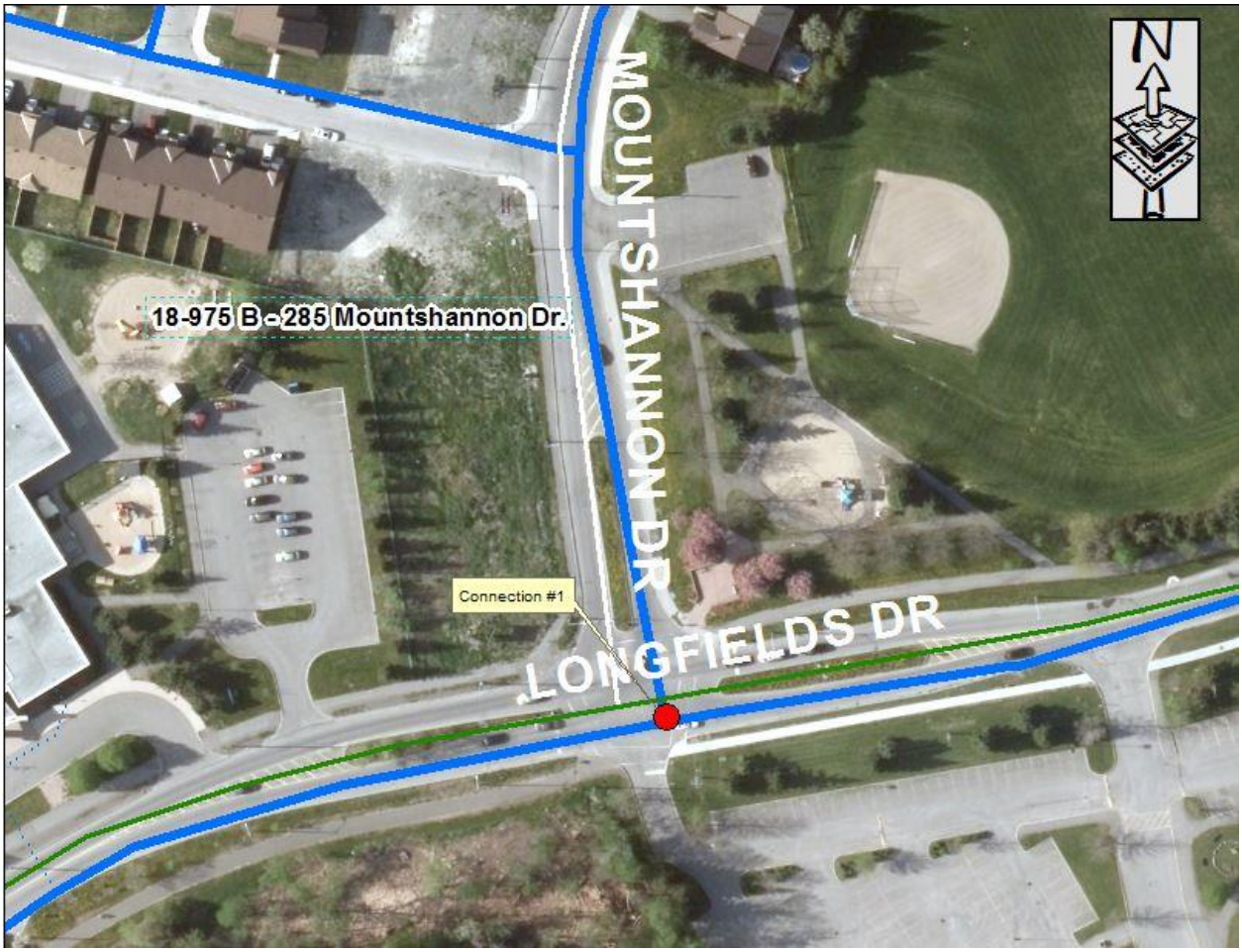
Date of Boundary Conditions: 2018-Jul-31

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	10.8	0.2
Maximum Daily Demand	51.6	0.9
Peak Hour	78	1.3
Fire Flow #1 Demand	10,000	166.7

Number Of Connections: 1

Location:



BOUNDARY CONDITIONS

Results:

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.9	56.5
Peak Hour	125.9	46.6
Max Day Plus Fire (10,000) L/min	124.5	44.5

[1]Elevation: **93.160 m**

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:

a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Alison Gosling

From: Charlotte Kelly
Sent: Wednesday, July 25, 2018 12:09 PM
To: Sharif, Sharif
Cc: Robert Freel; Alison Gosling
Subject: RE: 18-975 B - 285 Mountshannon Drive (Block 1)
Attachments: wtr-2018-07-23_17-975_BLOCK1.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Hi Sharif,

Please find the FUS calculations for 285 Mountshannon Drive attached.

Please let me know if you have any questions.

Thank-you,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

From: Sharif, Sharif <sharif.sharif@ottawa.ca>
Sent: July 25, 2018 9:25 AM
To: Charlotte Kelly <CKelly@dsel.ca>
Subject: RE: 18-975 B - 285 Mountshannon Drive (Block 1)

Hello Kelly,

Please provide the FUS calculation sheet. Thanks.

Sharif

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: Tuesday, July 24, 2018 11:26 AM

To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Alison Gosling <AGosling@dsel.ca>; Robert Freel <RFreel@dsel.ca>
Subject: FW: 18-975 B - 285 Mountshannon Drive (Block 1)

Good morning,

We would like to request water boundary conditions for Mountshannon Drive using the following proposed development demands:

1. Location of Service / Street Number: 285 Mountshannon Drive

2. Type of development and the amount of fire flow required for the proposed development:

- The proposed development is residential use consisting of 20 units.
    - It is anticipated that the development will have connections to be serviced from the existing 400 mm diameter watermain within Mountshannon Drive, as shown by the attached map.
    - Fire demand based on FUS was used to calculate a fire demand of 10 000 L/min.

3.

	L/min	L/s
Avg. Daily	10.5	0.18
Max Day	51.5	0.86
Peak Hour	77.7	1.30

If you have any questions please feel free to contact me.

Thank you,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

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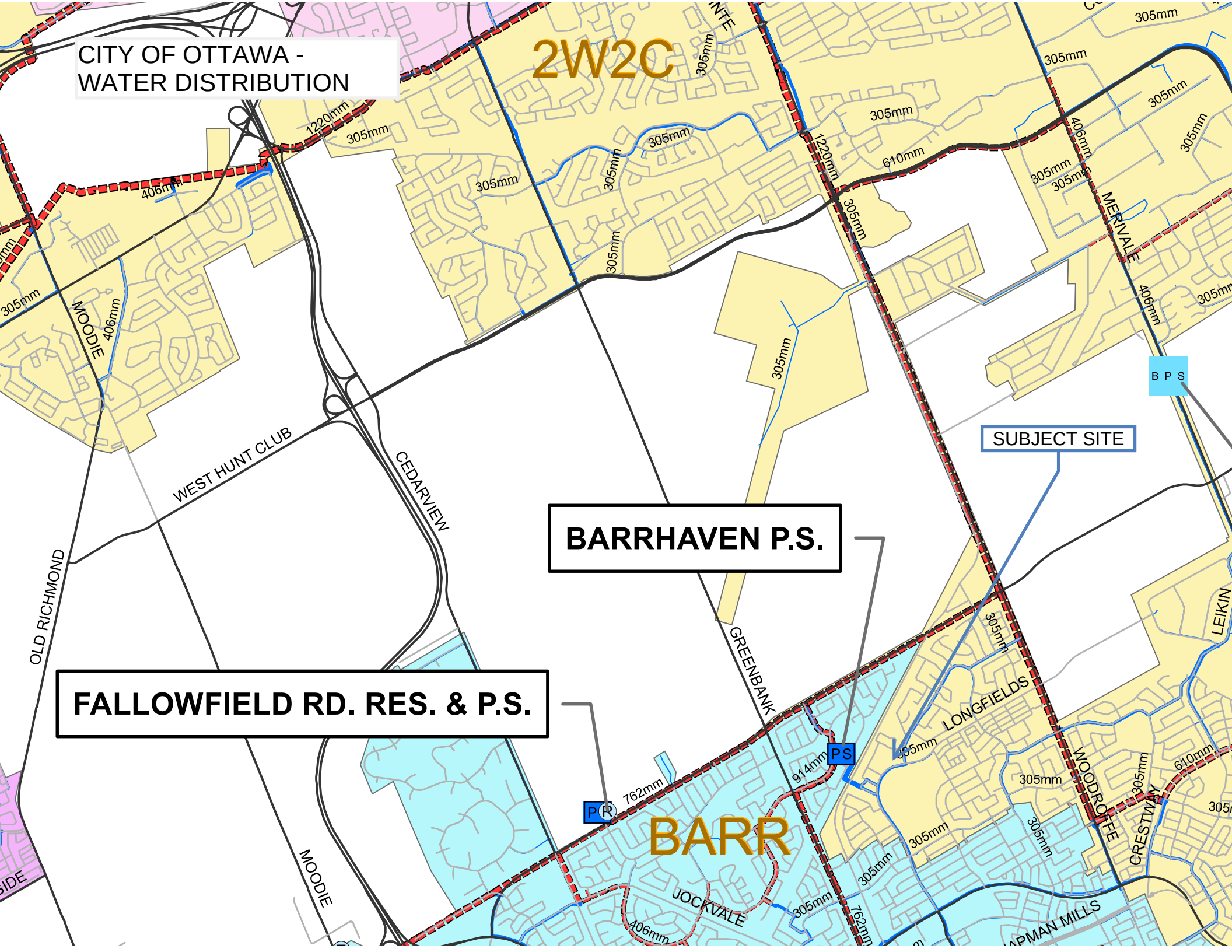

CITY OF OTTAWA -
WATER DISTRIBUTION
2W2C
BARR
SUBJECT SITE
BARRHAVEN P.S.
FALLOWFIELD RD. RES. & P.S.
WEST HUNT CLUB
CEDARVIEW
OLD RICHMOND
MOODIE
GREENBANK
JOCKVALE
LONGFIELDS
WOODROFFE
CRESTWAY
MERIVALE
LEIKIN
CHAPMAN MILLS
PS
PR
B P S
1220mm
914mm
762mm
610mm
406mm
305mm

APPENDIX C

Wastewater Collection

Mattino Developments Inc.
285 Mountshannon Drive - Block 1
Proposed Site Conditions

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 0.208 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.01**	**L/s**
Infiltration / Inflow (Wet)	**0.06**	**L/s**
Infiltration / Inflow (Total)	**0.07**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7	20	54
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**54**	
Average Domestic Flow	**0.18**	**L/s**
Peaking Factor	**3.65**	
Peak Domestic Flow	**0.64**	**L/s**

Total Estimated Average Dry Weather Flow Rate	**0.19**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.65**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**0.71**	**L/s**

Residential demands, Harmon's Correction Factor, Extraneous Flow Rates and Commercial Peaking Factor established by the City of Ottawa Technical Bulletin ISTB-2018-01. Commercial demands established by City of Ottawa Sewer Design Guidelines Appendix 4A.

SANITARY SEWER CALCULATION SHEET

CLIENT: **Mattino Developments Inc.**
LOCATION: **285 Mountshannon Drive - Block 1**
FILE REF: **17-975**
DATE: **6-May-19**

DESIGN PARAMETERS

Avg. Daily Flow Res.	280	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.33	L/s/ha
Avg. Daily Flow Comn	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
BLDG (SOUTH)	SAN1	SAN2	0.208	0		4	0	11.0	0.208	11.0	4.00	0.14		0.00		0.00		0.00	0.0	0.208	0.208	0.069	0.21	200	0.40	9.7	0.031	0.050	0.66	20.7	0.01
BLDG (WEST)	SAN2	SAN3	0.000	0	0	8	0	22.0	0.000	22.0	4.00	0.29		0.00		0.00		0.00	0.0	0.000	0.000	0.000	0.29	200	0.40	40.1	0.031	0.050	0.66	20.7	0.01
	SAN3	EX.SAN (MOUNTSHANNON	0.000					0.0	0.208	33.0	4.00	0.43							0.0	0.000	0.208	0.069	0.50	200	1.00	40.1	0.031	0.050	1.04	32.8	0.02
BLDG (EAST)	BLDG	EX.SAN (MOUNTSHANNON	0.000			8		22.0	0.000	22.0	4.00	0.29		0.00		0.00		0.00	0.0	0.000	0.000	0.000	0.29	135	1.00	14.1	0.014	0.034	0.80	11.5	0.02

LONGFIELDS CENTRAL
SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Novatech Engineering Consultants Ltd.
April 3rd, 2014

7.0 WASTEWATER COLLECTION SYSTEM

The sanitary sewers in this development will connect to the north branch of the existing East Barrhaven Trunk (EBHT) sanitary sewer. The EBHT drains into the West Rideau Collector Sewer (WRCS) on Merivale Road and eventually makes its way to the Robert O. Pickard Environmental Centre to be treated before being released to the Ottawa River. The wastewater collection system is shown below in **Figure 7.1**.

Population estimates and sanitary flows for the proposed development are calculated using design criteria from the Sewer Design Guidelines:

Table 7-1: Wastewater Design Parameters

Parameter	Design Parameter
Town Home/Stacked Unit Population Density	2.7 people/unit
Average Apartment Unit Population Density	1.8 people/unit
Residential Flow Rate, Average Daily	350 L/cap/day
Residential Peaking Factor	Harmon Equation (min=2.0, max=4.0)
Commercial & Institutional Flow Rate	50,000 L/day/ha
ICI Peaking Factor	1.5
Infiltration Rate	0.28 L/s/ha
Minimum Pipe Size	250 mm (ICI), 200mm (Res)
Minimum Velocity	0.6 m/s
Maximum Velocity	3.0 m/s

The proposed peak sanitary flows are summarized below in **Table 7-2**.

Table 7-2: Proposed Wastewater Flow Summary

Development Condition	Towns/ Stacked Towns	Apart-ments	Res. Area (ha)	Institutional Area (ha)	Infiltration Area (ha)	Peak Design Flow (L/s)
Proposed Site	103	80	4.17	0	4.80	8.84
External Upstream Contributions	16	0	0.21	0	0.46	0.81
Total	**135**	**80**	**4.90**	**0**	**5.79**	**9.63**
1998 Servicing Study Update	**-**	**-**	**5.91**	**-**	**5.91**	**9.83**

The theoretical peak design flow from the total development area will be 9.80L/s. Internally the proposed site peak flow is 9.63 L/s which can be serviced by 200mm diameter pipes with a minimum slope of 0.32% which have a capacity of 19.4L/s.

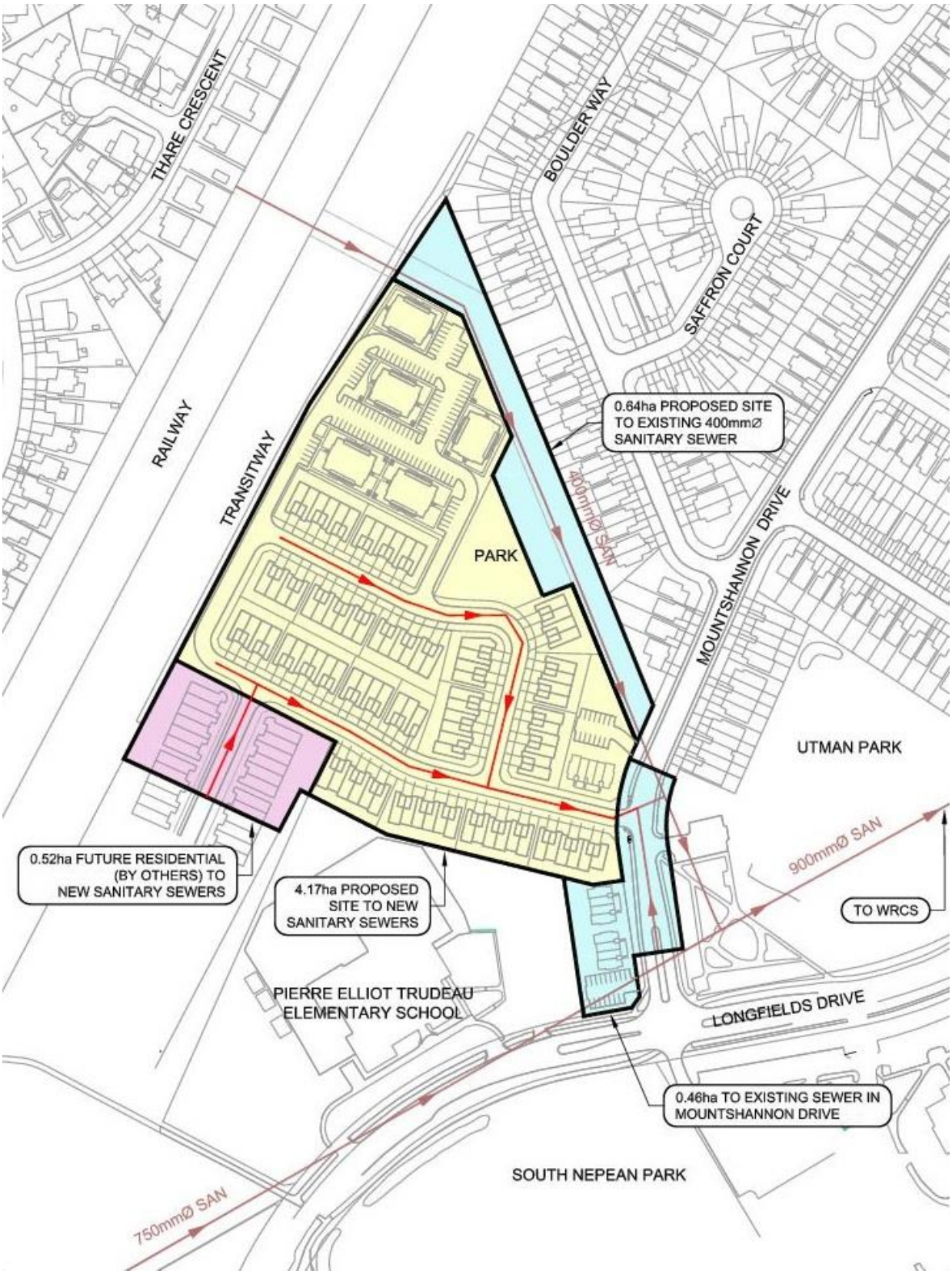


Figure 7.1: Wastewater Collection System

The 1998 Longfields Davidson Heights Servicing Study Update assigned a value of 86 people/gross ha to the area, resulting in an anticipated peak flow of 9.83 L/s. The proposed total peak flow is 0.03 L/s lower than this update had accounted for (0.30%). The downstream pipes are 900mm diameter with capacities of 707 L/s. None of the downstream pipes are running above capacity, therefore there is adequate downstream capacity to service the proposed development. Design sheets from the 1998 Servicing Study update are attached in **Appendix B**.

The proposed development will tie into the existing sanitary sewer in Mountshannon Drive at manhole MS3. The existing sewer is a 300mm diameter pipe with 0.32% slope and a capacity of approximately 57 L/s. Currently there are no additional services (no flow) in this section of sewer.

Block 1, consisting of 16 stacked townhomes will also be serviced into the existing sewer in Mountshannon Drive, between manholes MS3 and MS1. This is the most upstream section of the existing sewer with the only contribution coming from the proposed site. The existing sewer is a 250mm diameter pipe at 0.30% which has a capacity of 34 L/s.

Design calculations for the sewershed are attached in **Appendix B,** and a Sanitary Drainage Area Plan is located in **Appendix E**.

Longfields Central
SANITARY SEWER DESIGN SHEET

AREA			RESIDENTIAL							ICI		INFILTRATION			Total Flow (l/s)	PIPE							
AREA ID	From	To	Towns	Stacked Towns	Java	Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)	C/I Area (Ha)	Peak Flow (l/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)	d/D_{full}	v/V_{full} (%)
645 Longfields Drive																							
C1	C32	109	16			43.2	43.2	4.00	0.70			0.52	0.52	0.15	0.85	200	2.60	65.2	55.17	1.70	1.5%	0.08	33.0%
A20	111	109	4			10.8	10.8	4.00	0.18			0.20	0.20	0.06	0.23	200	2.00	24.9	48.39	1.49	0.5%	0.00	0.0%
A1	109	107	10			27.0	81.0	4.00	1.31			0.29	1.01	0.28	1.60	200	0.50	55.8	24.19	0.75	6.6%	0.16	54.0%
A2	107	105	10			27.0	108.0	4.00	1.75			0.27	1.28	0.36	2.11	200	0.55	35.4	25.38	0.78	8.3%	0.19	60.0%
A3	105	103	6			16.2	124.2	4.00	2.01			0.17	1.45	0.41	2.42	200	1.75	41.8	45.26	1.40	5.3%	0.16	54.0%
A5	121	119	25			67.5	67.5	4.00	1.09			0.70	0.70	0.20	1.29	200	1.00	85.1	34.22	1.06	3.8%	0.12	45.0%
A6,A7	119	117	2		80	149.4	216.9	4.00	3.51			1.10	1.80	0.50	4.02	200	0.35	17.3	20.24	0.62	19.9%	0.30	78.0%
A11,A21	117	115	1			2.7	219.6	4.00	3.56	0.20	0.17	0.28	2.08	0.58	4.31	200	0.35	28.5	20.24	0.62	21.3%	0.30	78.0%
A12	115	113	3			8.1	227.7	4.00	3.69			0.09	2.17	0.61	4.30	200	0.35	18.8	20.24	0.62	21.2%	0.30	78.0%
A4	113	103	21			56.7	284.4	4.00	4.61			0.57	2.74	0.77	5.38	200	0.35	75.5	20.24	0.62	26.6%	0.34	83.0%
A13,A14	103	101	11	10		56.7	465.3	3.99	7.52			0.52	4.71	1.32	8.84	200	0.35	67.9	20.24	0.62	43.7%	0.44	96.0%
	101	MS3				0.0	465.3	3.99	7.52			0.00	4.71	1.32	8.84	200	0.35	13.8	20.24	0.62	43.7%	0.44	96.0%
Existing in Mountshannon Drive																							
A15	MS1	MS3		16		43.2	43.2	4.00	0.70			0.38	0.38	0.11	0.81	250	0.30	75.8	33.98	0.67	2.4%	0.08	33.0%
Connection to EBHT																							
A19	MS3	K2				0.0	508.5	3.97	8.18			0.08	5.17	1.45	9.63	300	0.32	15.5	57.07	0.78	16.9%	0.27	73.0%

Design Parameters:

Avg Flow/Person =	350	l/day
Infiltration =	0.28	l/s/ha
Residential Peaking Factor = Harmon Equation (max 4, min 2)		
Pipe Friction n =	0.013	
Comm./Inst. Flow =	50000	l/ha/day
Peaking Factor Comm./Inst. =	1.5	

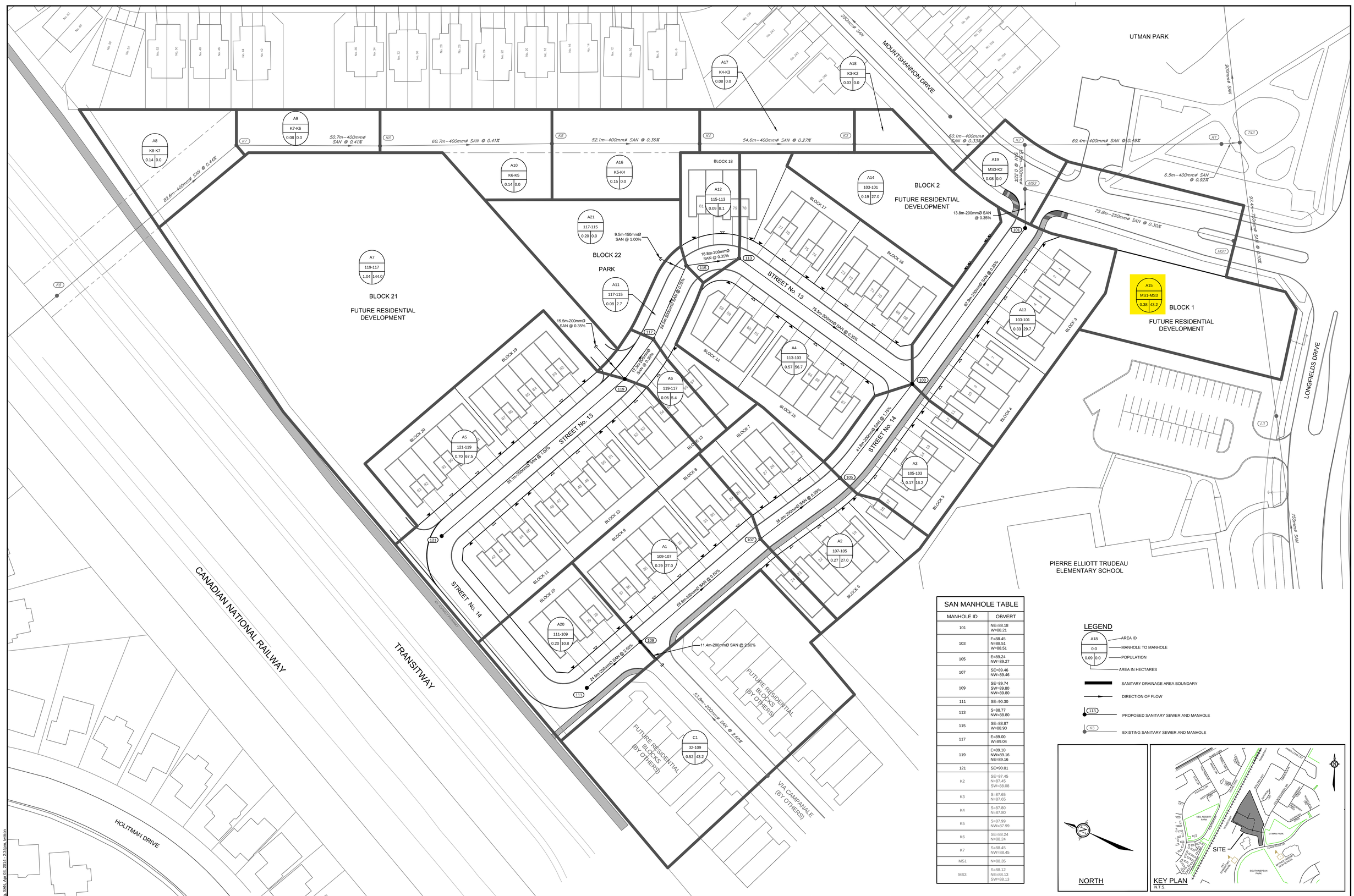
Population Density:

Towns	2.7	ppl/unit
Stacked Towns	2.7	ppl/unit
Java	1.8	ppl/unit

Project: 112021
Designed: LRW
Checked: MAB
Date: April 2, 2014

NOVATECH ENGINEERING CONSULTANTS LTD.

LICENSED PROFESSIONAL ENGINEER
M. A. BISSETT
APR. 3/14
PROVINCE OF ONTARIO



SAN MANHOLE TABLE	
MANHOLE ID	OBVERT
101	NE=88.18 W=88.21
103	E=88.45 N=88.51 W=88.51
105	E=89.24 NW=89.27
107	SE=89.46 NW=89.46
109	SE=89.74 SW=89.80 NW=89.80
111	SE=90.30
113	S=88.77 NW=88.80
115	SE=88.87 W=88.90
117	E=89.00 W=89.04
119	E=89.10 NW=89.16 NE=89.16
121	SE=90.01
K2	SE=87.45 N=87.45 SW=88.08
K3	S=87.65 N=87.65
K4	S=87.80 N=87.80
K5	S=87.99 NW=87.99
K6	SE=88.24 N=88.24
K7	S=88.45 NW=88.45
MS1	N=88.35
MS3	S=88.12 NE=88.13 SW=88.13

LEGEND

- A18 / 0-0 / 0.09 | 0.0 — AREA ID; MANHOLE TO MANHOLE; POPULATION; AREA IN HECTARES
- SANITARY DRAINAGE AREA BOUNDARY
- DIRECTION OF FLOW
- 113 — PROPOSED SANITARY SEWER AND MANHOLE
- K3 — EXISTING SANITARY SEWER AND MANHOLE

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Mattino DEVELOPMENTS INC.
171 CLARIDGE DRIVE
OTTAWA, ON
K2J 5V8

No.	REVISION	DATE	BY
3.	REVISED PER CITY COMMENTS	APR 3/14	MAB
2.	REVISED PLAN OF SUBDIVISION	FEB 14/14	MAB
1.	ISSUED FOR APPROVAL	JUN 07/13	KJM

SCALE 1:500 (1:500, 0 5 10 15 20)

DESIGN LRW | CHECKED MAB | DRAWN DTD | CHECKED MAB | APPROVED JGR

FOR REVIEW ONLY

REGISTERED PROFESSIONAL ENGINEER — J.G. RIDDELL — PROVINCE OF ONTARIO

LICENCED PROFESSIONAL ENGINEER — M.A. BISSETT — APR. 3/14 — PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
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Ottawa, Ontario, Canada
K2M 1P6
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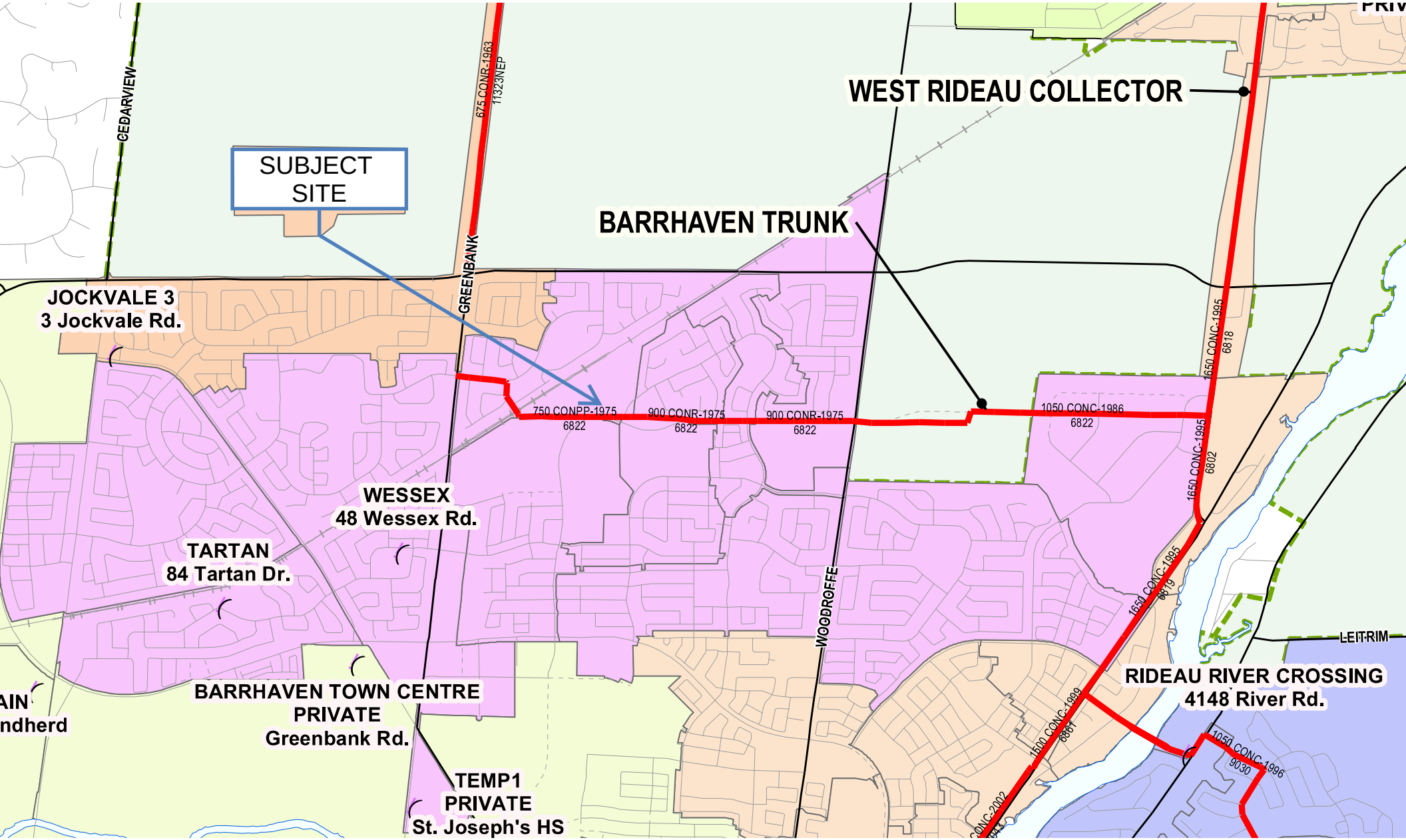
Facsimile (613) 254-5867
Email: novatech@novatech-eng.com

CITY of OTTAWA
LONGFIELDS CENTRAL
591 LONGFIELDS DRIVE

SANITARY DRAINAGE AREA PLAN

PROJECT No. 112021
REV REV # 3
DRAWING No. 112021-SAN

CITY OF OTTAWA - SANITARY TRUNK SEWERS AND COLLECTION AREAS



APPENDIX D

Stormwater Management

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.011 ha
C 0.69 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}^* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
11.8	95.6	2.0	2.0	0.0	0.0	163.7	4.2	4.2	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m^3)	100-Year Release Rate (L/s)	100-Year Storage (m^3)
Unattenuated Areas	1.96	0.0	4.19	0.0
Total	**2.0**	**0.00**	**4.2**	**0.00**

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Target Flow Rate

Area 0.208 ha

Minor System Flow

Q	28.8	L/s/ha	*Release rate and storage volume required based on Longfields Concentral Site Servicing and Stormwater Management Study prepared by Novatech Engineering Consultants Ltd.
Q	6.0	L/s	
Volume Required	100.0	m^3/ha	
Volume Required	20.8	m^3	

Estimated Post Development Peak Flow from Attenuated Areas

Area ID A2

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage	**Ponding**	**h_o**	**delta d**	**V***	**V_{acc}****	**$Q_{release}$†**	**$V_{drawdown}$**
	(m)	**(m^2)**	**(m)**	**(m)**	**(m^3)**	**(m^3)**	**(L/s)**	**(hr)**
Orifice INV	90.96		0.00			0.0	0	0.00
Storage Pipe SL	91.06		0.10	0.10	0.0	0.0	0.5	0.01
Storage Pipe OBV	91.16		0.20	0.10	0.0	0.0	0.6	0.01
T/L 1	92.55	0.4	1.59	1.39	6.0	6.0	0.6	2.79
0.05m Ponding & T/L 2	92.60	14.2	1.64	0.05	0.3	6.3	1.7	1.03
0.14m Ponding	92.70	154.3	1.74	0.10	7.2	13.5	1.75	2.14
0.22m Ponding	92.77	271.0	1.81	0.07	14.7	28.2	1.8	4.35

* V=Incremental storage volume

**V_{acc}=Total surface and sub-surface

† $Q_{release}$ = Release rate calculated from Tempest LMF Curve

Orifice Location **CB4&CB5** **Dia** LMF40

Total Area 0.117 ha

C 0.77 Rational Method runoff coefficient

	5-year				
t_c	**i**	**Q_{actual}‡**	**$Q_{release}$**	**Q_{stored}**	**V_{stored}**
(min)	**(mm/hr)**	**(L/s)**	**(L/s)**	**(L/s)**	**(m^3)**
10	104.2	25.9	1.8	24.1	14.5
15	83.6	20.8	1.8	19.0	17.1
20	70.3	17.5	1.8	15.7	18.8
25	60.9	15.1	1.8	13.4	20.0
30	53.9	13.4	1.8	11.6	20.9
35	48.5	12.1	1.8	10.3	21.6
40	44.2	11.0	1.8	9.2	22.1
45	40.6	10.1	1.8	8.3	22.5
50	37.7	9.4	1.8	7.6	22.7
55	35.1	8.7	1.8	6.9	22.9
60	32.9	8.2	1.8	6.4	23.1
65	31.0	7.7	1.8	5.9	23.1
70	29.4	7.3	1.8	5.5	23.2
75	27.9	6.9	1.8	5.2	23.2
80	26.6	6.6	1.8	4.8	23.1
85	25.4	6.3	1.8	4.5	23.1
90	24.3	6.0	1.8	4.3	23.0
95	23.3	5.8	1.8	4.0	22.9
100	22.4	5.6	1.8	3.8	22.7
105	21.6	5.4	1.8	3.6	22.6
110	20.8	5.2	1.8	3.4	22.4

5-year $Q_{attenuated}$ **1.78 L/s**
5-year Max. Storage Required **23.2 m^3**
Est. 5-year Storage Elevation **92.73 m**

Mattino Developments Inc.
285 Mountshannon Drive - Block 1
Proposed Conditions
(Minor System Flow - Flow to Municipal Sewers)

Estimated Post Development Peak Flow from Attenuated Areas

Area ID A1

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage	**Ponding**	**h_o**	**delta d**	**V***	**V_{acc}****	**$Q_{release}$†**	**$V_{drawdown}$**
	(m)	**(m^2)**	**(m)**	**(m)**	**(m^3)**	**(m^3)**	**(L/s)**	**(hr)**
Orifice INV	90.64		0.00			0.0	0	0.00
Storage Pipe SL	90.74		0.10	0.10	0.0	0.0	1.2	0.00
Storage Pipe OBV	90.84		0.20	0.10	0.0	0.0	1.5	0.00
T/L	92.09	0.4	1.45	1.25	0.2	0.2	4	0.01
0.10m Ponding	92.19	25.1	1.55	0.10	1.0	1.1	4.1	0.08
0.20m Ponding	92.29	95.4	1.65	0.10	5.6	6.8	4.2	0.45
0.23m Ponding	92.32	121.7	1.68	0.03	3.2	10.0	4.2	0.66

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† $Q_{release}$ = Release rate calculated from orifice equation

Orifice Location **CB1** **Dia** LMF65
Total Area 0.080 ha
C 0.77 Rational Method runoff coefficient

	5-year				
t_c (min)	**i (mm/hr)**	**Q_{actual}‡ (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**
10	104.2	17.8	4.2	13.6	8.2
15	83.6	14.3	4.2	10.1	9.1
20	70.3	12.0	4.2	7.8	9.4
25	60.9	10.4	4.2	6.2	9.3
30	53.9	9.2	4.2	5.0	9.0
35	48.5	8.3	4.2	4.1	8.6
40	44.2	7.6	4.2	3.4	8.1
45	40.6	6.9	4.2	2.7	7.4
50	37.7	6.4	4.2	2.2	6.7
55	35.1	6.0	4.2	1.8	6.0
60	32.9	5.6	4.2	1.4	5.2
65	31.0	5.3	4.2	1.1	4.3
70	29.4	5.0	4.2	0.8	3.5
75	27.9	4.8	4.2	0.6	2.6
80	26.6	4.5	4.2	0.3	1.6
85	25.4	4.3	4.2	0.1	0.7
90	24.3	4.2	4.2	0.0	0.0
95	23.3	4.0	4.0	0.0	0.0
100	22.4	3.8	3.8	0.0	0.0
105	21.6	3.7	3.7	0.0	0.0
110	20.8	3.6	3.6	0.0	0.0

5-year $Q_{attenuated}$ **4.20 L/s**
5-year Max. Storage Required **9.4 m^3**
Est. 5-year Storage Elevation **92.31 m**

Summary of Release Rates and Storage Volumes

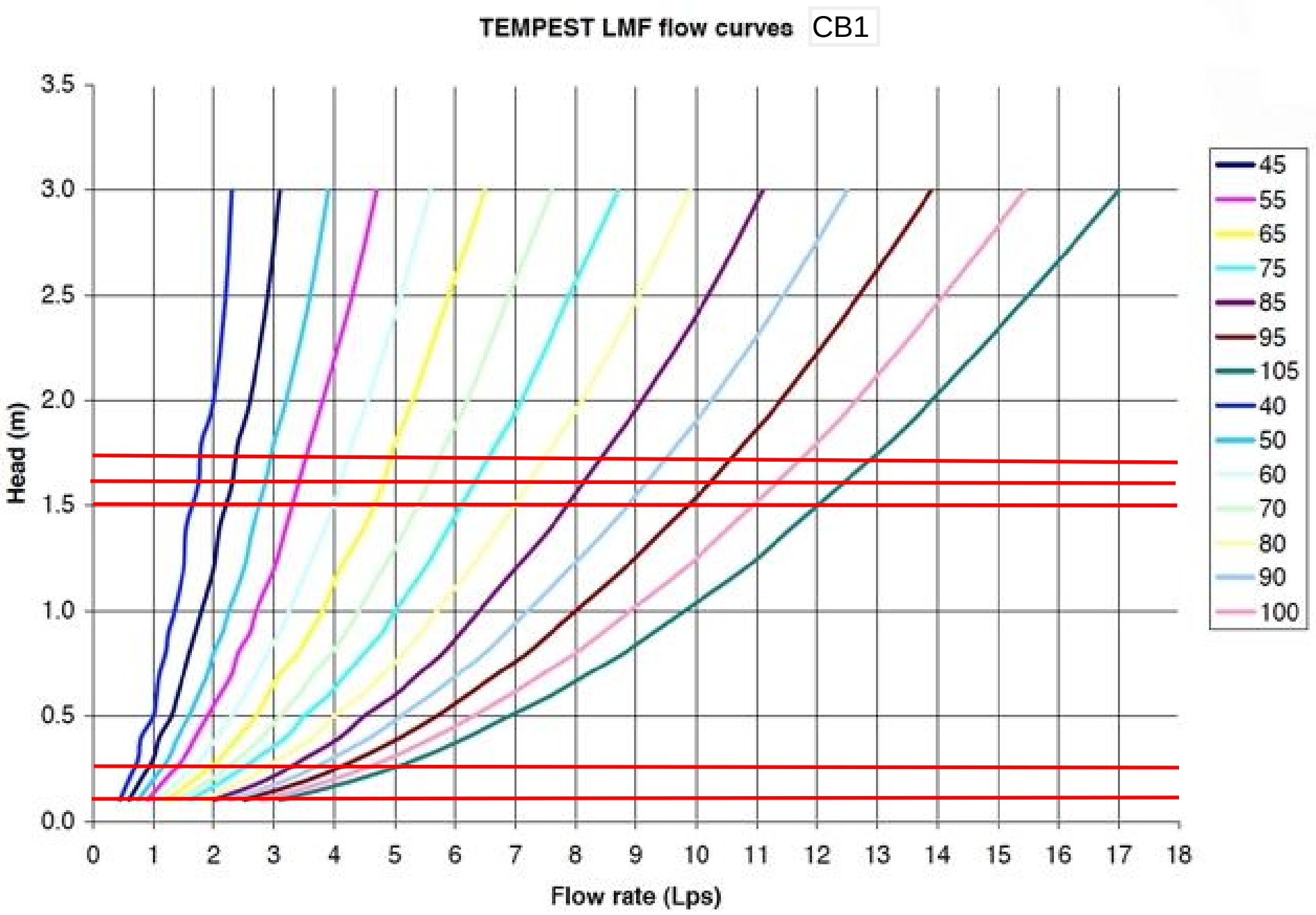
Control Area	**5-Year Release Rate (L/s)**	**5-Year Required Storage (m^3)**	**Available Storage (m^3)**
A1 (CB1)	4.2	9.4	10.0
A2 (CB4/CB5)	1.8	23.2	28.2
Total	**6.0**	**32.6**	**38.2**

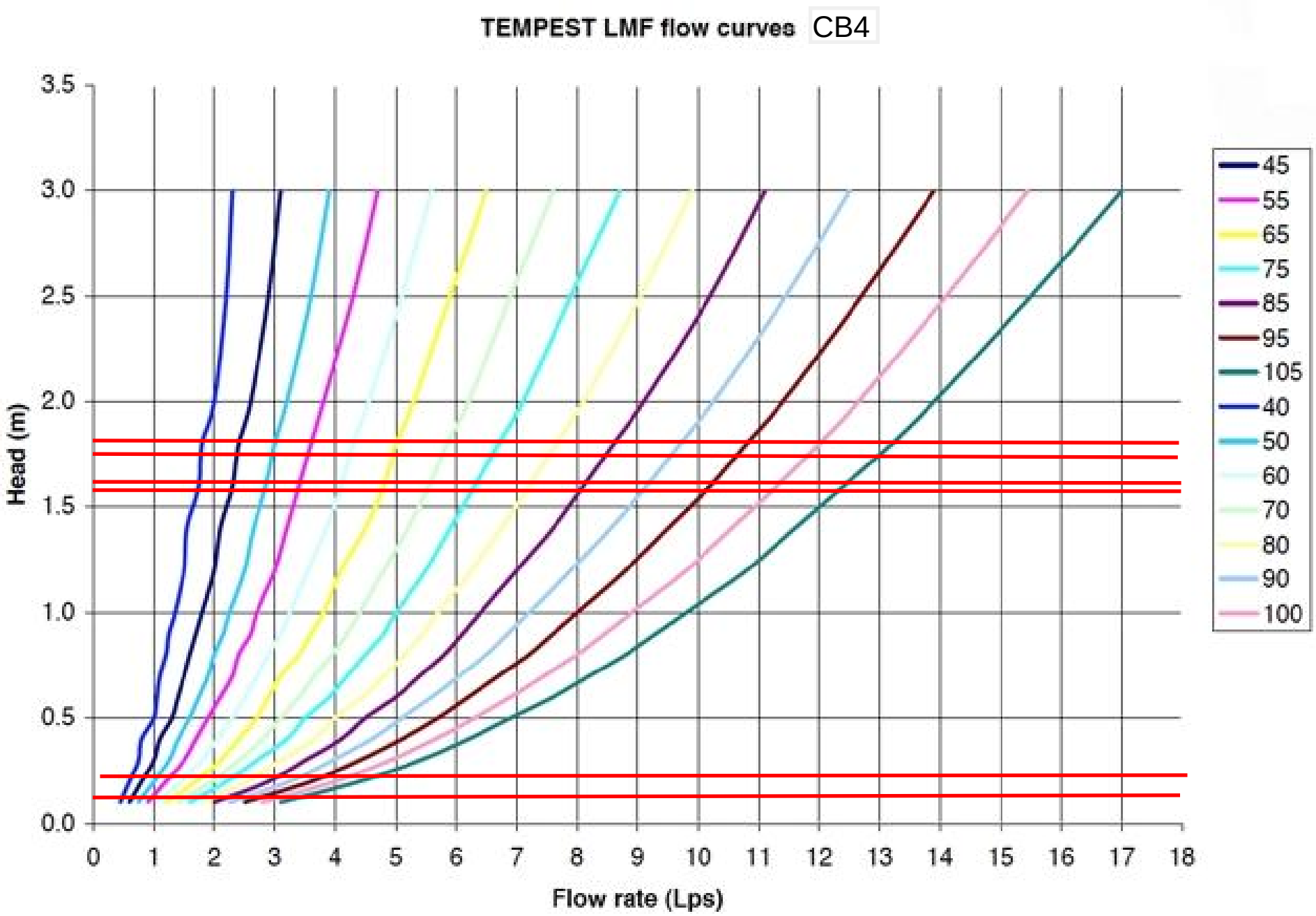
										Sewer Data								
Area ID	**Up**	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
			(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
A2	CB5	CB4	0.117	0.77	0.09	0.09	10.0	104.2	25.9	200	1.00	9.8	0.031	0.050	1.04	32.8	0.2	0.79
	CB4	MH102			0.00	0.09	10.2	103.4	25.7	200	1.00	11.6	0.031	0.050	1.04	32.8	0.2	0.78
	MH102	MH101			0.00	0.09	10.3	102.4	25.5	250	0.50	45.9	0.049	0.063	0.86	42.0	0.9	0.61
							11.2											
A1	CB1	MH101	0.080	0.77	0.06	0.06	10.0	104.2	17.8	200	1.00	3.7	0.031	0.050	1.04	32.8	0.1	0.54
							10.1											
	MH101	EX. STM			0.00	0.15	11.2	98.1	41.2	250	1.00	40.0	0.049	0.063	1.21	59.5	0.6	0.69
							11.8											

A1	**Imp.**	**Perv.**	**Total**
Area	0.065	0.015	0.080
C	0.9	0.2	0.77

A2	**Imp.**	**Perv.**	**Total**
Area	0.095	0.022	0.117
C	0.9	0.2	0.77

U1	**Imp.**	**Perv.**	**Total**
Area	0.007	0.003	0.011
C	0.9	0.2	0.69


TEMPEST LMF flow curves
CB1
Head (m)
Flow rate (Lps)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
45
55
65
75
85
95
105
40
50
60
70
80
90
100


TEMPEST LMF flow curves CB4
Head (m)
Flow rate (Lps)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
45
55
65
75
85
95
105
40
50
60
70
80
90
100

LONGFIELDS CENTRAL
SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Novatech Engineering Consultants Ltd.
April 3rd, 2014

4.0 STORMWATER MANAGEMENT DESIGN

The stormwater management criteria for the proposed development was prepared in accordance with the City of Ottawa Sewer Design Guidelines (October 2012) and the Longfields Davidson Heights Serviceability Study Update Report (1998).

4.1 Storm Drainage/ Conveyance

- Storm sewers will be designed to convey the 1:5 year post-development peak flow for the proposed development
- Overland flows are to be confined within the right-of-ways and/or defined drainage easements for all storms up to the 1:100 year event.
- ICD flow rates are to be calculated for each drainage area to ensure that the following stormwater management (SWM) objectives are satisfied with respect to the 1998 Serviceability Study Update Report (1998) and City of Ottawa Design Guidelines:
    - Flow into the minor system will be controlled to a maximum of 64 L/s/ha where available;
    - Road sags will be designed to allow a maximum ponding depth of 0.25m;
    - Rearyard swales will be designed to allow a maximum static ponding depth of 0.30m;
    - Surface storage in backyards will be accounted for in design computations;
    - Provide total on-site storage (right-of-ways, rearyards, parking lots, rooftop, underground, etc.) of 100 m^3/ha;
    - Maximum flow depths and elevations on streets shall not exceed 300 mm and shall be confined to the road right-of-way and shall not be within 300 mm (vertical) to the nearest building opening.
        - The maximum flow depth on streets (both public and private and on parking lots) under either static or dynamic conditions shall be 300 mm;
    - The product of the 100 year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.6;
    - The 100 year hydraulic grade line within the storm sewers shall not be within 30 cm (vertical) to adjacent building underside of footing;
    - A set downstream HGL of 90.54m at MH 100 will govern the 100-yr HGL throughout the site;
    - A set downstream HGL of 89.92m within the storm trunk will govern the 100-yr HGL at the inlet lead from RYCB-10
    - Major system flow leaving the site will convey along Mountshannon Drive and stored as surface storage in the existing major system outlet of SWM Park 959.

4.2 Storm Sewer Design (Minor System)

The minor system flows from the Longfields Central Development is conveyed through Street 14 and outlets into the existing 1350mm trunk sewer through Manhole MH100 at Mountshannon Drive. The minor system from the large grassed area along the northern section of the site will outlet into the existing 1350mm trunk between Manhole MHT-2 and MHT-3. The overall layout of the proposed storm sewer network is shown on **Figure 4.1**

The proposed storm sewers have been designed using the Rational Method and design sheets are located in **Appendix B.** The corresponding Storm Drainage Area Plan (Drawing 112021-STM) is provided in **Appendix E.** The design criteria used in sizing the storm sewers are summarized in **Table 4-1**.

Table 4-1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	5 Year Return Period
Storm Sewer Design	Rational Method/AutoDesk Storm Analysis
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Time of Concentration (T_c)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

4.2.1 Inlet Control Devices

Inlet control devices (ICD's) will be installed in all road and rearyard catchbasins to limit the inflows to the minor system during all storm events. Catchbasin leads will typically be interconnected with a single ICD controlling inflow to the storm sewer.

Inlet control devices are proposed at all storm sewer inlets within the roadways and rearyards to ensure inflows to the storm sewer system are regulated to 64 L/s/ha. Inlet control devices shall be a combination of CB lead plug/insertion type and Vortex units based on the allowable flow entering the minor system for each sub-catchment. ICD plug sizes are to be selected from the approved Ottawa standards for round orifices (83mm, 94mm, 102mm, 108mm, 127mm, 152mm, 178mm) and Vortex units based on the ICD curves in the Ottawa Sewer Design Guidelines Appendix 7-C.

4.3 Overland Flow Path (Major System)

The right-of-ways have been designed to convey runoff from storms that exceed the allowable flow into the minor system. The road profiles have been graded to ensure that the 100-year peak overland flows are confined within the right-of-way at a maximum static flow depth of 0.30m (static ponding + cascading flow). The major system has been designed to ensure that the product of velocity x depth does not exceed 0.60 during the 100-year event.

4.4 Offsite Major System Storage - SWM PARK 959

It is proposed that all overland major system flow leaving the Longfields Central development will be accommodated as surface storage in the SWM Park 959 located at the intersection of Mountshannon Drive and Longfields Drive as specified in the *Servicing Report for Longfields Development (David McManus Engineering, Revised June 2007).*

4.5 Infiltration Best Management Practices

Lot level and infiltration best management practices (BMPs) will be used to mitigate against the potential reduction in infiltration resulting from development. Proposed BMPs for groundwater infiltration include:

- Roof leaders will be directed to rearyard areas.

By implementing infiltration BMPs as part of the storm drainage design, the impacts of development on the hydrologic cycle can be considerably reduced. Infiltration of clean runoff will have additional benefits for stormwater management.

Table 5-4: Longfields Central Development SWM Breakdown (100-year storm event)

Description	Area	Minor System Flow		Total Static Ponding		Major System Flow
	(ha)	(L/s)	(L/s/ha)	(m^3)	(m^3/ha)	(L/s)
High Density Residential						
Block 1 (A-29)	0.21	6.0	28.8	20.8	100.0	94.3
Block 2 (A-30)	0.15	9.6	63.9	25.0	166.7	10.3
Block 21(A-2a/b)	1.00	37.6	37.5	270.0	270.0	38.7
Medium Density Residential						
Medium-Density	3.63	257.0	70.7	186.4	51.3	314.9
Total	**4.99**	**310.1**	**62.1**	**502.2**	**100.6**	**458.4**

Table 5-5: Longfields Central SWM Summary (100-yr storm event)

Description	Area	Minor System Flow		Total Static Ponding		Major System Flow
	(ha)	(L/s)	(L/s/ha)	(m^3)	(m^3/ha)	(L/s)
Longfields Central Development	4.99	310.1	62.1	502.2	100.6	458.4
*Campanale Dev. Controlled (A-22,31,32)	0.66	42.2	64.0	27.4	41.5	194.2
*Campanale Dev. Uncontrolled (A-17,18)	0.11	-	-	-	-	40.2
*Campanale Dev. Major Overland (A-33)	0.23	-	-	2.3	9.9	45.4
Total to Mountshannon Drive	**5.99**	**352 L/s**	**-**	**-**	**-**	**738 L/s**
****Total Overland Flow into SWM Park 959**	**-**	**-**	**-**	**-**	**-**	**535 L/s**

**Values as per approved Campanale Homes Development taken from Longfields Subdivision (Stantec – 2013)*
*** Dynamic Flow taken from the Autodesk SSA Model (Chicago 100-yr 4 Hour Event)*

Please note in Table 5.5. that the total overland flow into the existing SWM Park 959 is less than the total flow to Mount Shannon Drive from the site due to the dynamic flow routing though Mountshannon Drive and surface storage located at the sag (CB X2-X3) adjacent to SWM Park 959 along Mountshannon Drive.

Results provided above show that the minor system flow leaving the Longfields Central Development is being controlled to 64 L/s/ha as required in the Longfields Davidson Heights Serviceability Study Update Report (1998). A significant amount of major system overland flow is conveyed onto Mountshannon Drive from the Longfields Central development. This is due to the constraint on the minor system inlets through the site and also the large amount of major system flow contributing from the adjacent Campanale Homes development areas.

5.4.4 Major System Outlet – SWM PARK 959

A weighted average runoff coefficient *(C-Value)* for detailed design of the Longfields Central Development site *(4.99 ha)*, based on the parameters stated in Table 5.1 was calculated to be 0.62 *(60.0% IMP).* This updated C-Value was determined to be above the assumed C-Value provided in the Longfields Davidson Heights SWM Park 959 Modeling Update completed by Stantec Engineering *(March 1, 2013)*. The Stantec model update estimated an overall sub-catchment area *(Area ID-23)* of 5.75 ha and runoff coefficient of 0.55. A decrease in area and

increase in imperviousness within the development has changed from the most recent Stantec SWM Model of Park 959 *(March 1, 2013)*.

Modeling updates completed by Stantec Engineering *(March 1, 2013)* for the SWM Park 959 have been completed to address the need for more storage during complete development of the Longfields Davidson Heights area.

To approximate the major system flow differences between the Stantec estimation and the detailed design of the Longfields Central Development by Novatech, the total area of the development site was multiplied by the weighted C-value to get a value that is initially used within the rational method equation. Because no detailed hydrologic modeling is being completed by Novatech for the total tributary areas to SWM Park 959 and Novatech currently does not have the hydrologic model of SWM Park 959, this calculation should suffice in approximating how close the estimated and detailed design major system flows are to each other based on strictly the weighted parameters of the site. The calculations are as follows:

Stantec (March 1, 2013) Design:	Novatech Engineering Detailed Design:
Area (ha) = 5.75 ha	Area (ha) = 4.99 ha
C-Value = 0.55	C-Value = 0.62
A x C = 3.16	A x C = 3.09

It has been determined that Stantec assumed more conservative parameters for the Longfields Central Development than what the detailed design has computed. Therefore, more overland major system flow into SWM Park 959 was computed by Stantec from the subject site than the flow provided within the detailed design by Novatech Engineering in this report. The hydrologic analysis of SWM Park 959 is therefore adequate in representing the Longfields Central Development and no further analysis is required.

5.4.5 Future Development Blocks

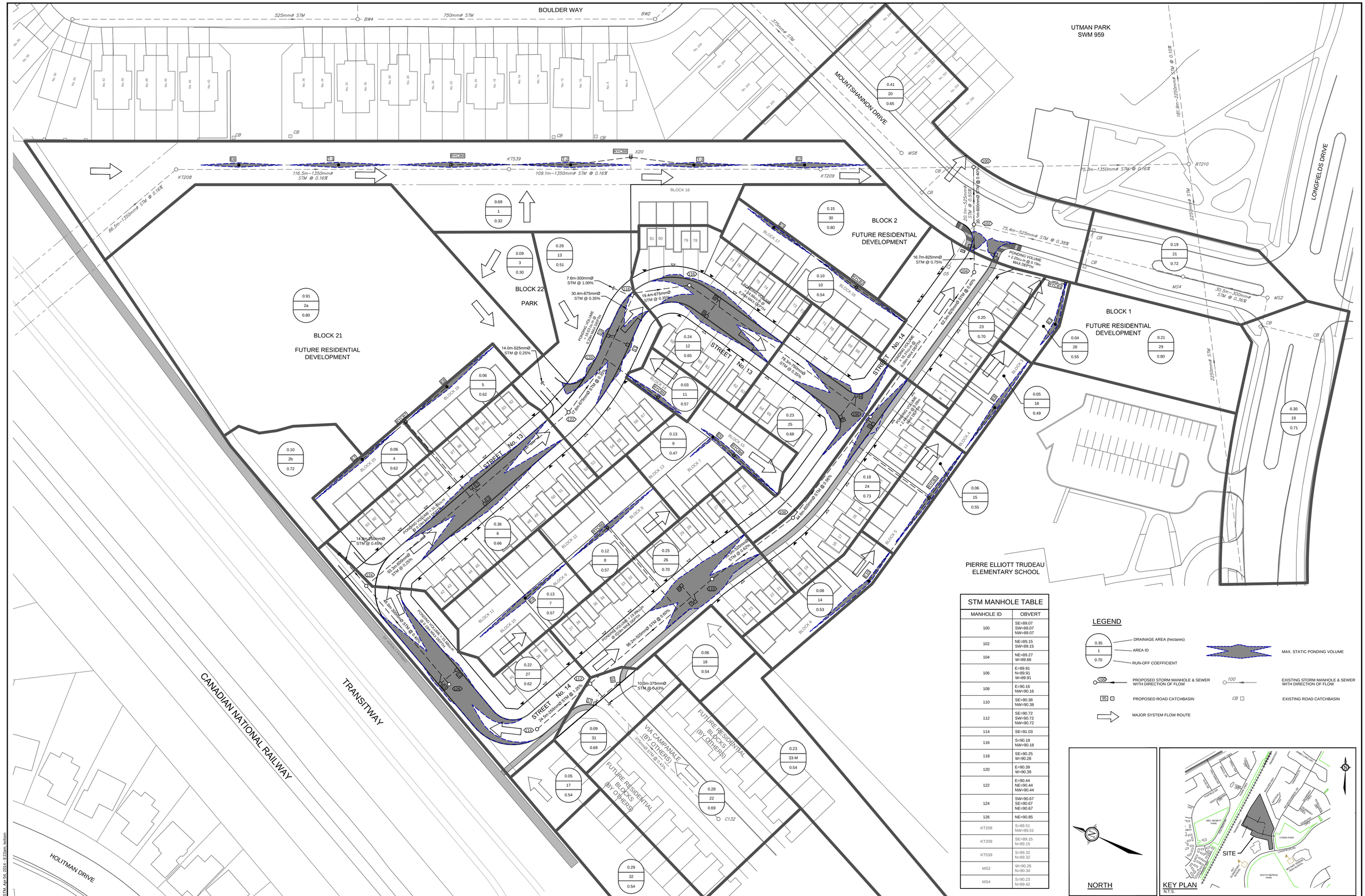
During detailed design of the Longfields Development, it was determined that the medium density residential area is unable to provide the 64 L/s/ha and 100 m^3/ha through storage within the roadway and rearyard areas as requested in the *Longfields Davidson Heights Serviceability Study Update Report (1998)*. To achieve the guidelines set out in the Longfields Davidson Heights Serviceability Study Update Report (1998) throughout the development, the following high unit residential blocks will be restricted to the design criteria provided below:

Block 1 (0.21 ha)

- Restricted minor system flow of 6.0 L/s (28.8 L/s/ha)
- On-Site storage of 20.8 m^3 (100 m^3/ha)

Block 2 (0.15 ha)

- Restricted minor system flow of 9.6 L/s (64 L/s/ha)
- On-Site storage of 25 m^3 (167 m^3/ha)



STM MANHOLE TABLE	
MANHOLE ID	OBVERT
100	SE=89.07 SW=89.07 NW=89.07
102	NE=89.15 SW=89.15
104	NE=89.27 W=89.66
106	E=89.91 N=89.91 W=89.91
108	E=90.16 NW=90.16
110	SE=90.38 NW=90.38
112	SE=90.72 SW=90.72 NW=90.72
114	SE=91.03
116	S=90.18 NW=90.18
118	SE=90.25 W=90.28
120	E=90.39 W=90.39
122	E=90.44 NE=90.44 NW=90.44
124	SW=90.67 SE=90.67 NE=90.67
126	NE=90.85
KT208	S=89.51 NW=89.51
KT209	SE=89.15 N=89.15
KT539	S=89.32 N=89.32
MS2	W=90.26 N=90.34
MS4	S=90.23 N=89.42

LEGEND

- DRAINAGE AREA (hectares) / AREA ID / RUN-OFF COEFFICIENT
- MAX. STATIC PONDING VOLUME
- PROPOSED STORM MANHOLE & SEWER WITH DIRECTION OF FLOW
- EXISTING STORM MANHOLE & SEWER WITH DIRECTION OF FLOW
- PROPOSED ROAD CATCHBASIN
- EXISTING ROAD CATCHBASIN
- MAJOR SYSTEM FLOW ROUTE

NORTH

KEY PLAN
N.T.S.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Mattino DEVELOPMENTS INC.
171 CLARIDGE DRIVE
OTTAWA, ON
K2J 5V8

No.	REVISION	DATE	BY
3.	REVISED PER CITY COMMENTS	APR 03/14	MAB
2.	REVISED PLAN OF SUBDIVISION	FEB 14/14	MAB
1.	ISSUED FOR APPROVAL	JUN 07/13	KJM

SCALE
1:500
1:500
0 5 10 15 20

DESIGN: LRW
CHECKED: MAB
DRAWN: DTD
CHECKED: MAB
APPROVED: JGR

FOR REVIEW ONLY

REGISTERED PROFESSIONAL ENGINEER
J.G. RIDDELL
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M.A. BISSETT
APR. 3/14
PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novatinfo@novatech-eng.com

CITY of OTTAWA
LONGFIELDS CENTRAL
591 LONGFIELDS DRIVE

STORM DRAINAGE AREA PLAN

PROJECT No. 112021
REV REV # 3
DRAWING No. 112021-STM

M:\2012\112021\CAD\Design\112021-STM.dwg, STM, Apr 04, 2014 - 8:23am, Nelson

FILENAME: 112021-STM.dwg

HP

HP

XHYD4

XVB4

XVB3

X7

SIDEWALK

MOUNTSHANNON DRIVE

100mmØ WM

400mmØ WM

400mmØ WM

75.8m-250mmØ SAN @ 0.30%

75.4m-525mmØ STM @ 0.38%

MS1

MS4

MS2

SIDEWALK

X6

250mmØ STM

X5

X4

150mmØ STM

135mmØ SAN (TYP.)

19mmØ WTR (TYP.)

BLOCK 1

FUTURE RESIDENTIAL
STACKED TOWNS

185.5m-225Ømm Ø STM @ 0.10%

97.4m-750mmØ SAN @ 0.10%

400mmØ WM

LONGFIELDS DRIVE

50mmØ WM

200mmØ SAN

CBMH1

19mmØ WTR (TYP.)

135mmØ SAN (TYP.)

150mmØ
FOUNDATION
DRAIN

150mmØ STM

CBMH2

HP

SANMH1

SANMH2

200mmØ SAN

G

50mmØ WM

1

2

3

4

BLOCK 3

PIERRE ELLIOTT TRUDEAU
ELEMENTARY SCHOOL

M:\2012\112021\CAD\Design\Figures\Design Sketch\112021-DSK2.dwg, DSK2-1, Oct 18, 2013 - 11:28am, lwilson

NOVATECH
ENGINEERING
CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

LONGFIELDS CENTRAL
591 LONGFIELDS DRIVE

BLOCK 1
PROPOSED SERVICING

SCALE 1:300 (0 3 6 9 12)

DATE OCT 18/13 | JOB 112021 | FIGURE DSK2-1

STANTEC 2002 UPDATE

HGL Analysis

August 12th , 2002

File: 634 00365

Jean Lachance, P.Eng.
Program Manager, Infrastructure Approvals (South Ottawa)
Development Services Department
City of Ottawa
2 Constellation Drive, 5th floor
Nepean, On, K2G 5J9

Dear Mr. Lachance

Reference: ***Update to Longfields / Davidson-Heights model***

Further to our July 19th, 2002 memo to Larry Erion (DSD) and Chris Rogers (TUPW) regarding changes to the above noted model, please find herein a summary of the modifications that were undertaken as well as a revised drainage area map, SWM pond summary and HGL summary.

Changes to DDSWMM Model:
The latest DDSWMM version (LDJLY-15.dat) was obtained from the Infrastructure Branch of TUPW. The model was modified to reflect to following changes:

- The major flow from Area 85 now drains to Area 51 and eventually to pond 998 (along Beatrice Dr.) as opposed to draining to pond 198, which is also the culvert on Woodroffe Avenue .

- Area 78 now drains to Area 77 and eventually to pond 998 on Beatrice Drive. This area also used to drain to pond 198 on Woodroffe Avenue.

- It was noted that in the current DDSWMM version, pond 997 (at Beatrice and Claridge) was removed and all areas draining to it were re-routed to pond 998 (on Beatrice, north of Claridge). This change was confirmed by Larry Erion.

- The overland areas draining to pond 198 (Woodroffe culvert) consist of areas 50 and 87 for a total drainage area of 11.14 ha.

- Areas 943 and 944, that consists of Woodroffe avenue between Claridge Drive and Fallowfield Road, were halved since half of Woodroffe avenue will drain to roadside ditches (and eventually into a ravine). The area of Woodroffe that

drains to the minor system was modified to reflect the actual number of Catchbasins (as per the McCormick Ranking Drawings) and the catchbasins were modified to simulate actual CBs with a maximum capture of 50 L/s (as opposed to 19.8 L/s from regular CBs with ICDs).

All changes are documented in the model. The model has been saved as version 16 (LDJLY-16.txt). The revised drainage area map that was produced by TUPW has been revised to reflect the above noted changes. The map is appended herein.

Impact on Woodroffe Avenue Culvert:

The proposed 600 mm dia concrete culvert on Woodroffe Avenue (between Claride Drive and Longfields Drive) was reviewed base on the revised analysis. The original DDSWMM analysis estimated the peak flow at this location to be approximately 3.34 cms. The modifications to the major system have reduced this peak flow to 1.55 cms.

Using the profile information provided by McCormick Ranking, the 600 mm dia culvert will have the following specifications:

- Culvert Dia = 600 mm
- Culvert length = 45 m
- Inlet at 90.48, outlet at 90.35 , slope of 0.29%

The analysis was undertaken using the Environment Canada culvert program. In order to pass the 1.55 cms flow without overtopping the roadway, **twin 600 mm diameter concrete culverts will be required**. The maximum upstream WL will be 92.45 m.

Impact on Pond 998 (Beatrice Drive):

Since more flow is now being diverted to the Beatrice Drive Pond, we have reviewed the required volume for this pond. The total area draining to Pond 998 now consists of 46.05 ha as opposed to 29.73 ha outlined in Appendix J of the 1998 study. The new required volume for this facility is 3656 m3 with a corresponding area of 0.55 ha (assuming a depth of 0.7 m).

We have revised appendix J and have appended it to this letter for your information.

Impact on Minor System (Changes to XP-SWMM model):

The latest XP-SWMM version (LDHNOV15.XP) was obtained from the Infrastructure Branch of TUPW. The revised output from the modified DDSMMM model was interfaced with the XP-SWMM model and a new run was done to obtain new results.

The analysis shows that the HGL has not increased due to the changes to Woodroffe Avenue. Actually, the results show a slight decrease in HGL attributable most likely to the timing of the uncontrolled flow from Woodroffe Avenue.

A new 100 year HGL table has been prepared and is appended to this letter. Please note that most of the changes to the HGL from the original table are due to changes in pipe inverts, lenghts and locations. **It is therefore critical that inverts (or obverts) or proposed or as-built drawings be checked against the model to ensure that HGL are realistic. It may be necessary to revise the model again to reflect what is being proposed.**

We have also included for your information a revised drainage area map that shows the latest drainage area boundaries.

If you have any questions regarding the above, please do not hesitate to contact the undersigned at 724-4085.

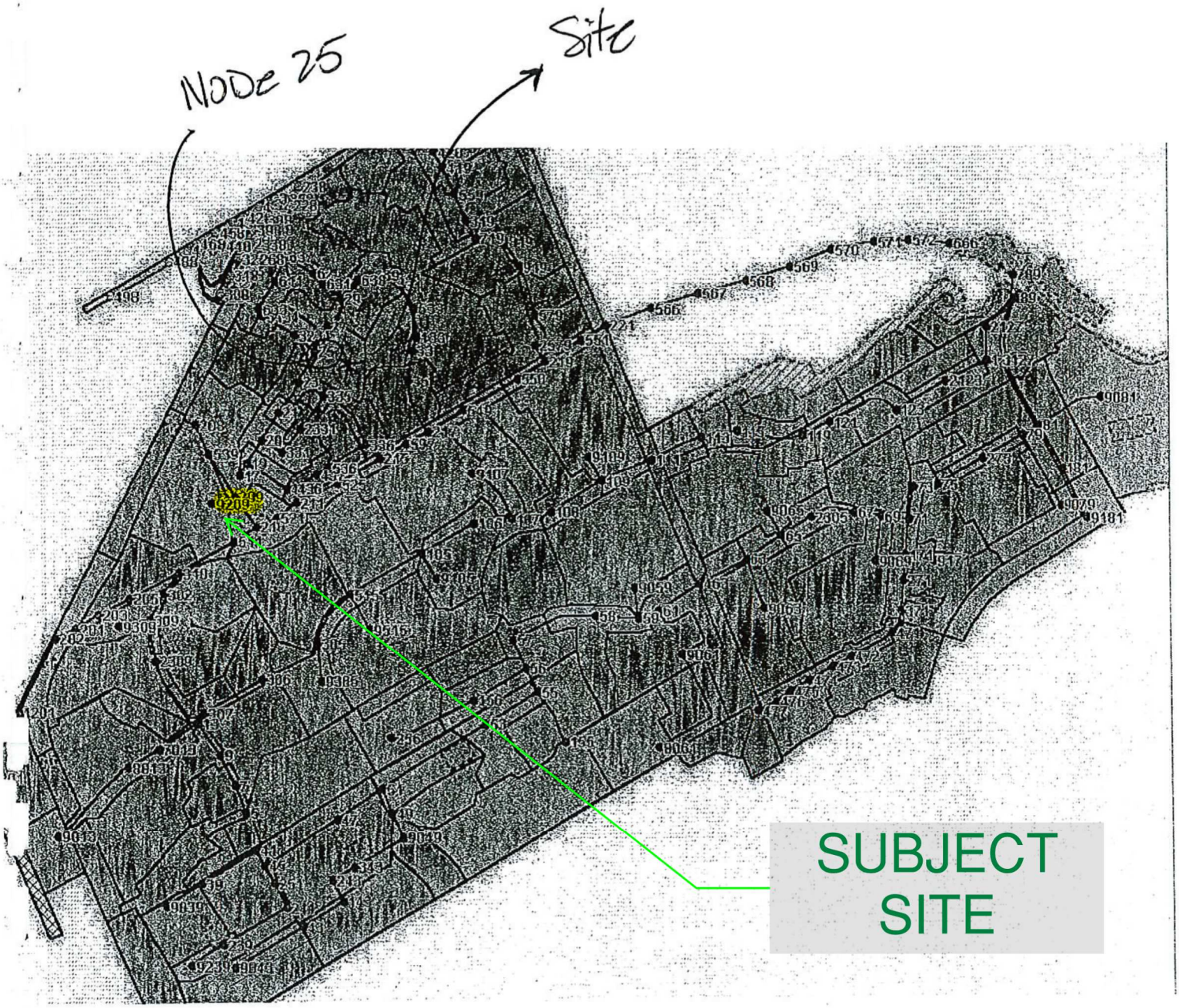
Yours very truly,

STANTEC CONSULTING LTD.

Eric M. Tousignant, P.Eng.
Senior Environmental Engineer

Revised HGL Table (Aug 2002)
Longfields Davidson Heights

Junction Name	Ground Elevation meters	Obvert Elevation meters	Nov 01 version 100 yr HGL meters	Aug 02 version 100 yr HGL meters
638	92.14	88.631	90.1231	90.0813
419	92.06	89.63	89.4739	89.391
559	91.98	89.47	89.4165	89.3237
319	91.88	89.13	89.3557	89.2663
719	91.96	88.989	89.2727	89.1854
541	92.38	88.4	90.0002	89.9579
31	91.56	88.299	89.9187	89.8761
533	92.9	88.169	89.8934	89.8506
33	91.8	87.972	89.8414	89.7986
35	92.19	87.802	89.7716	89.7286
217	92.1	88.276	89.5137	89.4701
819	91.8	88.652	88.9684	88.8981
919	92.4	88.304	88.6794	88.6211
579	92.3	88.164	88.5978	88.5399
111	92.75	87.803	88.3425	88.3329
463	92.5	88.761	89.5013	89.5398
525	92.65	88.696	89.9692	89.934
215	92.2	88.486	89.6761	89.6356
210	92.5	89.273	90.2822	90.254
209	92.69	89.12	90.6863	90.6571
539	92.959	89.24	90.9224	90.8932
208	92.8	89.42	91.1697	91.1406
211	92.89	88.906	90.1189	90.0869
17	92.6	89.533	90.2589	90.2236
19	92.5	89.445	90.2427	90.2074
435	92.65	89.247	90.1453	90.1102
436	92.65	88.987	90.1156	90.0804
437	92.65	88.779	90.0693	90.0342
23	92.6	89.962	90.2522	90.2172
335	92.65	89.129	90.1832	90.1481
336	92.5	88.874	90.1045	90.0693
536	92.96	88.719	90.0515	90.0162
331	92.65	89.498	90.231	90.196
20	92.6	90.111	90.2916	90.2564
21	92.8	90.152	90.283	90.2481
2331	92.6	89.361	90.2155	90.1805
25	92	89.567	90.3021	90.2671
27	92.2	89.732	90.3505	90.3156
2579	92.3	87.904	88.5004	88.442
219	92.8	87.756	88.4566	88.3976
550	92.5	87.966	88.8387	88.7857
549	92.45	88.176	89.2262	89.1788
221	91.1	87.503	87.7226	87.6697


Node 25
Site
SUBJECT SITE

APPENDIX E

Supporting Documentation

patersongroup **memorandum**

consulting engineers

re: **Geotechnical Responses to City Comments**
Proposed Residential Development
Blocks 1 and 2 - 255 and 285 Mountshannon Drive - Ottawa

to: Mattino Homes - **Mr. Pino Mattino** - mattino.ca@gmail.com

to: DSEL - **Ms. Alison Gosling** - agosling@dsel.ca

date: July 18, 2019

file: PG2306-MEMO.06

The present memorandum has been prepared to address the geotechnical items noted in the City of Ottawa comments prepared for the aforementioned site in a letter dated June 20, 2019. The present report should be read in conjunction with Paterson Report PG2306-1 dated January 13, 2013. Our response is summarized below:

Comment 19

Comment: *Provide a separate memo that confirms that the grading and site servicing plan is acceptable from a geotechnical point of view.*

Response:. Paterson has reviewed the following grading and site servicing plans provided by DSEL:

- ❏ Grading Plan - 285 Mountshannon Drive - Block 1 - Project No. 17-975 - Drawing No. GP-1 - Revision 4 dated May 31-2019.
- ❏ Site Servicing Plan - 285 Mountshannon Drive - Block 1 - Project No. 17-975 - Drawing No. SSP-1 - Revision 4 dated May 31-2019.
- ❏ Grading Plan - 255 Mountshannon Drive - Block 2 - Project No. 17-976 - Drawing No. GP-1 - Revision 2 dated May 6-2019.
- ❏ Site Servicing Plan - 255 Mountshannon Drive - Block 2 - Project No. 17-976 - Drawing No. SSP-1 - Revision 2 dated May 6-2019.

Grading Plan Review

Paterson has reviewed the proposed grades on the above noted grading plans. Based on our review, all the proposed grades are in conformance with the permissible grade raise restrictions in the geotechnical report noted above. Therefore, the proposed grades are acceptable from a geotechnical perspective and lightweight fill is not required.

Site Servicing Plan Review

Based on our review of the above noted site servicing plans, there are areas within the site where the sewer pipes are provided with insufficient soil cover for frost protection. It is further indicated on the site servicing plans that "frost protection recommendations for storm sewers with less than 1.5 m and sanitary sewers with less than 1.8 m from ground surface to pipe obvert to be provided by geotechnical engineer." The following table can be used as the recommendation for insulating sewer pipes with reduced soil cover at the subject site:

Table 1 - Rigid Insulation Recommendations for Sewer Pipes with Reduced Soil Cover

Thermal Condition	Soil Cover Provided D (mm)	Insulation Dimensions (mm)	
		t (thickness)	L (extension)
Unheated	Less than 1,100	Not Recommended	
	1,100 to 1,400	75	Extend 900 mm horizontally beyond edge face of the sewer
	1,400 to 1,700	50	Extend 600 mm horizontally beyond edge face of the sewer
	1,700 to 2,000	25	Extend 300 mm horizontally beyond edge face of the sewer
Notes: All designs are based on a freezing index of 1000°C-days.			

All rigid insulation should consist of either Dow Chemical HI 40 or Owens Corning Canada Foamular 400, and inspected and approved by the geotechnical consultant at the time of construction.

We trust that this information satisfies your immediate requirements.

Paterson Group Inc.

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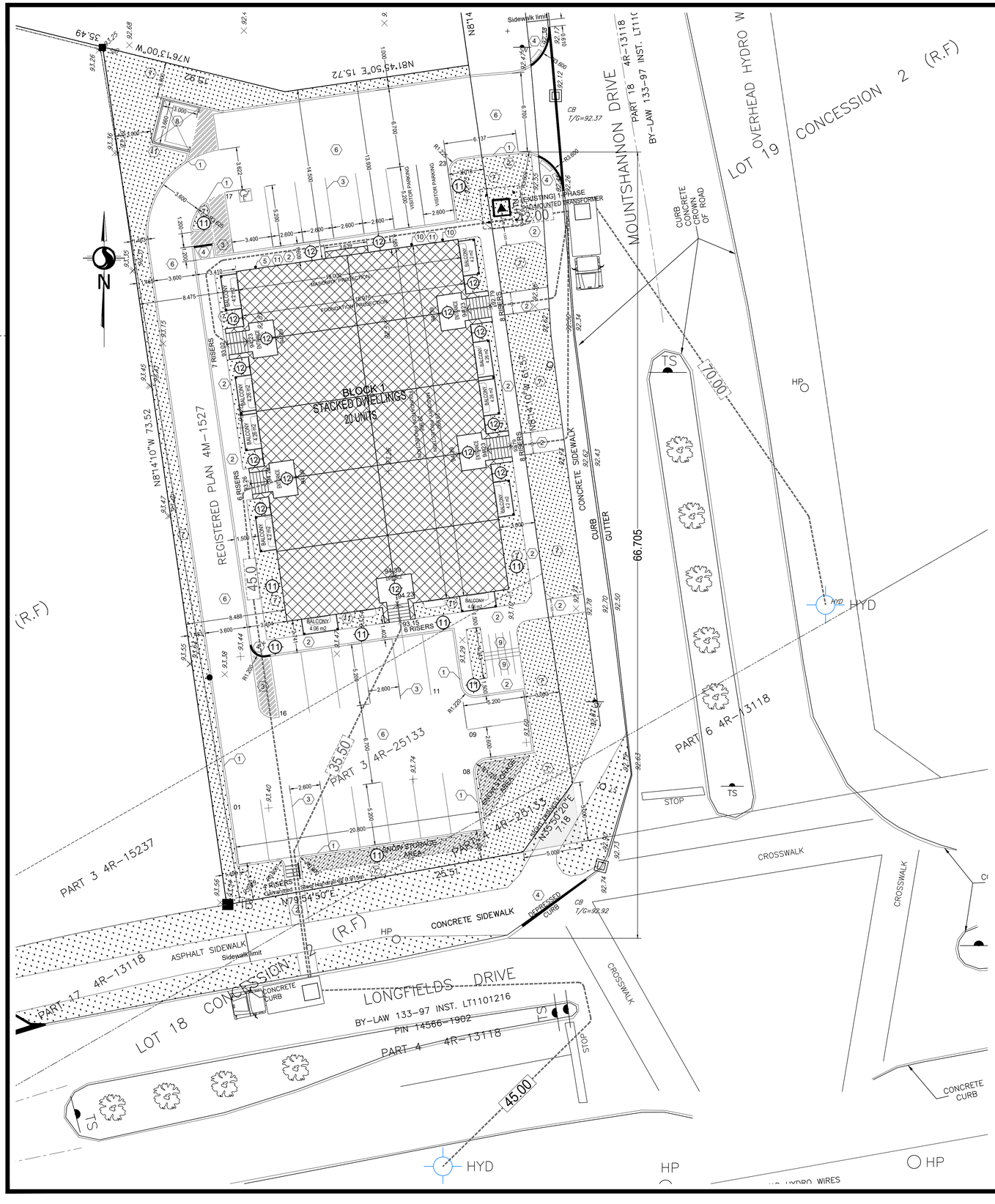
DRAWINGS / FIGURES



KEY PLAN

BUILDING CODE ANALYSIS

- 3 STOREYS RESEDENTIAL USE BUILDING WITH BASEMENT
- 20 STACKED DWELLING UNITS
- FACING 2 STREETS
- BUILDING AREA : 569,8 m²
- GROSS FLOOR AREA : 2 279 m².
- USE: GROUP GROUP "C".
- CLASSIFICATION: 9.10.8.1
- PARTS 9 OF OBC 2012.
- COMBUSTIBLE CONSTRUCTION.
- SECOND FLOOR FIRE SEPARATION: 3/4HR REQUIRED C/W VERTICAL STRUCTURAL COMPONENTS
- UPPER DWELLING STAIRWAY ENTRANCE/EXIT ENCLOSURES FIRE SEPARATION: 3/4HR REQUIRED C/W VERTICAL STRUCTURAL COMPONENTS
- FIRE RESISTANCE FOR ROOF: NOT REQUIRED
- PLUMBING EQUIPMENTS:
  . 1 WASHROOM PER UNIT REQUIRED
  . 10% NATURAL LIGHTNING REQUIRED FOR LIVING ROOMS & DINNING ROOMS
  . 5% NATURAL LIGHTNING REQUIRED FOR BEDROOMS
- BARRIER FREE PATH OF TRAVEL NOT REQUIRED ACCORDING.

CURRENT ZONING BY LAW

DESCRIPTION	PROPOSED	REQUIRED
LOT AREA	2076,97 m²	660
LOT FRONTAGE	30,5 m	22 m
LOT DEPTH	61,5 m	N/A
MAX. NUMBER OF DWELLING UNITS	20	20
FRONT SET BACK	22 m	3 m
CORNER SIDE YARD SETBACK	3 m	2 m R4A[2163]
INTERIOR SIDE YARD SETBACK	8,4 m	3 m
REAR SET BACK	13,9 m	7,5 m
REAR SET SETBACK BETWEEN UNITS	0	0
BUILDING AREA	569.8 m²	-
GROSS FLOOR AREA	2279.2 m²	-
BUILDING HEIGHT	11,807 m	11m
AMENITY AREA	-	0 R4A[2163]
MIN. LANDSCAPING BUFFER	2	2
PARKING SPACE	20	0.5 /UNIT-Rapid Transit
MIN. VISITOR PARKING & ACCESSIBLE PARKING	2+1	0.1 /UNIT-Rapid Transit
MIN. BICYCLE PARKING	10	0.5 /UNITS-TABLE 111A
AMENITY AREA	-	0
TOTAL PARKING LOT AREA	789 m²	-
LANDSCAPING PROVIDE FOR THE PARKING LOTS	315 m²	15%OF PARKING AREA(118.35 m²)
TOTAL SOFT & HARD LANDSCAPED AREA	634 m²	30% OF LOT AREA

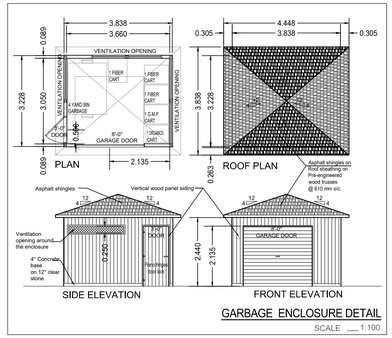
GRADE SCHEDULE

T.O.FIRST FLOOR: 94.39
T.O.FOUNDATION: 93.30 / 100 000
T.O.BASEMENT: 91.367
U.S.FOOTING: 90.96
AVERAGE GRADE: 93.005 (At the base of the main front yard facade wall).

MINOR VARIANCE:
-To permit a building height of 11.807m whereas the zoning requirement permits up to 11m.
-To permit parking in a provide/required front yard where section 109 (3) (a) does not permit it.
-To permit a reduced landscape buffer for a parking lot abutting a street of 2.5m whereas Table 110 requires 3m (adjacent to Longfields).
- To permit a reduced landscape buffer for a parking lot not abutting a street of 1m for the northern property line whereas Table 110 requires 1.5m.
- To permit a reduced landscape buffer for stacked dwellings of 1.463m for the western property line and 1m for the northern property line whereas exception 2163 requires 2m.

LÉGENDE

1. CONCRETE CURB
2. SIDEWALK
3. PAINT MARKS
4. DEPRESSED CURBS & SIDEWALK.
5. ACCESSIBLE PARKING WALL MOUNTED SIGNAGE
6. ASPHALT
7. GRASS
8. TRASH ENCLOSURE
9. BICYCLE PARKING SPACE ON CONCRETE SLAB SURFACE
10. VISITOR PARKING WALL MOUNTED SIGNAGE
11. LIGHT FIXTURE POST TOP
12. LIGHT FIXTURE WALL PACK



GARBAGE ENCLOSURE DETAIL
SCALE 1:100

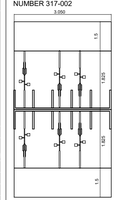
Item	Ontario Building Code Data Matrix Parts 3 & 9									OBC Reference
1	Project Description: ☒ New ☐ Addition ☐ Alteration ☐ Change of Use						☐ Part 10	☐ Part 11	☐ Part 3	☒ Part 9 2.1.1. 9.10.1.3.
2	Major Occupancy(s): C								3.1.2.1.(1)	9.10.2.
3	Building Area (sq.m.) 570.4 m2								1.1.3.2.	1.1.3.2.
4	Gross Area (sq.m.) 2234 m2								1.1.3.2.	1.1.3.2.
5	Number of Storeys: Above grade 3 Below grade 1								3.2.1.1. & 1.1.3.2.	2.1.1.3.
6	Height of building (m.) 12 m									2.1.1.3.
7	Number of Streets/Access Routes: 2								3.2.2.10. & 3.2.5.5.	
8	Building Classification: 9.10.8.1.								3.2.2.20.-83.	9.10.4.
9	Sprinkler System Proposed: ☐ Entire building ☐ Addition only ☐ In lieu or roof rating ☒ Not required Note:								3.2.2.20.-83. 3.2.1.5. 3.2.2.17.	9.10.8.
10	Standpipe required: ☐ Yes ☒ No								3.2.9.	
11	Fire Alarm required: ☐ Yes ☒ No								3.2.4.	9.10.17.2.
12	Water Service/Supply is Adequate: ☒ Yes ☐ No									
13	High building: ☐ Yes ☒ No								3.2.6.	
14	Permitted Construction: ☒ Combustible ☐ Non-combustible ☐ Both								3.2.2.20.-83.	9.10.6.
15	Mezzanine(s) Area (sq.m.) N/A								3.2.1.1.(3)-(8)	9.10.4.1.
16	Occupant load based on: ☐ sq.m./person ☒ design of building Occupancy 20 RESIDENTIAL CONDOS Load 80 persons								3.1.1.6.	9.9.1.3.
17	Barrier-free Design: ☐ Yes ☒ No (Explain) According to 9.5.2.1.2).								3.8.	9.5.2.
18	Hazardous Substance: ☐ Yes ☒ No								3.3.1.2.(1) & 3.3.1.19. (1)	9.10.1.3.
19	Required Fire Resistance Rating (F.R.R.)	Horizontal Assemblies F.R.R. (Hours)			Listed Design No. or Description (SG-2)				3.2.2.20.-83. & 3.2.1.4.	9.10.8. 9.10.9.
		Floors 3/4 Hours			SB-3 (F19d)					
		Roof 0 Hours								
		Mezzanine Hours			Listed Design No.					
		F.R.R. of Supporting Members			or Description (SG-2)					
		Floors 3/4 Hours			SB-3 (EW1a)					
		Roof 0 Hours								
		Mezzanine 0 Hours								
20	Spatial Separation - Construction of Exterior Walls								3.2.3.	9.10.14.
	Wall	Area of EBF (sq.m.)	L.D. (m.)	L/H or H/L	Permitted Max. % of Openings	Proposed % of Openings	F.R.R. (Hours)	Listed Design or Description	Comb. Const.	Non-C. Const.	Comb. Cladding	Non-C. Cladding
	WEST FIRE COMPARTMENT	32.4	8.475		100%	37%	-		X		X	
	EAST FIRE COMPARTMENT	32.4	-		100%	37%	-		X		X	
	NORTH FIRE COMPARTMENT	52.6	14.5		100%	6.8%	-		X		X	
	SOUTH FIRE COMPARTMENT	52.1	-		100%	19%	-		X		X	
21	Other - Describe									

Bike-Up

Bicycle Parking Systems

BIKE-UP BICYCLE PARKING SYSTEMS INC.
6 ANTARES DRIVE, PHASE II, UNIT #10 B,
NEPEAN, ONTARIO, CANADA K2E 8A9
PHONE: (613) 226-6452,
FAX: (613) 228-3539, 1-800-661-3506,
www.bikeup.com

NOTES:
1. INSTALLATION TO BE COMPLETD IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS
3. WHEN CALCULATING SPACING, ADD 12" TO BOTH ENDS OF THE RACK TO ALLOW FOR HANDLE BAR CLEARANCE.
4. USE 2" U-CLAMPS TO INSTALL ALL RACKS EXCEPTION:
   A. PRMANENT INSTALLATION - USE ANCHOR BOLTS AND SECURITY CAPS
   B. SEASONAL INSTALLATIONS - USE ANCHOR SLEEVES AND LAG BOLTS
5. RUNNERS ARE 1.9"Ø0 - 1/8" WALL PIPE STATIONS ARE 5/8" STEEL ROD.
6. WELDED CONSTRUCTION, HOT-DIPPED GALVANIZED AFTER FABRICATION. PAINTING AVAILABLE.
7. WEIGHTS:
APPROXIMATIVELY 14 LBS PER STATION.
8. CONTRACTORS NOTE: FOR PRODUCT AND PURCHASING INFORMATION, VISIT www.PROJECTmarketsite.com, REFERENCE NUMBER 317-002



FIVE STATION
TWO WAY RACK
SCALE N/A

SITE PLAN
SCALE: 1/175

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6				
5				
4				
3	3rd Submission	A.A.	P.T.	19.08.13
2	2nd Submission Comments	A.A.	P.T.	19.06.28
1	1st Submission Comments	A.A.	P.T.	19.05.13
Revision		By	Appd.	YY.MM.DD

6				
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2				
1	PRE-APPLICATION DOC.	A.A.	P.T.	18.12.11
Issued		By	Appd.	YY.MM.DD

Stamp

ONTARIO ASSOCIATION OF ARCHITECTS
PIERRE J. TABET
LICENCE 6027

Project

MATTINO HOMES

20 CONDO UNITS BUILDING
BLOCK 1
285 MOUNTSHANNON DRIVE,
OTTAWA,ON

Title

SITE PLAN

Project #	Scale	Date
	1:175	2019-08-13
Revision	Sheet	Drawing #
1	01	A-100