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ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT

FOR

4497 O'KEEFE COURT

MATTAMY HOMES

CITY OF OTTAWA

DSEL PROJECT NO.: 14-746

OCTOBER 2024
1ST SUBMISSION

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ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT FOR 4497 O'KEEFE COURT

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ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT FOR 4497 O'KEEFE COURT MATTAMY HOMES DSEL PROJECT NO: 14-746

1.0 INTRODUCTION

Mattamy Homes has retained DSEL to prepare an assessment report evaluating the adequacy of public services to support urban residential development at their 4497 O'Keefe Court property.

The subject property is located east of Highway 416, south of West Hunt Club Road, west of Cedarview Road, and north of Fallowfield Road and O'Keefe Court. The O'Keefe Drain is located to the south of the subject property. The subject property was previously contemplated to be developed as Phase 2 of a country lot subdivision. Phase 1 of the country lot subdivision has been constructed and is located immediately to the north-east, see ***Figure 1*** below for the property limits.

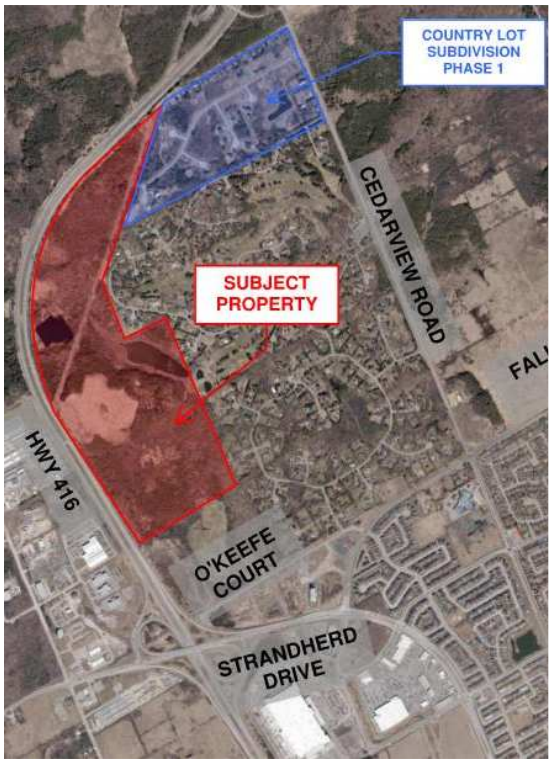

Figure 1: Site Location

The Phase 1 country lot subdivision is serviced by municipal watermains but relies on private lot-level septic systems for wastewater disposal and treatment. The subject property currently has draft plan of subdivision approval for development as a country lot subdivision, which was planned to follow the same municipal water and private lot-level

septic system servicing strategy that was approved for the existing Phase 1 country lot subdivision.

The following report outlines the adequacy of public services to support the potential water, wastewater, and storm servicing strategy for an updated and urbanized development concept plan for 4497 O'Keefe Court. Refer to ***Appendix A*** for the revised concept plan details and development statistics. The proposed plan is comprised of a mix of residential areas with varying densities, mixed-use blocks, parks, conservation areas, and a road network that includes proposed street connections to O'Keefe Court to the south and Onassa Circle to the north of the subject property.

There is an existing City park as well as a vacant parcel owned by others directly south of the subject property. In an effort to consider all potential development opportunities in the area surrounding the subject properties in this report, a potential residential concept for the vacant parcel has been prepared and can be found in ***Appendix A***.

As part of this report, **Stantec Consulting Ltd.** has prepared a water servicing analysis for the subject property, included in ***Appendix B*** of this report. **Paterson Group** have prepared a geotechnical investigation of the subject property to be submitted under separate cover.

2.0 BACKGROUND INFORMATION

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, October 2012
  (Sewer Design Guidelines)
- **Technical Bulletin ISDTB-2014-01**
  City of Ottawa, February 5, 2014
  (ITSB-2014-01)
- **Technical Bulletin PIEDTB-2016-01**
  City of Ottawa, September 6, 2016
  (PIEDTB-2016-01)
- **Technical Bulletin ISTB-2018-01**
  City of Ottawa, March 21, 2018
  (PIEDTB-2016-01)
- **Technical Bulletin ISTB-2018-04**
  City of Ottawa, June 27, 2018
  (PIEDTB-2016-01)
- **Technical Bulletin ISTB-2019-02**
  City of Ottawa, July 8, 2019
  (ITSB-2019-02)
- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010
  (*Water Supply Guidelines*)
- **Technical Bulletin ISD-2010-2**
  City of Ottawa, December 15, 2010
  (ISDTB-2010-2)
- **Technical Bulletin ISDTB-2014-02**
  City of Ottawa, May 27, 2014
  (ISDTB-2014-02)
- **Technical Bulletin ISTB-2018-02**
  City of Ottawa, March 21, 2018
  (ISTB-2018-02)

- **Technical Bulletin ISTB-2021-03**
  City of Ottawa, August 18, 2021
  (*ISDTB-2021-03)*
- **City of Ottawa Official Plan**
  Adopted by Council 2021, amended from time to time.
  (*Official Plan*)
- **Stormwater Management Planning and Design Manual**
  Ministry of Environment, March 2003
  (*SWMP Design Manual*)
- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MECP Design Guidelines)
- **Jock River Reach One Subwatershed Study**
  Stantec, June 2007
- **O'Keefe Drain Environmental and Stormwater Management Plan**
  CH2M Hill, May 2013
- **Mattamy Cedarview Water Servicing Analysis**
  Stantec, February 8, 2024

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Services

The existing water services in the vicinity of the proposed development include a 600mm diameter watermain within O'Keefe Court and a 305mm diameter watermain within Onassa Circle at Trilby Court. The 600mm watermain within O'Keefe Court is connected to the Moodie Drive elevated tank, located approximately 1 km to the west, across Hwy 416. For further details on the existing watermain network in the area, refer to ***Drawing 1***.

3.2 Water Supply Strategy

The subject property is proposed to be serviced by connections to existing watermains within Pressure Zone 3SW. Specifically, connections are to be made to the existing 600mm diameter watermain within O' Keefe Court, and the existing 305mm diameter watermain within Onassa Circle, at Trilby Court.

Stantec has completed a preliminary water servicing analysis for the subject property and the Cedarview Employment Lands. See the *Mattamy Cedarview Water Servicing Analysis* (Stantec, February 8, 2024), included in ***Appendix B*** for details. Further investigations are to be completed as the development process advances and the development statistics are refined, and additional input is provided by the City of Ottawa (e.g. boundary conditions).

The Stantec analysis utilized the City of Ottawa Water Design Guidelines and criteria outlined in the 2013 Water Master Plan (WMP) to establish water demands, level of service and pressure objectives during normal and emergency conditions. The estimated residential population for the subject lands was estimated based on projected household sizes as per population densities specified in the City's 2013 WMP. As per the 2013 WMP, the zone/system-level criteria for water demands were used for populations that exceed 3,000 persons.

Per the Stantec analysis, offsite upgrades to the City's potable water distribution system are expected to be required to service the subject property. Specifically, but not limited to, pumping upgrades within Pressure Zone 3SW.

It is understood that the City of Ottawa is in the process of a multi-year water infrastructure upgrade program to reconfigure the pressure zones in Barrhaven. Further coordination with City staff will be required to confirm that the planned upgrades will be sufficient to service the subject property.

Fire flow requirements for the proposed development are to be confirmed at the time of functional servicing design, and fire control measures are to be incorporated as required.

3.3 Water Supply Conclusion

The subject property will connect to existing watermains in Pressure Zone 3SW, specifically a 600mm watermain on O'Keefe Court and a 305mm watermain on Onassa Circle at Trilby Court. The O'Keefe Court watermain is linked to the Moodie Drive elevated tank.

Further water investigations are to be completed as the development process advances. As the City of Ottawa is upgrading water infrastructure and reconfiguring pressure zones in Barrhaven, ongoing coordination with City staff is required. Detailed water demands and fire flow requirements will be confirmed at functional servicing design.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The existing wastewater services in the vicinity of the subject lands include a 525mm diameter South Nepean Collector (SNC) sanitary sewer located on Strandherd Drive at the Maravista Drive intersection, approximately 1.8 km south of the subject property. Additionally, there is a nearby sanitary sewer on Citigate Drive, about 1.4 km south of the property, that varies in diameter from 250 to 375 mm. For details on the existing sewer network, refer to ***Drawing 1***.

4.2 Wastewater Servicing Strategy

The subject property is proposed to be serviced via a gravity sewer connection to the South Nepean Collector (SNC) sanitary sewer. Refer to the overall servicing figure, ***Drawing 1***, for an illustration of the proposed sanitary sewer network.

The design of the SNC was detailed in the *Strandherd Drive Widening Project – South Nepean Collector Phase 3: Sanitary Flow Calculations* report (Novatech, May 2019). DSEL has recreated the SNC drainage plan and sewer design sheet from this report, to investigate the capacity of the SNC to accommodate wastewater flows from the subject property. Refer to ***Appendix C***.

The SNC sewer design sheet has also been updated using recorded as-built information made available from the City of Ottawa, see ***Appendix C***. Considering the recorded as-built conditions, it has been identified that the residual free-flowing capacity within the critical sewer segment of the downstream SNC (MHSA 9 to MHSA 10, part of SNC Phase 2, located within Chapman Mills Drive) is 121.21 L/s.

Since the time that the *Strandherd Drive Widening Project – South Nepean Collector Phase 3* sanitary analysis was prepared, the Barrhaven Conservancy development project has been added to the planned SNC drainage area. The location of the Barrhaven Conservancy development is illustrated in the DSEL August 2023 Sanitary Drainage Plan included in ***Appendix C***. The capacity of the SNC, when considering the wastewater flow contribution from Barrhaven Conservancy, is presented in the DSEL August 2023 Sanitary Design Sheet in ***Appendix C***. With the wastewater flows from Barrhaven Conservancy considered, the residual free-flowing capacity within the critical SNC sewer segment is reduced to 32.85 L/s.

There are two potential routes to extend the subject property's sanitary sewer network to the existing SNC on Strandherd Drive. Option 1 would be for external sanitary sewers to be installed on O'Keefe Court, Fallowfield Drive, and Strandherd Drive before connecting to the existing SNC on Strandherd Drive at the Maravista Drive intersection. Option 2 would be for external sanitary sewers to be installed on O'Keefe Court, Fallowfield Road, and Citigate Drive before connecting to the existing sanitary sewer on Citigate Drive and ultimately connecting to the existing SNC via Systemhouse Street. Both routing options

can be seen in ***Drawing 1***. Note that Option 2 will likely require sanitary sewer replacements/upsizing within Citigate Drive and Systemhouse Street.

The design sheets for both Option 1 and Option 2 can be found in ***Appendix C.*** Note that in both options, the planned wastewater flow from Barrhaven Conservancy and the Cedarview Employment Lands have been considered. As shown in the sanitary sewer design sheets, the free-flowing capacity of the critical downstream sewer segment of the SNC is exceeded by roughly 5% for both options. Refer to ***Table 1*** for a comparison of the free-flowing sewer capacity at the critical SNC sewer segment.

Table 1: Summary of Residual Capacity in Critical SNC Trunk Sewer Segment

Critical Sewer Segment	As-Built Conditions per SNC Phase 3 Report		Barrhaven Conservancy Added		Subject Development Added	
	Residual Capacity (L/s)	Capacity Ratio	Residual Capacity (L/s)	Capacity Ratio	Residual Capacity (L/s)	Capacity Ratio
MHSA 9 to MHSA 10	121.21	71%	32.85	92%	-20.55	105%

As shown in both sets of design sheets included in ***Appendix C***, MHSA 9 to MHSA 10 is the only sewer segment that is expected to exceed the pipe's free-flowing capacity, likely due to the recorded as-built sewer slope of 0.05%. Seeing as this segment of the SNC was shown to be above capacity in the proposed development conditions, JFSA has conducted a preliminary sanitary Hydraulic Grade Line (HGL) analysis for the SNC, included in ***Appendix C***.

The JFSA analysis determined that, while the sewer design sheet indicates the peak wastewater flow rate within the MHSA 9 to MHSA 10 SNC sewer segment will exceed the pipe's calculated free-flowing capacity by 20.55 L/s, the hydraulic grade line (HGL) will remain at least 12 cm below the obvert of the SNC sewer. This suggests that the pipes will not be surcharged during peak flow conditions. Therefore, it can be concluded that there is sufficient capacity within the SNC to accommodate wastewater flows from both the urbanized development of the subject property and the Cedarview Employment Lands to the south.

4.3 Wastewater Servicing Conclusion

The analysis of the South Nepean Collector sewer's capacity reveals that the current and proposed wastewater flows, will slightly exceed the free-flowing capacity of the critical sewer segment (MHSA 9 to MHSA 10) by approximately 5%. A preliminary Hydraulic Grade Line (HGL) analysis confirms that despite this excess, the sewer system will not experience surcharge conditions. Therefore, both proposed routing options for connecting the subject property to the SNC, although slightly over capacity, are deemed viable for accommodating the planned wastewater flows.

5.0 STORM SERVICING & STORMWATER MANAGEMENT

5.1 Existing Stormwater Drainage Conditions

The subject property is located within the Jock River subwatershed, which is under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Under existing conditions, runoff is ultimately directed into the O'Keefe Drain located south of the subject property. The O'Keefe Drain is defined as a Municipal Drain under the Drainage Act.

Within the subject property, there is an existing wetland area that feeds the O'Keefe Drain, as well as an abandoned quarry. The locations of the existing wetlands and the O'Keefe Drain can be seen in ***Drawing 1***.

There are existing water features within the Conservation Lands shown in the concept plan at the south end of the subject property. Under existing conditions, these features ultimately outlet to the O'Keefe drain via an existing ditch in the location of the proposed road connection from the subject property to O'Keefe Court. Through coordination with **Kilgour & Associates**, the environmental consultant on file, it is understood that the function of these two existing watercourses within the subject property is to be maintained for environmental purposes. To accommodate the proposed road connection while preserving these water features' function, the existing features will be re-directed to drain eastward, directly to the O'Keefe Drain. The locations of the existing features and the proposed re-alignment are illustrated in ***Drawing 1***.

5.2 Stormwater Servicing Strategy

Stormwater runoff from the urbanized development of the subject property will be collected into a storm sewer network and directed into on-site wet ponds. Designated pond blocks can be seen in the latest development concept included in ***Appendix A***, and on the Overall Servicing Figure (***Drawing 1***). Note, the abandoned quarry on site is expected to be converted into a wet pond to service the site. Further design details, as well as geotechnical input and recommendations will be prepared as part of the functional servicing design.

The stormwater runoff will be treated in the wet ponds for quantity and quality control before being directed into the O'Keefe Drain. The treatment criteria will be established to adhere to Official Plan policies, the City of Ottawa and MECP design guidelines, and the *Jock River Reach 1 Subwatershed Study* (Stantec, June 2007).

Per the *Jock River Reach 1 Subwatershed Study* (Stantec, June 2007), the Jock River does not have quantity control requirements and requires an Enhanced Treatment level (80% removal of Total Suspended Solids (TSS)) of quality control.

It is conceptually proposed that the treated stormwater flows from the ponds will be directed via gravity sewer into the O'Keefe Drain just before the drain crosses O'Keefe Court. See Drawing 1 for details. While there are no quantity control requirements for Jock River, capacity constraints within the O'Keefe Drain will be confirmed as part of the

functional servicing design and the preliminary stormwater management strategy will be designed accordingly. It is anticipated that as part of the preliminary servicing design, in accordance with the Drainage Act, an engineer's report will need to be prepared by a Drainage Engineer to account for the proposed land use changes and modifications to the O'Keefe Drain.

5.3 Storm Servicing & Stormwater Management Conclusion

The stormwater management strategy for the subject property, located within the Jock River subwatershed, under the jurisdiction of the RVCA, will focus on utilizing on-site wet ponds for quantity and quality control of runoff. Runoff will be collected through a storm sewer network and treated in these ponds before being discharged into the O'Keefe Drain, which is classified as a Municipal Drain under the Drainage Act.

The treatment criteria will adhere to City of Ottawa guidelines, the Jock River Reach 1 Subwatershed Study, and relevant environmental policies. Since the Jock River does not require quantity control but mandates an Enhanced Treatment level for quality control, the preliminary stormwater management design will confirm the capacity constraints of the O'Keefe Drain. Furthermore, an engineer's report, as required under the Drainage Act, will be prepared to address land use changes and modifications to the O'Keefe Drain.

The subject property, situated in the Jock River subwatershed, will manage stormwater runoff through a dedicated storm sewer network and on-site wet ponds. These ponds will provide treatment for both quantity and quality before the runoff is released into the O'Keefe Drain.

At the time of functional servicing design, treatment criteria will be established to adhere to Official Plan policies, City of Ottawa and MECP design guidelines, and the Jock River Reach 1 Subwatershed Study.

6.0 UTILITIES

Utility services extending to the site may require connections to multiple existing infrastructure points: consultation with Enbridge gas, Hydro One, Rogers, and Bell is required as part of the functional servicing design process to confirm the servicing plan for the subject lands.

In October 2023, Hydro One was consulted to gather information about the existing utility equipment in the vicinity of the development. This consultation also aided in determining the future requirements for any access or proposed uses within the Hydro One corridor lands within the development area. Correspondence with Hydro One can be found in ***Appendix A.***

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate, and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated.

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

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

Catch basins will have catch basin inserts installed during construction to protect from silt entering the storm sewer system.

An erosion and sediment control plan will be prepared as part of the functional servicing design package, and the following specific recommendations to the contractor will be included:

- Limit the 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 leaving the site and entering existing ditches.
- Install mud mat to prevent mud tracking onto adjacent roads.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install catch basin inserts.
- Plan construction at the proper time to avoid flooding.

Prepared by,

David Schaeffer Engineering Ltd.

Per: Braden Kaminski, P.Eng.

David Schaeffer Engineering Ltd.

Per: Matt Wingate, P.Eng.

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Appendix A

- City of Ottawa Development Servicing Study Checklist
- Cedarview - Community Masterplan Concept, prepared by Urbantypology, dated August 17, 2023
- Cedarview – Concept Employment Block, prepared by Urbantypology, dated August 4, 2023
- Pre-consultation correspondence with Hydro One (October 2023)

DEVELOPMENT SERVICING STUDY CHECKLIST

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Title Page
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix A & Figure 1
☒	Plan showing the site and location of all existing services.	Drawing 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 (intended to support rezoning)
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	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.	To be provided as part of the functional servicing design stage.
☐	Statement of objectives and servicing criteria.	To be provided as part of the functional servicing design stage.
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, Section 4.1, and Section 5.1
☒	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).	Section 1.0
☒	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.	Drawing 1. Further details to be provided as part of the functional servicing design stage.
☐	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.	To be provided as part of the functional servicing design stage.
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.0
☐	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	To be provided as part of the functional servicing design stage.

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

	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 3.2
☒	Identification of system constraints	Section 3.2
☐	Identify boundary conditions	To be provided as part of the functional servicing design stage.
☒	Confirmation of adequate domestic supply and pressure	Appendix B
☐	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.	To be provided as part of the functional servicing design stage.
☒	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.	Appendix B
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	To be provided as part of the functional servicing design stage.
☐	Address reliability requirements such as appropriate location of shut-off valves	To be provided as part of the functional servicing design stage.
☒	Check on the necessity of a pressure zone boundary modification	Appendix B
☒	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 & Appendix B
☒	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, Appendix B & Drawing 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.	To be provided as part of the functional servicing design stage.
☒	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.	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).	To be provided as part of the functional servicing design stage.
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	To be provided as part of the functional servicing design stage.
☐	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 4.2

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

☒	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.	Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2 & Appendix C
☐	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).	To be provided as part of the functional servicing design stage.
☐	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 1.0 & Section 5.2
☒	Analysis of available capacity in existing public infrastructure.	Section 5.2
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawing 1
☐	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. Further details to be provided as part of the functional servicing design stage.
☐	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. Further details to be provided as part of the functional servicing design stage.
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3 & Drawing 1
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	To be provided as part of the functional servicing design stage.
☐	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	To be provided as part of the functional servicing design stage.
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	To be provided as part of the functional servicing design stage.

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

☐	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	To be provided as part of the functional servicing design stage.
☒	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Section 1.0, Section 5.2, Section 7.0
☐	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.	To be provided as part of the functional servicing design stage.
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	To be provided as part of the functional servicing design stage.
☒	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Drawing 1
☐	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	To be provided as part of the functional servicing design stage.
☒	Identification of municipal drains and related approval requirements.	Section 1.0 & Section 5.2
☐	Descriptions of how the conveyance and storage capacity will be achieved for the development.	To be provided as part of the functional servicing design stage.
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	To be provided as part of the functional servicing design stage.
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	To be provided as part of the functional servicing design stage.
☒	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.	To be provided as part of the functional servicing design stage.

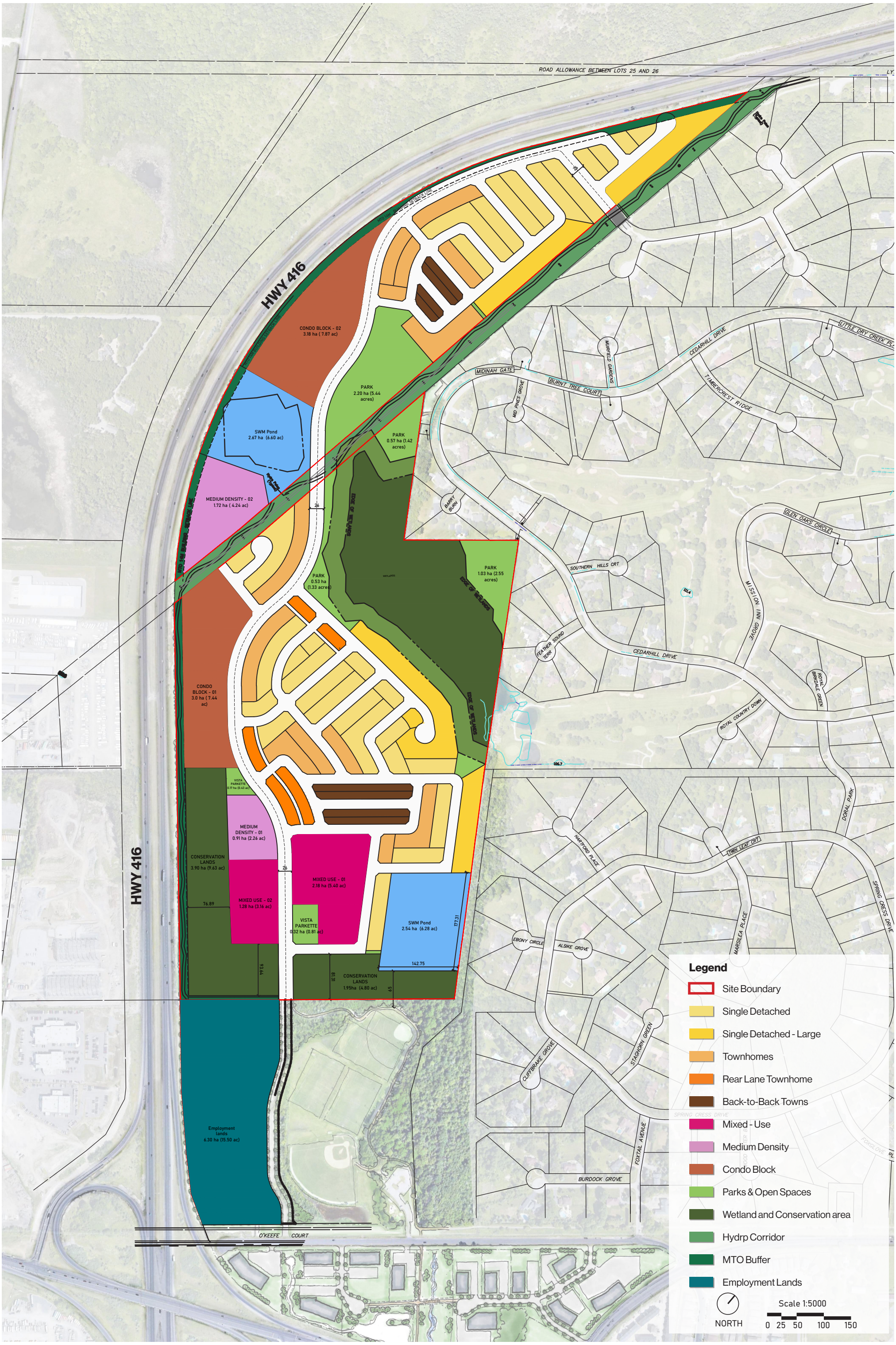
4.5 Approval and Permit Requirements: Checklist

☐	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.	To be provided as part of the functional servicing design stage.
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A

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

☐	Changes to Municipal Drains.	To be provided as part of the functional servicing design stage.
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	To be provided as part of the functional servicing design stage.

4.6 Conclusion Checklist		
☒	Clearly stated conclusions and recommendations	To be provided as part of the functional servicing design stage.
☐	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.	N/A
☒	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	Pg. 15



mattamyHOMES

Cedarview | Community Masterplan concept _ v6

Date : 17th August 2023

Urbantypology

Mattamy Cedarview: Concept v6

Date: August 17th 2023

Client: Mattamy Ottawa

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**71.99**	**177.89**	**100%**
NHS & Buffer	8.91	**22.02**	12.38%
Conservation Lands	5.84	**14.43**	8.11%
MTO Building Setback Buffer	2.80	**6.92**	3.89%
Developable Area*	**54.43**	**134.51**	**75.61%**
Developable Area	**54.43**	**134.51**	**100%**
SWM Pond	5.213	**12.88**	9.58%
Park	4.990	**12.33**	9.17%
Medium Density Block	2.632	**6.50**	4.84%
Mixed-Use and Condo Block	9.670	**23.89**	17.76%
Condo Blocks	6.200	**15.32**	11.39%
Net Developable Area*	**25.73**	**63.58**	**35.74%**

** Percentage out of total site area*

Low Denisty Residential Summary			
Frontage & Unit Summary	***Meter***	***Units***	***%***
Single Detached	3645.15	327	48.44%
Townhomes	1425.15	184	27.26%
Rear Lane Towns	380.22	118	17.48%
Back-to-Back Towns	897.90	46	6.81%
Low density Units Total	**6348.42**	**675**	**100.00%**

Density	**10.6**	**UPA**

Road Summary	*Meter*	*%*
26m Collector Road	1960.11	28.90%
18m Local Road	4363.93	64.35%
15m Window Street	50.00	0.74%
6m Lane	407.42	6.01%
Total Roads	**6781.47**	**100.00%**

Frontage to Road Ration	**1.00**

Medium Density Summary

	Area (ac)	*Commercial (sqm)*	*Mixed-use Units*	*Stacked Units*	*Back-to-Back Towns*	*Rear Lane Towns*	*Total Units*	*Parking Required**	*Parking Provided*	*Density (UPA)*
Mixed Use Block - 01	5.39	2299.01	68	84			***152***	316	311	**28.2**
Mixed Use Block - 02	3.16	1358.44	32	48			***80***	175	175	**25.3**
Condo Block - 01	7.44			132	54		***186***	186	221	**25.0**
Condo Block - 02	7.88			132	56	15	***203***	186	203	**25.8**
Sub Total	***23.86***	***3657.45***	***100***	***396***	***110***	***15***	***621***	***863***	***910***	

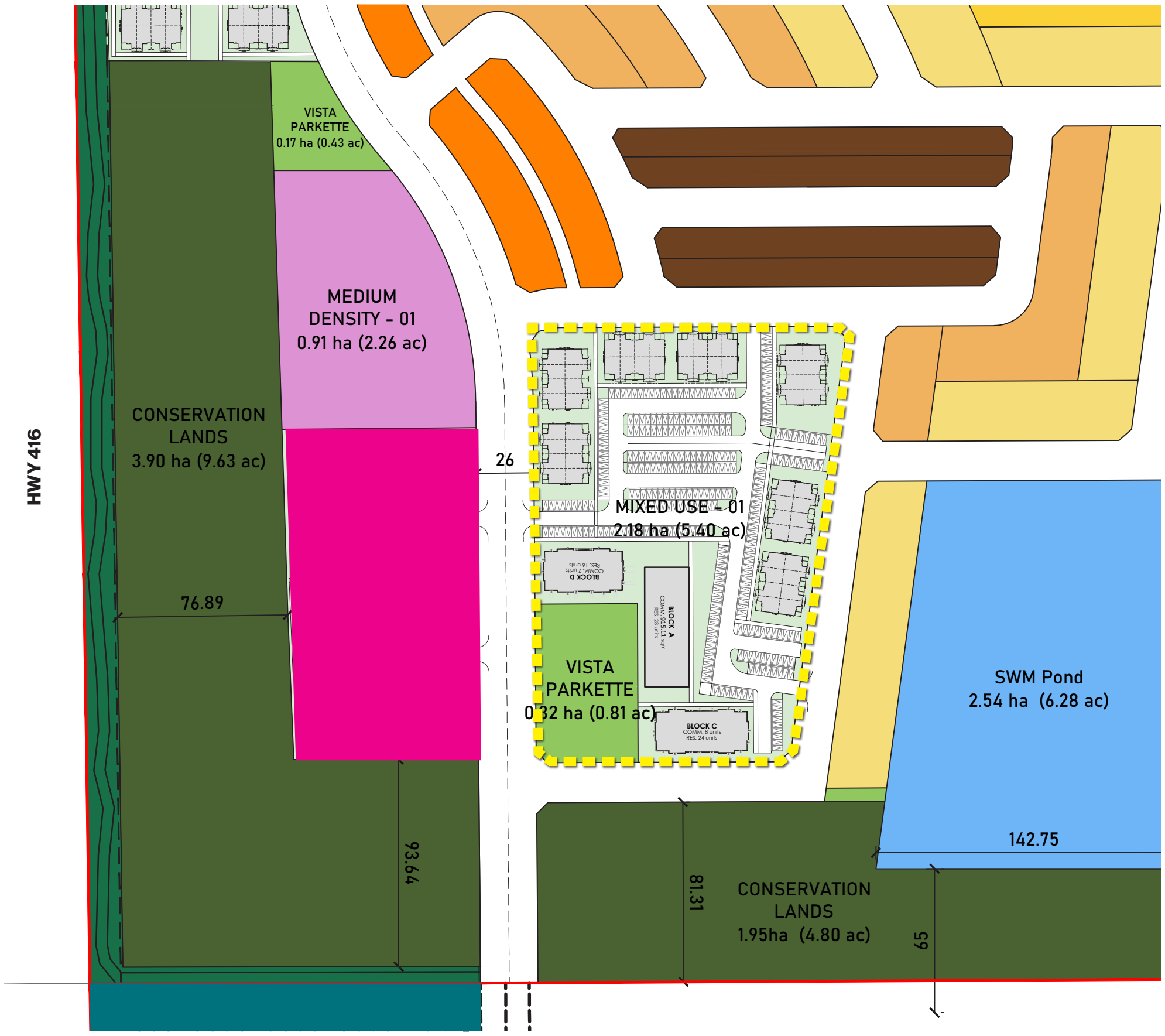
** Parking is provided for Stacked, mixed use unit and Commercial*

	Area (Ha)	*Area (Ac)*	*Target UPH*	*Units***
Medium Density Block - 01	0.91	2.25	75	**68**
Medium Density Block - 01	1.72	4.25	75	**129**
Sub Total	***2.63***	***6.50***		***197***

*** Unit Count based on Target UPH*

Cedarview Grand Total units	**1493**

Type of Lot	*Depth (m)*	*Width (m)*	*Units*	*%*	*Product %*
Single Detached					
30' Single	27	9.14	115	48%	**48.44%**
30' Corner Single	27	12	42		
36' Single	27	11	80	24%	
43' Single	27	13.10	90	28%	
		Sub Total	***327***	***100%***	
21' Front-Lane Townhome 2 Storey					
Corner Units	25	10.65	20	11%	**27.26%**
Interior Units	25	6.5	100	54%	
End Unit/ Lane Lot	25	8.2	64	35%	
		Sub Total	***184***	***100%***	
21' Back-to-Back Townhome					
Corner Units	14	10.2	16	14%	**17.48%**
Interior Units	14	6.4	62	53%	
End Unit/ Lane Lot	14	8.05	40	34%	
		Sub Total	***118***	***100%***	
20' Rear Lane towns					
Corner Units	20	9.5	10	22%	**6.81%**
Interior Units	20	6.0	26	57%	
End Unit/ Lane Lot	20	7.65	10	22%	
		Sub Total	***46***	***100%***	
		Low Density Residential Total Units:	***675***		**100%**



Mixed-Use Block- 01

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**2.18**	**5.39**	**100%**

Parking Ratio			
	Residential	*Visitors*	*Retail (stalls / 100m2)*
Mixed-Use Residential	1	0.2	
Stacked	1.2	0.2	
Back-to-Back			
Retail			5.05

	Retail (sqm)	*Res Units*	*Parking Required*	*Visitors Parking Required*	*Total Parking Required*	*Total Parking Provided*
Commecial	2299.0		116		198	***311***
Mixed Use Ressidential		68	68	14		
Stacked		84	101	17	119	
	Total	***152***	***285***	***30***	***316***	

Density	**28.22**	**UPA**

NORTH

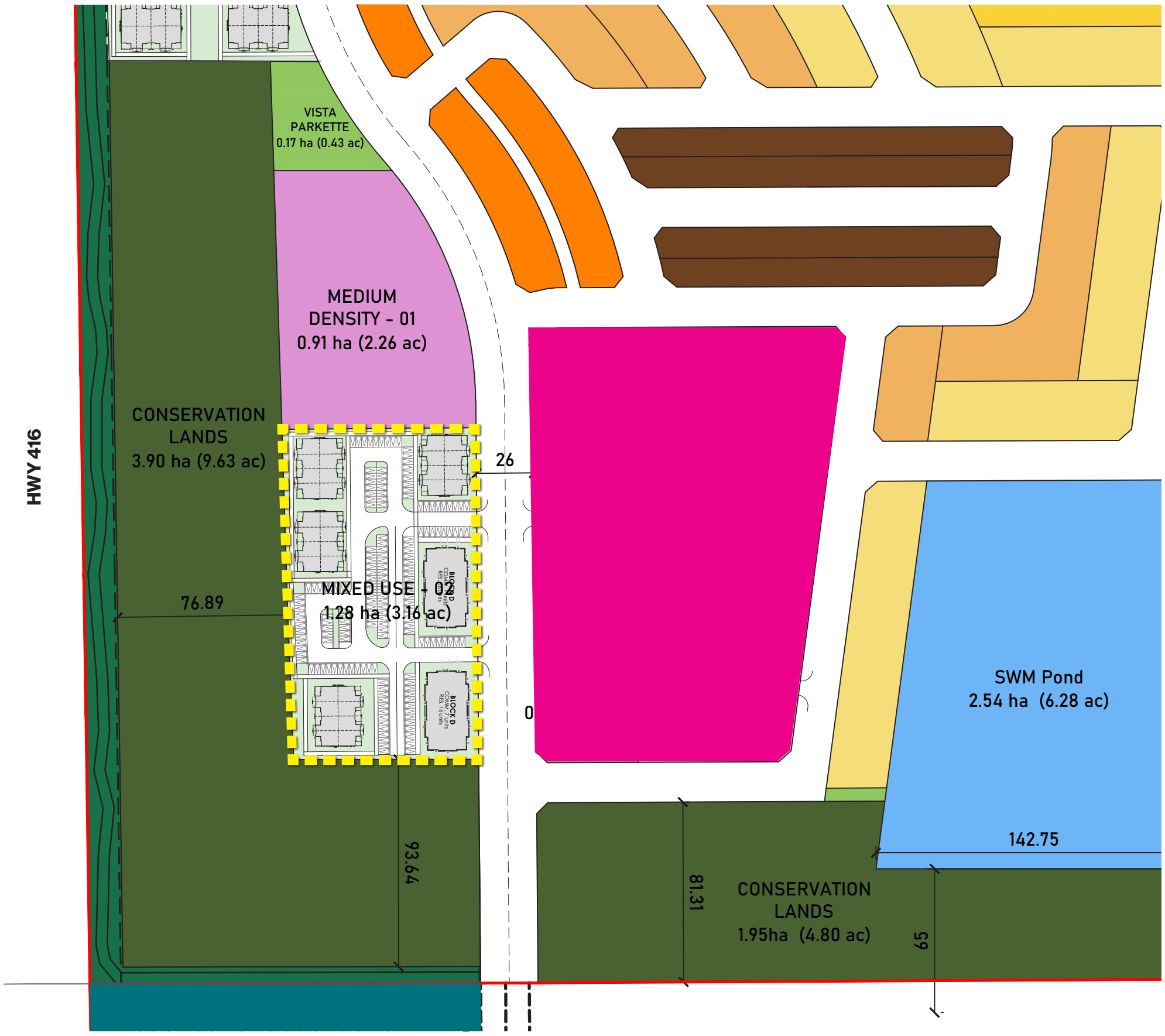
Scale 1:2000
0 25 50

mattamyHOMES

Cedarview | Concept _ v6 - Mixed Use Block - 01

Date : 17th August 2023

Urbantypology



Mixed-Use Block - 02

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**1.28**	**3.16**	**100%**

Parking Ratio			
	Residential	*Visitors*	*Retail (stalls / 100m2)*
Mixed-Use Residential	1	0.2	
Stacked	1.2	0.2	
Back-to-Back			
Retail			5.05

	Retail (sqm)	*Res Units*	*Parking Required*	*Visitors Parking Required*	*Total Parking Required*	*Total Parking Provided*
Commecial	1358.4		69		107	***175***
Mixed Use Ressidential		32	32	6		
Stacked		48	58	10	68	
	Total	***80***	***158***	***16***	***175***	

Density	**25.29**	**UPA**

NORTH

Scale 1:2000

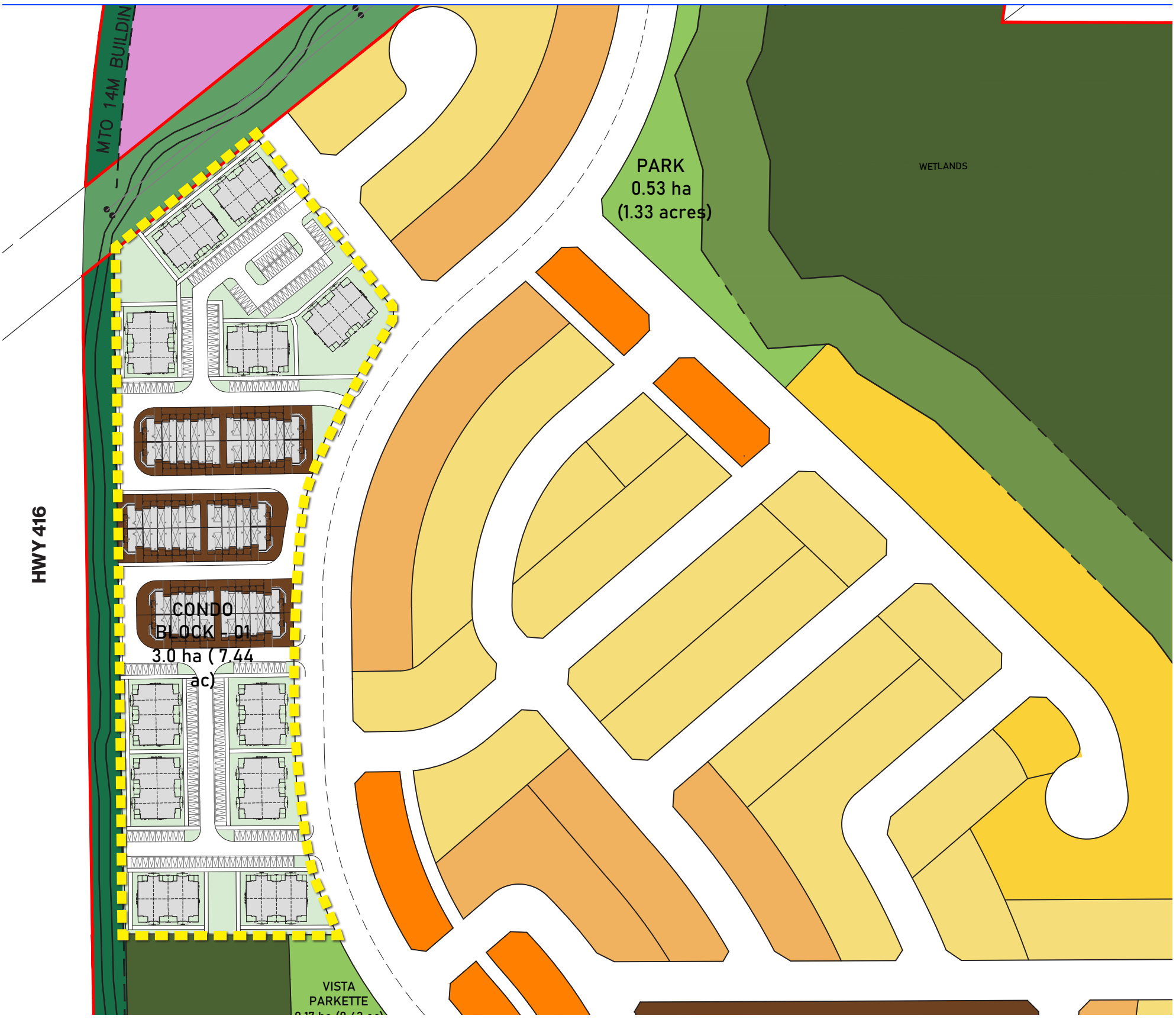
0 25 50

mattamyHOMES

Cedarview | Concept _ v6 - Mixed Use Block - 02

Date : 17th August 2023

Urbantypology



Condo Block - 01

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**3.01**	**7.44**	**100%**

Parking Ratio			
	Residential	*Visitors*	*Retail (stalls / 100m2)*
Mixed-Use Residential	1	0.2	
Stacked	1.2	0.2	
Back-to-Back			
Retail			5.05

	Retail (sqm)	*Res Units*	*Parking Required*	*Visitors Parking Required*	*Total Parking Required*	*Total Parking Provided*
Stacked		132	158	26	186	
Back-to-back Towns		54				***221***
Rear lane Towns						
	Total	***186***	***158***	***26***	***186***	

Density	**25.01**	**UPA**

NORTH

Scale 1:2000

0 25 50

mattamyHOMES

Cedarview | Concept _ v6 - Condo Block - 02

Date : 17th August 2023

Urbantypology

Condo Block - 02

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**3.19**	**7.88**	**100%**

Parking Ratio			
	Residential	*Visitors*	*Retail (stalls / 100m2)*
Mixed-Use Residential	1	0.2	
Stacked	1.2	0.2	
Back-to-Back			
Retail			5.05

	Retail (sqm)	*Res Units*	*Parking Required*	*Visitors Parking Required*	*Total Parking Required*	*Total Parking Provided*
Stacked		132	158	26	186	
Back-to-back Towns		56				***203***
Rear lane Towns		15				
	Total	***203***	***158***	***26***	***186***	

Density	**25.78**	**UPA**

NORTH

Scale 1:2000

0 25 50

mattamyHOMES

Cedarview | Concept _ v6 - Condo Block - 02

Date : 17th August 2023

Urbantypology

Employment Land

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**6.30**	**15.57**	**100%**

Parking Ratio	*Residential*	*Visitors*	*Retail (stalls / 100m2)*
Mixed-Use Residential	1	0.2	
Stacked	1.2	0.2	
Back-to-Back			
Retail			5.05

	Retail (sqm)	*Res Units*	*Parking Required*	*Visitors Parking Required*	*Total Parking Required*	*Total Parking Provided*
Commecial	915.1		46		80	***409***
Mixed Use Ressidential		28	28	6		
Stacked		228	274	46	320	
Back-to-Back		110				
Rear lane Towns		18				
	Total	***384***	***348***	***51***	***400***	

Density	**24.67**	**UPA**

NORTH

Scale 1:2000

0 25 50

mattamyHOMES

Cedarview | Concept _ v6_Employment Block - 01

Date : 17th August 2023

Urbantypology

Employment Land

Statistics Summary			
	Ha	*Acres*	*%*
Site Area	**6.30**	**15.57**	**100%**

Parking Ratio			
	Residential	*Visitors*	*Retail (stalls / 100m2)*
Mixed-Use Residential	1	0.2	
Stacked	1.2	0.2	
Back-to-Back			
Retail			5.05

	Retail (sqm)	*Res Units*	*Parking Required*	*Visitors Parking Required*	*Total Parking Required*	*Total Parking Provided*
Commecial	915.1		46		80	***409***
Mixed Use Ressidential		28	28	6		
Stacked		228	274	46	320	
Back-to-Back		110				
Rear lane Towns		18				
	Total	***384***	***348***	***51***	***400***	

Density	**24.67**	**UPA**

NORTH

Scale 1:2000

0 25 50

mattamyHOMES

Cedarview | Concept _ Employment Block - 01

Date : 4th August 2023

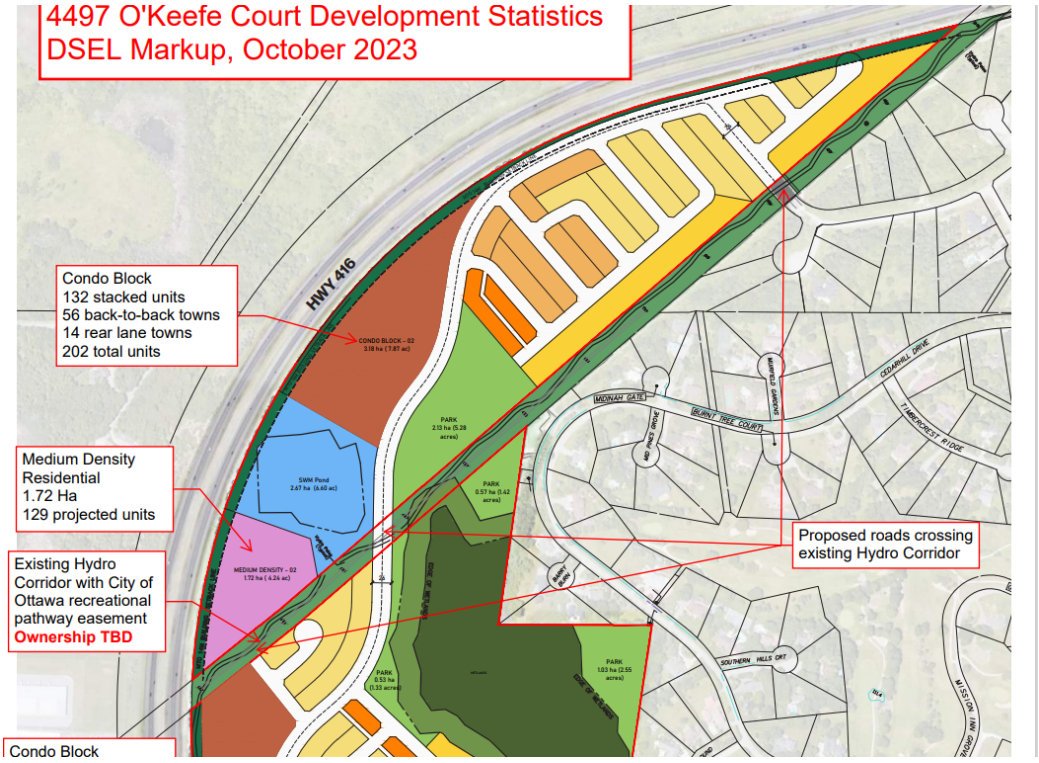
Urbantypology

Hannah Bulmer

From: DORFMAN Roman <Roman.Dorfman@hydroone.com>
Sent: October 24, 2023 9:39 AM
To: Hannah Bulmer
Cc: ZUFELT Deb; Anthony Temelini; Braden Kaminski; connor.gallagher@mattamycorp.com; kevin.murphy@mattamycorp.com; DE RANGO Dennis
Subject: FW: 4497 O'Keefe Court - Utility Servicing Kickoff (DSEL Job 746)
Attachments: DSEL_Disclaimer.pdf; 2023-08-02 - Cedarview _ Community Design_v4.dwg; 2023-10-20_ 4497O'KeefeCourt_Markup_ajt.pdf; Hydro One Technical Review Form_Version-2022.pdf; PSLUP - Planning Information Form - Mar 2022 (Fillable).pdf; EFT Payment Information (IO)v2-Licences.pdf; EFT Payment Information (IO)v2-Sale and Easement.pdf

Hannah, the subject Hydro One (HONI) corridor lands described in the attachments as well as in your email below are incorrectly identified as easement lands. These lands (PIN 046310409) are owned by the Province of Ontario and are subject to a Statutory right for HONI.

Any access or proposed uses within the subject lands require appropriate approvals and documentation. There are a number of proposed uses shown on the drawing below that will impact HONIs ROW that may require purchase (road crossings) as well as easements (ie sewers, watermains, swales, etc.) from the Province where each will require a formal submission to HONI for review and documentation



As well, I am not sure if you had submitted any circulations to HONIs Planning (abutting use review), but I have cc'd HONIs Planning Coordinator (Dennis Derango) for input

Please review the attached Technical Requirements that should be followed when submitting any and all proposals for utilizing the HONI corridor lands. When submitting proposal, please ensure to complete the attached Planning Form as well as submitting a non refundable Engineering and Review fee as per the attached instructions. The non refundable Engineering and Review Fees for submissions are as follows:

- Licensing: $1500+HST
- Easements: $2500+HST
- Sales: $2500+HST

When submitting any fees, please let me know so that I can ensure that they are applied to your submissions accordingly

If you would like to discuss the process or any other requirements for this project, please let me know and I will arrange for a meeting

Thank you

Roman Dorfman
Hydro One Real Estate Representative
Canacre Ltd.

(416) 433-8777
roman.dorfman@HydroOne.com

From: Hannah Bulmer <HBulmer@dsel.ca>
Sent: Monday, October 23, 2023 11:57 AM
To: Kevin Perez-Lau <kevinperez-lau@hydroottawa.com>; Subdivision Project Management <subdivision_pm@hydroone.com>; PROV LINE SUBDIVISION <ProvLineSubDivision@HydroOne.com>; BEAUDETTE Ryan <Ryan.Beaudette@HydroOne.com>; ZUFELT Deb <Deb.Zufelt@HydroOne.com>; Pozo Dickson, Julio <julio.dickson@bell.ca>; Jocelyn Bercier <Jocelyn.Bercier@rci.rogers.com>; Suzanne Renaud <Suzanne.Renaud@enbridge.com>; mark-ups@enbridge.com
Cc: Anthony Temelini <ATemelini@dsel.ca>; Braden Kaminski <BKaminski@dsel.ca>; connor.gallagher@mattamycorp.com; kevin.murphy@mattamycorp.com
Subject: 4497 O'Keefe Court - Utility Servicing Kickoff (DSEL Job 746)
Hello,

I hope this email finds you well. I am writing on behalf of Mattamy Homes, to inform you about the upcoming development at 4497 O'Keefe Court – see the concept plan attached. The site is located north of Fallowfield Road/Lytle Park, between Highway 416 and the existing Cedarhill Estates development. It should be noted that there is an existing Hydro corridor, including a City of Ottawa recreational pathway easement, that currently bisects the site – can you please confirm the ownership of the corridor?

The project is currently in the early stages and we are looking to gather information about the existing utility equipment in the vicinity of the development, including any cables/ducts/gas mains and the location of existing major structures (transformers, pedestals, etc.).

Can you please confirm the location of your existing equipment and if you foresee any issues with the current capacity of your respective networks? If so, please let us know the scope of potential network upgrades that would be required to service the proposed development.

Please let us know if you have any questions or if you would prefer that we set up a virtual meeting to discuss.

Thanks,

Hannah Bulmer
Project Coordinator
HBulmer@dsel.ca
613-898-4266

Toronto
600 Alden Road, Suite 700
Markham, ON L3R 0E7
905-475-3080

Ottawa
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856

Appendix B

- Mattamy Cedarview Water Servicing Analysis, prepared by Stantec, dated February 8, 2024

MATTAMY CEDARVIEW WATER SERVICING ANALYSIS

Final Report

February 8, 2024

Prepared for:
Mattamy Homes

Prepared by:
Stantec Consulting Ltd.

Project Number:
163401876

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
V01	DRAFT	MN	20240123	AMG	20240123	AP	20240125
V02	FINAL	MN	20240207	AMG	20240207	AP	20240208

The conclusions in the Report titled **Mattamy Cedarview Water Servicing Analysis** are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Mattamy (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Prepared by: 

Signature

Melissa Nelson, EIT

Printed Name

Reviewed by: 

Signature

Alexandre Mineault-Guitard, P.Eng.

Printed Name

Approved by: 

Signature

Ana Paerez, P.Eng.

Printed Name

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1 Introduction

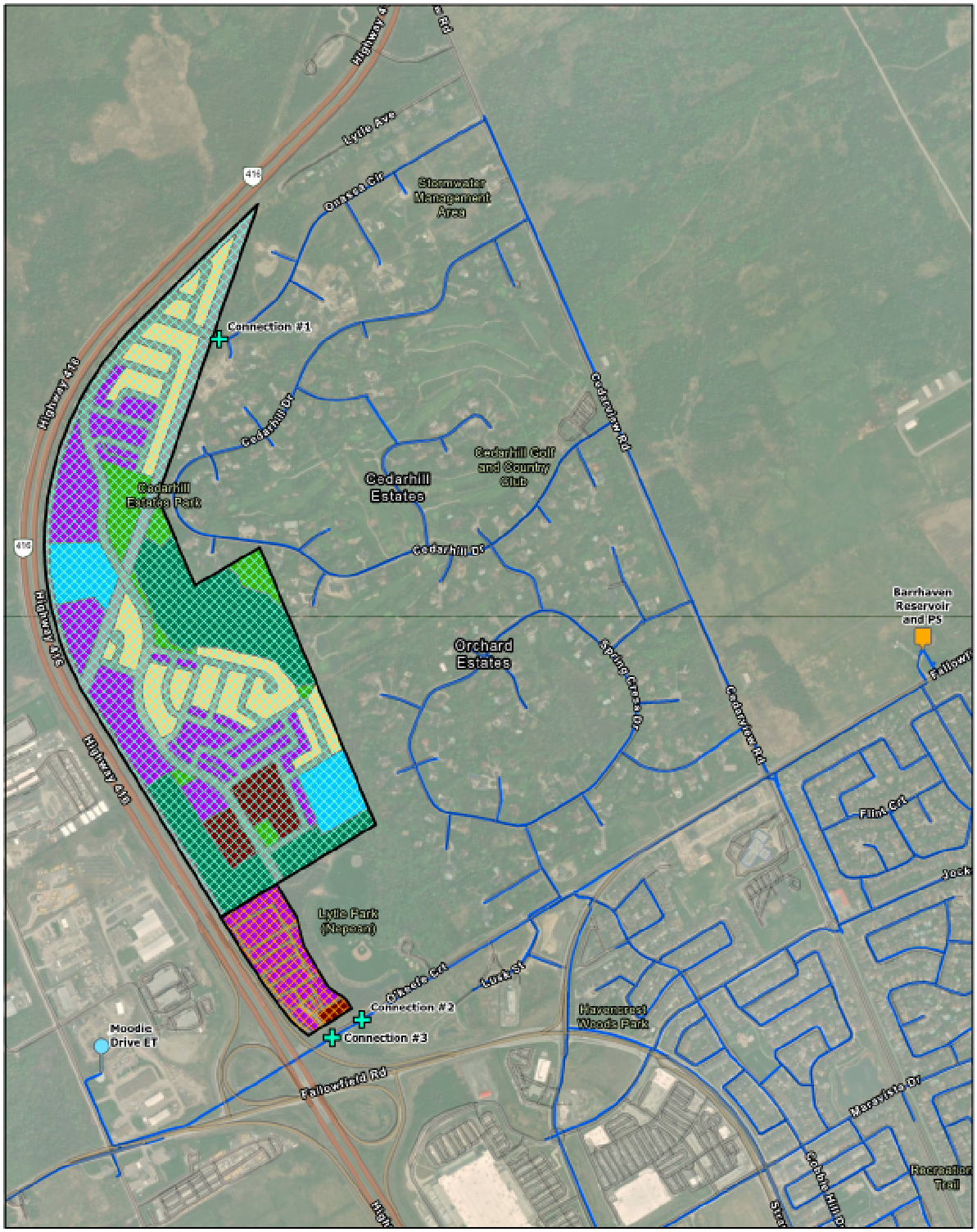
Stantec Consulting Ltd (Stantec) was retained by Mattamy Homes Limited (herein Mattamy) to complete a conceptual potable water hydraulic analysis for the envisioned Cedarview development lands. The purpose of the conceptual potable water hydraulic analysis is to confirm serviceability of the proposed lands and to identify the associated watermain sizing and infrastructure requirements, based on the conceptual draft site plan (i.e., street layouts and unit densities).

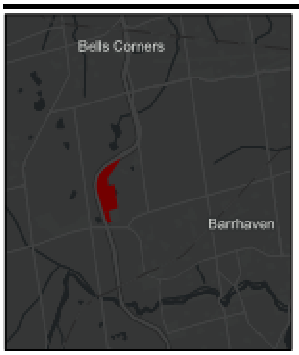
1.1 Background and Study Area

The study area, referred to as the Cedarview lands, is located in the city of Ottawa's (herein the City) southwestern suburban neighbourhood of Barrhaven. The study area is presented in **Figure 1-1**. The lands are situated between Highway 416 to the north and west, O'Keefe Crescent to the South, and Cedarhill and Orchard Estates to the east. Mattamy is interested in developing this area, which is currently zoned as 1-acre rural estate lots and rezoning it to urban mixed-use as shown in **Figure 1-1**. Mattamy is exploring the acquisition of the adjacent vacant parcel of land to the south, west of Lytle Park (see **Figure 1-1**), which has been referred to as "Employment Lands" and has also been considered in this potable water serviceability analysis.

For this assignment, Stantec's scope of work include the following tasks:

1. Reviewing background information and establishing water demands for the Cedarview and Employment Lands, based on the most current draft plan;
2. Estimating hydraulic boundary conditions at the envisioned connections to the City's water distribution network;
3. Developing a stand-alone hydraulic model for the proposed development;
4. Setting up and running model simulations for average day (AVDY), peak hour (PKHR), and maximum day (MXDY) plus fire flow demands to identify watermain sizing and redundancy needs required for the water distribution system within the development lands to meet the City's design criteria; and,
5. Documenting the approach used, findings and recommendations.





Notes
1. Coordinate System: City of Ottawa

Legend

- Cedarview Lands
- Employment Lands
- City of Ottawa Water Network
- Barrhaven Reservoir and PS
- Moodie Drive ET
- Connection Location

Land-Use

- Single Family Home (SFH)
- Multi-Level Townhouse (MLT)
- Mixed-Use (APT and Commercial)
- Park and Open Space
- Wetland and Conservation Area
- SWM
- Other

0 250 500 Meters

(At original document size of 11x17)
1:11,000

N

Stantec

Project Location
Ottawa, ON

Client/Project 160401835
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
1-1

Title
Study Area

Two (2) phases will be considered in the serviceability analysis, as follows:

- Phase 1: Cedarview Lands only; and
- Phase 2: Cedarview and Employment Lands.

Based on the latest draft plan provided by Mattamy (dated August 2nd, 2023), the proposed Cedarview development lands will comprise a total 342 single family home (SFH) units, 1,050 townhouse (MLT) units (consisting of a combination of standard, stacked, back-to-back and rear-lane townhouse units), as well as mixed-used areas comprising 100 apartment (APT) units, and a total of 0.37 ha of commercial lands. The proposed draft plan (i.e., road alignment, land-use, etc.) is presented in **Figure 1-1**. For the proposed Employment Lands (latest draft plan dated August 2nd, 2023), 356 MLT units, 28 APT units, and 0.09 ha of commercial areas are envisioned. Further details on population estimates are provided in **Section 3**.

The proposed development lands will be serviced from Pressure Zone 3SW (previously known as Zone BARR). The hydraulic grade line (HGL) within PZ 3SW is governed by the water levels in the Moodie Drive Elevated Tank (herein Moodie Dr ET), located immediately west of the study area, as shown in **Figure 1-1**. As such, the proposed development could be serviced from connections to the existing distribution, as shown in **Figure 1-1** and described below.

- Connection #1: The existing 305 mm stub along Onassa Circle;
- Connection #2: The existing 610 mm watermain along O'Keefe Crescent; and
- Connection #3: The existing 610 mm watermain along O'Keefe Crescent (Phase 2 only).

1.2 Data Collection

A summary of the data available to Stantec for this conceptual hydraulic analysis is detailed in **Table 1-1**.

Table 1-1: Data Sources

Type & Use	Title	Source	Date
Site Layout and Unit Counts (Cedarview Lands)	Cedarview Community – Masterplan concept v4	Mattamy Homes	2023/08/02
Site Layout and Unit Counts (Employment Lands)	Cedarview Concept – Employment Block – 01	Mattamy Homes	2023/08/04
Water Master Plan / Water Boundary Conditions	City of Ottawa 2013 Water Master Plan	City of Ottawa	2013/09/20

2 Design Criteria

The City of Ottawa Water Design Guidelines (City of Ottawa, 2010) and criteria outlined in the 2013 Water Master Plan (WMP) were used to establish water demands, level of service and pressure objectives during normal and emergency conditions.

2.1 System Pressures

As per the Ottawa Water Design Guidelines, the desired range of pressure under average day (AVDY) and maximum day (MXDY) demands is 345 to 552 kPa (50 to 80 psi), and no less than 276 kPa (40 psi) at ground elevation (i.e., at street level). The maximum pressure at any point in the water distribution system should not exceed 552 kPa (80 psi); pressure reducing measures are required to service areas where pressures greater than 552 kPa (80 psi) are anticipated.

Under emergency fire conditions, the system must be able to supply appropriate fire flows while maintaining a residual pressure of at least 138 kPa (20 psi).

Figure 2-1 shows the elevation of each model junction within the Cedarview Lands and Employment Lands. It should be noted that the latest grading data available for the conceptual lands (dated November 2021 by David Schaeffer Engineering Ltd.) does not align with the proposed road alignment in the latest draft plan concept and were thus not considered. Elevations were extracted from recent LIDAR data. Ground elevations range from 103.0 m to 120.0 m.

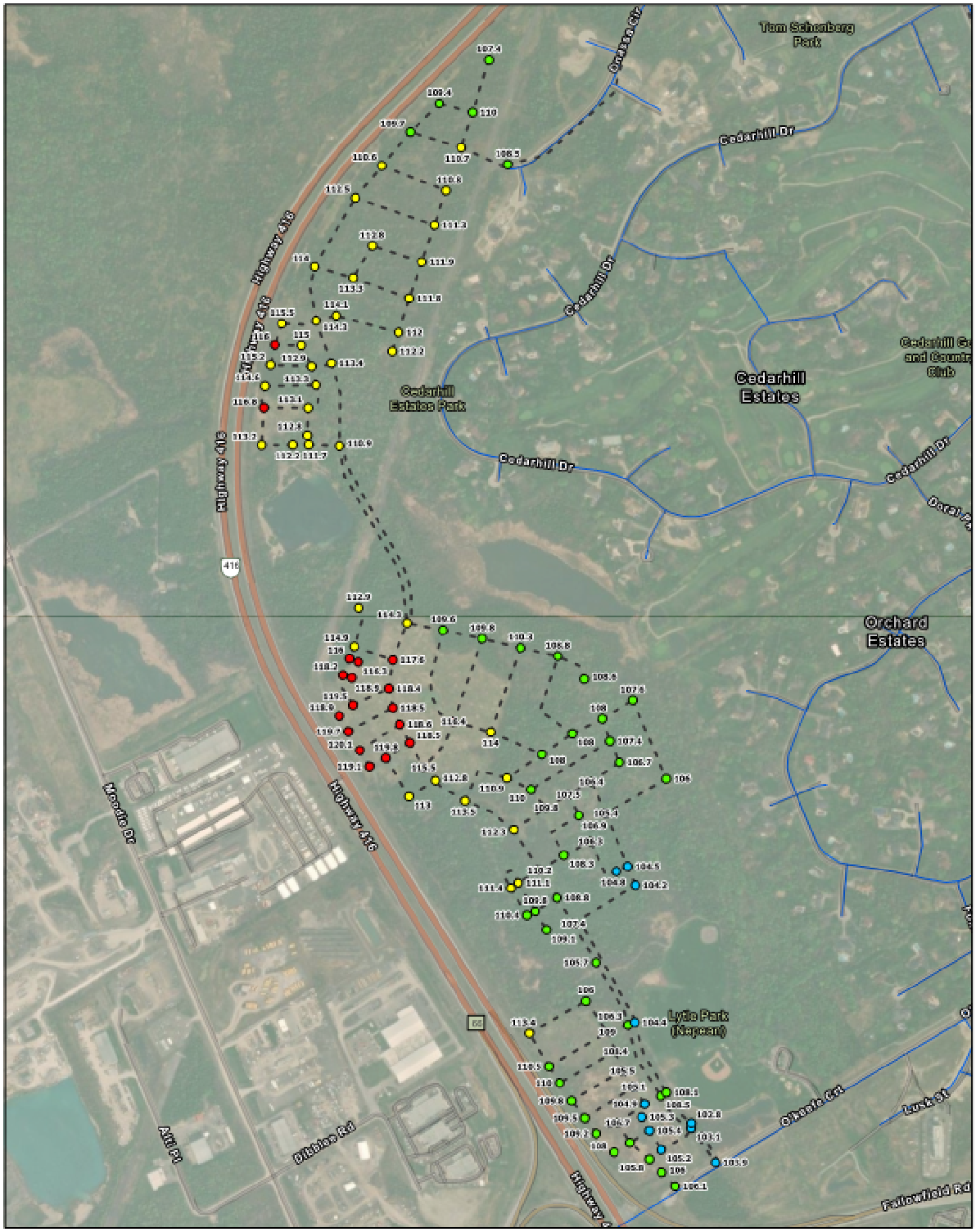
As such, the elevations considered in the conceptual hydraulic analysis might differ from the ultimate grading in the area. Model junction elevations should be updated, as needed, at later design stages.

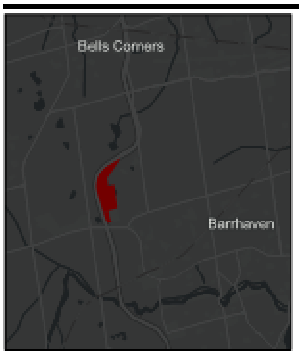
2.2 Fire Flow Requirements

The City requires a fire flow assessment be completed based on the calculation method published by the Fire Underwriters Survey (FUS) to demonstrate that local watermains can provide the objective fire flows. However, information regarding unit sizes and unit separation is not available at this time and as such, FUS calculations have not been completed.

As a result, an assumed required fire flow (RFF) of 13,000 L/min (or 216.67 L/s) has been used for this conceptual analysis, as recommended in the City's 2013 WMP, to ensure that the local watermains can provide this minimum fire flow at a residual pressure of 20 psi. If a lower RFF is identified at the detailed design stage, adjustment to the proposed watermain network could be explored.

It is recommended that FUS calculations and RFF requirements for the Cedarview and Employment lands be reviewed at the detailed design stage to ensure that fire flow requirements are met across the site.





Legend

- Proposed Water Network
- City of Ottawa Water Network

Ground Elevation (m)

- 100-105
- 105-110
- 110-115
- 115-120

0 100 200 Meters

(At original document size of 11x17)
1:7,500

N

Stantec

Project Location
Ottawa, ON

Client/Project 165401670
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
2-1

Title
Junction Elevation

Notes
1. Coordinate System: City of Ottawa

3 Growth and Demand Projections

3.1 Growth Projections

The estimated residential population for Cedarview Lands (Phase 1) and the Employment Lands (Phase 2) were estimated based on projected household sizes as per population densities (or persons per unit, PPU) specified in the City's 2013 WMP. As per the 2013 WMP, the zone/system-level criteria for water demands have been used for populations that exceed 3,000 persons.

Table 3-1 shows the estimated number of units and the projected populations based on the distribution of residential types for both phases of development. For Phase 1, the total number of units is estimated to be 1,492, with a residential population of 4,178 persons. For Phase 2, the additional unit number is estimated to be 384, with a residential population of 1,011. The total unit number for both Phase 1 and Phase 2 is therefore 1,876, with a total residential population of 5,189 persons.

Table 3-1: Estimated Unit Counts and Residential Population

Unit Type	Units	PPU	Population
Phase 1 (Cedarview Lands)			
SFH	342	3.4	1,163
MTL	1050	2.7	2,835
APT	100	1.8	180
Sub-total	***1,492***		***4,178***
Phase 2 (Employment Lands)			
MTL	356	2.7	961
APT	28	1.8	50
Sub-total	***384***		***1,011***
Total (Cedarview and Employment Lands)	***1,876***		***5,189***

Table 3-2 shows the proposed commercial area within each phase. Without information on employment density at this time, a density of 80 employees per hectare was assumed. As such, the estimated population for Phase 1 and Phase 2 is 29 and 7, respectively. Expected employment density should be confirmed at later stages of design, and water demands updated accordingly.

Table 3-2: Estimated Commercial Population

Unit Type	Area (ha)	Employee/ha	Population
Phase 1 - Commercial	0.37	80	29
Phase 2 - Commercial	0.09	80	7
Total	***0.46***		***36***

3.2 Demand Projections

The criteria outlined in the 2013 WMP has been followed to establish water demands. The demand rates from the WMP are applied to the population projections presented in **Table 3-1** based on land use. For residential land use, single-family were classified as "single-family houses" (SFH) that have a unit consumption rate of 180 L/cap/d. All townhouses are classified as "multi-level townhouses" (MLT) with a unit consumption rate of 198 L/cap/d. All apartments (APT) have a unit consumption rate of 219 L/c/day. For the commercial (COM) lands (see **Table 3-2**), a demand rate of 137 L/employee/d is applied to establish AVDY demands. To establish MXDY demands, an outdoor water demand (OWD) of 1,049 L/SFH/d was taken, as per the 2013 WMP, and allocated to all SFH units. This outdoor water demand was added to AVDY demands to obtain the MXDY demand. The estimated water demands are summarized in **Table 3-3**.

Table 3-3: Estimated Water Demands

Unit Type	Population	Water Demands		
		AVDY (L/s)	OWD (L/s)	MXDY (L/s)
Phase 1 (Cedarview Lands)				
SFH	2,237	2.42	4.15	6.57
MLT	991	6.50	-	6.50
APT	180	0.46	-	0.46
COM	29	0.05	-	0.05
Sub-Total	***4,207***	***9.42***	***4.15***	***13.57***
Phase 2 (Employment Lands)				
SFH	-	-	-	-
MLT	961	2.20	-	2.20
APT	50	0.13	-	0.13
COM	7	0.01	-	0.01
Sub-Total	***1,019***	***2.34***	-	***2.34***
Total (Cedarview and Employment Lands)	***5,226***	***11.76***	***4.15***	***15.92***

The projected AVDY and MXDY demands were distributed to the model nodes for the corresponding demand scenario and phase (i.e., winter/AVDY, summer/MXDY). Demand patterns developed by the City were applied to the demands.

Peak hour (PKHR) demands were established by applying diurnal patterns developed by the City of Ottawa to the maximum day demands. The diurnal patterns are different for each unit type and vary with time of day. The overall maximum observed demand, with patterns applied, is the PKHR demand. The PKHR demand for Mattamy Cedarview is 26.95 L/s, and the PKHR demand for the employment land is 3.47 L/s.

4 Model Development

Innovyze's InfoWater Pro (Version 3.5, Update #1) was used as a hydraulic modelling platform for the water distribution system analysis of the proposed development lands. The model was developed to reflect the most current site plan layout, including the proposed watermain layout (based on proposed road alignment) and water demands.

The watermains in the model were assigned Hazen-Williams coefficients ("C-Factors") in accordance with the City's Water Design Guidelines (City of Ottawa, 2010). These factors are listed in **Table 4-1** below.

Table 4-1: Hazen-Williams Coefficients by Watermain Size

Watermain Diameter (mm)	Coefficient
150	100
200 - 300	110
350 - 600	120
> 600	130

4.1 Boundary Conditions

Boundary conditions (HGL) at the envisioned connections to the City's water distribution network were estimated from the typical HGL of the Moodie Dr ET. As per the City's 2013 WMP and shown in **Figure 4-1**, the top water level (TWL) of the Moodie ET is 155 m. Furthermore, the tank's bottom elevation is approximately 145 m.

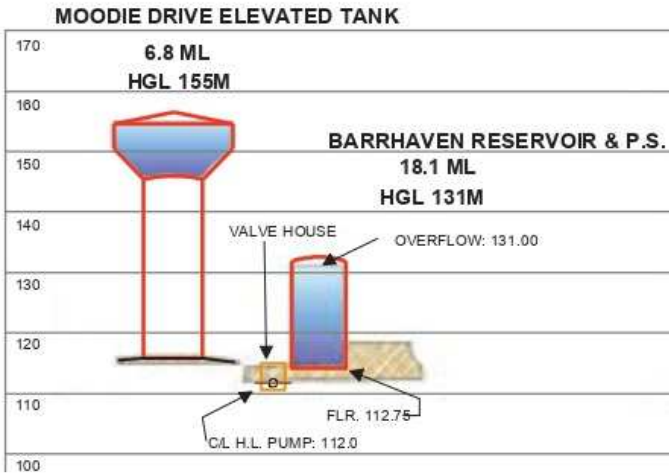


Figure 4-1: Moodie Drive Elevated Tank Schematic (adapted from the City's 2013 WMP)

Given that this tank is located about 1 kilometre west of the proposed development, it is anticipated that limited headlosses would occur along the existing 610 mm watermain linking the Moodie Dr ET and the proposed site. As a result, the typical operating levels of the tank could be used to estimate the hydraulic conditions at the proposed site connections. Considering the expected variation in the tank's water levels, an assumed HGL of 153 m was used for this analysis, such that the analysis is not completed under full tank conditions.

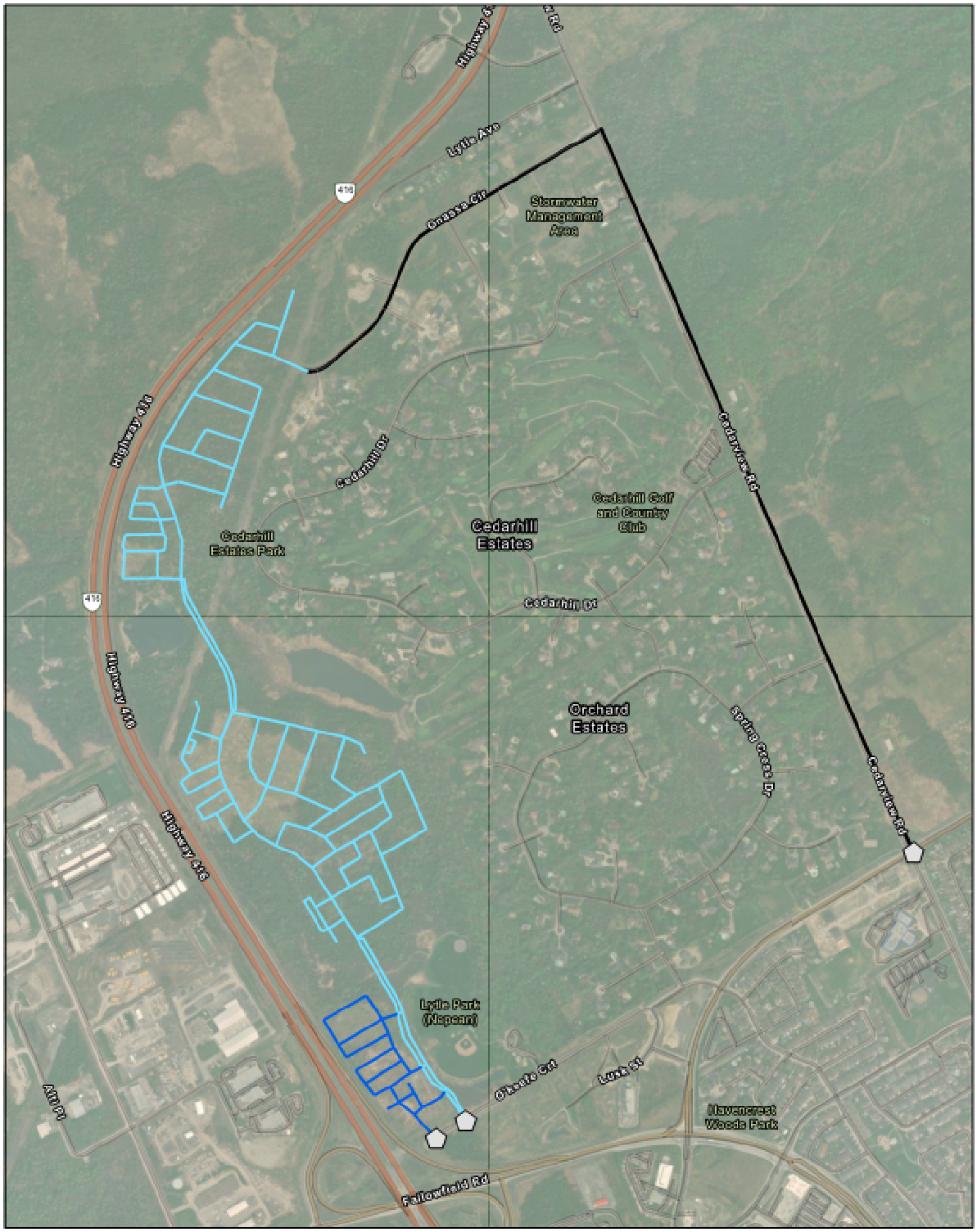
The expected boundary conditions at the proposed connections were estimated using the tank's HGL listed above, as well as considering headlosses along the 610 mm diameter watermain, based on the calculated water demands described in **Section 3.2**. For this analysis, it was assumed that all connections would occur along the 610 mm diameter watermain along O'Keefe Crt, as depicted in **Figure 4-2**. As a result, Connection #1 to the watermain on Onassa Cir was extended along Cedarview Rd to the intersection with O'Keefe Crt and the existing City's watermain infrastructure along Onassa Cir and Cedarview Rd were added to the hydraulic model (see **Figure 4-2**). Given the proximity of all connections, a common boundary condition was assumed at all connections, for each water demand scenario, given the limited headlosses that would occur between the proposed connections, along the 610 mm diameter watermain. Boundary conditions used for this study are summarized in **Table 4-2**. Detailed calculations can be found in **Appendix A**.

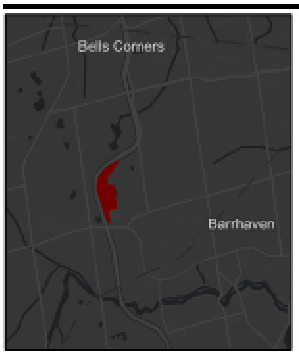
Table 4-2: HGL Boundary Conditions

Demand Scenario	Phase 1[1] HGL (m)	Phase 2[2] HGL (m)
AVDY	153.00	153.00
PKHR	152.98	152.97
AVDY+FF[3]	151.83	151.80
MXDY+FF[3]	151.79	151.76

[1] Cedarview Lands only.
[2] Cedarview and Employment Lands.
[3] 13,000 L/min or 217 L/s.

It should be noted that the above boundary conditions represent an approximation of the anticipated hydraulic conditions at the proposed connections to the City's network. Water boundary conditions should be requested from the City at later stages of design to ensure that appropriate hydraulic conditions are assessed, and recommendations are adjusted accordingly.





Legend

- Hydraulic Model Boundary Condition
- City Watermain Considered in the Hydraulic Model

Proposed Water Network

- Phase 1
- Phase 2

0 250 500 Meters

(At original document size of 11x17)
1:10,000

N

Stantec

Project Location
Ottawa, ON

Client/Project 160431875
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
4-2

Title
Hydraulic Model Configuration

Notes
1. Coordinate System: City of Ottawa

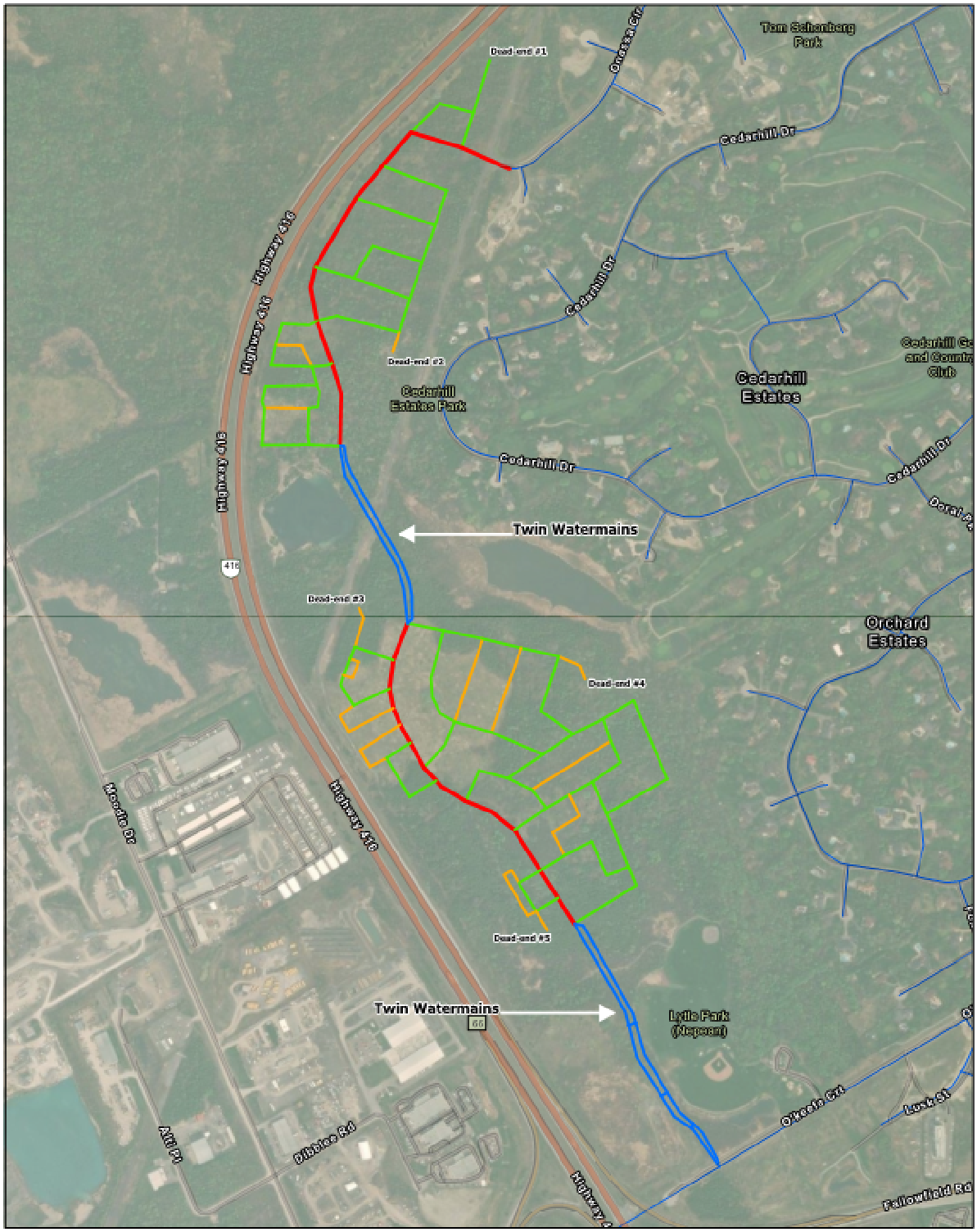
4.2 Proposed Watermain Sizing & Layout

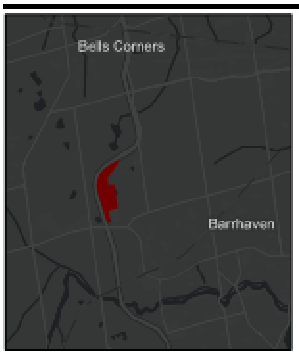
Watermain sizing and layout proposed as part of Phase 1 (Cedarview Lands only), is shown in **Figure 4-3**. Proposed watermain layout and sizing for Phase 2 (Cedarview and Employment Lands) is shown in **Figure 4-4**. The proposed network within the Cedarview and Employment Lands consists of 152 mm, 203 mm, 305 mm, and 406 mm diameter watermains. It should be noted that the addition of the Employment Lands in Phase 2 results in different watermain configuration and sizing recommendations in the southern portion of the proposed network.

The watermain layouts presented in **Figure 4-3** and **Figure 4-4** were identified to meet design criteria under normal and emergency conditions (including watermain break scenarios), as described in **Section 5** and **Section 6**. In various parts of the network, watermains were twinned to ensure appropriate servicing in case of major failure (i.e., watermain break). Most notably, along the backbone watermain connecting the northern and southern portions of the Cedarview Lands, as well as along the backbone watermain south of the Cedarview Lands, towards O'Keefe Crt. Of note, the twin watermain were sized at 305 mm diameter each, in comparison to the larger 406 mm diameter along the network's backbone, given that appropriate level of service was achieved in all reliability scenarios, when one of the two twin watermains would be out of service (i.e., watermain break).

As per the City of Ottawa Water Distribution Design Guidelines (Section 4.3.1), mitigation measures may be required on a case-by-case basis for new dead-ends to overcome stagnation and provide adequate chlorine residual. The proposed watermain layout contains five (5) dead-ends under Phase 1, and seven (7) under ultimate development conditions (i.e., Phase 1 and Phase 2). The dead-ends are identified on both **Figure 4-3** and **Figure 4-4**.

As per the City of Ottawa Water Distribution Design Guidelines, dead ends should be avoided as much as possible to limit potential water quality issues. Where dead-end watermains cannot be avoided, the guidelines specify a maximum watermain size of 152 mm unless a larger size is needed for supply reasons. All dead ends are proposed to be serviced by a 152 mm diameter watermain, except dead-end #1 (203 mm). These pipe sizes are recommended to meet demands under fire flow conditions. The configuration of the dead-end watermains will be as per the City's standard details. Furthermore, the maximum number of single-family units along a dead-end watermain should not exceed 49 to avoid the creation of a vulnerable service area. This shall be confirmed at the detailed design stage.





Legend

City of Ottawa Water Network

Proposed Watermain Diameter (mm)

- 152
- 203
- 305
- 410

Meters

1. Coordinate System: City of Ottawa

0 100 200 Meters

(At original document size of 11x17)
1:7,500

N

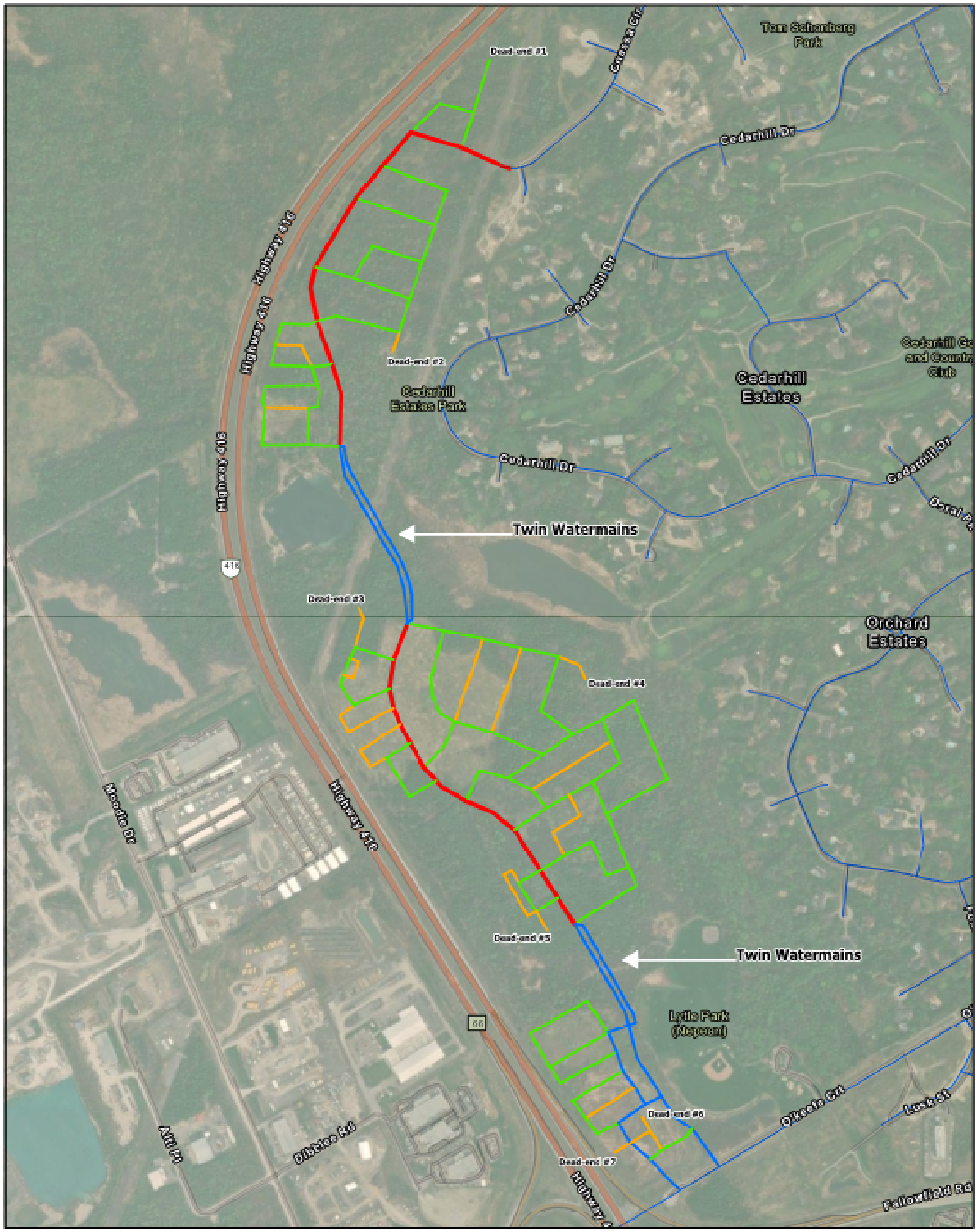
Stantec

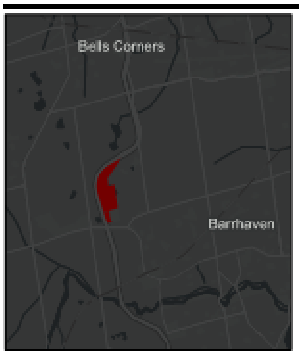
Project Location
Ottawa, ON

Client/Project 160401878
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
4-3

Title
Proposed Watermain Sizing – Phase 1 (Cedarview Lands)





Notes
1. Coordinate System: City of Ottawa

Legend

City of Ottawa Water Network

Proposed Watermain Diameter (mm)

- 152
- 203
- 305
- 410

0 100 200 Meters

(At original document size of 11x17)
1:7,500

N

Stantec

Project Location
Ottawa, ON

Client/Project 103401878
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
4-4

Title
Proposed Watermain Sizing – Phase 2 (Cedarview & Employment Lands)

5 Hydraulic Assessment

Hydraulic modelling was completed for the conceptual design to verify how the proposed network would respond. The following sub-sections present the modelling results under normal operating conditions (i.e., AVDY and PKHR), as well as under MXDY demands plus fire flow conditions.

5.1 Normal Operating Conditions

Under Phase 1 and Phase 2 AVDY conditions, model results show that the maximum modelled pressure is 71 psi for both phases. The maximum pressure is less than the City's maximum pressure objective of 80 psi and is thus considered acceptable.

Under PKHR demands for Phase 1 and Phase 2, the minimum modelled pressure is 47 psi for both phases. While this pressure falls outside of the desired pressure range of 50 to 80 psi, it is more than the minimum pressure objective of 40 psi. As such, it is considered acceptable.

Detailed modelling results are provided in **Appendix B**. Note that **Figure B-1** provides the model system map.

5.2 Maximum Day Plus Fire Flow

Available fire flows across the proposed study area must meet or exceed the required fire flow (RFF). As described in **Section 2.2**, the water network was assessed under an RFF of 13,000 L/min (217 L/s). Under MXDY+FF conditions, model results show that fire flows greater than 13,000 L/min are achievable, with a residual pressure of 138 kPa (20 psi), in most locations under both Phase 1 and Phase 2 conditions. Detailed modelling results are provided in **Appendix B.** However, there are a few locations where the residual pressures during fire flow conditions are below 138 kPa (20 psi), summarized below:

- Under Phase 1 conditions, nodes J10, J44, J56, J84, J128, J156, J158, J166, J168, J174, J176, J206, and J210 are below 138 kPa (20 psi). These results are outlined in **Table B-3** of **Appendix B**.
- Under Phase 2 conditions, nodes J10, J44, J56, J84, J128, J156, J158, J166, J168, J174, J176, J206, J210, J250, and J252 are below 138 kPa (20 psi). These results are outlined in **Table B-6** of **Appendix B**.

The worst-case scenario occurs at node J56, in both Phase 1 and Phase 2, where a maximum fire flow of 5,734 L/min and 5,724 L/min is available at a residual pressure of 138 kPa (20 psi), respectively. Most of these locations are located at dead-ends, where lower fire flow capacity is expected. Hydrant coverage (as per Ottawa's Design Guidelines ISTB-2018-02, Appendix I) should be reviewed at these locations at later design stages once boundary conditions have been obtained from the City and hydraulic conditions have been confirmed.

However, the fire flow requirements for the Cedarview and Employment Lands are to be confirmed at the detail design stage and fire control measures are to be included, as required. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant place procedure outlined in Appendix I of ISTB-2018-02 to avoid oversizing local pipes as described above.

6 Reliability Analysis

As per the City of Ottawa Design Guidelines, the system must be able to provide AVDY+FF while meeting serviceability requirements during major failure (i.e., watermain break). To assess reliability and resiliency against major failures, three (3) reliability scenarios were completed to confirm sufficient pressure and flow can be achieved during a major failure. These scenarios include the following and are shown in **Figure 6-1** (Phase 1) and **Figure 6-2** (Phase 2):

- **Break Scenario 1**: Break in the backbone watermain from Connection 1;
- **Break Scenario 2**: Break in the backbone watermain from Connection 2;
- **Break Scenario 3**: Break in the backbone watermain between the north and the south of the Cedarview Lands.

Note that the break scenarios were assessed under both Phase 1 and Phase 2 conditions, to confirm serviceability under all scenarios (demands, proposed watermain networks, etc.). Upon analysis of the reliability scenarios, the necessity of twin watermains was identified in some parts of the proposed network, to ensure appropriate servicing in case of major failure (i.e., watermain break). Most notably, along the backbone watermain connecting the northern and southern portions of the Cedarview Lands, as well as along the backbone watermain south of the Cedarview Lands, towards O'Keefe Crt.

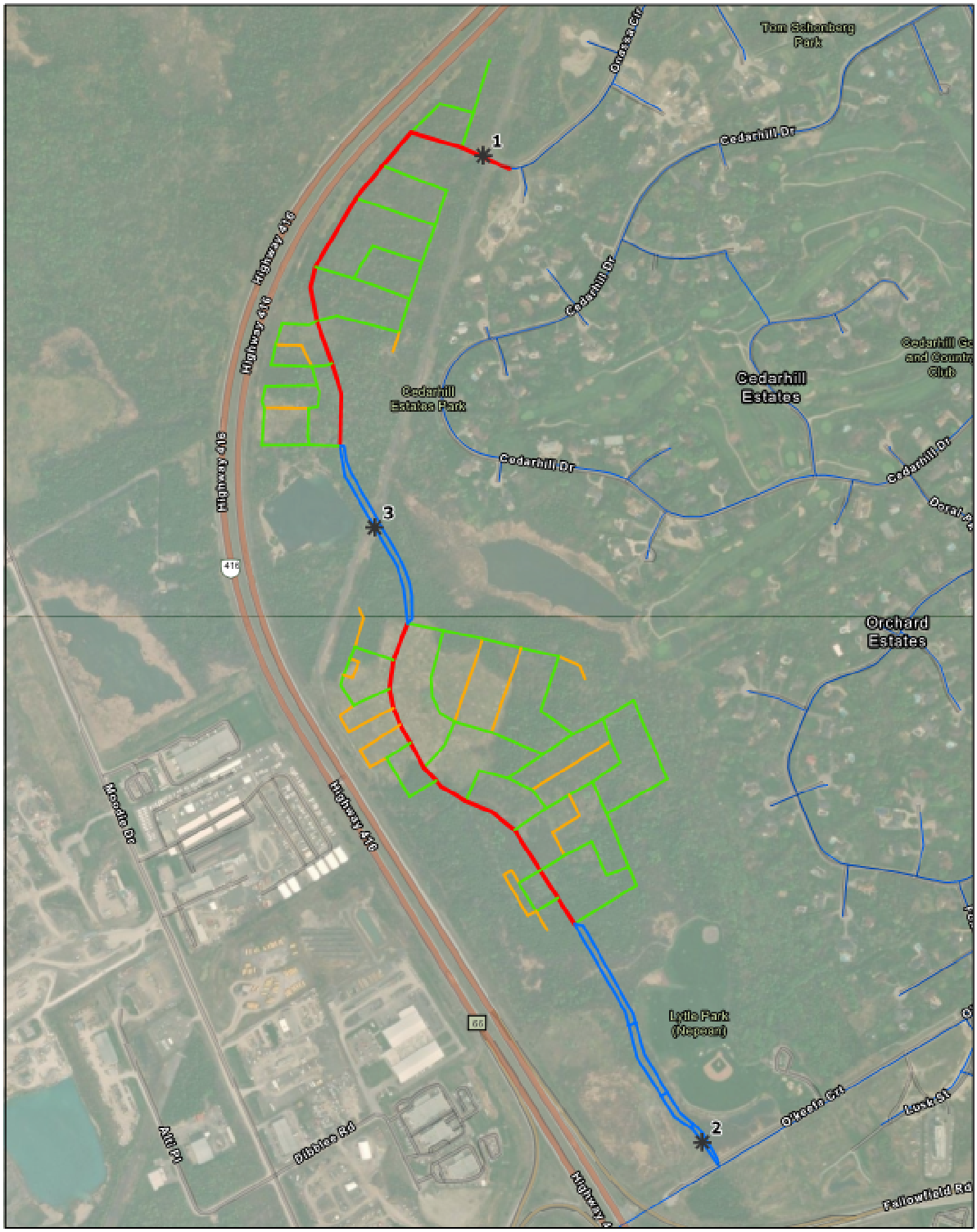
6.1 Phase 1

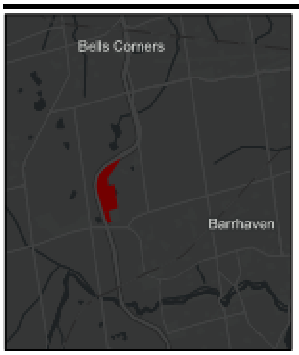
Modelling results shows that the targeted 13,000 L/min can be met at most junctions under all break scenarios and Phase 1 conditions. However, there are a few junctions that do not meet the criteria under each break scenario as listed in **Table 6-1**. Note that **Figure B-1** provides the model system map.

Fire flow requirements across the site are to be confirmed at later design stages and the required fire flow measures to meet City criteria under all watermain break scenarios are to be determined. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant placing procedure outlined in Appendix I of ISDTB-2018-02 to avoid oversizing local pipes.

Table 6-1: Reliability Analysis Results – Phase 1

Break Scenario	Model Nodes Not Meeting RFF of 13,000 L/min	Minimum Available Fire Flow at 20 psi (L/min)
1	J10, J30, J44, J56, J84, J128, J136, J138, J144, J156, J158, J166, J168, J174, J176, J196, J206, and J210	5,660
2	J10, J44, J56, J84, J128, J156, J158, J166, J168, J174, J176, J196, J206, and J210	5,711
3	J10, J44, J56, J84, J128, J136, J138, J156, J158, J166, J168, J174, J176, J206, and J210	5,749





Notes
1. Coordinate System: City of Ottawa

Legend

- City of Ottawa Water Network
- Watermain Break Location/Scenario

Proposed Watermain Diameter (mm)

- 152
- 203
- 305
- 410

0 100 200 Meters

(At original document size of 11x17)
1:7,500

N

Stantec

Project Location
Ottawa, ON

Client/Project 103401878
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
6-1

Title
Reliability Analysis Watermain Break Locations (Phase 1)

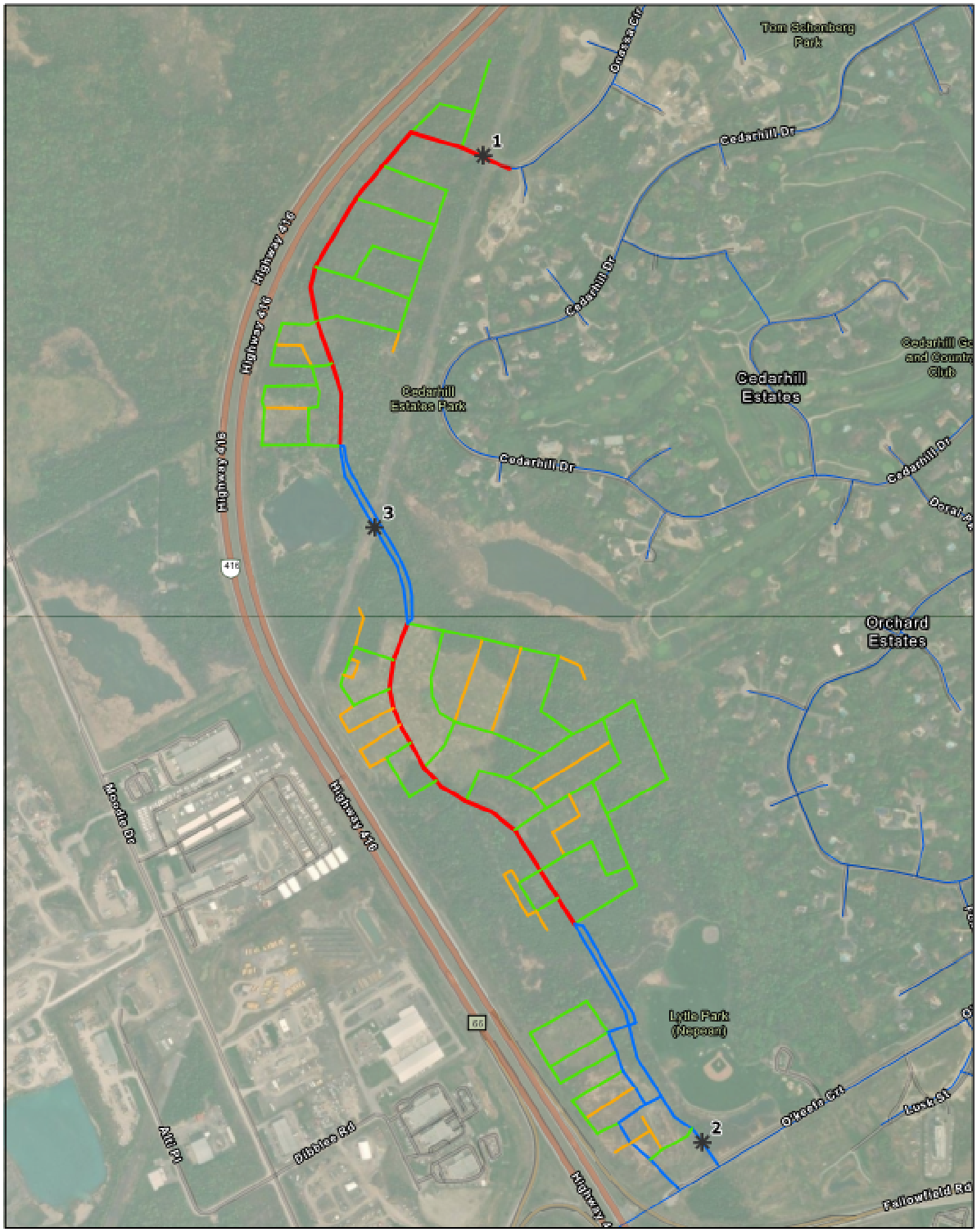
6.2 Phase 2

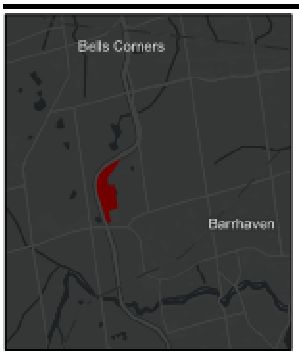
Modelling results shows that the RFF of 13,000 L/min can be met at most junctions under all break scenarios and Phase 2 conditions. However, there are a few junctions that do not meet the criteria under each break scenario, as listed in **Table 6-2**. Note that **Figure B-1** provides the model system map.

Fire flow requirements across the site are to be confirmed at later design stages and the required fire flow measures to meet City criteria under all watermain break scenarios are to be determined. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant placing procedure outlined in Appendix I of ISDTB-2018-02 to avoid oversizing local pipes.

Table 6-2: Reliability Analysis Results – Phase 2

Break Scenario	Model Nodes Not Meeting RFF of 13,000 L/min	Minimum Available Fire Flow at 20 psi (L/min)
1	J10, J30, J44, J56, J84, J128, J136, J138, J144, J156, J158, J166, J168, J174, J176, J196, J206, J210, J250, and J252	5,646
2	J10, J44, J56, J84, J128, J156, J158, J166, J168, J174, J176, J196, J206, J210, J250, and J252	5,685
3	J10, J44, J56, J84, J128, J136, J138, J158, J166, J168, J174, J176, J206, J210, J250, and J252	5,740





Notes
1. Coordinate System: City of Ottawa

Legend

- Watermain Break Location/Scenario
- Model Nodes
- City of Ottawa Water Network

Proposed Watermain Diameter (mm)

- 152
- 203
- 305
- 410

0 100 200 Meters

(At original document size of 11x17)
1:7,500

N

Stantec

Project Location
Ottawa, ON

Client/Project 160401878
Mattamy Homes
Mattamy Cedarview Lands Water Servicing Analysis

Figure No.
6-2

Title
Reliability Analysis Watermain Break Locations (Phase 2)

7 Offsite Assessment

Results from the conceptual hydraulic assessment suggest that the existing City's watermain infrastructure would be able to provide an adequate level of service for the proposed development. To provide further context on the serviceability of the study area, available information regarding the City's potable water distribution system was reviewed. The latest iteration of the City's master planning study completed in 2013 was reviewed and the following data was extracted:

- Zone BARR (as known in the City's 2013 WMP) is serviced from two pump stations: Barrhaven Reservoir (herein Barr Res PS) and Barrhaven (herein Barr PS). The pumps at both PSs are controlled by the level of the Moodie Drive ET.
- From Table 2-2, the 2013 firm capacity (with the largest pump out of service) of the Barr PS is 57 MLD or 660 L/s, whereas the Barr Res PS does not have any redundancy (i.e., 0 MLD).
- As part of a previous study (2009 IMP update), a pressure zone reconfiguration was recommended to service the South Urban Community (herein SUC). This implies modification to the Ottawa South and Barrhaven pumping stations which will supply the new and reconfigured Zone 3C (now referred to as Zone SUC). The Barr PS will be modified to include pumps for Zone BARR, and for the new Zone 3C. As part of this pressure zone reconfiguration, modifications to the Barr Res PS are also required.
- From Table 3-2, the projected maximum day demands (MXDY) for zone BARR are as follows:
  - 2012 (i.e., pre-reconfiguration): 22.45 MLD or 260 L/s.
  - 2015 (i.e., post-reconfiguration[1]): 11.47 MLD or 133 L/s.
  - 2031: 12.8 MLD or 148 L/s.
  - 2060: 12.9 MLD or 149 L/s.
- The proposed upgrades at both PSs, in relation to the proposed pressure zone recommendation, are as follows:
  - Barr Res PS: Add a new 7 MLD (81 L/s) pump to bring the firm capacity to 7 MLD (81 L/s), and add a new standby generator (scheduled to be completed in 2014). Upgrade the Reservoir's discharge along Fallowfield (up to Cedarview) to a 406 mm diameter pipe (scheduled to be completed in 2015).
  - Barr PS (servicing zone BARR): Add a new 7 MLD (81 L/s) pump to bring the firm capacity to 7 MLD or 81 L/s (schedule to be completed in 2015).
- The firm pumping capacity of the new Zone BARR would be 14.0 MLD (162 L/s), which is greater than the projected 2060 MXDY demand (12.9 MLD or 149 L/s).

The projected 2031 MXDY (148 L/s) represents about 92% of the pressure zone's firm pumping capacity. The buildout MXDY demand for the Mattamy Cedarview Development is 16 L/s (including the Employment Lands). If the study area is fully developed by 2031, the pressure zone's firm pumping capacity (162 L/s), as described in the 2013 WMP, would be exceeded. Available data suggests that pumping upgrades would be required. Such conclusions are to be validated with the City, given that current growth projections and pumping capacities might differ from what was presented in the 2013 WMP.

[1] The pressure zone reconfiguration is now targeted to be completed by mid-2025.

8 Conclusions and Recommendations

A distribution system capacity analysis was completed for the conceptual plan for the Cedarview and Employment Lands in the City's southwestern suburban neighbourhood of Barrhaven. The purpose of the analysis is to assess serviceability of the proposed development lands, as well as to identify preliminary watermain sizing and redundancy needs to achieve an acceptable level of service. Based on the hydraulic analysis the following conclusions were made:

- Based on the most current draft plan for the Cedarview Lands, the estimated AVDY, MXDY, and PKHR demands are 9.42 L/s, 13.57 L/s, and 26.95 L/s respectively. The estimated AVDY, MXDY, and PKHR demand for the Employment Lands are 2.34 L/s, 2.34 L/s, and 3.47 L/s respectively. The total estimated AVDY, MXDY, and PKHR demands for the entire development are 11.76 L/s, 15.92 L/s, and 30.41 L/s respectively.
- Information regarding proposed unit sizes and unit spacing is not available at this time, therefore FUS calculations have not been completed. A fire flow objective of 13,000 L/min was used for this analysis, as recommended by the City's 2013 WMP. It is recommended that the FUS calculations be reviewed at later stages of design to ensure that fire flow requirements are met across the site.
- Boundary conditions used as part of this analysis represent an approximation of the anticipated hydraulic conditions at the proposed connections to the City's network. Water boundary conditions were estimated from the typical HGL of the Moodie Dr ET, and the headlosses along the existing 610 mm diameter watermain (O'Keefe Crt) up to the proposed development. Water boundary conditions should be requested from the City at later stages of design to ensure that appropriate hydraulic conditions are assessed, and recommendations are confirmed or revised accordingly.
- Within the Cedarview and Employment Lands study area, the network proposed consists of 152 mm, 203 mm, 305 mm and 410 mm pipes. The proposed water network connects at two (2) different locations to the existing City network under Phase 1 (Cedarview lands only), and three (3) locations under Phase 2 (Cedarview and Employment Lands).
- Under AVDY demand conditions, model results suggest that the maximum pressure is below the allowable maximum pressure of 80 psi in accordance with the City of Ottawa design guidelines. Under PKHR demand conditions, the minimum pressures are in accordance with the City's system pressure requirements.
- Under MXDY + FF demand conditions, the assumed RFF of 13,000 L/min can be achieved across most of the proposed network under Phase 1, with the exception of a few locations, where the worst-case scenario results in a maximum available fire flow of 5,734 L/min. Similar observations are made under Phase 2 conditions, where the worst-case scenario results in a maximum available fire flow of 5,724 L/min. However, it should be noted that most of these locations are located at dead-ends, where lower fire flow capacity is expected. Hydrant coverage (as per Ottawa's Design Guidelines ISTB-2018-02, Appendix I) should be reviewed at these locations at later design stages once boundary conditions have been obtained from the City and hydraulic conditions have been confirmed.

- Fire flow requirements for Cedarview and Employment Lands are to be confirmed at later stages of design and fire control measures are to be included as required. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant place procedure outlined in Appendix I of ISTB-2018-02 to avoid oversizing local pipes.
- To assess reliability against major failures, three (3) reliability scenarios were completed under AVDY+FF demand conditions to confirm sufficient pressure and flow can be achieved during a major failure (i.e., watermain break). The necessity of twin watermains was identified in parts of the proposed network, to ensure appropriate servicing in case of major failure. Under all reliability scenarios, some locations are below the RFF of 13,000 L/min. Fire flow requirements across the site are to be confirmed at later design stages and the required fire flow measures to meet City criteria under all watermain break scenarios are to be determined. These fire control measures may include adding ordinary construction units, the addition of firewalls and/or using the alternative hydrant placing procedure outlined in Appendix I of ISDTB-2018-02 to avoid oversizing local pipes.
- Based on data extracted from the City's 2013 WMP, the envisioned firm pumping capacity of zone BARR (now known as Zone 3SW) would be 162 L/s (14.0 MLD), following the pressure zone reconfiguration to create the new Zone 3C (now known as Zone SUC).
- The projected 2031 MXDY (148 L/s) demand represents about 92% of the pressure zone's firm pumping capacity. The buildout MXDY demand for the proposed development is 16 L/s (including the Employment Lands). If the study area is fully developed by 2031, the pressure zone's firm pumping capacity (162 L/s), as described in the 2013 WMP, would be exceeded. This suggests that pumping upgrades would be required. Such conclusions are to be validated with the City, given that current growth projections and pumping capacities might differ from what was presented in the 2013 WMP.

9 References

City of Ottawa. (2010). Ottawa Design Guidelines – Water Distribution. Ottawa

City of Ottawa. (2018). Technical Bulletin. ISTB-2018-02. Ottawa.

Stantec Consulting Ltd. (2013) City of Ottawa 2013 Water Master Plan. Ottawa.

Appendix A Boundary Condition Estimation

163401876 - Mattamy Cedarview - Boundary Condition Estimations

Head Loss Calculations - Boundary Conditions Estimations - Phase 1 (Cedarview Lands)

Equations

Hazen-Williams Equation: $h_f = \frac{10.67 q^{1.85}}{(c^{1.85} d_h^{4.8655})}$

where:

h_f = head loss per unit pipe (m_{H2O}/m pipe)
C = Hazen-Williams roughness coefficient based on pipe material
q = flow rate (m^3/s)
d_h = inside hydraulic diameter (m)

Establishing Flow Scenario

Scenario		**ADD**	**PKHR**	**MDD+FF**	**ADD+FF**	
Flow (L/s)	**Q =**	**9.42**	**26.95**	**230.24**	**226.09**	**L/s**
Flow (m^3/s)	Q =	0.009	0.027	0.230	0.226	m^3/s

ESTIMATING HEAD LOSS ACROSS ALIGNMENT

Scenario: ADD

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.009	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0000	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	0.0	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***0.00***	***m***
Velocity (m/s)	v =	0.0	m/s

Scenario: PKHR

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.027	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0000	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	0.0	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***0.02***	***m***
Velocity (m/s)	v =	0.1	m/s

Scenario: MDD+FF

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.230	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0012	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	1.2	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***1.21***	***m***
Velocity (m/s)	v =	0.8	m/s

Scenario: ADD+FF

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.226	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0012	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	1.2	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***1.17***	***m***
Velocity (m/s)	v =	0.8	m/s

Boundary Conditions

Moodie Drive Max ET	155 m
Assumed HGL	153 m

Scenario	**Boundary Condition**
ADD	153.00
PKHR	152.98
MDD+FF	151.79
ADD+FF	151.83

163401876 - Mattamy Cedarview - Boundary Condition Estimations

Head Loss Calculations - Boundary Conditions Estimations - Phase 2 (Cedarview & Employment Lands)

Equations

Hazen-Williams Equation: $h_f = \frac{10.67 q^{1.85}}{(c^{1.85} d_h^{4.8655})}$

where:

h_f = head loss per unit pipe (m_{H2O}/m pipe)
C = Hazen-Williams roughness coefficient based on pipe material
q = flow rate (m^3/s)
d_h = inside hydraulic diameter (m)

Establishing Flow Scenario

Scenario		**ADD**	**PKHR**	**MDD+FF**	**ADD+FF**	
Flow (L/s)	**Q =**	**11.76**	**30.41**	**232.58**	**228.43**	**L/s**
Flow (m^3/s)	Q =	0.012	0.030	0.233	0.228	m^3/s

ESTIMATING HEAD LOSS ACROSS ALIGNMENT

Scenario: ADD

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.012	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0000	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	0.0	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***0.00***	***m***
Velocity (m/s)	v =	0.0	m/s

Scenario: PKHR

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.030	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0000	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	0.0	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***0.03***	***m***
Velocity (m/s)	v =	0.1	m/s

Scenario: MDD+FF

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.233	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0012	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	1.2	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***1.24***	***m***
Velocity (m/s)	v =	0.8	m/s

Scenario: ADD+FF

Friction Losses:

Length (m)		1,013	m
Hazen-Williams Roughness Constant		120	
Flow (m^3/s)		0.228	m^3/s
Diameter (mm)		600	mm
Diameter (m)		0.6	m
Head loss per unit pipe (m_{H2O}/m pipe)	h_f =	0.0012	m_{H2O}/m pipe
Head loss per unit pipe (m_{H2O}/km pipe)	h_f =	1.2	m_{H2O}/km pipe
Total Friction Head Loss (m)	***h_f =***	***1.20***	***m***
Velocity (m/s)	v =	0.8	m/s

Boundary Conditions

Moodie Drive Max ET 155 m
Assumed HGL 153 m

Scenario	**Boundary Condition**
ADD	153.00
PKHR	152.97
MDD+FF	151.76
ADD+FF	151.80

Appendix B Detailed Model Results

163401876 - Cedarview Mattamy: Water Distribution System Analysis

Table B-1: Model Results - AVDY (Phase 1)

Junction ID	Demand (L/s)	Head (m)	Pressure (psi)
Maximum	*0.11*	*153.00*	*71.00*
Minimum	*0.10*	*152.99*	*46.78*
J10	0.10	152.99	64.86
J104	0.10	152.99	61.13
J106	0.10	152.99	67.60
J110	0.10	152.99	57.86
J112	0.11	152.99	69.33
J114	0.11	152.99	64.75
J116	0.10	152.99	67.25
J12	0.10	152.99	61.07
J122	0.10	152.99	66.28
J124	0.10	152.99	56.94
J126	0.10	152.99	53.75
J128	0.10	152.99	53.96
J130	0.10	152.99	52.55
J132	0.10	152.99	53.34
J134	0.10	152.99	56.40
J136	0.10	152.99	54.59
J138	0.10	152.99	51.44
J14	0.10	152.99	61.92
J140	0.10	152.99	56.75
J142	0.10	152.99	58.64
J144	0.10	152.99	56.52
J146	0.10	152.99	57.96
J148	0.10	152.99	57.15
J150	0.10	152.99	56.26
J152	0.10	152.99	59.84
J154	0.10	152.99	52.53
J156	0.10	152.99	52.21
J158	0.10	152.99	48.52
J16	0.10	152.99	61.55
J160	0.10	152.99	49.51
J162	0.10	152.99	49.19
J164	0.10	152.99	47.55
J166	0.10	152.99	48.44
J168	0.10	152.99	47.30
J170	0.10	152.99	49.09
J172	0.10	152.99	48.94
J174	0.10	152.99	46.78
J176	0.10	152.99	48.11
J178	0.10	152.99	47.13
J18	0.10	152.99	60.07
J180	0.10	152.99	49.03
J182	0.10	152.99	56.88
J184	0.10	152.99	57.09
J186	0.10	152.99	64.69
J188	0.10	152.99	60.81
J190	0.10	152.99	68.99
J192	0.10	152.99	68.46
J194	0.10	152.99	66.39
J196	0.10	152.99	65.54
J198	0.11	152.99	63.58
J20	0.10	152.99	60.00
J202	0.11	152.99	59.54
J204	0.11	152.99	61.39
J206	0.10	152.99	62.37
J208	0.11	152.99	62.77
J210	0.10	152.99	59.13
J212	0.10	152.99	60.49
J22	0.10	152.99	60.32
J222	0.10	152.99	66.39
J224	0.10	153.00	63.28
J226	0.10	153.00	71.00
J24	0.10	152.99	57.54
J26	0.10	152.99	59.31
J28	0.10	152.99	58.38
J30	0.10	152.99	57.11
J32	0.10	152.99	56.36
J34	0.10	152.99	58.53
J36	0.10	152.99	58.20
J38	0.10	152.99	55.29
J40	0.10	152.99	55.36
J44	0.10	152.99	57.97
J46	0.10	152.99	54.95
J50	0.10	152.99	54.21
J52	0.10	152.99	61.35
J56	0.10	152.99	56.98
J58	0.10	152.99	54.93
J60	0.10	152.99	64.00
J62	0.10	152.99	63.94
J64	0.10	152.99	50.34
J66	0.10	152.99	61.63
J68	0.10	152.99	61.38
J70	0.10	152.99	51.98
J72	0.10	152.99	53.34
J74	0.10	152.99	56.11
J76	0.10	152.99	59.77
J78	0.10	152.99	55.41
J80	0.10	152.99	60.64
J82	0.10	152.99	62.86
J84	0.10	152.99	63.17
J86	0.10	152.99	63.97
J88	0.10	152.99	64.51
J90	0.10	152.99	66.74
J96	0.10	152.99	65.79
J98	0.10	152.99	64.83

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Table B-2: Model Results - PKHR (Phase 1)

Junction ID	Demand (L/s)	Head (m)	Pressure (psi)
Maximum	*0.30*	*152.97*	*70.96*
Minimum	*0.29*	*152.88*	*46.64*
J10	0.29	152.88	64.71
J104	0.29	152.89	60.99
J106	0.29	152.89	67.47
J110	0.29	152.90	57.73
J112	0.30	152.90	69.20
J114	0.30	152.91	64.63
J116	0.29	152.92	67.15
J12	0.29	152.88	60.92
J122	0.29	152.89	66.15
J124	0.29	152.88	56.79
J126	0.29	152.88	53.60
J128	0.29	152.88	53.81
J130	0.29	152.88	52.41
J132	0.29	152.88	53.19
J134	0.29	152.88	56.25
J136	0.29	152.88	54.44
J138	0.29	152.88	51.29
J14	0.29	152.88	61.78
J140	0.29	152.88	56.60
J142	0.29	152.88	58.49
J144	0.29	152.88	56.37
J146	0.29	152.88	57.81
J148	0.29	152.88	57.00
J150	0.29	152.88	56.11
J152	0.29	152.88	59.69
J154	0.29	152.89	52.39
J156	0.29	152.89	52.06
J158	0.29	152.89	48.37
J16	0.29	152.88	61.41
J160	0.29	152.89	49.36
J162	0.29	152.89	49.04
J164	0.29	152.89	47.40
J166	0.29	152.89	48.29
J168	0.29	152.89	47.16
J170	0.29	152.89	48.95
J172	0.29	152.89	48.80
J174	0.29	152.89	46.64
J176	0.29	152.89	47.97
J178	0.29	152.89	46.99
J18	0.29	152.88	59.93
J180	0.29	152.89	48.89
J182	0.29	152.89	56.74
J184	0.29	152.89	56.95
J186	0.29	152.89	64.56
J188	0.29	152.90	60.68
J190	0.29	152.90	68.86
J192	0.29	152.90	68.33
J194	0.29	152.90	66.26
J196	0.29	152.89	65.40
J198	0.30	152.90	63.45
J20	0.29	152.88	59.85
J202	0.30	152.90	59.41
J204	0.30	152.90	61.27
J206	0.29	152.90	62.24
J208	0.30	152.90	62.65
J210	0.29	152.90	59.00
J212	0.29	152.90	60.37
J22	0.29	152.88	60.17
J222	0.29	152.94	66.30
J224	0.29	152.96	63.22
J226	0.29	152.97	70.96
J24	0.29	152.88	57.39
J26	0.29	152.88	59.16
J28	0.29	152.88	58.23
J30	0.29	152.88	56.96
J32	0.29	152.88	56.22
J34	0.29	152.88	58.38
J36	0.29	152.88	58.05
J38	0.29	152.88	55.14
J40	0.29	152.88	55.21
J44	0.29	152.88	57.82
J46	0.29	152.88	54.80
J50	0.29	152.89	54.06
J52	0.29	152.89	61.21
J56	0.29	152.89	56.83
J58	0.29	152.89	54.79
J60	0.29	152.89	63.86
J62	0.29	152.89	63.80
J64	0.29	152.89	50.20
J66	0.29	152.89	61.48
J68	0.29	152.89	61.24
J70	0.29	152.89	51.84
J72	0.29	152.89	53.20
J74	0.29	152.89	55.97
J76	0.29	152.89	59.64
J78	0.29	152.89	55.27
J80	0.29	152.89	60.49
J82	0.29	152.89	62.72
J84	0.29	152.89	63.02
J86	0.29	152.89	63.83
J88	0.29	152.89	64.37
J90	0.29	152.89	66.60
J96	0.29	152.89	65.65
J98	0.29	152.89	64.69

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Table B-3: Model Results - MXDY+FF (Phase 1)

Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*0.15*	*216.67*	*68.04*	*1659.29*
Minimum	*0.14*	*216.67*	*-104.41*	*95.57*
J10	0.14	216.67	0.36	176.76
J104	0.14	216.67	45.23	381.14
J106	0.14	216.67	49.10	377.01
J110	0.14	216.67	48.91	533.49
J112	0.15	216.67	49.83	372.14
J114	0.15	216.67	56.93	645.68
J116	0.14	216.67	59.41	660.59
J12	0.14	216.67	35.41	284.88
J122	0.14	216.67	49.57	395.24
J124	0.14	216.67	39.12	334.44
J126	0.14	216.67	29.32	262.05
J128	0.14	216.67	12.68	193.86
J130	0.14	216.67	29.58	266.17
J132	0.14	216.67	30.58	271.42
J134	0.14	216.67	35.10	297.29
J136	0.14	216.67	24.54	235.27
J138	0.14	216.67	22.48	227.47
J14	0.14	216.67	35.93	286.03
J140	0.14	216.67	32.53	276.69
J142	0.14	216.67	37.27	307.04
J144	0.14	216.67	25.96	240.37
J146	0.14	216.67	31.58	267.93
J148	0.14	216.67	33.69	283.75
J150	0.14	216.67	42.28	385.85
J152	0.14	216.67	46.46	419.08
J154	0.14	216.67	30.11	269.94
J156	0.14	216.67	16.92	205.68
J158	0.14	216.67	13.56	192.68
J16	0.14	216.67	45.80	386.40
J160	0.14	216.67	26.96	254.14
J162	0.14	216.67	38.68	410.54
J164	0.14	216.67	28.52	270.49
J166	0.14	216.67	5.43	170.89
J168	0.14	216.67	-4.77	149.83
J170	0.14	216.67	38.72	413.28
J172	0.14	216.67	38.70	415.68
J174	0.14	216.67	-4.08	150.15
J176	0.14	216.67	6.08	172.00
J178	0.14	216.67	30.74	293.80
J18	0.14	216.67	43.99	373.42
J180	0.14	216.67	38.95	420.96
J182	0.14	216.67	38.78	330.33
J184	0.14	216.67	47.34	497.00
J186	0.14	216.67	48.35	392.86
J188	0.14	216.67	52.33	578.65
J190	0.14	216.67	51.67	398.91
J192	0.14	216.67	48.93	368.24
J194	0.14	216.67	45.49	344.73
J196	0.14	216.67	20.61	218.47
J198	0.15	216.67	47.63	392.72
J20	0.14	216.67	32.96	272.05
J202	0.15	216.67	44.81	390.54
J204	0.15	216.67	46.61	400.03
J206	0.14	216.67	-26.12	143.67
J208	0.15	216.67	54.58	608.79
J210	0.14	216.67	8.55	187.49
J212	0.14	216.67	28.65	248.86
J22	0.14	216.67	44.90	384.99
J222	0.14	216.67	60.71	835.36
J224	0.14	216.67	59.29	1087.71
J226	0.14	216.67	68.04	1659.29
J24	0.14	216.67	42.36	373.26
J26	0.14	216.67	36.81	300.52
J28	0.14	216.67	35.01	289.80
J30	0.14	216.67	28.09	250.02
J32	0.14	216.67	33.74	286.41
J34	0.14	216.67	34.51	285.73
J36	0.14	216.67	29.73	257.12
J38	0.14	216.67	32.93	283.50
J40	0.14	216.67	40.67	368.23
J44	0.14	216.67	-38.91	128.29
J46	0.14	216.67	40.67	372.47
J50	0.14	216.67	32.73	285.15
J52	0.14	216.67	47.51	417.67
J56	0.14	216.67	-104.41	95.57
J58	0.14	216.67	44.07	445.79
J60	0.14	216.67	47.46	386.64
J62	0.14	216.67	46.12	368.73
J64	0.14	216.67	39.68	415.90
J66	0.14	216.67	44.87	371.55
J68	0.14	216.67	39.80	317.15
J70	0.14	216.67	35.69	324.78
J72	0.14	216.67	43.46	463.00
J74	0.14	216.67	46.68	500.46
J76	0.14	216.67	44.84	389.00
J78	0.14	216.67	35.67	305.98
J80	0.14	216.67	36.01	290.04
J82	0.14	216.67	33.74	270.89
J84	0.14	216.67	-95.43	105.36
J86	0.14	216.67	45.28	358.29
J88	0.14	216.67	36.40	282.48
J90	0.14	216.67	34.33	267.30
J96	0.14	216.67	44.52	338.80
J98	0.14	216.67	44.95	348.82

Sufficient hydrant coverage to meet the RFF.

Table B-4: Model Results - AVDY+FF (Reliability Analysis Scenarios 1 to 3, Phase 1)

	Break Scenario 1 (Connection 1 Break)			Break Scenario 2 (Connection 2 Break)			Break Scenario 3 (Connection 3 Break)		
Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*69.34*	*216.67*	*1559.25*	*69.33*	*216.67*	*842.54*	*69.34*	*216.67*	*1659.85*
Minimum	*45.11*	*216.67*	*94.33*	*45.12*	*216.67*	*95.18*	*45.12*	*216.67*	*95.82*
J10	63.18	216.67	161.70	63.19	216.67	175.15	63.20	216.67	170.19
J104	59.45	216.67	343.93	59.46	216.67	356.26	59.46	216.67	382.04
J106	65.93	216.67	347.92	65.93	216.67	355.67	65.94	216.67	377.87
J110	56.19	216.67	440.46	56.19	216.67	467.50	56.19	216.67	533.76
J112	67.66	216.67	347.76	67.66	216.67	351.75	67.67	216.67	372.93
J114	63.08	216.67	542.77	63.08	216.67	548.74	63.08	216.67	645.63
J116	65.58	216.67	576.30	65.58	216.67	558.62	65.59	216.67	660.89
J12	59.39	216.67	230.82	59.40	216.67	277.39	59.40	216.67	258.26
J122	64.61	216.67	360.19	64.61	216.67	370.47	64.62	216.67	396.13
J124	55.26	216.67	267.90	55.27	216.67	319.56	55.27	216.67	286.10
J126	52.07	216.67	221.95	52.08	216.67	254.03	52.09	216.67	234.19
J128	52.28	216.67	175.45	52.29	216.67	190.62	52.29	216.67	181.55
J130	50.88	216.67	222.95	50.88	216.67	257.48	50.89	216.67	236.24
J132	51.66	216.67	226.43	51.67	216.67	262.47	51.67	216.67	240.69
J134	54.72	216.67	247.56	54.73	216.67	286.47	54.73	216.67	260.84
J136	52.91	216.67	206.53	52.92	216.67	229.53	52.92	216.67	214.61
J138	49.76	216.67	198.81	49.77	216.67	221.74	49.77	216.67	206.83
J14	60.25	216.67	232.75	60.26	216.67	278.57	60.26	216.67	259.56
J140	55.08	216.67	235.74	55.08	216.67	267.97	55.09	216.67	246.64
J142	56.97	216.67	256.72	56.97	216.67	295.77	56.98	216.67	269.28
J144	54.84	216.67	211.58	54.85	216.67	234.58	54.85	216.67	219.55
J146	56.28	216.67	231.40	56.29	216.67	260.24	56.29	216.67	241.08
J148	55.47	216.67	240.80	55.48	216.67	274.44	55.48	216.67	251.91
J150	54.58	216.67	290.12	54.59	216.67	363.27	54.59	216.67	316.28
J152	58.16	216.67	318.37	58.17	216.67	392.38	58.17	216.67	338.67
J154	50.86	216.67	244.39	50.86	216.67	258.96	50.87	216.67	270.87
J156	50.53	216.67	193.26	50.54	216.67	200.66	50.54	216.67	206.45
J158	46.84	216.67	180.97	46.85	216.67	187.99	46.85	216.67	193.50
J16	59.88	216.67	280.34	59.89	216.67	368.38	59.89	216.67	328.16
J160	47.84	216.67	230.32	47.84	216.67	243.94	47.85	216.67	255.14
J162	47.51	216.67	330.23	47.52	216.67	371.22	47.52	216.67	411.07
J164	45.87	216.67	240.74	45.88	216.67	257.36	45.88	216.67	271.56
J166	46.76	216.67	162.58	46.77	216.67	167.58	46.77	216.67	171.59
J168	45.63	216.67	143.85	45.63	216.67	147.50	45.64	216.67	150.44
J170	47.42	216.67	333.33	47.42	216.67	372.86	47.43	216.67	413.86
J172	47.26	216.67	336.14	47.27	216.67	374.16	47.27	216.67	416.33
J174	45.11	216.67	144.53	45.12	216.67	147.67	45.12	216.67	150.77
J176	46.44	216.67	164.26	46.44	216.67	168.44	46.45	216.67	172.69
J178	45.46	216.67	260.34	45.46	216.67	276.37	45.47	216.67	294.93
J18	58.39	216.67	269.11	58.40	216.67	356.76	58.41	216.67	319.05
J180	47.36	216.67	341.38	47.36	216.67	377.84	47.37	216.67	421.65
J182	55.21	216.67	296.83	55.21	216.67	312.38	55.22	216.67	331.16
J184	55.41	216.67	404.97	55.42	216.67	442.91	55.42	216.67	497.17
J186	63.02	216.67	356.95	63.02	216.67	367.70	63.03	216.67	393.74
J188	59.14	216.67	481.37	59.14	216.67	501.09	59.14	216.67	578.80
J190	67.31	216.67	368.38	67.32	216.67	374.25	67.32	216.67	399.74
J192	66.79	216.67	343.24	66.79	216.67	348.25	66.80	216.67	369.05
J194	64.72	216.67	322.57	64.72	216.67	327.41	64.73	216.67	345.53
J196	63.87	216.67	211.71	63.87	216.67	213.70	63.88	216.67	219.02
J198	61.91	216.67	358.93	61.91	216.67	366.46	61.92	216.67	393.58
J20	58.32	216.67	227.69	58.33	216.67	264.97	58.33	216.67	246.93
J202	57.86	216.67	355.30	57.87	216.67	361.90	57.87	216.67	391.48
J204	59.72	216.67	364.53	59.72	216.67	370.71	59.73	216.67	400.95
J206	60.70	216.67	141.69	60.70	216.67	142.13	60.71	216.67	144.00
J208	61.10	216.67	509.00	61.10	216.67	523.07	61.11	216.67	608.85
J210	57.46	216.67	182.83	57.46	216.67	183.83	57.46	216.67	188.01
J212	58.82	216.67	238.88	58.82	216.67	240.86	58.83	216.67	249.56
J22	58.64	216.67	281.21	58.65	216.67	366.29	58.65	216.67	325.00
J222	64.72	216.67	734.33	64.72	216.67	645.03	64.72	216.67	835.48
J224	61.61	216.67	993.29	61.61	216.67	713.44	61.62	216.67	1088.33
J226	69.34	216.67	1559.25	69.33	216.67	842.54	69.34	216.67	1659.85
J24	55.86	216.67	274.24	55.87	216.67	354.59	55.87	216.67	313.65
J26	57.63	216.67	244.29	57.64	216.67	290.82	57.64	216.67	267.18
J28	56.70	216.67	238.65	56.71	216.67	280.78	56.71	216.67	258.59
J30	55.43	216.67	213.60	55.44	216.67	243.97	55.44	216.67	228.23
J32	54.69	216.67	234.78	54.69	216.67	277.19	54.70	216.67	254.61
J34	56.86	216.67	237.12	56.86	216.67	277.08	56.87	216.67	255.66
J36	56.52	216.67	219.86	56.53	216.67	250.69	56.53	216.67	234.12
J38	53.61	216.67	233.69	53.62	216.67	274.12	53.62	216.67	251.33
J40	53.68	216.67	273.24	53.69	216.67	348.67	53.70	216.67	306.51
J44	56.29	216.67	122.28	56.30	216.67	127.56	56.30	216.67	124.99
J46	53.27	216.67	278.29	53.28	216.67	351.63	53.29	216.67	307.49
J50	52.53	216.67	256.89	52.54	216.67	272.94	52.55	216.67	286.04
J52	59.67	216.67	371.50	59.68	216.67	385.79	59.68	216.67	418.54
J56	55.30	216.67	94.33	55.31	216.67	95.18	55.31	216.67	95.82
J58	53.26	216.67	354.80	53.27	216.67	405.30	53.27	216.67	445.66
J60	62.33	216.67	348.40	62.33	216.67	362.66	62.34	216.67	387.48
J62	62.27	216.67	335.58	62.28	216.67	347.58	62.28	216.67	369.61
J64	48.66	216.67	333.21	48.67	216.67	376.99	48.68	216.67	416.26
J66	59.95	216.67	329.02	59.96	216.67	349.65	59.96	216.67	372.24
J68	59.71	216.67	290.56	59.71	216.67	302.80	59.72	216.67	317.97
J70	50.31	216.67	289.13	50.31	216.67	304.98	50.32	216.67	325.81
J72	51.66	216.67	376.62	51.67	216.67	413.77	51.67	216.67	463.41
J74	54.44	216.67	410.04	54.44	216.67	443.27	54.45	216.67	500.77
J76	58.10	216.67	347.41	58.10	216.67	361.99	58.11	216.67	389.89
J78	53.74	216.67	279.35	53.74	216.67	290.66	53.75	216.67	306.93
J80	58.96	216.67	269.48	58.97	216.67	278.61	58.97	216.67	290.87
J82	61.19	216.67	255.08	61.20	216.67	261.93	61.20	216.67	271.66
J84	61.49	216.67	104.29	61.50	216.67	104.86	61.50	216.67	105.61
J86	62.30	216.67	328.95	62.30	216.67	338.60	62.31	216.67	359.22
J88	62.84	216.67	267.52	62.84	216.67	272.46	62.85	216.67	283.27
J90	65.07	216.67	255.38	65.07	216.67	259.09	65.08	216.67	268.00
J96	64.12	216.67	315.10	64.12	216.67	322.50	64.12	216.67	339.66
J98	63.16	216.67	322.35	63.16	216.67	330.83	63.17	216.67	349.72

Sufficient hydrant coverage to meet the RFF.

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Table B-4: Model Results - AVDY (Phase 2)

Junction ID	Demand (L/s)	Head (m)	Pressure (psi)
Maximum	*0.13*	*153.00*	*71.00*
Minimum	*0.10*	*152.98*	*46.78*
J10	0.10	152.98	64.86
J104	0.10	152.99	61.12
J106	0.10	152.99	67.60
J110	0.10	152.99	57.85
J112	0.11	152.99	69.33
J114	0.11	152.99	64.74
J116	0.10	152.99	67.25
J12	0.10	152.98	61.06
J122	0.10	152.99	66.28
J124	0.10	152.98	56.94
J126	0.10	152.98	53.75
J128	0.10	152.98	53.96
J130	0.10	152.98	52.55
J132	0.10	152.98	53.33
J134	0.10	152.98	56.40
J136	0.10	152.98	54.58
J138	0.10	152.98	51.43
J14	0.10	152.98	61.92
J140	0.10	152.98	56.75
J142	0.10	152.98	58.64
J144	0.10	152.98	56.52
J146	0.10	152.98	57.95
J148	0.10	152.98	57.14
J150	0.10	152.98	56.25
J152	0.10	152.98	59.84
J154	0.10	152.98	52.53
J156	0.10	152.98	52.20
J158	0.10	152.98	48.51
J16	0.10	152.98	61.55
J160	0.10	152.98	49.51
J162	0.10	152.99	49.18
J164	0.10	152.98	47.54
J166	0.10	152.98	48.43
J168	0.10	152.98	47.30
J170	0.10	152.99	49.09
J172	0.10	152.99	48.93
J174	0.10	152.99	46.78
J176	0.10	152.99	48.11
J178	0.10	152.99	47.13
J18	0.10	152.98	60.07
J180	0.10	152.99	49.03
J182	0.10	152.99	56.88
J184	0.10	152.99	57.08
J186	0.10	152.99	64.69
J188	0.10	152.99	60.80
J190	0.10	152.99	68.98
J192	0.10	152.99	68.46
J194	0.10	152.99	66.39
J196	0.10	152.99	65.54
J198	0.11	152.99	63.58
J20	0.10	152.98	59.99
J202	0.11	152.99	59.53
J204	0.11	152.99	61.39
J206	0.10	152.99	62.37
J208	0.11	152.99	62.77
J210	0.10	152.99	59.12
J212	0.10	152.99	60.49
J214	0.12	152.99	62.49
J216	0.12	152.99	66.83
J218	0.12	152.99	56.28
J22	0.10	152.98	60.32
J220	0.12	152.99	60.48
J222	0.10	152.99	66.38
J224	0.10	153.00	63.28
J226	0.10	153.00	71.00
J228	0.12	152.99	61.08
J230	0.12	152.99	63.34
J232	0.12	152.99	67.45
J234	0.12	152.99	61.37
J236	0.12	152.99	61.85
J238	0.12	152.99	68.10
J24	0.10	152.98	57.53
J240	0.12	153.00	68.37
J242	0.12	153.00	65.81
J244	0.12	153.00	66.39
J246	0.12	153.00	67.72
J248	0.12	153.00	67.09
J250	0.12	153.00	63.94
J252	0.12	153.00	67.85
J254	0.12	153.00	67.91
J256	0.13	153.00	66.86
J258	0.12	153.00	62.32
J26	0.10	152.98	59.30
J28	0.10	152.98	58.38
J30	0.10	152.98	57.10
J32	0.10	152.98	56.36
J34	0.10	152.98	58.53
J36	0.10	152.98	58.19
J38	0.10	152.98	55.28
J40	0.10	152.98	55.36
J44	0.10	152.98	57.96
J46	0.10	152.98	54.95
J50	0.10	152.98	54.20
J52	0.10	152.99	61.34
J56	0.10	152.98	56.97
J58	0.10	152.99	54.93
J60	0.10	152.99	64.00
J62	0.10	152.99	63.94
J64	0.10	152.99	50.34
J66	0.10	152.99	61.62
J68	0.10	152.99	61.38
J70	0.10	152.99	51.98
J72	0.10	152.99	53.33
J74	0.10	152.99	56.11
J76	0.10	152.99	59.77
J78	0.10	152.99	55.41
J80	0.10	152.99	60.63
J82	0.10	152.99	62.86
J84	0.10	152.99	63.16
J86	0.10	152.99	63.97
J88	0.10	152.99	64.51
J90	0.10	152.99	66.74
J96	0.10	152.99	65.78
J98	0.10	152.99	64.83

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Table B-5: Model Results - PKHR (Phase 2)

Junction ID	Demand (L/s)	Head (m)	Pressure (psi)
Maximum	*0.30*	*152.96*	*70.94*
Minimum	*0.17*	*152.86*	*46.62*
J10	0.29	152.87	64.69
J104	0.29	152.87	60.96
J106	0.29	152.87	67.44
J110	0.29	152.88	57.70
J112	0.30	152.88	69.18
J114	0.30	152.89	64.60
J116	0.29	152.90	67.12
J12	0.29	152.87	60.90
J122	0.29	152.87	66.12
J124	0.29	152.86	56.76
J126	0.29	152.86	53.58
J128	0.29	152.86	53.78
J130	0.29	152.86	52.38
J132	0.29	152.86	53.16
J134	0.29	152.86	56.22
J136	0.29	152.86	54.41
J138	0.29	152.86	51.26
J14	0.29	152.87	61.75
J140	0.29	152.86	56.58
J142	0.29	152.86	58.47
J144	0.29	152.86	56.34
J146	0.29	152.86	57.78
J148	0.29	152.86	56.97
J150	0.29	152.86	56.08
J152	0.29	152.87	59.67
J154	0.29	152.87	52.36
J156	0.29	152.87	52.04
J158	0.29	152.87	48.35
J16	0.29	152.87	61.38
J160	0.29	152.87	49.34
J162	0.29	152.87	49.02
J164	0.29	152.87	47.38
J166	0.29	152.87	48.27
J168	0.29	152.87	47.13
J170	0.29	152.87	48.92
J172	0.29	152.87	48.77
J174	0.29	152.87	46.62
J176	0.29	152.87	47.94
J178	0.29	152.87	46.96
J18	0.29	152.87	59.90
J180	0.29	152.87	48.86
J182	0.29	152.87	56.72
J184	0.29	152.87	56.92
J186	0.29	152.87	64.53
J188	0.29	152.88	60.65
J190	0.29	152.88	68.83
J192	0.29	152.88	68.30
J194	0.29	152.88	66.24
J196	0.29	152.87	65.38
J198	0.30	152.88	63.42
J20	0.29	152.86	59.82
J202	0.30	152.88	59.38
J204	0.30	152.88	61.24
J206	0.29	152.88	62.22
J208	0.30	152.88	62.62
J210	0.29	152.88	58.97
J212	0.29	152.88	60.34
J214	0.17	152.92	62.39
J216	0.17	152.92	66.73
J218	0.17	152.92	56.18
J22	0.29	152.87	60.15
J220	0.17	152.92	60.38
J222	0.29	152.92	66.28
J224	0.29	152.94	63.20
J226	0.29	152.96	70.94
J228	0.17	152.92	60.99
J230	0.17	152.93	63.24
J232	0.17	152.93	67.37
J234	0.17	152.94	61.29
J236	0.17	152.94	61.76
J238	0.17	152.94	68.02
J24	0.29	152.87	57.36
J240	0.17	152.94	68.29
J242	0.17	152.94	65.73
J244	0.17	152.95	66.33
J246	0.17	152.95	67.66
J248	0.17	152.96	67.03
J250	0.17	152.95	63.87
J252	0.17	152.95	67.78
J254	0.17	152.96	67.85
J256	0.19	152.96	66.81
J258	0.17	152.94	62.24
J26	0.29	152.86	59.13
J28	0.29	152.86	58.21
J30	0.29	152.86	56.93
J32	0.29	152.86	56.19
J34	0.29	152.86	58.36
J36	0.29	152.86	58.02
J38	0.29	152.86	55.11
J40	0.29	152.86	55.19
J44	0.29	152.86	57.79
J46	0.29	152.86	54.78
J50	0.29	152.87	54.04
J52	0.29	152.87	61.18
J56	0.29	152.87	56.80
J58	0.29	152.87	54.76
J60	0.29	152.87	63.83
J62	0.29	152.87	63.78
J64	0.29	152.87	50.17
J66	0.29	152.87	61.46
J68	0.29	152.87	61.21
J70	0.29	152.87	51.81
J72	0.29	152.87	53.17
J74	0.29	152.87	55.95
J76	0.29	152.87	59.61
J78	0.29	152.87	55.24
J80	0.29	152.87	60.47
J82	0.29	152.87	62.69
J84	0.29	152.87	63.00
J86	0.29	152.87	63.80
J88	0.29	152.87	64.35
J90	0.29	152.87	66.57
J96	0.29	152.87	65.62
J98	0.29	152.87	64.66

163401876 - Cedarview Mattamy: Water Distribution System Analysis

Table B-6: Model Results - MXDY+FF (Phase 2)

Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Residual Pressure (psi)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*0.15*	*216.67*	*67.60*	*1687.72*
Minimum	*0.12*	*216.67*	*-104.67*	*95.41*
J10	0.14	216.67	0.15	176.38
J104	0.14	216.67	44.95	377.72
J106	0.14	216.67	48.82	374.10
J110	0.14	216.67	48.63	524.46
J112	0.15	216.67	49.54	369.39
J114	0.15	216.67	56.63	632.45
J116	0.14	216.67	59.13	648.35
J12	0.14	216.67	35.19	283.65
J122	0.14	216.67	49.29	391.88
J124	0.14	216.67	38.89	332.21
J126	0.14	216.67	29.09	260.70
J128	0.14	216.67	12.45	193.19
J130	0.14	216.67	29.34	264.72
J132	0.14	216.67	30.35	269.94
J134	0.14	216.67	34.87	295.58
J136	0.14	216.67	24.31	234.24
J138	0.14	216.67	22.25	226.41
J14	0.14	216.67	35.71	284.81
J140	0.14	216.67	32.30	275.27
J142	0.14	216.67	37.03	305.29
J144	0.14	216.67	25.72	239.35
J146	0.14	216.67	31.34	266.66
J148	0.14	216.67	33.45	282.26
J150	0.14	216.67	42.05	382.60
J152	0.14	216.67	46.22	415.35
J154	0.14	216.67	29.84	268.21
J156	0.14	216.67	16.66	204.77
J158	0.14	216.67	13.30	191.78
J16	0.14	216.67	45.58	383.80
J160	0.14	216.67	26.69	252.48
J162	0.14	216.67	38.41	404.94
J164	0.14	216.67	28.25	268.41
J166	0.14	216.67	5.16	170.21
J168	0.14	216.67	-5.04	149.29
J170	0.14	216.67	38.45	407.52
J172	0.14	216.67	38.43	409.77
J174	0.14	216.67	-4.35	149.59
J176	0.14	216.67	5.80	171.28
J178	0.14	216.67	30.46	291.15
J18	0.14	216.67	43.77	370.98
J180	0.14	216.67	38.68	414.83
J182	0.14	216.67	38.51	327.76
J184	0.14	216.67	47.07	489.60
J186	0.14	216.67	48.07	389.44
J188	0.14	216.67	52.05	568.08
J190	0.14	216.67	51.38	395.61
J192	0.14	216.67	48.64	365.52
J194	0.14	216.67	45.20	342.34
J196	0.14	216.67	20.32	217.69
J198	0.15	216.67	47.34	389.16
J20	0.14	216.67	32.73	270.88
J202	0.15	216.67	44.52	386.63
J204	0.15	216.67	46.32	396.06
J206	0.14	216.67	-26.41	143.34
J208	0.15	216.67	54.29	597.12
J210	0.14	216.67	8.26	186.84
J212	0.14	216.67	28.36	247.63
J214	0.12	216.67	56.53	768.11
J216	0.12	216.67	49.44	386.47
J218	0.12	216.67	38.80	333.03
J22	0.14	216.67	44.68	382.30
J220	0.12	216.67	40.16	323.64
J222	0.14	216.67	60.50	819.51
J224	0.14	216.67	58.99	1029.23
J226	0.14	216.67	67.60	1416.27
J228	0.12	216.67	40.90	327.72
J230	0.12	216.67	57.52	789.12
J232	0.12	216.67	62.03	878.92
J234	0.12	216.67	46.90	402.56
J236	0.12	216.67	49.77	454.52
J238	0.12	216.67	63.04	937.18
J24	0.14	216.67	42.14	370.53
J240	0.12	216.67	63.99	1072.69
J242	0.12	216.67	61.48	1043.67
J244	0.12	216.67	62.43	1138.35
J246	0.12	216.67	42.56	312.43
J248	0.12	216.67	63.77	1384.51
J250	0.12	216.67	-2.82	171.58
J252	0.12	216.67	-10.79	164.39
J254	0.12	216.67	61.62	767.61
J256	0.13	216.67	64.03	1687.72
J258	0.12	216.67	51.32	485.94
J26	0.14	216.67	36.58	298.99
J28	0.14	216.67	34.78	288.35
J30	0.14	216.67	27.86	248.97
J32	0.14	216.67	33.51	284.92
J34	0.14	216.67	34.29	284.33
J36	0.14	216.67	29.51	256.02
J38	0.14	216.67	32.70	281.98
J40	0.14	216.67	40.44	365.36
J44	0.14	216.67	-39.14	128.04
J46	0.14	216.67	40.44	369.43
J50	0.14	216.67	32.46	283.27
J52	0.14	216.67	47.23	413.34
J56	0.14	216.67	-104.67	95.41
J58	0.14	216.67	43.80	440.17
J60	0.14	216.67	47.18	383.36
J62	0.14	216.67	45.83	365.80
J64	0.14	216.67	39.41	410.38
J66	0.14	216.67	44.59	368.50
J68	0.14	216.67	39.53	315.08
J70	0.14	216.67	35.42	321.89
J72	0.14	216.67	43.19	456.16
J74	0.14	216.67	46.40	492.61
J76	0.14	216.67	44.56	385.28
J78	0.14	216.67	35.39	303.73
J80	0.14	216.67	35.74	288.34
J82	0.14	216.67	33.47	269.53
J84	0.14	216.67	-95.71	105.19
J86	0.14	216.67	45.00	355.55
J88	0.14	216.67	36.11	280.99
J90	0.14	216.67	34.04	266.06
J96	0.14	216.67	44.23	336.52
J98	0.14	216.67	44.67	346.31

Sufficient hydrant coverage to meet the RFF.

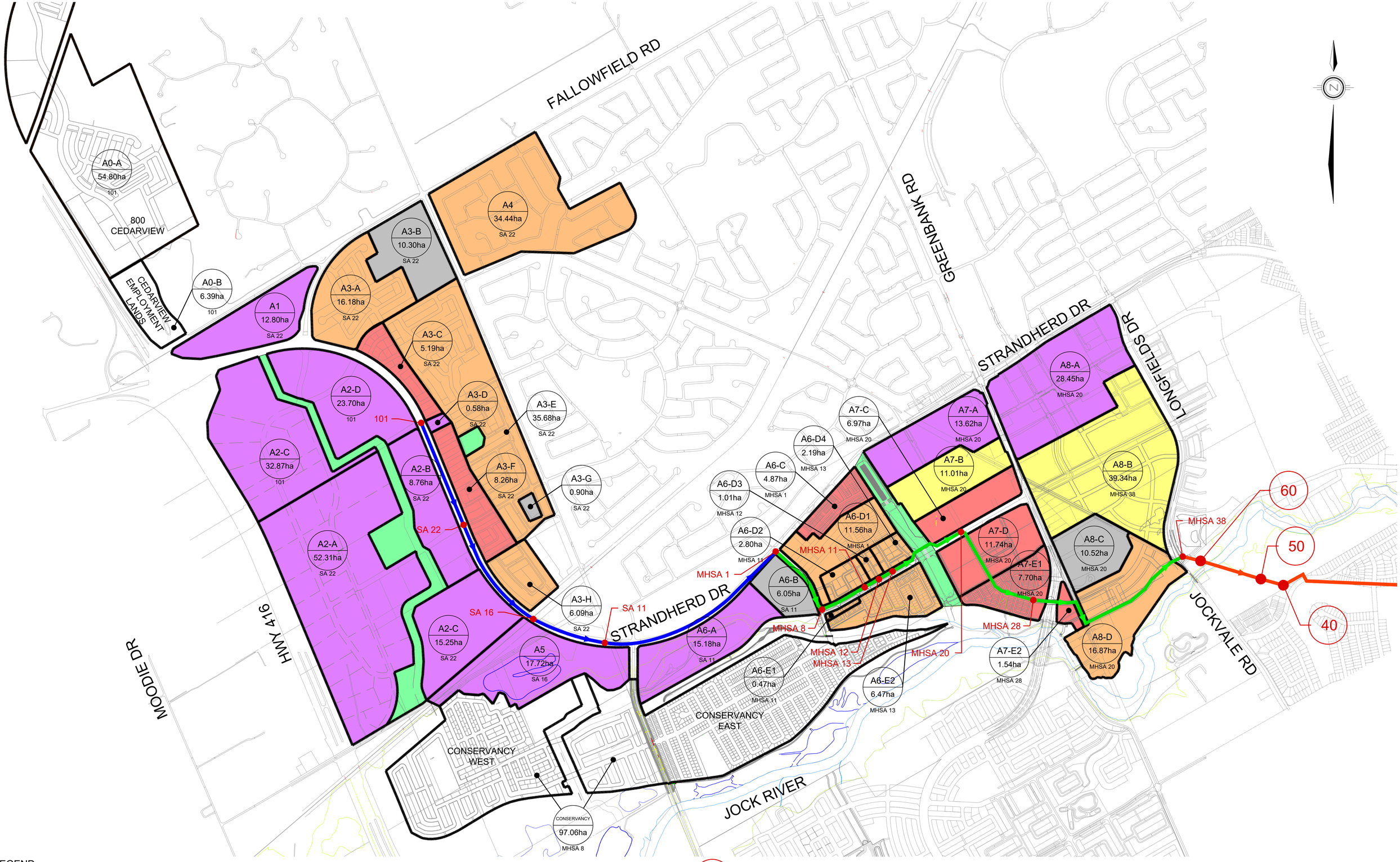
Table B-8: Model Results - AVDY+FF (Reliability Analysis Scenarios 1 to 3, Phase 2)

	Break Scenario 1 (Connection 1 Break)			Break Scenario 2 (Connection 2 Break)			Break Scenario 3 (Connection 3 Break)		
Junction ID	Base Demand (L/s)	Required Fire Flow (L/s)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Available Fire Flow @ Residual 20 psi (L/s)	Base Demand (L/s)	Required Fire Flow (L/s)	Available Fire Flow @ Residual 20 psi (L/s)
Maximum	*69.29*	*216.67*	*1651.91*	*69.28*	*216.67*	*1298.82*	*69.29*	*216.67*	*1689.37*
Minimum	*45.06*	*216.67*	*94.11*	*45.06*	*216.67*	*94.75*	*45.08*	*216.67*	*95.66*
J10	63.14	216.67	161.11	63.14	216.67	173.88	63.15	216.67	169.89
J104	59.41	216.67	339.64	59.41	216.67	344.53	59.42	216.67	378.61
J106	65.88	216.67	344.12	65.88	216.67	345.46	65.89	216.67	374.96
J110	56.14	216.67	431.47	56.14	216.67	441.30	56.15	216.67	524.73
J112	67.61	216.67	344.10	67.61	216.67	342.03	67.62	216.67	370.17
J114	63.03	216.67	529.59	63.03	216.67	513.49	63.04	216.67	632.40
J116	65.54	216.67	563.08	65.53	216.67	523.15	65.54	216.67	648.63
J12	59.34	216.67	229.27	59.35	216.67	272.85	59.36	216.67	257.45
J122	64.56	216.67	355.91	64.56	216.67	358.83	64.57	216.67	392.76
J124	55.22	216.67	265.37	55.22	216.67	311.48	55.23	216.67	284.87
J126	52.03	216.67	220.23	52.03	216.67	249.19	52.04	216.67	233.35
J128	52.24	216.67	174.49	52.24	216.67	188.33	52.25	216.67	181.07
J130	50.83	216.67	221.13	50.83	216.67	252.28	50.84	216.67	235.34
J132	51.61	216.67	224.59	51.62	216.67	257.16	51.63	216.67	239.78
J134	54.68	216.67	245.46	54.68	216.67	280.28	54.69	216.67	259.83
J136	52.86	216.67	205.12	52.87	216.67	225.86	52.88	216.67	213.93
J138	49.71	216.67	197.39	49.72	216.67	218.04	49.73	216.67	206.13
J14	60.20	216.67	231.20	60.21	216.67	274.07	60.22	216.67	258.76
J140	55.03	216.67	233.91	55.03	216.67	262.81	55.04	216.67	245.76
J142	56.92	216.67	254.56	56.92	216.67	289.41	56.93	216.67	268.25
J144	54.80	216.67	210.17	54.80	216.67	230.91	54.81	216.67	218.87
J146	56.23	216.67	229.70	56.24	216.67	255.61	56.25	216.67	240.27
J148	55.42	216.67	238.89	55.43	216.67	269.00	55.44	216.67	251.00
J150	54.53	216.67	286.95	54.54	216.67	351.79	54.55	216.67	314.68
J152	58.12	216.67	314.72	58.12	216.67	379.27	58.13	216.67	336.93
J154	50.81	216.67	242.11	50.81	216.67	252.88	50.82	216.67	269.14
J156	50.49	216.67	191.97	50.49	216.67	197.50	50.50	216.67	205.54
J158	46.80	216.67	179.72	46.80	216.67	184.95	46.81	216.67	192.61
J16	59.83	216.67	277.83	59.84	216.67	358.83	59.85	216.67	326.74
J160	47.79	216.67	228.14	47.79	216.67	238.19	47.80	216.67	253.49
J162	47.46	216.67	324.68	47.47	216.67	353.70	47.48	216.67	405.47
J164	45.83	216.67	238.12	45.83	216.67	250.25	45.84	216.67	269.48
J166	46.72	216.67	161.62	46.72	216.67	165.30	46.73	216.67	170.91
J168	45.58	216.67	143.09	45.58	216.67	145.77	45.59	216.67	149.91
J170	47.37	216.67	327.62	47.37	216.67	354.99	47.38	216.67	408.11
J172	47.22	216.67	330.28	47.22	216.67	355.92	47.23	216.67	410.42
J174	45.06	216.67	143.75	45.06	216.67	145.87	45.08	216.67	150.21
J176	46.39	216.67	163.25	46.39	216.67	166.06	46.40	216.67	171.98
J178	45.41	216.67	257.09	45.41	216.67	267.47	45.42	216.67	292.27
J18	58.35	216.67	266.76	58.35	216.67	347.80	58.36	216.67	317.69
J180	47.31	216.67	335.30	47.31	216.67	359.08	47.32	216.67	415.52
J182	55.16	216.67	293.55	55.16	216.67	303.40	55.17	216.67	328.58
J184	55.37	216.67	397.61	55.37	216.67	420.36	55.38	216.67	489.77
J186	62.97	216.67	352.61	62.97	216.67	355.89	62.98	216.67	390.31
J188	59.09	216.67	470.85	59.09	216.67	471.39	59.10	216.67	568.23
J190	67.27	216.67	364.10	67.26	216.67	362.75	67.28	216.67	396.43
J192	66.74	216.67	339.65	66.74	216.67	338.67	66.75	216.67	366.34
J194	64.67	216.67	319.37	64.67	216.67	318.94	64.68	216.67	343.14
J196	63.82	216.67	210.59	63.82	216.67	210.92	63.83	216.67	218.24
J198	61.86	216.67	354.42	61.86	216.67	354.32	61.87	216.67	390.01
J20	58.27	216.67	226.15	58.28	216.67	260.66	58.29	216.67	246.16
J202	57.82	216.67	350.44	57.81	216.67	348.85	57.83	216.67	387.56
J204	59.67	216.67	359.57	59.67	216.67	357.41	59.68	216.67	396.97
J206	60.65	216.67	141.23	60.65	216.67	141.06	60.66	216.67	143.68
J208	61.05	216.67	497.37	61.05	216.67	490.98	61.06	216.67	597.18
J210	57.41	216.67	181.92	57.41	216.67	181.60	57.42	216.67	187.37
J212	58.77	216.67	237.18	58.77	216.67	236.51	58.78	216.67	248.34
J214	60.77	216.67	687.55	60.77	216.67	557.97	60.78	216.67	768.79
J216	65.11	216.67	375.22	65.11	216.67	349.44	65.12	216.67	387.18
J218	54.57	216.67	323.49	54.57	216.67	301.26	54.58	216.67	333.83
J22	58.60	216.67	278.60	58.60	216.67	356.43	58.61	216.67	323.56
J220	58.77	216.67	316.48	58.76	216.67	296.83	58.77	216.67	324.32
J222	64.67	216.67	715.55	64.66	216.67	593.62	64.68	216.67	819.56
J224	61.57	216.67	939.95	61.56	216.67	615.65	61.57	216.67	1029.91
J226	69.29	216.67	1350.79	69.28	216.67	598.69	69.29	216.67	1417.29
J228	59.37	216.67	320.45	59.36	216.67	300.39	59.38	216.67	328.41
J230	61.63	216.67	715.20	61.62	216.67	567.73	61.63	216.67	789.89
J232	65.74	216.67	804.08	65.74	216.67	614.57	65.75	216.67	879.60
J234	59.66	216.67	395.56	59.66	216.67	358.75	59.67	216.67	403.30
J236	60.14	216.67	445.39	60.13	216.67	396.28	60.14	216.67	455.33
J238	66.39	216.67	862.36	66.38	216.67	635.21	66.39	216.67	937.88
J24	55.81	216.67	271.60	55.82	216.67	344.73	55.83	216.67	312.21
J240	66.66	216.67	983.55	66.65	216.67	675.72	66.66	216.67	1073.22
J242	64.10	216.67	978.46	64.09	216.67	696.46	64.10	216.67	1044.66
J244	64.69	216.67	1084.84	64.68	216.67	776.17	64.69	216.67	1139.52
J246	66.01	216.67	311.73	66.01	216.67	296.81	66.02	216.67	312.78
J248	65.38	216.67	1336.57	65.38	216.67	941.00	65.38	216.67	1385.87
J250	62.23	216.67	171.44	62.22	216.67	168.48	62.23	216.67	171.78
J252	66.14	216.67	164.37	66.13	216.67	161.70	66.14	216.67	164.56
J254	66.20	216.67	757.69	66.20	216.67	611.38	66.21	216.67	768.57
J256	65.16	216.67	1651.91	65.15	216.67	1298.82	65.16	216.67	1689.37
J258	60.61	216.67	475.75	60.60	216.67	418.51	60.62	216.67	486.79
J26	57.58	216.67	242.42	57.59	216.67	285.18	57.60	216.67	266.23
J28	56.66	216.67	236.84	56.66	216.67	275.47	56.67	216.67	257.68
J30	55.38	216.67	212.18	55.39	216.67	240.15	55.40	216.67	227.53
J32	54.64	216.67	232.94	54.64	216.67	271.75	54.65	216.67	253.68
J34	56.81	216.67	235.34	56.81	216.67	271.94	56.82	216.67	254.78
J36	56.47	216.67	218.38	56.48	216.67	246.69	56.49	216.67	233.39
J38	53.56	216.67	231.81	53.57	216.67	268.60	53.58	216.67	250.39
J40	53.64	216.67	270.45	53.64	216.67	338.42	53.65	216.67	305.03
J44	56.24	216.67	121.91	56.25	216.67	126.83	56.26	216.67	124.79
J46	53.23	216.67	275.34	53.23	216.67	340.85	53.24	216.67	305.96
J50	52.49	216.67	254.44	52.49	216.67	266.32	52.50	216.67	284.16
J52	59.63	216.67	366.27	59.63	216.67	371.34	59.64	216.67	414.20
J56	55.25	216.67	94.11	55.26	216.67	94.75	55.27	216.67	95.66
J58	53.21	216.67	349.26	53.21	216.67	387.23	53.23	216.67	440.06
J60	62.28	216.67	344.26	62.28	216.67	351.27	62.29	216.67	384.19
J62	62.22	216.67	331.82	62.22	216.67	337.36	62.24	216.67	366.69
J64	48.62	216.67	327.76	48.62	216.67	359.58	48.63	216.67	410.75
J66	59.91	216.67	325.24	59.91	216.67	339.01	59.92	216.67	369.20
J68	59.66	216.67	287.81	59.66	216.67	295.41	59.67	216.67	315.89
J70	50.26	216.67	285.56	50.26	216.67	295.17	50.27	216.67	322.92
J72	51.62	216.67	369.82	51.62	216.67	392.89	51.63	216.67	456.57
J74	54.39	216.67	402.22	54.39	216.67	419.79	54.40	216.67	492.91
J76	58.05	216.67	342.84	58.05	216.67	349.39	58.06	216.67	386.16
J78	53.69	216.67	276.42	53.69	216.67	282.82	53.70	216.67	304.68
J80	58.92	216.67	267.17	58.92	216.67	272.53	58.93	216.67	289.18
J82	61.14	216.67	253.18	61.14	216.67	257.02	61.16	216.67	270.30
J84	61.45	216.67	104.06	61.45	216.67	104.37	61.46	216.67	105.44
J86	62.25	216.67	325.39	62.25	216.67	329.00	62.26	216.67	356.48
J88	62.79	216.67	265.45	62.79	216.67	267.12	62.80	216.67	281.78
J90	65.02	216.67	253.64	65.02	216.67	254.62	65.03	216.67	266.77
J96	64.07	216.67	312.04	64.07	216.67	314.38	64.08	216.67	337.38
J98	63.11	216.67	319.04	63.11	216.67	321.96	63.12	216.67	347.21

Sufficient hydrant coverage to meet the RFF.

Appendix C

- Sanitary Drainage, prepared by DSEL, dated August 2023
- Sanitary Design Sheet – Existing (Design Sewers), prepared by DSEL, dated August 2023
- Sanitary Design Sheet – Existing (As-Built Sewers), prepared by DSEL, dated August 2023
- Sanitary Design Sheet – Conservancy, prepared by DSEL, dated August 2023
- Sanitary Design Sheet – Option 1, prepared by DSEL, dated August 2023
- Sanitary Design Sheet – Option 2, prepared by DSEL, dated August 2023
- Mattamy Cedarview Development – Sanitary HGL Analysis, prepared by JFSA, dated October 6, 2023



LEGEND

- EXISTING / PROPOSED HIGH DENSITY RESIDENTIAL
- EXISTING / PROPOSED MEDIUM DENSITY RESIDENTIAL
- EXISTING / PROPOSED LOW DENSITY RESIDENTIAL
- EXISTING / PROPOSED COMMERCIAL
- EXISTING / PROPOSED INSTITUTIONAL
- OTHER LANDS (OPEN SPACE, PARKS, AND SWMFS)
- SOUTH NEPEAN COLLECTOR PHASE 1
- SOUTH NEPEAN COLLECTOR PHASE 2
- SOUTH NEPEAN COLLECTOR PHASE 3
- 90 — SOUTH NEPEAN COLLECTOR NODE ID
- MHSA 11 — SOUTH NEPEAN COLLECTOR MANHOLE ID

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MATTAMY CEDARVIEW

CITY OF OTTAWA

SOUTH NEPEAN COLLECTOR SANITARY DRAINAGE AREAS AND LAND USE

SCALE:	1:7500	PROJECT No.:	14-746
DATE:	AUGUST 2023	DRAWING:	02

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SYSTEMHOUSE STREET																													
Contribution From Citigate Drive, Pipe 211 - 213													35.83	35.83						35.83	35.83								
		213	401						0.00	0			0.07	35.90		0.00		0.00	17.45	0.07	35.90	11.85	29.30	26.4	300	0.25	50.44	0.58	0.71	0.74
		401	403						0.00	0			0.21	36.11		0.00		0.00	17.55	0.21	36.11	11.92	29.47	87.7	300	0.25	50.44	0.58	0.71	0.74
		403	405						0.00	0			0.29	36.39		0.00		0.00	17.69	0.29	36.39	12.01	29.70	118.4	300	0.25	50.44	0.59	0.71	0.74
									0.00	0			2.29	38.69		0.00		0.00	18.81	2.29	38.69	12.77	31.57							
		405	407						0.00	0			0.20	38.88		0.00		0.00	18.90	0.20	38.88	12.83	31.73	81.2	375	0.14	68.44	0.46	0.62	0.61
									0.00	0			11.95	50.83		0.00		0.00	24.71	11.95	50.83	16.77	41.48							
									0.00	0			5.28	56.11		0.00		0.00	27.27	5.28	56.11	18.51	45.79							
		407	409						0.00	0			0.30	56.40		0.00		0.00	27.42	0.30	56.40	18.61	46.03	115.8	375	0.25	91.46	0.50	0.83	0.83
		409	101						0.00	0			0.16	56.57		0.00		0.00	27.50	0.16	56.57	18.67	46.16	53.5	375	0.25	91.46	0.50	0.83	0.83
To STRANDHERD DRIVE, Pipe 101 - SA 23									0.00	0				56.57		0.00		0.00			56.57									
STRANDHERD DRIVE - SOUTH NEPEAN COLLECTOR (PHASE 3)																													
Contribution From Systemhouse Street, Pipe 409 - 101									0.00	0				56.57		0.00		0.00		0.00	56.57									
		101	103						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	110.1	525	0.11	148.80	0.31	0.69	0.60
		103	105						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	120.0	525	0.11	148.80	0.31	0.69	0.60
		105	107						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	120.0	525	0.11	148.80	0.31	0.69	0.60
		107	SA 23						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	119.6	525	0.11	148.80	0.31	0.69	0.60
		SA 23	SA 22						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	54.9	600	0.45	429.70	0.11	1.52	0.99
	NODE 120	SA 22	SA 21	105.84				10974	105.84	10974	2.53	90.03	89.70	146.27	11.20	11.20		0.00	74.73	206.74	263.31	86.89	251.66	131.9	750	0.10	367.27	0.69	0.83	0.89
		SA 21	SA 20						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	90.6	750	0.10	367.27	0.69	0.83	0.89
		SA 20	SA 19						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	90.0	750	0.10	367.27	0.69	0.83	0.89
		SA 19	SA 18						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	72.1	750	0.10	367.27	0.69	0.83	0.89
		SA 18	SA 17						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	71.9	750	0.10	367.27	0.69	0.83	0.89
		SA 17	SA 16						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	71.4	750	0.10	367.27	0.69	0.83	0.89
	NODE 110	SA 16	SA 15						105.84	10974	2.53	90.03	17.72	163.99		11.20		0.00	83.35	17.72	281.03	92.74	266.12	73.2	750	0.10	367.27	0.72	0.83	0.91
		SA 15	SA 14						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	67.5	750	0.10	367.27	0.72	0.83	0.91
		SA 14	SA 13						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	56.6	750	0.10	367.27	0.72	0.83	0.91
		SA 13	SA 12						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	133.5	750	0.10	367.27	0.72	0.83	0.91
		SA 12	SA 11						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	150.0	750	0.10	367.27	0.72	0.83	0.91
	NODE 100	SA 11	SA 10						105.84	10974	2.53	90.03	15.18	179.17	6.05	17.25		0.00	92.69	21.23	302.26	99.75	282.47	97.8	750	0.10	367.27	0.77	0.83	0.92
		SA 10	SA 9						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	76.7	750	0.10	367.27	0.77	0.83	0.92
		SA 9	SA 8						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	79.7	750	0.10	367.27	0.77	0.83	0.92
		SA 8	SA 7						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	75.3	750	0.10	367.27	0.77	0.83	0.92
		SA 7	SA 6						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	84.9	750	0.10	367.27	0.77	0.83	0.92
		SA 6	SA 5						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	77.1	750	0.10	367.27	0.77	0.83	0.92
		SA 5	SA 4						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	78.9	750	0.10	367.27	0.77	0.83	0.92
		SA 4	SA 3						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	80.5	750	0.10	367.27	0.77	0.83	0.92
		SA 3	SA 2						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	150.0	750	0.10	367.27	0.77	0.83	0.92
		SA 2	SA 1						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	114.6	750	0.10	367.27	0.77	0.83	0.92
		SA 1	EX 80						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	12.4	750	0.10	367.27	0.77	0.83	0.92
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 1 - MHSA 2									105.84	10974				179.17		17.25		0.00			302.26									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00	
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013 (Pvc)	0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS EXISTING (DESIGN SEWERS)
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023
			Sheet No. 1 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SOUTH NEPEAN COLLECTOR (PHASE 2)																													
Contribution From Strandherd Drive - SOUTH NEPEAN COLLECTOR PHASE 3, Pipe SA 1 - EX 80									105.84	10974				179.17		17.25		0.00		0.00	302.26								
	NODE 90	MHSA 1	MHSA 2	16.43				1890	122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	16.43	318.69	105.17	301.09	57.3	900	0.10	597.22	0.50	0.94	0.94
		MHSA 2	MHSA 3						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	57.3	900	0.10	597.22	0.50	0.94	0.94
		MHSA 3	MHSA 4						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	73.9	900	0.10	597.22	0.50	0.94	0.94
		MHSA 4	MHSA 5						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	34.6	900	0.10	597.22	0.50	0.94	0.94
		MHSA 5	MHSA 6						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	42.8	900	0.10	597.22	0.50	0.94	0.94
		MHSA 6	MHSA 7						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	84.4	900	0.10	597.22	0.50	0.94	0.94
		MHSA 7	MHSA 8						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	16.5	900	0.10	597.22	0.50	0.94	0.94
		MHSA 8	MHSA 9						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	85.4	900	0.10	597.22	0.50	0.94	0.94
		MHSA 9	MHSA 10						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	70.6	900	0.10	597.22	0.50	0.94	0.94
		MHSA 10	MHSA 11						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	70.6	900	0.10	597.22	0.50	0.94	0.94
		MHSA 11	MHSA 12	3.27				311	125.54	13175	2.47	105.38		179.17		17.25		0.00	92.69	3.27	321.96	106.25	304.31	77.8	900	0.10	597.22	0.51	0.94	0.94
		MHSA 12	MHSA 13	1.01				96	126.55	13272	2.47	106.04		179.17		17.25		0.00	92.69	1.01	322.97	106.58	305.30	77.8	900	0.10	597.22	0.51	0.94	0.94
		MHSA 13	MHSA 14	8.66				824	135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	8.66	331.63	109.44	313.79	77.8	900	0.10	597.22	0.53	0.94	0.95
		MHSA 14	MHSA 15						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	25.4	900	0.10	597.22	0.53	0.94	0.95
		MHSA 15	MHSA 16						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	34.2	900	0.10	597.22	0.53	0.94	0.95
		MHSA 16	MHSA 17						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	86.7	900	0.10	597.22	0.53	0.94	0.95
		MHSA 17	MHSA 18						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	34.3	900	0.10	597.22	0.53	0.94	0.95
		MHSA 18	MHSA 19						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	68.6	900	0.10	597.22	0.53	0.94	0.95
		MHSA 19	MHSA 20						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	65.5	900	0.10	597.22	0.53	0.94	0.95
	NODE 80	MHSA 20	MHSA 21	54.29				7805	189.50	21901	2.29	162.56	42.07	221.24	10.52	27.77		0.00	116.55	106.88	438.51	144.71	423.81	18.2	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 21	MHSA 22						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	81.9	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 22	MHSA 23						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	84.7	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 23	MHSA 24						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	77.4	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 24	MHSA 25						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	45.5	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 25	MHSA 26						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	35.8	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 26	MHSA 27						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	83.3	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 27	MHSA 28						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	74.4	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 28	MHSA 29	1.54				249	191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	1.54	440.05	145.22	425.89	77.3	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 29	MHSA 30						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	83.8	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 30	MHSA 31						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	42.3	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 31	MHSA 32						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	100.6	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 32	MHSA 33						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	13.9	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 33	MHSA 34						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	99.9	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 34	MHSA 35						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	99.9	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 35	MHSA 36						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	88.7	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 36	MHSA 37						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	88.8	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 37	MHSA 38						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	90.3	1050	0.10	900.87	0.47	1.04	1.02
	NODE 70	MHSA 38	MHSA 39	53.68				5311	244.72	27461	2.21	196.86		221.24		27.77		0.00	116.55	53.68	493.73	162.93	476.34	87.5	1050	0.10	900.87	0.53	1.04	1.05
To SOUTH NEPEAN COLLECTOR PHASE 1									244.72	27461				221.24		27.77		0.00			493.73								

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	
Average Daily Flow =	280	l/p/day			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	
Max Res. Peak Factor =	4.00				
Commercial/Park Peak Factor =	1.50				
Institutional =	0.32	l/s/Ha			

Institutional Peak Factor =	1.00			
Industrial Peak Factor = as per MOE Graph				
Extraneous Flow =	0.330	L/s/ha		
Minimum Velocity =	0.600	m/s		
Manning's n =	(Conc) 0.013	(Pvc)	0.013	
Townhouse coeff=	2.7			
Single house coeff=	3.4			

Designed: BNC

Checked: SLM

Dwg. Reference: 02

PROJECT: **SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS EXISTING (DESIGN SEWERS)**

LOCATION: **City of Ottawa**

File Ref: 16-746

Date: **23 Aug 2023**

Sheet No. 2 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SYSTEMHOUSE STREET																													
Contribution From Citigate Drive, Pipe 211 - 213													35.83	35.83						35.83	35.83								
		213	401						0.00	0			0.07	35.90		0.00		0.00	17.45	0.07	35.90	11.85	29.30	26.4	300	0.25	50.44	0.58	0.71	0.74
		401	403						0.00	0			0.21	36.11		0.00		0.00	17.55	0.21	36.11	11.92	29.47	87.7	300	0.25	50.44	0.58	0.71	0.74
		403	405						0.00	0			0.29	36.39		0.00		0.00	17.69	0.29	36.39	12.01	29.70	118.4	300	0.25	50.44	0.59	0.71	0.74
									0.00	0			2.29	38.69		0.00		0.00	18.81	2.29	38.69	12.77	31.57							
		405	407						0.00	0			0.20	38.88		0.00		0.00	18.90	0.20	38.88	12.83	31.73	81.2	375	0.14	68.44	0.46	0.62	0.61
									0.00	0			11.95	50.83		0.00		0.00	24.71	11.95	50.83	16.77	41.48							
									0.00	0			5.28	56.11		0.00		0.00	27.27	5.28	56.11	18.51	45.79							
		407	409						0.00	0			0.30	56.40		0.00		0.00	27.42	0.30	56.40	18.61	46.03	115.8	375	0.25	91.46	0.50	0.83	0.83
		409	101						0.00	0			0.16	56.57		0.00		0.00	27.50	0.16	56.57	18.67	46.16	53.5	375	0.25	91.46	0.50	0.83	0.83
To STRANDHERD DRIVE, Pipe 101 - SA 23									0.00	0				56.57		0.00		0.00			56.57									
STRANDHERD DRIVE - SOUTH NEPEAN COLLECTOR (PHASE 3)																													
Contribution From Systemhouse Street, Pipe 409 - 101									0.00	0				56.57		0.00		0.00		0.00	56.57									
		101	103						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	110.1	525	0.11	148.80	0.31	0.69	0.60
		103	105						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	120.0	525	0.10	141.88	0.33	0.66	0.58
		105	107						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	120.0	525	0.12	155.42	0.30	0.72	0.62
		107	SA 23						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	119.6	525	0.09	134.60	0.34	0.62	0.56
		SA 23	SA 22						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	54.9	600	0.45	429.70	0.11	1.52	0.99
	NODE 120	SA 22	SA 21	105.84				10974	105.84	10974	2.53	90.03	89.70	146.27	11.20	11.20		0.00	74.73	206.74	263.31	86.89	251.66	121.8	750	0.12	402.33	0.63	0.91	0.96
		SA 21	SA 20						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	90.6	750	0.12	402.33	0.63	0.91	0.96
		SA 20	SA 19						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	90.0	750	0.12	402.33	0.63	0.91	0.96
		SA 19	SA 18						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	66.8	750	0.11	385.20	0.65	0.87	0.93
		SA 18	SA 17						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	76.9	750	0.12	402.33	0.63	0.91	0.96
		SA 17	SA 16						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	68.7	750	0.12	402.33	0.63	0.91	0.96
	NODE 110	SA 16	SA 15						105.84	10974	2.53	90.03	17.72	163.99		11.20		0.00	83.35	17.72	281.03	92.74	266.12	84.1	750	0.12	402.33	0.66	0.91	0.97
		SA 15	SA 14						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	59.7	750	0.13	418.75	0.64	0.95	1.00
		SA 14	SA 13						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	56.6	750	0.12	402.33	0.66	0.91	0.97
		SA 13	SA 12						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	144.6	750	0.10	367.27	0.72	0.83	0.91
		SA 12	SA 11						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	150.0	750	0.10	367.27	0.72	0.83	0.91
	NODE 100	SA 11	SA 10						105.84	10974	2.53	90.03	15.18	179.17	6.05	17.25		0.00	92.69	21.23	302.26	99.75	282.47	46.4	750	0.10	367.27	0.77	0.83	0.92
		SA 10	SA 9						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	117.0	750	0.10	367.27	0.77	0.83	0.92
		SA 9	SA 8						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	79.7	750	0.10	367.27	0.77	0.83	0.92
		SA 8	SA 7						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	69.3	750	0.10	367.27	0.77	0.83	0.92
		SA 7	SA 6						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	91.0	750	0.10	367.27	0.77	0.83	0.92
		SA 6	SA 5						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	77.1	750	0.10	367.27	0.77	0.83	0.92
		SA 5	SA 4						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	78.9	750	0.10	367.27	0.77	0.83	0.92
		SA 4	SA 3						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	80.5	750	0.10	367.27	0.77	0.83	0.92
		SA 3	SA 2						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	150.0	750	0.10	367.27	0.77	0.83	0.92
		SA 2	SA 1						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	100.6	750	0.10	367.27	0.77	0.83	0.92
		SA 1	EX 80						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	24.5	750	0.10	367.27	0.77	0.83	0.92
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 1 - MHSA 2									105.84	10974				179.17		17.25		0.00			302.26									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00	
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013 (Pvc)	0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS EXISTING (AS-BUILT SEWERS)
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023
		Sheet No.	1 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SOUTH NEPEAN COLLECTOR (PHASE 2)																													
Contribution From Strandherd Drive - SOUTH NEPEAN COLLECTOR PHASE 3, Pipe SA 1 - EX 80									105.84	10974				179.17		17.25		0.00		0.00	302.26								
	NODE 90	MHSA 1	MHSA 2	16.43				1890	122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	16.43	318.69	105.17	301.09	58.4	900	0.12	654.22	0.46	1.03	1.01
		MHSA 2	MHSA 3						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	47.7	900	0.08	534.17	0.56	0.84	0.86
		MHSA 3	MHSA 4						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	76.2	900	0.06	462.61	0.65	0.73	0.77
		MHSA 4	MHSA 5						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	32.3	900	0.14	706.64	0.43	1.11	1.07
		MHSA 5	MHSA 6						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	42.6	900	0.09	566.58	0.53	0.89	0.90
		MHSA 6	MHSA 7						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	74.1	900	0.11	626.37	0.48	0.98	0.97
		MHSA 7	MHSA 8						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	26.0	900	0.12	654.22	0.46	1.03	1.01
		MHSA 8	MHSA 9						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	85.8	900	0.08	534.17	0.56	0.84	0.86
		MHSA 9	MHSA 10						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	70.8	900	0.05	422.30	0.71	0.66	0.72
		MHSA 10	MHSA 11						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	70.8	900	0.07	499.67	0.60	0.79	0.82
		MHSA 11	MHSA 12	3.27				311	125.54	13175	2.47	105.38		179.17		17.25		0.00	92.69	3.27	321.96	106.25	304.31	78.2	900	0.11	626.37	0.49	0.98	0.98
		MHSA 12	MHSA 13	1.01				96	126.55	13272	2.47	106.04		179.17		17.25		0.00	92.69	1.01	322.97	106.58	305.30	74.4	900	0.13	680.94	0.45	1.07	1.04
		MHSA 13	MHSA 14	8.66				824	135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	8.66	331.63	109.44	313.79	81.3	900	0.11	626.37	0.50	0.98	0.98
		MHSA 14	MHSA 15						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	25.9	900	0.07	499.67	0.63	0.79	0.83
		MHSA 15	MHSA 16						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	34.5	900	0.08	534.17	0.59	0.84	0.87
		MHSA 16	MHSA 17						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	86.9	900	0.13	680.94	0.46	1.07	1.05
		MHSA 17	MHSA 18						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	34.6	900	0.51	1348.72	0.23	2.12	1.72
		MHSA 18	MHSA 19						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	68.7	900	0.08	534.17	0.59	0.84	0.87
		MHSA 19	MHSA 20						135.21	14096	2.44	111.66		179.17		17.25		0.00	92.69	0.00	331.63	109.44	313.79	63.1	900	0.08	534.17	0.59	0.84	0.87
	NODE 80	MHSA 20	MHSA 21	54.29				7805	189.50	21901	2.29	162.56	42.07	221.24	10.52	27.77		0.00	116.55	106.88	438.51	144.71	423.81	18.1	1050	0.36	1709.28	0.25	1.97	1.63
		MHSA 21	MHSA 22						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	82.4	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 22	MHSA 23						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	85.0	1050	0.09	854.64	0.50	0.99	0.98
		MHSA 23	MHSA 24						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	77.3	1050	0.15	1103.33	0.38	1.27	1.18
		MHSA 24	MHSA 25						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	45.5	1050	0.09	854.64	0.50	0.99	0.98
		MHSA 25	MHSA 26						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	35.9	1050	0.09	854.64	0.50	0.99	0.98
		MHSA 26	MHSA 27						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	83.1	1050	0.12	986.85	0.43	1.14	1.09
		MHSA 27	MHSA 28						189.50	21901	2.29	162.56		221.24		27.77		0.00	116.55	0.00	438.51	144.71	423.81	74.3	1050	0.04	569.76	0.74	0.66	0.72
		MHSA 28	MHSA 29	1.54				249	191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	1.54	440.05	145.22	425.89	60.7	1050	0.08	805.76	0.53	0.93	0.94
		MHSA 29	MHSA 30						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	99.8	1050	0.10	900.87	0.47	1.04	1.02
		MHSA 30	MHSA 31						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	42.6	1050	0.27	1480.28	0.29	1.71	1.47
		MHSA 31	MHSA 32						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	111.3	1050	0.09	854.64	0.50	0.99	0.98
		MHSA 32	MHSA 33						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	118.7	1050	0.09	854.64	0.50	0.99	0.98
		MHSA 33	MHSA 34						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	119.7	1050	0.09	854.64	0.50	0.99	0.98
		MHSA 34	MHSA 35						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	86.2	1050	0.07	753.72	0.57	0.87	0.89
		MHSA 35	MHSA 36						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	58.9	1050	0.05	637.01	0.67	0.74	0.79
		MHSA 36	MHSA 37						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	110.8	1050	0.11	944.84	0.45	1.09	1.06
		MHSA 37	MHSA 38						191.04	22150	2.29	164.12		221.24		27.77		0.00	116.55	0.00	440.05	145.22	425.89	72.3	1050	0.15	1103.33	0.39	1.27	1.19
	NODE 70	MHSA 38	MHSA 39	53.68				5311	244.72	27461	2.21	196.86		221.24		27.77		0.00	116.55	53.68	493.73	162.93	476.34	87.5	1050	0.10	900.87	0.53	1.04	1.05
To SOUTH NEPEAN COLLECTOR PHASE 1									244.72	27461				221.24		27.77		0.00			493.73								

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	
Average Daily Flow =	280	l/p/day			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	
Max Res. Peak Factor =	4.00				
Commercial/Park Peak Factor =	1.50				
Institutional =	0.32	l/s/Ha			

Institutional Peak Factor =	1.00				
Industrial Peak Factor = as per MOE Graph					
Extraneous Flow =	0.330	L/s/ha			
Minimum Velocity =	0.600	m/s			
Manning's n =	(Conc)	0.013	(Pvc)	0.013	
Townhouse coeff=	2.7				
Single house coeff=	3.4				

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS EXISTING (AS-BUILT SEWERS)
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023
			Sheet No. 2 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION								COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SYSTEMHOUSE STREET																													
Contribution From Citigate Drive, Pipe 211 - 213												35.83	35.83						35.83	35.83									
	213	401						0.00	0			0.07	35.90		0.00		0.00	17.45	0.07	35.90	11.85	29.30	26.4	300	0.25	50.44	0.58	0.71	0.74
	401	403						0.00	0			0.21	36.11		0.00		0.00	17.55	0.21	36.11	11.92	29.47	87.7	300	0.25	50.44	0.58	0.71	0.74
	403	405						0.00	0			0.29	36.39		0.00		0.00	17.69	0.29	36.39	12.01	29.70	118.4	300	0.25	50.44	0.59	0.71	0.74
								0.00	0			2.29	38.69		0.00		0.00	18.81	2.29	38.69	12.77	31.57							
	405	407						0.00	0			0.20	38.88		0.00		0.00	18.90	0.20	38.88	12.83	31.73	81.2	375	0.14	68.44	0.46	0.62	0.61
								0.00	0			11.95	50.83		0.00		0.00	24.71	11.95	50.83	16.77	41.48							
								0.00	0			5.28	56.11		0.00		0.00	27.27	5.28	56.11	18.51	45.79							
	407	409						0.00	0			0.30	56.40		0.00		0.00	27.42	0.30	56.40	18.61	46.03	115.8	375	0.25	91.46	0.50	0.83	0.83
	409	101						0.00	0			0.16	56.57		0.00		0.00	27.50	0.16	56.57	18.67	46.16	53.5	375	0.25	91.46	0.50	0.83	0.83
To STRANDHERD DRIVE, Pipe 101 - SA 23								0.00	0				56.57		0.00		0.00			56.57									
STRANDHERD DRIVE - SOUTH NEPEAN COLLECTOR (PHASE 3)																													
Contribution From Systemhouse Street, Pipe 409 - 101								0.00	0				56.57		0.00		0.00		0.00	56.57									
	101	103						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	110.1	525	0.11	148.80	0.31	0.69	0.60
	103	105						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	120.0	525	0.10	141.88	0.33	0.66	0.58
	105	107						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	120.0	525	0.12	155.42	0.30	0.72	0.62
	107	SA 23						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	119.6	525	0.09	134.60	0.34	0.62	0.56
	SA 23	SA 22						0.00	0				56.57		0.00		0.00	27.50	0.00	56.57	18.67	46.16	54.9	600	0.45	429.70	0.11	1.52	0.99
NODE 120	SA 22	SA 21	105.84				10974	105.84	10974	2.53	90.03	89.70	146.27	11.20	11.20		0.00	74.73	206.74	263.31	86.89	251.66	121.8	750	0.12	402.33	0.63	0.91	0.96
	SA 21	SA 20						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	90.6	750	0.12	402.33	0.63	0.91	0.96
	SA 20	SA 19						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	90.0	750	0.12	402.33	0.63	0.91	0.96
	SA 19	SA 18						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	66.8	750	0.11	385.20	0.65	0.87	0.93
	SA 18	SA 17						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	76.9	750	0.12	402.33	0.63	0.91	0.96
	SA 17	SA 16						105.84	10974	2.53	90.03		146.27		11.20		0.00	74.73	0.00	263.31	86.89	251.66	68.7	750	0.12	402.33	0.63	0.91	0.96
NODE 110	SA 16	SA 15						105.84	10974	2.53	90.03	17.72	163.99		11.20		0.00	83.35	17.72	281.03	92.74	266.12	84.1	750	0.12	402.33	0.66	0.91	0.97
	SA 15	SA 14						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	59.7	750	0.13	418.75	0.64	0.95	1.00
	SA 14	SA 13						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	56.6	750	0.12	402.33	0.66	0.91	0.97
	SA 13	SA 12						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	144.6	750	0.10	367.27	0.72	0.83	0.91
	SA 12	SA 11						105.84	10974	2.53	90.03		163.99		11.20		0.00	83.35	0.00	281.03	92.74	266.12	150.0	750	0.10	367.27	0.72	0.83	0.91
NODE 100	SA 11	SA 10						105.84	10974	2.53	90.03	15.18	179.17	6.05	17.25		0.00	92.69	21.23	302.26	99.75	282.47	46.4	750	0.10	367.27	0.77	0.83	0.92
	SA 10	SA 9						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	117.0	750	0.10	367.27	0.77	0.83	0.92
	SA 9	SA 8						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	79.7	750	0.10	367.27	0.77	0.83	0.92
	SA 8	SA 7						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	69.3	750	0.10	367.27	0.77	0.83	0.92
	SA 7	SA 6						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	91.0	750	0.10	367.27	0.77	0.83	0.92
	SA 6	SA 5						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	77.1	750	0.10	367.27	0.77	0.83	0.92
	SA 5	SA 4						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	78.9	750	0.10	367.27	0.77	0.83	0.92
	SA 4	SA 3						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	80.5	750	0.10	367.27	0.77	0.83	0.92
	SA 3	SA 2						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	150.0	750	0.10	367.27	0.77	0.83	0.92
	SA 2	SA 1						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	100.6	750	0.10	367.27	0.77	0.83	0.92
	SA 1	EX 80						105.84	10974	2.53	90.03		179.17		17.25		0.00	92.69	0.00	302.26	99.75	282.47	24.5	750	0.10	367.27	0.77	0.83	0.92
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 1 - MHSA 2								105.84	10974				179.17		17.25		0.00			302.26									
CONSERVANCY																													
CONSERVANCY		MHSA 8	88.28				8123	88.28	8123			4.21	4.21		0.00	4.57	4.57		97.06	97.06									
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 8 - MHSA 9								88.28	8123				4.21		0.00		4.57			97.06									

*NOTE: Conservancy info derived from DSEL job# 20-1180: 2023-04-18_Rev11 design sheet.

13.7Ha of commercial area indicated in latest Conservancy Sanitary Design Sheet has been subtracted as it has already been accounted for in the Novatech SNC sewer drainage area.

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00	
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013 (Pvc)	0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS CONSERVANCY
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023
			Sheet No. 1 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION								COMM		INSTIT		PARK		C+I+I	INFILTRATION					PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SOUTH NEPEAN COLLECTOR (PHASE 2)																														
Contribution From Strandherd Drive - SOUTH NEPEAN COLLECTOR PHASE 3, Pipe SA 1 - EX 80									105.84	10974				179.17		17.25		0.00		0.00	302.26									
	NODE 90	MHSA 1	MHSA 2	16.43				1890	122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	16.43	318.69	105.17	301.09	58.4	900	0.12	654.22	0.46	1.03	1.01
		MHSA 2	MHSA 3						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	47.7	900	0.08	534.17	0.56	0.84	0.86
		MHSA 3	MHSA 4						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	76.2	900	0.06	462.61	0.65	0.73	0.77
		MHSA 4	MHSA 5						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	32.3	900	0.14	706.64	0.43	1.11	1.07
		MHSA 5	MHSA 6						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	42.6	900	0.09	566.58	0.53	0.89	0.90
		MHSA 6	MHSA 7						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	74.1	900	0.11	626.37	0.48	0.98	0.97
		MHSA 7	MHSA 8						122.27	12864	2.48	103.23		179.17		17.25		0.00	92.69	0.00	318.69	105.17	301.09	26.0	900	0.12	654.22	0.46	1.03	1.01
Contribution From CONSERVANCY									88.28	8123				4.21		0.00		4.57		0.00	97.06									
		MHSA 8	MHSA 9						210.55	20987	2.31	156.78		183.38		17.25		4.57	95.47	0.00	415.75	137.20	389.45	85.8	900	0.08	534.17	0.73	0.84	0.91
		MHSA 9	MHSA 10						210.55	20987	2.31	156.78		183.38		17.25		4.57	95.47	0.00	415.75	137.20	389.45	70.8	900	0.05	422.30	0.92	0.66	0.75
		MHSA 10	MHSA 11						210.55	20987	2.31	156.78		183.38		17.25		4.57	95.47	0.00	415.75	137.20	389.45	70.8	900	0.07	499.67	0.78	0.79	0.87
		MHSA 11	MHSA 12	3.27				311	213.82	21298	2.30	158.76		183.38		17.25		4.57	95.47	3.27	419.02	138.28	392.50	78.2	900	0.11	626.37	0.63	0.98	1.04
		MHSA 12	MHSA 13	1.01				96	214.83	21395	2.30	159.36		183.38		17.25		4.57	95.47	1.01	420.03	138.61	393.44	74.4	900	0.13	680.94	0.58	1.07	1.11
		MHSA 13	MHSA 14	8.66				824	223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	8.66	428.69	141.47	401.50	81.3	900	0.11	626.37	0.64	0.98	1.04
		MHSA 14	MHSA 15						223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	0.00	428.69	141.47	401.50	25.9	900	0.07	499.67	0.80	0.79	0.87
		MHSA 15	MHSA 16						223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	0.00	428.69	141.47	401.50	34.5	900	0.08	534.17	0.75	0.84	0.92
		MHSA 16	MHSA 17						223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	0.00	428.69	141.47	401.50	86.9	900	0.13	680.94	0.59	1.07	1.11
		MHSA 17	MHSA 18						223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	0.00	428.69	141.47	401.50	34.6	900	0.51	1348.72	0.30	2.12	1.84
		MHSA 18	MHSA 19						223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	0.00	428.69	141.47	401.50	68.7	900	0.08	534.17	0.75	0.84	0.92
		MHSA 19	MHSA 20						223.49	22219	2.29	164.56		183.38		17.25		4.57	95.47	0.00	428.69	141.47	401.50	63.1	900	0.08	534.17	0.75	0.84	0.92
	NODE 80	MHSA 20	MHSA 21	54.29				7805	277.78	30024	2.18	212.26	42.07	225.45	10.52	27.77		4.57	119.33	106.88	535.57	176.74	508.33	18.1	1050	0.36	1709.28	0.30	1.97	1.71
		MHSA 21	MHSA 22						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	82.4	1050	0.10	900.87	0.56	1.04	1.07
		MHSA 22	MHSA 23						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	85.0	1050	0.09	854.64	0.59	0.99	1.03
		MHSA 23	MHSA 24						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	77.3	1050	0.15	1103.33	0.46	1.27	1.25
		MHSA 24	MHSA 25						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	45.5	1050	0.09	854.64	0.59	0.99	1.03
		MHSA 25	MHSA 26						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	35.9	1050	0.09	854.64	0.59	0.99	1.03
		MHSA 26	MHSA 27						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	83.1	1050	0.12	986.85	0.52	1.14	1.14
		MHSA 27	MHSA 28						277.78	30024	2.18	212.26		225.45		27.77		4.57	119.33	0.00	535.57	176.74	508.33	74.3	1050	0.04	569.76	0.89	0.66	0.74
		MHSA 28	MHSA 29	1.54				249	279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	1.54	537.11	177.25	510.32	60.7	1050	0.08	805.76	0.63	0.93	0.98
		MHSA 29	MHSA 30						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	99.8	1050	0.10	900.87	0.57	1.04	1.07
		MHSA 30	MHSA 31						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	42.6	1050	0.27	1480.28	0.34	1.71	1.55
		MHSA 31	MHSA 32						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	111.3	1050	0.09	854.64	0.60	0.99	1.03
		MHSA 32	MHSA 33						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	118.7	1050	0.09	854.64	0.60	0.99	1.03
		MHSA 33	MHSA 34						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	119.7	1050	0.09	854.64	0.60	0.99	1.03
		MHSA 34	MHSA 35						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	86.2	1050	0.07	753.72	0.68	0.87	0.93
		MHSA 35	MHSA 36						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	58.9	1050	0.05	637.01	0.80	0.74	0.82
		MHSA 36	MHSA 37						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	110.8	1050	0.11	944.84	0.54	1.09	1.11
		MHSA 37	MHSA 38						279.32	30273	2.18	213.74		225.45		27.77		4.57	119.33	0.00	537.11	177.25	510.32	72.3	1050	0.15	1103.33	0.46	1.27	1.25
	NODE 70	MHSA 38	MHSA 39	53.68				5311	333.00	35584	2.12	244.93		225.45		27.77		4.57	119.33	53.68	590.79	194.96	559.22	87.5	1050	0.10	900.87	0.62	1.04	1.10
To SOUTH NEPEAN COLLECTOR PHASE 1									333.00	35584				225.45		27.77		4.57			590.79									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00		
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7		
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4		

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS CONSERVANCY
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023 — Sheet No. 2 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION								COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
800 CEDARVIEW																													
800 CEDARVIEW	101		49.50				4269	49.50	4269			0.37	0.37		0.00	4.93	4.93		54.80	54.80									
To Strandherd Drive, Pipe 101 - SA 23								49.50	4269				0.37		0.00		4.93			54.80									
CEDARVIEW EMPLOYMENT LANDS																													
CEDARVIEW EMPLOYMENT LANDS	101		6.30				1038	6.30	1038			0.09	0.09		0.00		0.00		6.39	6.39									
To Strandherd Drive, Pipe 101 - SA 23								6.30	1038				0.09		0.00		0.00			6.39									
SYSTEMHOUSE STREET																													
Contribution From Citigate Drive, Pipe 211 - 213												35.83	35.83						35.83	35.83									
	213	401						0.00	0			0.07	35.90		0.00		0.00	17.45	0.07	35.90	11.85	29.30	26.4	300	0.25	50.44	0.58	0.71	0.74
	401	403						0.00	0			0.21	36.11		0.00		0.00	17.55	0.21	36.11	11.92	29.47	87.7	300	0.25	50.44	0.58	0.71	0.74
	403	405						0.00	0			0.29	36.39		0.00		0.00	17.69	0.29	36.39	12.01	29.70	118.4	300	0.25	50.44	0.59	0.71	0.74
								0.00	0			2.29	38.69		0.00		0.00	18.81	2.29	38.69	12.77	31.57							
	405	407						0.00	0			0.20	38.88		0.00		0.00	18.90	0.20	38.88	12.83	31.73	81.2	375	0.14	68.44	0.46	0.62	0.61
								0.00	0			11.95	50.83		0.00		0.00	24.71	11.95	50.83	16.77	41.48							
								0.00	0			5.28	56.11		0.00		0.00	27.27	5.28	56.11	18.51	45.79							
	407	409						0.00	0			0.30	56.40		0.00		0.00	27.42	0.30	56.40	18.61	46.03	115.8	375	0.25	91.46	0.50	0.83	0.83
	409	101						0.00	0			0.16	56.57		0.00		0.00	27.50	0.16	56.57	18.67	46.16	53.5	375	0.25	91.46	0.50	0.83	0.83
To STRANDHERD DRIVE, Pipe 101 - SA 23								0.00	0				56.57		0.00		0.00			56.57									
STRANDHERD DRIVE - SOUTH NEPEAN COLLECTOR (PHASE 3)																													
Contribution From 800 CEDARVIEW								49.50	4269				0.37		0.00		4.93		54.80	54.80									
Contribution From CEDARVIEW EMPLOYMENT LANDS								6.30	1038				0.09		0.00		0.00		6.39	6.39									
Contribution From Systemhouse Street, Pipe 409 - 101								0.00	0				56.57		0.00		0.00		0.00	56.57									
	101	103						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	110.1	525	0.11	148.80	0.77	0.69	0.76
	103	105						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	120.0	525	0.10	141.88	0.81	0.66	0.73
	105	107						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	120.0	525	0.12	155.42	0.74	0.72	0.79
	107	SA 23						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	119.6	525	0.09	134.60	0.86	0.62	0.70
NODE 130	SA 23	SA 22						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	54.9	600	0.45	429.70	0.27	1.52	1.28
NODE 120	SA 22	SA 21	105.84				10974	161.64	16281	2.39	126.31	89.70	146.72	11.20	11.20		4.93	75.75	206.74	324.49	107.08	309.14	121.8	750	0.12	402.33	0.77	0.91	1.00
	SA 21	SA 20						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	90.6	750	0.12	402.33	0.77	0.91	1.00
	SA 20	SA 19						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	90.0	750	0.12	402.33	0.77	0.91	1.00
	SA 19	SA 18						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	66.8	750	0.11	385.20	0.80	0.87	0.97
	SA 18	SA 17						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	76.9	750	0.12	402.33	0.77	0.91	1.00
	SA 17	SA 16						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	68.7	750	0.12	402.33	0.77	0.91	1.00
NODE 110	SA 16	SA 15						161.64	16281	2.39	126.31	17.72	164.44		11.20		4.93	84.36	17.72	342.21	112.93	323.60	84.1	750	0.12	402.33	0.80	0.91	1.01
	SA 15	SA 14						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	59.7	750	0.13	418.75	0.77	0.95	1.04
	SA 14	SA 13						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	56.6	750	0.12	402.33	0.80	0.91	1.01
	SA 13	SA 12						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	144.6	750	0.10	367.27	0.88	0.83	0.94
	SA 12	SA 11						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	150.0	750	0.10	367.27	0.88	0.83	0.94
NODE 100	SA 11	SA 10						161.64	16281	2.39	126.31	15.18	179.62	6.05	17.25		4.93	93.70	21.23	363.44	119.94	339.95	46.4	750	0.10	367.27	0.93	0.83	0.94
	SA 10	SA 9						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	117.0	750	0.10	367.27	0.93	0.83	0.94
	SA 9	SA 8						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	79.7	750	0.10	367.27	0.93	0.83	0.94
	SA 8	SA 7						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	69.3	750	0.10	367.27	0.93	0.83	0.94
	SA 7	SA 6						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	91.0	750	0.10	367.27	0.93	0.83	0.94
	SA 6	SA 5						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	77.1	750	0.10	367.27	0.93	0.83	0.94
	SA 5	SA 4						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	78.9	750	0.10	367.27	0.93	0.83	0.94
	SA 4	SA 3						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	80.5	750	0.10	367.27	0.93	0.83	0.94
	SA 3	SA 2						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	150.0	750	0.10	367.27	0.93	0.83	0.94
	SA 2	SA 1						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	100.6	750	0.10	367.27	0.93	0.83	0.94
	SA 1	EX 80						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	24.5	750	0.10	367.27	0.93	0.83	0.94
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 1 - MHSA 2								161.64	16281				179.62		17.25		4.93			363.44									
CONSERVANCY																													
CONSERVANCY	MHSA 8		88.28				8123	88.28	8123			4.21	4.21		0.00	4.57	4.57		97.06	97.06									
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 8 - MHSA 9								88.28	8123				4.21		0.00		4.57			97.06									

*NOTE: Conservancy info derived from DSEL job# 20-1180: 2023-04-18_Rev11 design sheet.

13.7Ha of commercial area indicated in latest Conservancy Sanitary Design Sheet has been subtracted as it has already been accounted for in the Novatech SNC sewer drainage area.

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00		
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7		
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4		

Designed: BNC

Checked: SLM

Dwg. Reference: 02

PROJECT: **SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS**
CONSERVANCY + CEDARVIEW LANDS - OPTION 1

LOCATION: **City of Ottawa**

File Ref: 16-746 | Date: **23 Aug 2023** | Sheet No. 1 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SOUTH NEPEAN COLLECTOR (PHASE 2)																													
Contribution From Strandherd Drive - SOUTH NEPEAN COLLECTOR PHASE 3, Pipe SA 1 - EX 80									161.64	16281				179.62		17.25		4.93		0.00	363.44									
	NODE 90	MHSA 1	MHSA 2	16.43				1890	178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	16.43	379.87	125.36	356.97	58.4	900	0.12	654.22	0.55	1.03	1.05
		MHSA 2	MHSA 3						178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	47.7	900	0.08	534.17	0.67	0.84	0.90
		MHSA 3	MHSA 4						178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	76.2	900	0.06	462.61	0.77	0.73	0.80
		MHSA 4	MHSA 5						178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	32.3	900	0.14	706.64	0.51	1.11	1.11
		MHSA 5	MHSA 6						178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	42.6	900	0.09	566.58	0.63	0.89	0.94
		MHSA 6	MHSA 7						178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	74.1	900	0.11	626.37	0.57	0.98	1.02
		MHSA 7	MHSA 8						178.07	18171	2.36	138.71		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	26.0	900	0.12	654.22	0.55	1.03	1.05
Contribution From CONSERVANCY									88.28	8123				4.21		0.00		4.57		0.00	97.06									
		MHSA 8	MHSA 9						266.35	26294	2.23	189.77		183.83		17.25		4.57	95.69	0.00	476.93	157.39	442.85	85.8	900	0.08	534.17	0.83	0.84	0.94
		MHSA 9	MHSA 10						266.35	26294	2.23	189.77		183.83		17.25		4.57	95.69	0.00	476.93	157.39	442.85	70.8	900	0.05	422.30	1.05	0.66	0.75
		MHSA 10	MHSA 11						266.35	26294	2.23	189.77		183.83		17.25		4.57	95.69	0.00	476.93	157.39	442.85	70.8	900	0.07	499.67	0.89	0.79	0.89
		MHSA 11	MHSA 12	3.27				311	269.62	26605	2.22	191.67		183.83		17.25		4.57	95.69	3.27	480.20	158.47	445.83	78.2	900	0.11	626.37	0.71	0.98	1.07
		MHSA 12	MHSA 13	1.01				96	270.63	26702	2.22	192.25		183.83		17.25		4.57	95.69	1.01	481.21	158.80	446.74	74.4	900	0.13	680.94	0.66	1.07	1.14
		MHSA 13	MHSA 14	8.66				824	279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	8.66	489.87	161.66	454.61	81.3	900	0.11	626.37	0.73	0.98	1.07
		MHSA 14	MHSA 15						279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.61	25.9	900	0.07	499.67	0.91	0.79	0.89
		MHSA 15	MHSA 16						279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.61	34.5	900	0.08	534.17	0.85	0.84	0.94
		MHSA 16	MHSA 17						279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.61	86.9	900	0.13	680.94	0.67	1.07	1.14
		MHSA 17	MHSA 18						279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.61	34.6	900	0.51	1348.72	0.34	2.12	1.91
		MHSA 18	MHSA 19						279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.61	68.7	900	0.08	534.17	0.85	0.84	0.94
		MHSA 19	MHSA 20						279.29	27526	2.21	197.26		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.61	63.1	900	0.08	534.17	0.85	0.84	0.94
	NODE 80	MHSA 20	MHSA 21	54.29				7805	333.58	35331	2.13	243.46	42.07	225.90	10.52	27.77		4.57	119.55	106.88	596.75	196.93	559.94	18.1	1050	0.36	1709.28	0.33	1.97	1.76
		MHSA 21	MHSA 22						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	82.4	1050	0.10	900.87	0.62	1.04	1.10
		MHSA 22	MHSA 23						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	85.0	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 23	MHSA 24						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	77.3	1050	0.15	1103.33	0.51	1.27	1.27
		MHSA 24	MHSA 25						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	45.5	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 25	MHSA 26						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	35.9	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 26	MHSA 27						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	83.1	1050	0.12	986.85	0.57	1.14	1.17
		MHSA 27	MHSA 28						333.58	35331	2.13	243.46		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.94	74.3	1050	0.04	569.76	0.98	0.66	0.75
		MHSA 28	MHSA 29	1.54				249	335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	1.54	598.29	197.44	561.89	60.7	1050	0.08	805.76	0.70	0.93	1.00
		MHSA 29	MHSA 30						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	99.8	1050	0.10	900.87	0.62	1.04	1.10
		MHSA 30	MHSA 31						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	42.6	1050	0.27	1480.28	0.38	1.71	1.59
		MHSA 31	MHSA 32						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	111.3	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 32	MHSA 33						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	118.7	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 33	MHSA 34						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	119.7	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 34	MHSA 35						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	86.2	1050	0.07	753.72	0.75	0.87	0.95
		MHSA 35	MHSA 36						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	58.9	1050	0.05	637.01	0.88	0.74	0.83
		MHSA 36	MHSA 37						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	110.8	1050	0.11	944.84	0.59	1.09	1.14
		MHSA 37	MHSA 38						335.12	35580	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	72.3	1050	0.15	1103.33	0.51	1.27	1.28
	NODE 70	MHSA 38	MHSA 39	53.68				5311	388.80	40891	2.08	275.30		225.90		27.77		4.57	119.55	53.68	651.97	215.15	610.00	87.5	1050	0.10	900.87	0.68	1.04	1.12
To SOUTH NEPEAN COLLECTOR PHASE 1									388.80	40891				225.90		27.77		4.57			651.97									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	
Average Daily Flow =	280	l/p/day			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	
Max Res. Peak Factor =	4.00				
Commercial/Park Peak Factor =	1.50				
Institutional =	0.32	l/s/Ha			

Institutional Peak Factor =	1.00			
Industrial Peak Factor =	as per MOE Graph			
Extraneous Flow =	0.330	L/s/ha		
Minimum Velocity =	0.600	m/s		
Manning's n =	(Conc) 0.013	(Pvc) 0.013		
Townhouse coeff=	2.7			
Single house coeff=	3.4			

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS CONSERVANCY + CEDARVIEW LANDS - OPTION 1
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023
			Sheet No. 2 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION								COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
800 CEDARVIEW																													
800 CEDARVIEW	101		49.50				4269	49.50	4269			0.37	0.37		0.00	4.93	4.93		54.80	54.80									
To Strandherd Drive, Pipe 101 - SA 23								49.50	4269				0.37		0.00		4.93			54.80									
CEDARVIEW EMPLOYMENT LANDS																													
CEDARVIEW EMPLOYMENT LANDS	101		6.30				1038	6.30	1038			0.09	0.09		0.00		0.00		6.39	6.39									
To Strandherd Drive, Pipe 101 - SA 23								6.30	1038				0.09		0.00		0.00			6.39									
SYSTEMHOUSE STREET																													
Contribution From 800 CEDARVIEW								49.50	4269				0.37		0.00		4.93		54.80	54.80									
Contribution From CEDARVIEW EMPLOYMENT LANDS								6.30	1038				0.09		0.00		0.00		6.39	6.39									
Contribution From Citigate Drive, Pipe 211 - 213												35.83	35.83						35.83	35.83									
	213	401						55.80	5307	2.78	47.76	0.07	36.36		0.00		4.93	18.47	0.07	97.09	32.04	98.26	26.4	450	0.25	148.72	0.66	0.94	1.00
	401	403						55.80	5307	2.78	47.76	0.21	36.56		0.00		4.93	18.57	0.21	97.29	32.11	98.43	87.7	450	0.25	148.72	0.66	0.94	1.00
	403	405						55.80	5307	2.78	47.76	0.29	36.85		0.00		4.93	18.71	0.29	97.58	32.20	98.67	118.4	450	0.25	148.72	0.66	0.94	1.00
								55.80	5307	2.78	47.76	2.29	39.14		0.00		4.93	19.82	2.29	99.87	32.96	100.54							
	405	407						55.80	5307	2.78	47.76	0.20	39.34		0.00		4.93	19.92	0.20	100.07	33.02	100.70	81.2	450	0.14	111.29	0.90	0.70	0.79
								55.80	5307	2.78	47.76	11.95	51.29		0.00		4.93	25.73	11.95	112.02	36.97	110.45							
								55.80	5307	2.78	47.76	5.28	56.56		0.00		4.93	28.29	5.28	117.29	38.71	114.75							
	407	409						55.80	5307	2.78	47.76	0.30	56.86		0.00		4.93	28.44	0.30	117.59	38.81	115.00	115.8	450	0.25	148.72	0.77	0.94	1.03
	409	101						55.80	5307	2.78	47.76	0.16	57.02		0.00		4.93	28.52	0.16	117.75	38.86	115.13	53.5	450	0.25	148.72	0.77	0.94	1.03
To STRANDHERD DRIVE, Pipe 101 - SA 23								55.80	5307				57.02		0.00		4.93			117.75									
STRANDHERD DRIVE - SOUTH NEPEAN COLLECTOR (PHASE 3)																													
Contribution From Systemhouse Street, Pipe 409 - 101								55.80	5307				57.02		0.00		4.93		0.00	117.75									
	101	103						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	110.1	525	0.11	148.80	0.77	0.69	0.76
	103	105						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	120.0	525	0.10	141.88	0.81	0.66	0.73
	105	107						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	120.0	525	0.12	155.42	0.74	0.72	0.79
	107	SA 23						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	119.6	525	0.09	134.60	0.86	0.62	0.70
	SA 23	SA 22						55.80	5307	2.78	47.76		57.02		0.00		4.93	28.52	0.00	117.75	38.86	115.13	54.9	600	0.45	429.70	0.27	1.52	1.28
NODE 120	SA 22	SA 21	105.84				10974	161.64	16281	2.39	126.31	89.70	146.72	11.20	11.20		4.93	75.75	206.74	324.49	107.08	309.14	121.8	750	0.12	402.33	0.77	0.91	1.00
	SA 21	SA 20						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	90.6	750	0.12	402.33	0.77	0.91	1.00
	SA 20	SA 19						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	90.0	750	0.12	402.33	0.77	0.91	1.00
	SA 19	SA 18						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	66.8	750	0.11	385.20	0.80	0.87	0.97
	SA 18	SA 17						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	76.9	750	0.12	402.33	0.77	0.91	1.00
	SA 17	SA 16						161.64	16281	2.39	126.31		146.72		11.20		4.93	75.75	0.00	324.49	107.08	309.14	68.7	750	0.12	402.33	0.77	0.91	1.00
NODE 110	SA 16	SA 15						161.64	16281	2.39	126.31	17.72	164.44		11.20		4.93	84.36	17.72	342.21	112.93	323.60	84.1	750	0.12	402.33	0.80	0.91	1.01
	SA 15	SA 14						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	59.7	750	0.13	418.75	0.77	0.95	1.04
	SA 14	SA 13						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	56.6	750	0.12	402.33	0.80	0.91	1.01
	SA 13	SA 12						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	144.6	750	0.10	367.27	0.88	0.83	0.94
	SA 12	SA 11						161.64	16281	2.39	126.31		164.44		11.20		4.93	84.36	0.00	342.21	112.93	323.60	150.0	750	0.10	367.27	0.88	0.83	0.94
NODE 100	SA 11	SA 10						161.64	16281	2.39	126.31	15.18	179.62	6.05	17.25		4.93	93.70	21.23	363.44	119.94	339.95	46.4	750	0.10	367.27	0.93	0.83	0.94
	SA 10	SA 9						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	117.0	750	0.10	367.27	0.93	0.83	0.94
	SA 9	SA 8						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	79.7	750	0.10	367.27	0.93	0.83	0.94
	SA 8	SA 7						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	69.3	750	0.10	367.27	0.93	0.83	0.94
	SA 7	SA 6						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	91.0	750	0.10	367.27	0.93	0.83	0.94
	SA 6	SA 5						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	77.1	750	0.10	367.27	0.93	0.83	0.94
	SA 5	SA 4						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	78.9	750	0.10	367.27	0.93	0.83	0.94
	SA 4	SA 3						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	80.5	750	0.10	367.27	0.93	0.83	0.94
	SA 3	SA 2						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	150.0	750	0.10	367.27	0.93	0.83	0.94
	SA 2	SA 1						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	100.6	750	0.10	367.27	0.93	0.83	0.94
	SA 1	EX 80						161.64	16281	2.39	126.31		179.62		17.25		4.93	93.70	0.00	363.44	119.94	339.95	24.5	750	0.10	367.27	0.93	0.83	0.94
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 1 - MHSA 2								161.64	16281				179.62		17.25		4.93			363.44									
CONSERVANCY																													
CONSERVANCY	MHSA 8		88.28				8123	88.28	8123			4.21	4.21		0.00	4.57	4.57		97.06	97.06									
To SOUTH NEPEAN COLLECTOR PHASE 2, Pipe MHSA 8 - MHSA 9								88.28	8123				4.21		0.00		4.57			97.06									

*NOTE: Conservancy info derived from DSEL job# 20-1180: 2023-04-18_Rev11 design sheet.

13.7Ha of commercial area indicated in latest Conservancy Sanitary Design Sheet has been subtracted as it has already been accounted for in the Novatech SNC sewer drainage area.

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00	
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed: BNC

Checked: SLM

Dwg. Reference: 02

PROJECT: **SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS CONSERVANCY + CEDARVIEW LANDS - OPTION 2**

LOCATION: **City of Ottawa**

File Ref: 16-746 | Date: **23 Aug 2023** | Sheet No. 1 of 2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SOUTH NEPEAN COLLECTOR (PHASE 2)																													
Contribution From Strandherd Drive - SOUTH NEPEAN COLLECTOR PHASE 3, Pipe SA 1 - EX 80									161.64	16281				179.62		17.25		4.93		0.00	363.44									
	NODE 90	MHSA 1	MHSA 2	16.43				1889	178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	16.43	379.87	125.36	356.97	58.4	900	0.12	654.22	0.55	1.03	1.05
		MHSA 2	MHSA 3						178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	47.7	900	0.08	534.17	0.67	0.84	0.90
		MHSA 3	MHSA 4						178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	76.2	900	0.06	462.61	0.77	0.73	0.80
		MHSA 4	MHSA 5						178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	32.3	900	0.14	706.64	0.51	1.11	1.11
		MHSA 5	MHSA 6						178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	42.6	900	0.09	566.58	0.63	0.89	0.94
		MHSA 6	MHSA 7						178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	74.1	900	0.11	626.37	0.57	0.98	1.02
		MHSA 7	MHSA 8						178.07	18170	2.36	138.70		179.62		17.25		0.00	92.91	0.00	379.87	125.36	356.97	26.0	900	0.12	654.22	0.55	1.03	1.05
Contribution From CONSERVANCY									88.28	8123				4.21		0.00		4.57		0.00	97.06									
		MHSA 8	MHSA 9						266.35	26293	2.23	189.76		183.83		17.25		4.57	95.69	0.00	476.93	157.39	442.84	85.8	900	0.08	534.17	0.83	0.84	0.94
		MHSA 9	MHSA 10						266.35	26293	2.23	189.76		183.83		17.25		4.57	95.69	0.00	476.93	157.39	442.84	70.8	900	0.05	422.30	1.05	0.66	0.75
		MHSA 10	MHSA 11						266.35	26293	2.23	189.76		183.83		17.25		4.57	95.69	0.00	476.93	157.39	442.84	70.8	900	0.07	499.67	0.89	0.79	0.89
		MHSA 11	MHSA 12	3.27				311	269.62	26604	2.22	191.66		183.83		17.25		4.57	95.69	3.27	480.20	158.47	445.82	78.2	900	0.11	626.37	0.71	0.98	1.07
		MHSA 12	MHSA 13	1.01				96	270.63	26701	2.22	192.25		183.83		17.25		4.57	95.69	1.01	481.21	158.80	446.74	74.4	900	0.13	680.94	0.66	1.07	1.14
		MHSA 13	MHSA 14	8.66				824	279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	8.66	489.87	161.66	454.60	81.3	900	0.11	626.37	0.73	0.98	1.07
		MHSA 14	MHSA 15						279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.60	25.9	900	0.07	499.67	0.91	0.79	0.89
		MHSA 15	MHSA 16						279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.60	34.5	900	0.08	534.17	0.85	0.84	0.94
		MHSA 16	MHSA 17						279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.60	86.9	900	0.13	680.94	0.67	1.07	1.14
		MHSA 17	MHSA 18						279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.60	34.6	900	0.51	1348.72	0.34	2.12	1.91
		MHSA 18	MHSA 19						279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.60	68.7	900	0.08	534.17	0.85	0.84	0.94
		MHSA 19	MHSA 20						279.29	27525	2.21	197.25		183.83		17.25		4.57	95.69	0.00	489.87	161.66	454.60	63.1	900	0.08	534.17	0.85	0.84	0.94
	NODE 80	MHSA 20	MHSA 21	54.29				7805	333.58	35330	2.13	243.45	42.07	225.90	10.52	27.77		4.57	119.55	106.88	596.75	196.93	559.93	18.1	1050	0.36	1709.28	0.33	1.97	1.76
		MHSA 21	MHSA 22						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	82.4	1050	0.10	900.87	0.62	1.04	1.10
		MHSA 22	MHSA 23						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	85.0	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 23	MHSA 24						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	77.3	1050	0.15	1103.33	0.51	1.27	1.27
		MHSA 24	MHSA 25						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	45.5	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 25	MHSA 26						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	35.9	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 26	MHSA 27						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	83.1	1050	0.12	986.85	0.57	1.14	1.17
		MHSA 27	MHSA 28						333.58	35330	2.13	243.45		225.90		27.77		4.57	119.55	0.00	596.75	196.93	559.93	74.3	1050	0.04	569.76	0.98	0.66	0.75
		MHSA 28	MHSA 29	1.54				249	335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	1.54	598.29	197.44	561.89	60.7	1050	0.08	805.76	0.70	0.93	1.00
		MHSA 29	MHSA 30						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	99.8	1050	0.10	900.87	0.62	1.04	1.10
		MHSA 30	MHSA 31						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	42.6	1050	0.27	1480.28	0.38	1.71	1.59
		MHSA 31	MHSA 32						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	111.3	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 32	MHSA 33						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	118.7	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 33	MHSA 34						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	119.7	1050	0.09	854.64	0.66	0.99	1.05
		MHSA 34	MHSA 35						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	86.2	1050	0.07	753.72	0.75	0.87	0.95
		MHSA 35	MHSA 36						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	58.9	1050	0.05	637.01	0.88	0.74	0.83
		MHSA 36	MHSA 37						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	110.8	1050	0.11	944.84	0.59	1.09	1.14
		MHSA 37	MHSA 38						335.12	35579	2.12	244.90		225.90		27.77		4.57	119.55	0.00	598.29	197.44	561.89	72.3	1050	0.15	1103.33	0.51	1.27	1.28
	NODE 70	MHSA 38	MHSA 39	53.68				5311	388.80	40890	2.08	275.30		225.90		27.77		4.57	119.55	53.68	651.97	215.15	610.00	87.5	1050	0.10	900.87	0.68	1.04	1.12
To SOUTH NEPEAN COLLECTOR PHASE 1									388.80	40890				225.90		27.77		4.57			651.97									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Institutional Peak Factor =	1.00		
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Park Peak Factor =	1.50				Townhouse coeff=	2.7		
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4		

Designed:	BNC	PROJECT:	SOUTH NEPEAN COLLECTOR SANITARY ANALYSIS CONSERVANCY + CEDARVIEW LANDS - OPTION 2
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	02	File Ref: 16-746	Date: 23 Aug 2023 — Sheet No. 2 of 2

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October 06, 2023 Project Number: P386

David Schaeffer Engineering Ltd
120 Iber Road, Unit 103
Ottawa, Ontario
K2S 1E9

Attention: **Braden Kaminski, P.Eng**

Subject: **Mattamy Cedarview Development - Sanitary HGL Analysis**

Introduction

The Mattamy Cedarview Development is located in Barrhaven, within the City of Ottawa, north of O'Keefe Crescent and east of Highway 416. The proposed developable area will be approximately 54.43 ha and will comprise residential housing, mixed-use condo blocks, parks and a SWM pond. The proposed development's sanitary system will connect to the existing sanitary network for Barrhaven. As requested by your office, the following outlines the existing sanitary system hydraulic grade line (HGL) as well as under proposed conditions once contributions from the Cedarview development are added. As such the following memo outlines the approach taken in assessing the existing and proposed sanitary HGL and summarises the findings of this analysis.

Background Data

The existing sanitary pipe data and flow contributions were taken from the following data sources:

- Existing Sanitary Flow Contributions - "Strandherd Drive Widening Project South Nepean Collector Phase 3: Sanitary Flow Calculations", Novatech, May 30, 2019
- Sanitary Sewer Network Details - As-built drawings provided by the City of Ottawa

Complete (both existing and proposed) sanitary design sheets have been completed by DSEL and have been provided in Attachment A. Note that in both options, the wastewater flows from Barrhaven Conservancy and a potential future employment land south of the subject property have been considered, refer to Attachment C in DSEL's Servicing Memo for this site.

Analysis Approach

A hydraulic grade line analysis for the existing sanitary system was completed using PCSWMM modelling software. The existing sanity sewer infrastructure data was extracted from DSEL's compiled sanitary network spreadsheets and incorporated into a PCSWMM model, and the incremental flows derived by DSEL's calculations (Attachment A) were then applied to each Maintenance Hole (MH) in the model as steady flows (using the baseflow option). Exit losses were applied to all sanitary sewer pipes in the system based on the angle of the downstream connection. **Figure 1** provides an overview of the model. Note that the Barrhaven sanitary network is quite an expansive system as such this analysis is limited to 6 km of network spanning from CitiGate Drive (upstream extent) to Longfield Drive (downstream extent). At the downstream extent of the model, a normal outfall has been assumed. The same analysis was completed again with the additional flow contributions from the Cedarview development added to the upstream extent of the model at MH 101 on Stranderherd Drive at the intersection with Systemhouse Street.

Results

The maximum HGL obtained at each MH has been extracted from the model, with the results from this analysis under existing and proposed conditions provided in **Tables 1 & 2**, respectively. From this analysis under existing conditions, no pipes in this network are surcharged with a minimum freeboard of **23cm** at **MH SA_9**, and an average freeboard of **40cm**. **Figure 2** presents the maximum HGL along the network under this condition.

Under proposed conditions no pipes in this network are surcharged with a minimum freeboard of **12cm** at **MH SA_11**, and an average freeboard of **30cm**. **Figure 3** presents the maximum HGL along the network under this condition. As no pipes will be surcharged under the proposed conditions it can be concluded that the proposed sanitary sewer infrastructure is sufficiently sized, to safely convey the additional sanitary flows from Cedarview development through the Barrhaven sanitary sewer network.

Conclusion

A sanitary HGL analysis for the Barrhaven sanitary network was completed using PCSWMM based on sanitary sewer as-built information and flow details provided by DSEL. From this analysis, it was found that under both existing and proposed conditions the sanitary sewer is not surcharged as such it can be concluded that the existing sanitary infrastructure is sufficiently sized, to safely convey sanitary flows from Cedarview development through the Barrhaven sanitary sewer network.

Yours truly,
J.F Sabourin and Associates Inc.

Jonathon Burnett, B.Eng, P.Eng
Water Resources Engineer

cc: J.F Sabourin, M.Eng, P.Eng
Director of Water Resources Projects

Figures

Figure 1: Model Overview
Figure 2 Existing Conditions HGL Profile
Figure 3 Proposed Conditions HGL profile

Tables

Table 1: Existing Conditions - Barrhaven Sanitary Analysis
Table 2: Proposed Conditions - Barrhaven Sanitary Analysis

Attachments

Attachment A: Sanitary Design Sheets (DSEL)

N

Legend

- Manholes
- Conduits

SCALE: 1:15000

0 200 400 600 800 m

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

DSEL

Mattamy Cedarview
-
Sanitary Capacity Analysis

Figure 1: Model Overview

PROJECT	386(02)-19
DRAWN	ON
DATE	October 2023

C:\Users\JonathonBurnett\J.F. Sabourin and Associates Inc\JFSA-OTTAWA-SERVER - Documents\PROJ\386(02)-19\202309 FSR\Design\GIS\20231005-Memo Figures

Figure 2 - Existing Conditions HGL Profile

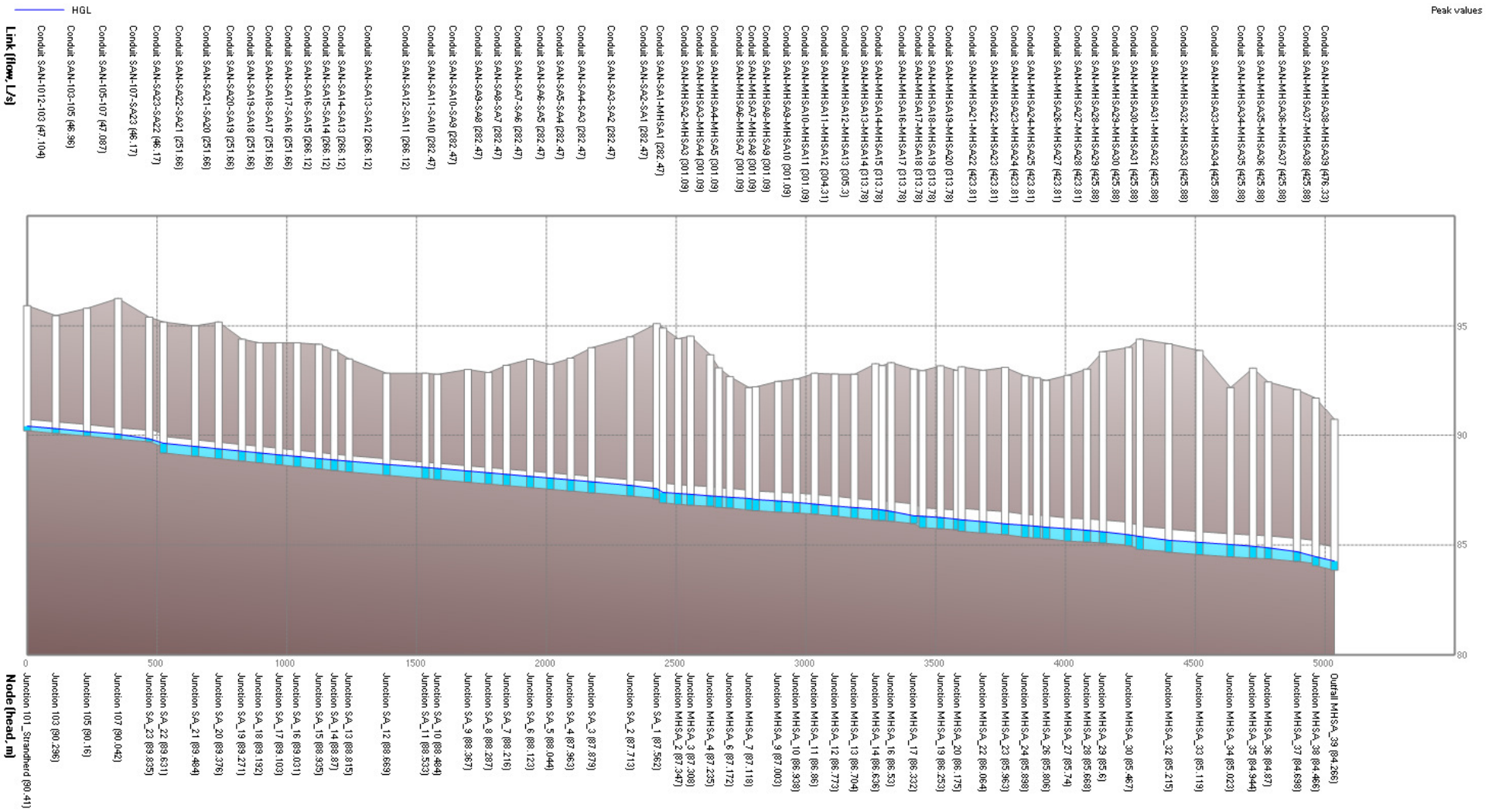


Figure 3 - Proposed Conditions HGL Profile

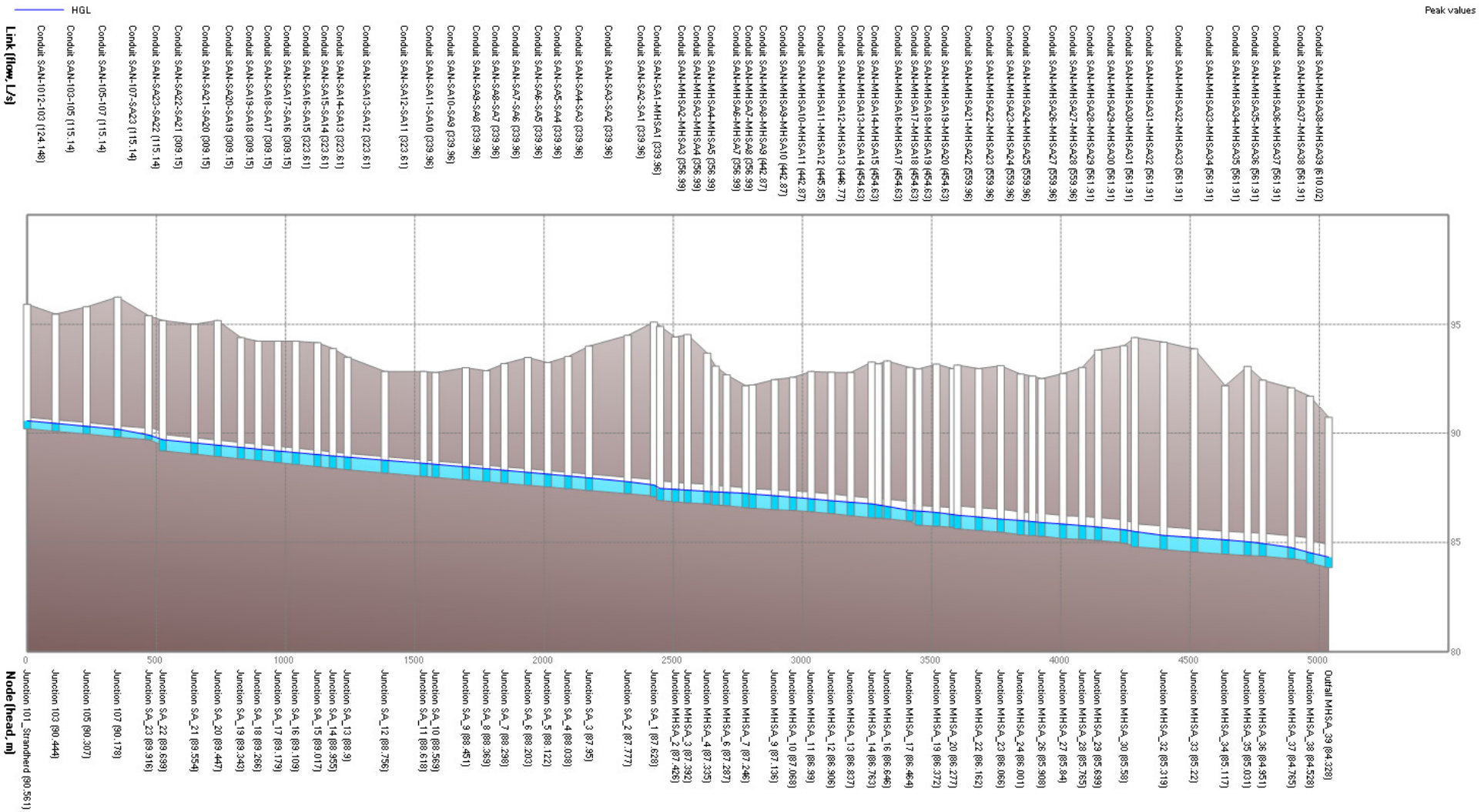


Table 1 - Existing Conditions - Barrhaven Sanitary Analysis

US MH	DS MH	Diameter (m)	Upstream Obvert (m)	Downstream Obvert (m)	Total Flows (L/S)	HGL		Freeboard From Obvert	
						Upstream (m)	Downstream (m)	Upstream (m)	Downstream (m)
01_Strandher	103	0.53	90.73	90.61	46.2	90.41	90.29	0.32	0.31
103	105	0.53	90.61	90.49	46.2	90.29	90.16	0.31	0.33
105	107	0.53	90.49	90.34	46.2	90.16	90.04	0.33	0.30
107	SA_23	0.53	90.34	90.23	46.2	90.04	89.83	0.30	0.40
SA_23	SA_22	0.60	90.30	90.05	46.2	89.83	89.63	0.47	0.42
SA_22	SA_21	0.75	89.94	89.79	251.7	89.63	89.48	0.31	0.31
SA_21	SA_20	0.75	89.79	89.68	251.7	89.48	89.38	0.31	0.30
SA_20	SA_19	0.75	89.68	89.57	251.7	89.38	89.27	0.30	0.30
SA_19	SA_18	0.75	89.57	89.50	251.7	89.27	89.19	0.30	0.31
SA_18	SA_17	0.75	89.50	89.40	251.7	89.19	89.10	0.31	0.30
SA_17	SA_16	0.75	89.40	89.32	251.7	89.10	89.03	0.30	0.28
SA_16	SA_15	0.75	89.32	89.22	266.1	89.03	88.93	0.28	0.28
SA_15	SA_14	0.75	89.22	89.14	266.1	88.93	88.87	0.28	0.27
SA_14	SA_13	0.75	89.14	89.07	266.1	88.87	88.81	0.27	0.26
SA_13	SA_12	0.75	89.07	88.92	266.1	88.81	88.67	0.26	0.25
SA_12	SA_11	0.75	88.92	88.77	266.1	88.67	88.53	0.25	0.24
SA_11	SA_10	0.75	88.77	88.73	282.5	88.53	88.48	0.24	0.24
SA_10	SA_9	0.75	88.73	88.61	282.5	88.48	88.37	0.24	0.23
SA_9	SA_8	0.75	88.61	88.53	282.5	88.37	88.29	0.23	0.23
SA_8	SA_7	0.75	88.53	88.46	282.5	88.29	88.22	0.23	0.23
SA_7	SA_6	0.75	88.46	88.37	282.5	88.22	88.12	0.23	0.24
SA_6	SA_5	0.75	88.37	88.29	282.5	88.12	88.04	0.24	0.24
SA_5	SA_4	0.75	88.29	88.21	282.5	88.04	87.96	0.24	0.25
SA_4	SA_3	0.75	88.21	88.13	282.5	87.96	87.88	0.25	0.25
SA_3	SA_2	0.75	88.13	87.98	282.5	87.88	87.71	0.25	0.27
SA_2	SA_1	0.75	87.98	87.88	282.5	87.71	87.56	0.27	0.31
SA_1	MHSA_1	0.75	87.85	87.82	282.5	87.56	87.39	0.28	0.43
MHSA_1	MHSA_2	0.90	87.82	87.75	301.1	87.39	87.35	0.43	0.40
MHSA_2	MHSA_3	0.90	87.75	87.71	301.1	87.35	87.31	0.40	0.40
MHSA_3	MHSA_4	0.90	87.71	87.66	301.1	87.31	87.24	0.40	0.42
MHSA_4	MHSA_5	0.90	87.66	87.61	301.1	87.24	87.21	0.42	0.40
MHSA_5	MHSA_6	0.90	87.61	87.58	301.1	87.21	87.17	0.40	0.41
MHSA_6	MHSA_7	0.90	87.58	87.49	301.1	87.17	87.12	0.41	0.37
MHSA_7	MHSA_8	0.90	87.49	87.46	301.1	87.12	87.07	0.37	0.39
MHSA_8	MHSA_9	0.90	87.46	87.40	301.1	87.07	87.00	0.39	0.40
MHSA_9	MHSA_10	0.90	87.40	87.36	301.1	87.00	86.94	0.40	0.42
MHSA_10	MHSA_11	0.90	87.36	87.31	301.1	86.94	86.86	0.42	0.45
MHSA_11	MHSA_12	0.90	87.30	87.22	304.3	86.86	86.77	0.44	0.45
MHSA_12	MHSA_13	0.90	87.22	87.12	305.3	86.77	86.70	0.45	0.42
MHSA_13	MHSA_14	0.90	87.12	87.03	313.8	86.70	86.64	0.42	0.39
MHSA_14	MHSA_15	0.90	87.03	87.01	313.8	86.64	86.59	0.39	0.42
MHSA_15	MHSA_16	0.90	87.01	86.98	313.8	86.59	86.53	0.42	0.45
MHSA_16	MHSA_17	0.90	86.98	86.87	313.8	86.53	86.33	0.45	0.54
MHSA_17	MHSA_18	0.90	86.87	86.69	313.8	86.33	86.31	0.54	0.38
MHSA_18	MHSA_19	0.90	86.69	86.64	313.8	86.31	86.25	0.38	0.39
MHSA_19	MHSA_20	0.90	86.64	86.59	313.8	86.25	86.17	0.39	0.42
MHSA_20	MHSA_21	1.05	86.74	86.67	423.8	86.17	86.15	0.57	0.52
MHSA_21	MHSA_22	1.05	86.67	86.59	423.8	86.15	86.06	0.52	0.53
MHSA_22	MHSA_23	1.05	86.59	86.52	423.8	86.06	85.96	0.53	0.56
MHSA_23	MHSA_24	1.05	86.52	86.40	423.8	85.96	85.90	0.56	0.50
MHSA_24	MHSA_25	1.05	86.40	86.36	423.8	85.90	85.85	0.50	0.51

Table 1 - Existing Conditions - Barrhaven Sanitary Analysis

US MH	DS MH	Diameter (m)	Upstream Obvert (m)	Downstream Obvert (m)	Total Flows (L/S)	HGL		Freeboard From Obvert	
						Upstream (m)	Downstream (m)	Upstream (m)	Downstream (m)
MHSA_25	MHSA_26	1.05	86.36	86.33	423.8	85.85	85.81	0.51	0.52
MHSA_26	MHSA_27	1.05	86.33	86.23	423.8	85.81	85.74	0.52	0.49
MHSA_27	MHSA_28	1.05	86.22	86.19	423.8	85.74	85.67	0.48	0.52
MHSA_28	MHSA_29	1.05	86.19	86.14	425.9	85.67	85.60	0.52	0.54
MHSA_29	MHSA_30	1.05	86.14	86.04	425.9	85.60	85.47	0.54	0.57
MHSA_30	MHSA_31	1.05	86.01	85.90	425.9	85.47	85.39	0.54	0.51
MHSA_31	MHSA_32	1.05	85.85	85.75	425.9	85.39	85.22	0.46	0.53
MHSA_32	MHSA_33	1.05	85.72	85.61	425.9	85.22	85.12	0.50	0.49
MHSA_33	MHSA_34	1.05	85.61	85.51	425.9	85.12	85.02	0.49	0.49
MHSA_34	MHSA_35	1.05	85.51	85.45	425.9	85.02	84.94	0.49	0.51
MHSA_35	MHSA_36	1.05	85.45	85.42	425.9	84.94	84.87	0.51	0.55
MHSA_36	MHSA_37	1.05	85.42	85.30	425.9	84.87	84.70	0.55	0.60
MHSA_37	MHSA_38	1.05	85.31	85.20	425.9	84.70	84.47	0.61	0.73
MHSA_38	MHSA_39	1.05	85.10	84.90	476.3	84.47	84.27	0.63	0.63
							Max	**0.63**	**0.73**
							Min	**0.23**	**0.23**
							Average	**0.40**	

Table 2 - Proposed Conditions - Barrhaven Sanitary Analysis

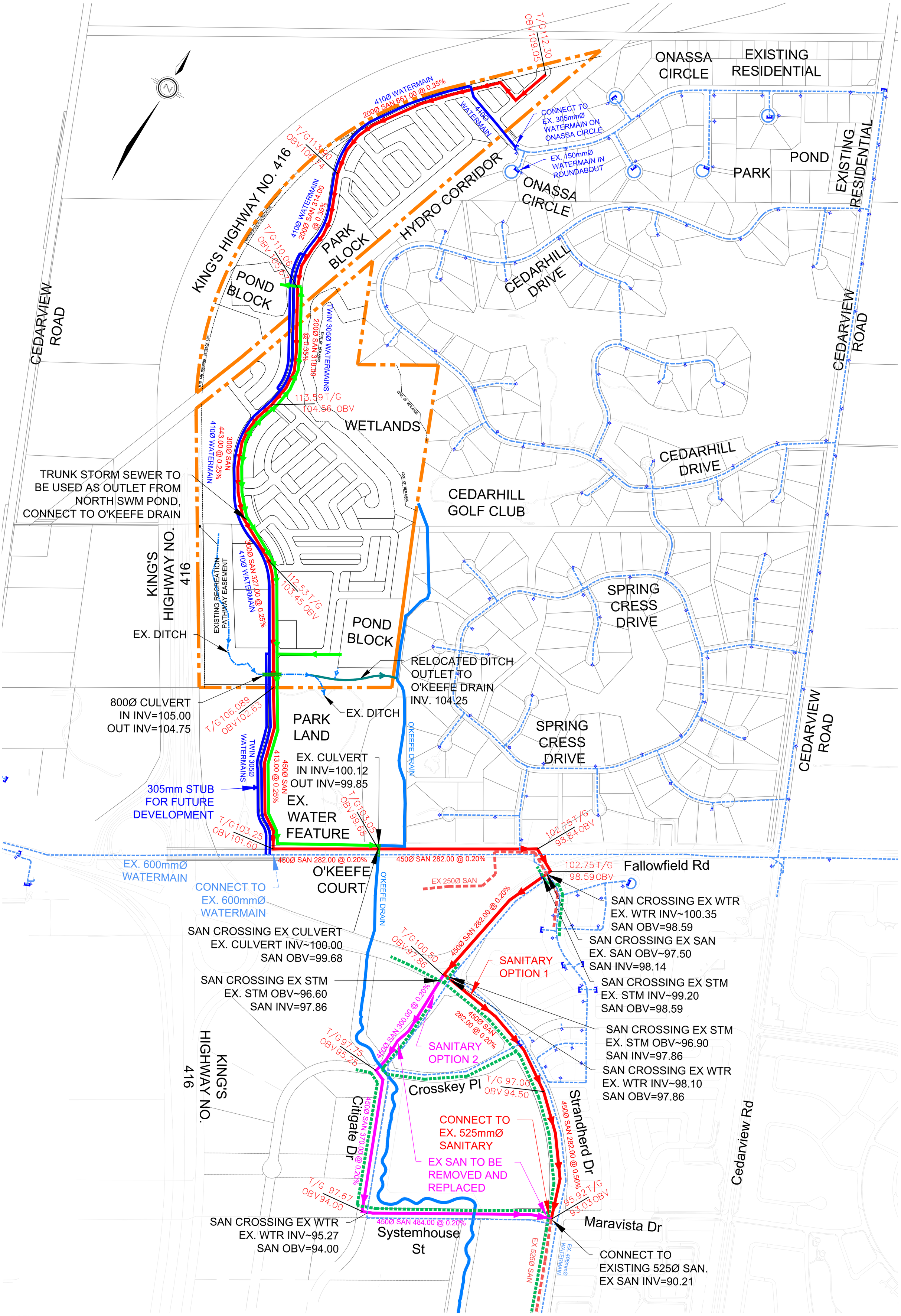
US MH	DS MH	Diameter (m)	Upstream Obvert (m)	Downstream Obvert (m)	Total Flows (L/S)	HGL		Freeboard From Obvert	
						Upstream (m)	Downstream (m)	Upstream (m)	Downstream (m)
01_Strandher	103	0.53	90.73	90.61	115.1	90.56	90.44	0.17	0.17
103	105	0.53	90.61	90.49	115.1	90.44	90.31	0.17	0.17
105	107	0.53	90.49	90.34	115.1	90.31	90.18	0.17	0.16
107	SA_23	0.53	90.34	90.23	115.1	90.18	89.92	0.16	0.31
SA_23	SA_22	0.60	90.30	90.05	115.1	89.92	89.70	0.38	0.35
SA_22	SA_21	0.75	89.94	89.79	309.2	89.70	89.55	0.24	0.24
SA_21	SA_20	0.75	89.79	89.68	309.2	89.55	89.45	0.24	0.23
SA_20	SA_19	0.75	89.68	89.57	309.2	89.45	89.34	0.23	0.23
SA_19	SA_18	0.75	89.57	89.50	309.2	89.34	89.27	0.23	0.23
SA_18	SA_17	0.75	89.50	89.40	309.2	89.27	89.18	0.23	0.22
SA_17	SA_16	0.75	89.40	89.32	309.2	89.18	89.11	0.22	0.20
SA_16	SA_15	0.75	89.32	89.22	323.6	89.11	89.02	0.20	0.20
SA_15	SA_14	0.75	89.22	89.14	323.6	89.02	88.95	0.20	0.19
SA_14	SA_13	0.75	89.14	89.07	323.6	88.95	88.90	0.19	0.17
SA_13	SA_12	0.75	89.07	88.92	323.6	88.90	88.76	0.17	0.16
SA_12	SA_11	0.75	88.92	88.77	323.6	88.76	88.62	0.16	0.15
SA_11	SA_10	0.75	88.77	88.73	340.0	88.62	88.57	0.15	0.16
SA_10	SA_9	0.75	88.73	88.61	340.0	88.57	88.45	0.16	0.16
SA_9	SA_8	0.75	88.61	88.53	340.0	88.45	88.37	0.16	0.16
SA_8	SA_7	0.75	88.53	88.46	340.0	88.37	88.30	0.16	0.16
SA_7	SA_6	0.75	88.46	88.37	340.0	88.30	88.20	0.16	0.16
SA_6	SA_5	0.75	88.37	88.29	340.0	88.20	88.12	0.16	0.16
SA_5	SA_4	0.75	88.29	88.21	340.0	88.12	88.04	0.16	0.16
SA_4	SA_3	0.75	88.21	88.13	340.0	88.04	87.95	0.16	0.17
SA_3	SA_2	0.75	88.13	87.98	340.0	87.95	87.78	0.17	0.19
SA_2	SA_1	0.75	87.98	87.88	340.0	87.78	87.63	0.19	0.25
SA_1	MHSA_1	0.75	87.85	87.82	340.0	87.63	87.47	0.22	0.35
MHSA_1	MHSA_2	0.90	87.82	87.75	357.0	87.47	87.43	0.35	0.32
MHSA_2	MHSA_3	0.90	87.75	87.71	357.0	87.43	87.39	0.32	0.32
MHSA_3	MHSA_4	0.90	87.71	87.66	357.0	87.39	87.33	0.32	0.33
MHSA_4	MHSA_5	0.90	87.66	87.61	357.0	87.33	87.31	0.33	0.30
MHSA_5	MHSA_6	0.90	87.61	87.58	357.0	87.31	87.29	0.30	0.29
MHSA_6	MHSA_7	0.90	87.58	87.49	357.0	87.29	87.25	0.29	0.24
MHSA_7	MHSA_8	0.90	87.49	87.46	357.0	87.25	87.21	0.24	0.25
MHSA_8	MHSA_9	0.90	87.46	87.40	442.9	87.21	87.14	0.25	0.26
MHSA_9	MHSA_10	0.90	87.40	87.36	442.9	87.14	87.07	0.26	0.29
MHSA_10	MHSA_11	0.90	87.36	87.31	442.9	87.07	86.99	0.29	0.32
MHSA_11	MHSA_12	0.90	87.30	87.22	445.9	86.99	86.91	0.31	0.31
MHSA_12	MHSA_13	0.90	87.22	87.12	446.8	86.91	86.84	0.31	0.28
MHSA_13	MHSA_14	0.90	87.12	87.03	454.6	86.84	86.76	0.28	0.27
MHSA_14	MHSA_15	0.90	87.03	87.01	454.6	86.76	86.71	0.27	0.30
MHSA_15	MHSA_16	0.90	87.01	86.98	454.6	86.71	86.65	0.30	0.33
MHSA_16	MHSA_17	0.90	86.98	86.87	454.6	86.65	86.46	0.33	0.41
MHSA_17	MHSA_18	0.90	86.87	86.69	454.6	86.46	86.43	0.41	0.26
MHSA_18	MHSA_19	0.90	86.69	86.64	454.6	86.43	86.37	0.26	0.27
MHSA_19	MHSA_20	0.90	86.64	86.59	454.6	86.37	86.28	0.27	0.31
MHSA_20	MHSA_21	1.05	86.74	86.67	560.0	86.28	86.24	0.46	0.43
MHSA_21	MHSA_22	1.05	86.67	86.59	560.0	86.24	86.16	0.43	0.43
MHSA_22	MHSA_23	1.05	86.59	86.52	560.0	86.16	86.07	0.43	0.45
MHSA_23	MHSA_24	1.05	86.52	86.40	560.0	86.07	86.00	0.45	0.40
MHSA_24	MHSA_25	1.05	86.40	86.36	560.0	86.00	85.95	0.40	0.41
MHSA_25	MHSA_26	1.05	86.36	86.33	560.0	85.95	85.91	0.41	0.42
MHSA_26	MHSA_27	1.05	86.33	86.23	560.0	85.91	85.84	0.42	0.39

Table 2 - Proposed Conditions - Barrhaven Sanitary Analysis

US MH	DS MH	Diameter (m)	Upstream Obvert (m)	Downstream Obvert (m)	Total Flows (L/S)	HGL		Freeboard From Obvert	
						Upstream (m)	Downstream (m)	Upstream (m)	Downstream (m)
MHSA_27	MHSA_28	1.05	86.22	86.19	560.0	85.84	85.77	0.38	0.42
MHSA_28	MHSA_29	1.05	86.19	86.14	561.9	85.77	85.70	0.42	0.44
MHSA_29	MHSA_30	1.05	86.14	86.04	561.9	85.70	85.58	0.44	0.46
MHSA_30	MHSA_31	1.05	86.01	85.90	561.9	85.58	85.50	0.43	0.40
MHSA_31	MHSA_32	1.05	85.85	85.75	561.9	85.50	85.32	0.35	0.43
MHSA_32	MHSA_33	1.05	85.72	85.61	561.9	85.32	85.22	0.40	0.39
MHSA_33	MHSA_34	1.05	85.61	85.51	561.9	85.22	85.12	0.39	0.39
MHSA_34	MHSA_35	1.05	85.51	85.45	561.9	85.12	85.03	0.39	0.42
MHSA_35	MHSA_36	1.05	85.45	85.42	561.9	85.03	84.95	0.42	0.47
MHSA_36	MHSA_37	1.05	85.42	85.30	561.9	84.95	84.77	0.47	0.53
MHSA_37	MHSA_38	1.05	85.31	85.20	561.9	84.77	84.53	0.54	0.67
MHSA_38	MHSA_39	1.05	85.10	84.90	610.0	84.53	84.33	0.57	0.57
							Max	**0.57**	**0.67**
							Min	**0.15**	**0.15**
							Average	**0.30**	

Drawings

- Overall Servicing Figure, prepared by DSEL, dated October 2024



LEGEND

- PROPOSED SANITARY OPTION 1
- PROPOSED SANITARY OPTION 2
- PROPOSED WATERMAIN
- PROPOSED STORM
- EXISTING SANITARY
- EXISTING STORM
- EXISTING WATERMAIN

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MATTAMY CEDARVIEW

CITY OF OTTAWA

OVERALL SERVICING FIGURE

SCALE:	1:4000	PROJECT No.:	14-746
DATE:	OCTOBER 2024	DRAWING:	01