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FUNCTIONAL SERVICING REPORT

FOR

MINTO COMMUNITIES – CANADA AND CITY OF OTTAWA 3311 GREENBANK ROAD

CITY OF OTTAWA

PROJECT NO.: 17-911

JUNE 2017– REV 0

FUNCTIONAL SERVICING REPORT
FOR
MINTO COMMUNITIES – CANADA
3311 GREENBANK ROAD

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Functional Servicing Report (FSR) in support of the *Planning Act* development applications for part of 3311 Greenbank Road (PIN 04732 – 1365) and part of 2393 Longfields Drive/3392 Jockvale Road (PIN 04732-0034). This FSR has been prepared in accordance with City of Ottawa's *Servicing Study Guidelines for Development Applications*, as demonstrated by the checklist included in ***Appendix A***.

The FSR study area encompasses lands owned by Minto Communities – Canada and by the City of Ottawa that are subject to development permit and zoning by-law amendment applications. The lands are generally located west of Jockvale Road, east of Greenbank Road, and north of the Jock River. The FSR study area boundary is shown in ***Figure 1***. The lands are described as Part of Lots 12 and 13, Concession 2 (Rideau Front), within the Geographic Township of Nepean within the City of Ottawa.

The FSR study area:

- measures approximately 6 ha.;
- is located within the City of Ottawa urban boundary in the Barrhaven ward;
- is under the jurisdiction of the Rideau Valley Conservation Authority (RVCA);
- is located south of an existing secondary school at 3333 Greenbank Road (multiple PINs, including PIN 04732-1363);
- abuts additional City-owned land located at 2393 Longfields Drive/3392 Jockvale Road (PIN 04732-0034), north of the Jock River, that is zoned as Development Reserve and is currently undeveloped except for small isolated areas occupied by storage yard uses; and,
- abuts 3379 Greenbank Road (PIN 04732 – 0033), owned by Tartan Homes.

With a goal to examine the lands subject to the development applications in a comprehensive manner, this FSR considers portions of neighbouring lands (e.g. 261 Bren-Maur Road, owned by City of Ottawa (PIN 04732-3132)) in order to identify servicing efficiencies and constraints, including consideration of development plans for the

neighbouring lands. The neighbouring properties and site location can be seen in ***Figure 1***.

The FSR study area and surrounding lands are governed by the broader *South Nepean Town Centre Community Design Plan (City of Ottawa, 2006)* and its *Appendix I, South Nepean Town Centre Community Design Plan Preliminary Serviceability Report (CCL, December 2005)*. The design plan and preliminary serviceability report were completed in order to prepare a preferred servicing strategy and cohesive development concept for the core of South Nepean Town Centre Community (SNTC) development area (165 ha.). The reports identify existing infrastructure and environmental constraints, describe the neighbourhood-level trunk services that will service all properties within the study area, establish targets for future site-specific stormwater management plans, and identify required infrastructure upgrades to support the proposed development of the SNTC area.

Since completion of the reports, many of the identified neighbourhood-level SNTC infrastructure projects have been completed or are under construction, including:

- the Nepean-South Chapman Mills stormwater management pond and associated trunk storm sewers, interceptor maintenance holes, and outlet;
- the South Nepean Collector trunk sanitary sewer; and,
- additions to the City of Ottawa watermain network.

Furthermore, the planning and design of the Greenbank Road widening and realignment project, and associated trunk watermain have been completed. The planned Greenbank Road trunk watermain is detailed in the recent *Greenbank Road Watermain Functional Design Report* (Robinson Consultants, 2017). Key excerpts from background studies relevant to the servicing information presented in this Functional Servicing Report are included in ***Appendix B*** (as detailed herein).

The objectives of this report are to:

- Provide sufficient detail to demonstrate that development of the subject property will be adequately supported by municipal services, including existing services and planned services set out in background servicing studies;
- Define the course of subsequent detailed design, review, and acceptance of the proposed municipal services;
- Demonstrate how the proposed municipal services will conform with current Ontario Ministry of the Environment and Climate Change servicing design criteria and other applicable agency guidelines; and,
- Demonstrate good engineering practice for the protection of public safety, the environment, and sustainable operation.

1.1 Existing Conditions

Under existing conditions, the study area is predominantly undeveloped.

The existing elevations within the study area generally range from 98m south of the existing high school to 92m at the southeastern limit of the study area. The study area drains to the Jock River located to the south of the study area.

Geotechnical, subsurface, groundwater, archeological, and environmental conditions and constraints for the study area are defined in documents under separate cover, prepared in support of the development applications.

1.2 Development Concept

The proposed development concept can be seen in ***Figure 2***. Within the study area, the proposed land uses include townhomes and a mid-rise residential block all accessed via a network of local roads (Street 2,3,4, and a north-south unnamed road) with 18.0m right-of-way (ROW) widths and a collector road (Street 1) with a 20.0m ROW width. In addition, a 20.0m local road right-of-way is located south of the study area, with four intersection connections to the study area. Although the southern 20m local road is outside of the study area of the FSR, it is expected that Minto Communities – Canada/ City of Ottawa may be responsible for securing specific planning, design, and construction approvals to construct portions of the road and related services, given the servicing requirements in the ROW (as described further in ***Sections 3.0 - 5.0***). Similarly, an off-site storm sewer/storm ditch is required to service the site (as described further in ***Section 5.0***), and it is expected that Minto Communities – Canada/City of Ottawa will be responsible for securing planning and construction approvals to construct this off-site infrastructure. Notwithstanding, Minto Communities – Canada seeks to reserve the right to negotiate cost-sharing agreements with the City of Ottawa and other affected landowners for the planning, design, and construction of the local road south of the study area and of the off-site storm sewer/storm ditch.

The predicted populations associated with the development concept are described in ***Table 1***. To meet the objectives of this FSR, the development of the City of Ottawa lands within the study area is considered to support:

- Townhomes – Approximately 31 units, using Minto's typical executive townhome footprints as representative of typical of servicing demands/constraints; and
- Stacked Townhome Multi-Family Residential Buildings – Approximately 80 units and associated surface parking within the mid-rise residential block, using Minto's development along Chapman Mills, east of Longfields Drive, with footprints of approximately 650 sq.m per building, as representative of typical of servicing demands/constraints.

When servicing designs require that servicing demands from the adjacent Tartan Homes property be accommodated (as described further in ***Sections 3.0 - 5.0***), it is assumed that the development would consist of stacked townhome multi-family residential buildings, consistent with the densities applied to the mid-rise residential block within the study area.

Per ***Table 1***, the net residential density of the study area (i.e. excluding local and collector road areas) is 58 units/hectare or 143 persons/hectare. The gross density of the study area (i.e. including road areas) is 41 units/hectare or 101 persons/hectare.

The mid-rise residential block, to be developed by the City of Ottawa, is expected to be subject to a separate site plan application, in which detailed access and servicing – among other matters – will be reviewed and approved.

The CDP anticipated general mid-rise residential buildout of the study area – permitting apartments; street, block and stacked townhouses; institutional uses, etc. between 2 and 4 storeys in height and with a target net density of 100 units/ hectare. The proposed development is consistent with the permitted uses in the CDP and below the target net density. Accordingly, the development is not predicted to exceed the servicing demands anticipated in the *South Nepean Town Centre Community Design Plan Preliminary Serviceability Report* (CCL, December 2005) and subsequent servicing reports for the neighbourhood-level trunk infrastructure.

Note that although consistent with the development concepts in the background studies, the road network, land uses, and arrangement of land uses for the subject property have been refined as part of the development application process and have been arranged with regard for the conceptual road layout for the neighbouring properties. Additional details are provided in documents under separate cover that have been prepared in support of the development applications.

The City of Ottawa ROW approvals branch is requested to be engaged in the detailed design of the 20m ROW cross section south of the study area, given the meandering as-built alignment of the South Nepean Collector sewer (see ***Section 4.0*** for details), the storm sewer requirements for the study area (see ***Section 5.0*** for additional details), and the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014) requirement for a 300mm diameter trunk watermain (see ***Section 3.0*** for additional details), all in the same ROW.

The study area may be developed in phases, according to the landowners' preferred timing. Per background studies, the existing Jockvale Road ROW is expected to be removed in the future, and Greenbank Road is expected to be widened and to change alignments. For the purpose of the grading and servicing designs recommended in this FSR, Minto Communities – Canada has directed that Jockvale Road be considered in its current alignment and Greenbank Road be considered in its current alignment.

Table 1: Development Statistic Projections Derived from Concept Plan

Land Use	Total Area (ha)	Projected Residential Units	Residential Population per Unit *	Projected Population *
Minto Executive Townhomes	2.38	115	2.7	311
City of Ottawa Townhomes	0.75	31	2.7	84
City of Ottawa Stacked Townhomes	0.83	80	2.1	168
Collector Street (Street 1)	0.88			
Local Streets	0.75			
Total	**5.59 ha**	**226**		**563**

** NOTE: Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies. Population projection and residential population per unit values are based on Ministry of Environment and Climate Change guidelines for servicing demand calculations. Local Roads included in Block estimates above.*

1.3 Required Permits / Approvals

The City of Ottawa must approve detailed engineering design drawings and reports prior to construction of the municipal infrastructure identified in this report. This is expected to occur as part of the approval process for *Planning Act* development applications.

The following additional approvals and permits listed in ***Table 2*** could be expected to be required prior to construction of the municipal infrastructure detailed herein. Please note that other permits and approvals may be required, as detailed in the other studies submitted as part of the *Planning Act* development applications (e.g. *Tree Conservation Report, Environmental Impact Statement, Phase 1 Environmental Site Assessment, etc.).*

Table 2: Anticipated Permit/Approval Requirements

Agency	Permit/Approval Required	Trigger	Remarks
RVCA	Permit under Ontario Regulation 174/06, RVCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation	Although outside of the RVCA regulation limits, potential changes to existing stormwater features discharging to Jock River could trigger RVCA permitting requirements.	Proposed land uses & municipal infrastructure require grading within the study area and may result in changes to existing drainage patterns or new/modifications to the shoreline – for example, the new overland flow route proposed in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).
MOECC	Environmental Compliance Approval	Construction of new sanitary, storm sewers, and potential stormwater management works.	The MOECC is expected to review the stormwater collection system and wastewater collection system by transfer of review submission.
MOECC	Permit to Take Water	Construction of proposed land uses (e.g. basements for residential homes) and services.	Pumping of groundwater or surface water may be required during construction, given site conditions, proposed land uses, and on-site/off-site municipal infrastructure.
City of Ottawa	MOE Form 1 – Record of Watermains Authorized as a Future Alteration.	Construction of watermains.	The City of Ottawa is expected to review the watermains on behalf of the MOE through the Form 1 – Record of Watermains Authorized as a Future Alteration.
City of Ottawa / Private Landowners	Permission/license to access/occupation and/or legal property instruments.	Construction of servicing infrastructure (e.g. storm sewer, overland flow route) beyond the FSR study area.	Construction activities and permanent infrastructure beyond the FSR study area may trigger legal agreements.

1.4 Pre-consultation

Pre-application consultation was conducted with City of Ottawa development review staff in March 2017. Pre-consultation correspondence, along with the City of Ottawa servicing guidelines checklist, is provided in ***Appendix A***. Minto Communities – Canada and the City of Ottawa are expected to consult with the RVCA as part of the *Planning Act* development application process.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following documents informed the preparation of this FSR report:

- Ottawa Sewer Design Guidelines, City of Ottawa, *SDG002,* October 2012. *(City Standards)*
    - Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, February 5, 2014. *(ISDTB-2014-01)*
    - Technical Bulletin PIEDTB-2016-01, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, September 6, 2016. *(PIEDTB-2016-01)*
- 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*)*
- Design Guidelines for Sewage Works, Ministry of the Environment, 2008. *(MOE* Design Guidelines*)*
- Stormwater Planning and Design Manual, Ministry of the Environment, March 2003. *(*SWMP Design Manual)
- Infrastructure Master Plan, City of Ottawa, November 2013.
- Ontario Building Code Compendium, Ministry of Municipal Affairs and Housing Building Development Branch, 2012 and as updated from time to time. *(OBC)*
- Mississippi-Rideau Source Water Protection Plan, MVCA & RVCA, August 2014.
- Jock River Flood Risk Mapping Project, RVCA, June 2005.
- Stormwater Management Guidelines for New Developments Draft Report, JFSA, May 2014.
- South Nepean High School Stormwater Management Plan, Novatech, September 2001.
- South Nepean Town Centre Community Design Plan, City of Ottawa, July 2006.
- Appendix I, South Nepean Town Centre Community Design Plan Preliminary Serviceability Report, CCL, December 2005.
- Nepean South Chapman Mills Stormwater Management Servicing Report, IBI Group, September 2006.
- South Nepean Town Centre Trunk Storm Sewer EA, Stantec, 2009.

- Nepean South Chapman Mills Stormwater Management Servicing Report, Second Addendum, IBI Group, September 2010.
- South Nepean Collector Functional Design Update, Dillon, 2012.
- Draft Kennedy Burnett Potable Water Master Servicing Study, Stantec Consulting Ltd, March 25, 2014.
- Draft South Nepean Collector Sewer Alignment Finalisation Report (Phase 2 & Phase 3), Novatech Engineering Consultants, June 2014.
- South Nepean Collector: Phase 2, Hydraulics Review, Technical Memorandum, Novatech, August 20, 2015.
- South Nepean Collector Design Drawings (ISD14-2033), Novatech Engineering Consultants, Rev 9 dated December 2016.
- South Nepean Collector interim as-built information, Novatech, May 2017.
- Chapman Mills Boulevard, Functional Design, City of Ottawa, March 16, 2016.
- Draft Longfields Drive Collector Sanitary Sewer Design Sheet and Drainage Boundary Information, City of Ottawa, October 2016.
- Update to Chapman Mills SWM Servicing, IBI Group, February 28, 2017.
- As-built information for existing roads, sewers, and watermains within and adjacent to the study area.

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the existing City of Ottawa BARR pressure zone, per the Water Distribution Mapping excerpt in ***Appendix C***. Twin 400 mm diameter watermains exist within the Jockvale Road ROW, and a 400mm diameter watermain exists to the east, along Longfields Drive. Existing 200 mm diameter watermain and hydrants exist to the north of the site to service the existing secondary school. The existing services are shown in ***Figure 3.***

Per the *Greenbank Road Watermain Functional Design Report* (Robinson Consultants, 2017), to the west of the subject property, a future 600 mm diameter BARR trunk watermain is planned within the east side of the ROW of the future alignment of Greenbank Road, while a 300mm diameter watermain is planned within the west side of the ROW.

3.2 Water Supply Servicing Design

Figure 4 shows the proposed configuration of watermains for the study area, based on the configuration and sizing of trunk watermain infrastructure from the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014). The study area is identified as the general location for a trunk 300 mm diameter watermain connecting the existing 400 mm diameter watermains at the intersection of Jockvale Road/Longfields Drive to the future watermain(s) within the future realignment of Greenbank Road. Adequacy of sizing and configuration of trunk watermain infrastructure, including hydraulic modelling, is further detailed in the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014). The *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014) contemplated the development of the study area by employing the demand patterns (e.g. fire flows, residential usage demands, outdoor water demands, etc.) from the City's Water Master Plan hydraulic model, which are presumed to be consistent with the residential land uses currently proposed and as approved in the CDP. Key excerpts from the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014) are included in ***Appendix B.***

Conforming to *City of Ottawa Design Guidelines*, the water servicing approach for the study area is for potable water to be supplied through pressurized local watermains on each street, connecting to a trunk watermain that would connect to the existing watermain network along Jockvale Road. This trunk watermain can be extended in the future through the neighbouring lands to connect to the future watermain(s) within the ROW of the future alignment of Greenbank Road. Similarly, although a direct connection to the Jockvale Road watermain is proposed at this time, the trunk watermain can be extended eastward to connect to the existing Longfields Drive trunk watermain, if required.

As detailed designs progress, timing, alignment, and sizing of watermains will be confirmed. The subdivision's local watermain network will be sized to meet maximum hour and maximum day plus fire flow demands, as confirmed through detailed hydraulic modelling. ***Table 3*** summarizes the *Water Supply Guidelines* that are to be employed in the detailed hydraulic modelling for the site, to be based on detailed boundary conditions provided by the City of Ottawa. To provide redundancy and looping, a second connection to the existing Jockvale Road trunk watermain network is proposed at Street 1, in accordance with the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014).

Water demand calculations for the study area and adjacent Tartan Home property are provided in ***Appendix C***: the average daily demand for the study area is expected to be 189 L/min**.** Fire flow requirements are to be confirmed in accordance with *Local Guidelines (Fire Underwriters Survey), City of Ottawa Water Supply Guidelines*, and the *Ontario Building Code*, upon development of detailed concepts for the townhouses and stacked townhomes proposed for the study area. For planning purposes, fire flow estimates of 10,000 L/min (per ISTB-2014-02) and 14,000 L/min are assumed (see water demand calculations in ***Appendix C***) - for townhouses and stacked townhomes, respectively - based on the information available in the preliminary concept plan.

Minto Communities – Canada is requesting that service laterals for the proposed development be located with the water service tight to the proposed driveways. Although City of Ottawa standard W27 calls for the water service to be located according to 1/3 of the lot width, a deviation to 0.5m offset from driveway is proposed to support the proposed landscape plan (submitted under separate cover).

Table 3: Water Supply Design Criteria

Design Parameter	Value
Residential Single Family	3.4 P/unit
Residential Semi-detached	2.7 P/unit
Residential Townhouse/Back-to-Back	2.1 P/unit
Residential Apartment (High Density)	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand **	2.5 x Average Daily *
Residential Maximum Hourly **	5.5 x Average Daily *
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

Daily average based on Appendix 4-A from **Water Supply Guidelines. Table updated to reflect ISD-2010-2.*
*** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons. City Guidelines used for populations greater than 500 persons.*

3.3 Water Supply Conclusion

The *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014) uses hydraulic modelling to demonstrate that the proposed concept plan can be adequately serviced, in conformance with all relevant *City of Ottawa* and *MOECC Guidelines* and *Policies*, by the existing and planned municipal trunk watermain network.

Specifically within the study area, a local network of watermains and a 300mm diameter trunk watermain are proposed, in accordance with the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014). Two connections to the existing Jockvale Road trunk watermain(s) are proposed in accordance with the *Draft Kennedy Burnett Potable Water Master Servicing Study* (Stantec Consulting Ltd, March 25, 2014).

The proposed 300mm diameter trunk watermain is set to connect to the planned 600mm diameter trunk watermain that is associated with realigned Greenbank Road, and can also be extended to connect to the Longfields Drive existing trunk watermain.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The study area is tributary to the South Nepean Collector sewer, which operates at the intersection of Jockvale Road and Longfields Drive prior to conveying wastewater under the Jock River. The South Nepean Collector sewer is currently being extended to the northwest, including 1050mm diameter sewer segments within the 20m local road ROW south of the site. Preliminary as-built information is provided in ***Appendix B.***

There is a temporary pump station to the north of the subject property and an accompanying 100 mm diameter sanitary forcemain that services the existing secondary school and continues north on Greenbank Road.

The existing wastewater services are depicted in ***Figure 3***.

4.2 Wastewater Design

As per the *South Nepean Collector: Phase 2 Hydraulics Review/Assessment* (Novatech, 2014) the South Nepean Collector was sized taking the subject area's wastewater drainage into consideration. The study area is part of a larger area classified as low-density residential with a gross residential population density of 120.9 people/ha (exceeding the 101 people/ha gross residential density anticipated under the current design concept). Key excerpts showing the design assumptions for the South Nepean Collector sewer are provided in ***Appendix B***, demonstrating that the trunk South Nepean Collector sanitary sewer will adequately service the site.

The subject property is expected to be serviced by an internal gravity sewer system that is to follow the local road network. The local sanitary sewers will provide service to all roads and development blocks within the study area. Per direction of City of Ottawa staff, the local sanitary sewer network is to connect into the South Nepean Collector trunk sewer at the as-built sanitary sewer stub and drop into the South Nepean Collector Maintenance Hole (MH) 35, as depicted in ***Figure 5***. It is assumed that the adjacent land owned by Tartan Homes is also required to drain to the designated drop location into the South Nepean Collector sewer, and as such, a sanitary control maintenance hole is shown for the Tartan Homes site, connecting to the planned sanitary sewer network in the study area.

Table 4 summarizes the wastewater parameters that will be employed in the detailed design of sanitary sewers for the site. The proposed wastewater system for the subject property will to be designed to conform to all relevant *City Standards* and *MOECC Guidelines.* Preliminary sizing is provided in ***Appendix D***, in accordance with ***Table 4.*** The peak wastewater outflow anticipated from the study area and adjacent Tartan Homes property to the South Nepean Collector is 12.4 L/s.

The preliminary as-built South Nepean Collector trunk sanitary sewer inverts are provided in ***Appendix B***. When considered in conjunction with the proposed grading described in ***Section 5.6***, the collector sewer substantially exceeds the depth requirements to service the study area. Similarly, the as-built 250mm diameter sewer stub and drop into South Nepean Collector Maintenance Hole (MH) 35 are anticipated to meet the sizing and depth requirements to service the study area.

The constructed alignment of the South Nepean Collector sewer results in the sanitary trunk sewer meandering within the approximate centre of the 20 m road south of the study area. As discussed in ***Section 1.2,*** the City of Ottawa ROW approvals branch is requested to be engaged in the detailed design of the ROW cross section.

Because of the existing grade transition across the site and the proposed grading associated with the overland flow network and tie ins to the existing road network, the sanitary sewer depth exceeds 7m at specific locations within the site. In accordance with *City of Ottawa Standard S11 & S11.1* (Sewer Service Connections For Rigid & Flexible Main Sewer Pipe), connections to sewers over 5m deep are expected to require approved controlled settlement joints. City of Ottawa Standard Specifications, Section MS 22 15, Item S.18 1-13 lists the approved sewer service lateral pipe products – including 'controlled settlement joints' from IPEX Inc. and Royal Pipe Systems, among others.

Table 4: Wastewater Design Criteria

Design Parameter	Value
Residential Single Family	3.4 P/unit
Residential Semi-detached	2.7 P/unit
Residential Townhouse/Back-to-Back	2.1 P/unit
Residential Apartment (High Density)	1.8 P/unit
Average Daily Demand	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial / Institutional Flows	50,000 L/ha/day
Commercial / Institutional Peak Factor	1.5
Infiltration and Inflow Allowance	0.28 L/s/ha
Park Flows	28,000 L/ha/d
Park Peaking Factor	1.0
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012, and recently approved residential subdivision designs in City of Ottawa.	

4.3 Wastewater Servicing Conclusions

A network of local gravity sewers is proposed within the study area – to be designed in conformance with all relevant *City of Ottawa* and *MOECC Guidelines* and *Policies* - connecting to the South Nepean Collector sanitary trunk sewer that has currently been installed directly south of the study area in the proposed 20 m road ROW. Since the trunk sewer has been sized for long-term development of the SNTC lands, the sewer has sufficient depth and capacity to adequately provide an outlet for the local sanitary sewer network serving the study area. The local gravity sewers have been designed to include wastewater contributions from the Tartan Homes property adjacent to the study area.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Drainage

The study area is within the Jock River watershed. Under existing conditions, the study area drains by sheet flow and local minor depressions from 98m south of the secondary school towards the Jock River. Flows paths are estimated to be:

- Direct to the Jock River;
- Towards Greenbank Road (94m), then south towards Jock River; and,
- Southeast towards southeast corner of the study area near Jockvale Road (92m), then towards the Jock River.

For the secondary school adjacent to the site, stormwater runoff is currently controlled within parking areas and roofs to a peak stormwater runoff rate of approximately 831 L/s (IBI Group, personal communications, June 2017). The stormwater runoff is directed south along a Jockvale Road via an 800mm diameter culvert and a roadside ditch, and then east under Jockvale Road by way of an existing 800mm diameter culvert. Additional details are provided in background studies (Novatech, September 2001).

The study area is considered to be within the planned catchment of the existing stormwater management facility (SWMF) east of Longfields Drive and south of Paul Metivier Drive (IBI, February 2017). The existing stormwater management works are depicted in ***Figures 3, 6 & 7*** and can be summarized as:

- Interceptor maintenance hole and stormwater facility inlet within Longfields Drive, south of Paul Metivier Drive;
- 1650mm/1900mm diameter trunk storm sewer within the continuation of Riocan Ave;
- 2100mm diameter trunk storm sewer within Longfields Drive running south of Paul Metivier Drive to discharge to the Jock River; and,
- 675mm diameter trunk sewer within Longfields Drive running north towards the SWMF.

Existing MOECC Environmental Compliance Approvals are included in ***Appendix B.*** Note that as part of the development applications, a change in stormwater management strategy is proposed from the background studies, as described in the recent memo *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017) that is included in ***Appendix B***. As part of the update:

- minor modifications to the boundaries of the existing stormwater management facility catchment area are proposed, but are minor in nature and are meant to better align with the current road network concept;

- the minor storm flows from study area are to continue to be directed to the existing SWMF, as contemplated in the background studies, but are to increase from 85 l/s/ha to 100 l/s/ha;
- the minor flows from the adjacent Tartan lands (PIN 04732 – 0033) are to be conveyed through the minor system identified for the study area, as contemplated in the background studies;
- on-site storage of the 100-year design storm flows is no longer required; and,
- a new overland flow route at 0.6% is proposed through the study area and through the City of Ottawa lands south of the study area (PIN 04732-0034), to convey all major flows from south of Chapman Mills and west of Longfields Drive to the Jock River.

5.2 Post-Development Stormwater Management Targets

The following City standards will be required for stormwater management within the subject property:

- Storm sewer design for local roads & collector roads will provide capture and conveyance of 100 l/s/ha per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017), which is considered a deviation from the minimum 2-year level of service for local roads and the minimum 5-year level of service for collector roads per the City's latest Technical Bulletin PIEDTB-2016-01 (see *Stormwater Management Guidelines for New Developments Draft Report* (JFSA, May 2014) for additional information on the relationship between unit capture rates and design storm events), but is consistent with background studies and constructed infrastructure in the SNTC area.
- Despite the 100 L/s/ha capture rate mentioned above, the minimum storm sewer sizes will be applied using rational method calculations to provide at minimum a 2-year level of service for local roads and the minimum 5-year level of service for collector roads per the City's latest Technical Bulletin PIEDTB-2016-01.
- For less frequent storms (i.e. larger than 100 L/s/ha capture rate), the minor system sewer capture will be restricted with the use of inlet control devices to prevent excessive hydraulic surcharges.
- Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s and no greater than 6.0 m/s.
- For the 100-year storm and for all roads, the maximum depth of water (static and/or dynamic) on streets, rearyards, public space and parking areas shall not exceed 0.35 m at the gutter.
- The major system shall be designed with sufficient capacity to allow the excess runoff of a 100-year storm to be conveyed within the public ROW or adjacent to the right-of-way provided that the water level must not touch any part of the building

envelope, must remain below all building openings during the stress test event (100-year + 20%), and must maintain 15 cm vertical clearance between spill elevation on the street and the ground elevation at the nearest building envelope.

- Surface water accumulation at street low points during the design event of the minor system is not permitted.
- When catchbasins are installed in rear yards, safe overland flow routes are to be provided to allow the release of excess flows from such areas. A minimum of 30 cm of vertical clearance is required between the rear yard spill elevation and the ground elevation at the adjacent building envelope.
- The product of the maximum flow depths on streets and maximum flow velocity must be less than 0.60 m^2/s on all roads.
- Stormwater runoff must be treated to provide Enhanced Level of protection, corresponding to an 80% average long term removal of total suspended solids, as defined in the *MOECC Stormwater Management Facility Design Guidelines* (MOECC, 2003). This is assumed to be achieved by directing the minor system to the SWMF, per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).

5.3 Off-Site Trunk Storm Sewer (Minor System)

Per the background studies and the recent amendments proposed in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017), minor flows of 100 l/s/ha are to be captured from the site and are to be directed towards the existing stormwater management facility by way of a new off-site trunk storm sewer. The trunk storm sewer is to connect between the intersection of Jockvale Road and Street 1 and the existing stormwater trunk that has been constructed within the continuation of the Riocan Ave ROW, as depicted in ***Figure 6***.

The proposed alignment of the off-site stormwater trunk sewer is to follow the planned extension of Street 1, as shown in ***Figure 6*** and as per the CDP. The approximate length of the off-site sewer is 210 m.

Preliminary sizing of the off-site storm sewer is provided in ***Appendix E,*** based on rational method calculations to provide at minimum a 2-year level of service for local roads and the minimum 5-year level of service for collector roads per the City's latest Technical Bulletin PIEDTB-2016-01, and advice to include a minor system capture rate of 831 L/s for the existing secondary school site (IBI Group, personal communications, June 2017). The preliminary rational method peak design flow to the off-site storm trunk sewer is 2380 L/s. The off-site storm sewer size is 1500 mm dia., based on an anticipated slope of 0.15%.

However, some segments of the off-site storm sewer may be downsized at the detailed design stage, when the catchment areas are further discretized. In addition, opportunities to downsize the off-site trunk sewer may be explored as part of the *Update to Chapman*

Mills SWM Servicing (IBI Group, February 2017), as the predicted rational method peak design flow exceeds the modelled minor system capture values in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017) by approximately 10%. The minor system capture values in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017) consist of:

- 537 L/s (part of the City-owned lands at 261 Bren-Maur Road (PIN 04732-3132))
- 112 L/s (Tartan lands adjacent to the study area (PIN 04732 – 0033)),
- 383 L/s (Minto lands in the study area);
- 251 L/s (City of Ottawa lands in study area); and,
- 831 L/s (Existing School Site, per IBI Group, personal communications, June 2017).

Currently the secondary school's storm outflows are conveyed under Jockvale Road towards an open ditch within the lands owned by the City of Ottawa at 261 Bren-Maur Road. Per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017), at the time of development within 261 Bren-Maur Road, these flows are to be captured by the off-site storm sewer within these lands. Until such time as development within 261 Bren-Maur Road or other nearby development triggers need for infrastructure within 261 Bren-Maur Road, it is proposed to defer construction of the off-site storm sewer and instead build a ditch with 3:1 side slopes, running at the invert of the future sewer. The ditch and cross sections are shown in ***Figure 7.*** Because the proposed ditch will also pick up existing overland flow from parts of the undeveloped lands within and north of 261 Bren-Maur Road, at the time of detailed design, the interim ditch and interim connection into existing MH T10 will be designed to ensure that the inputs to the downstream storm sewer network will not exceed the planned ultimate release rates to the system.

5.4 Local Storm Sewers (Minor System)

Local storm sewers will provide service to all roads and development blocks within the study area and the adjacent land owned by Tartan Homes (PIN 04732 – 0033), in accordance with the background studies, connecting into the proposed off-site storm sewer.

The study area is expected to be serviced by an internal gravity storm sewer system that is to follow the local road network and connect to the proposed off-site trunk storm sewer at an obvert of approximately 90.17m. One springline-to-springline connection is proposed at STM MH 102, for the incoming storm sewer from STM MH109 – STM MH 102. This deviation from *City of Ottawa Standards* is proposed to maximize the cover on the downstream sewer system, which is constrained by the requirements of the overland flow network (***Section 5.5***). Despite the proposed springline-to-springline connection, the segment of storm sewer from STM MH 110 – STM MH 109 has 1.75 m cover, which is less than the target of 2 m in the *City of Ottawa Sewer Design Guidelines.*

Table 5 summarizes the standards that will be employed in the detailed design of the trunk and local storm sewers. Preliminary storm sewer sizing is provided in ***Appendix E*** and shown in ***Figure 7,*** using rational method calculations and using runoff coefficients (C-values) representative of the proposed land uses (applying C=0.90 for paved driveways, asphalt, and roofs, and C=0.2 for pervious and flat 0-5% vegetated backyards, front yards, and parts of the boulevard, per the *Ottawa Sewer Design Guidelines*). The design of the minor system is based on collecting drainage for the minimum 2-year level of service for local roads and the minimum 5-year level of service for collector roads, per the City's latest Technical Bulletin PIEDTB-2016-01, assuming the use of inlet control devices (ICD) for all proposed road and rear yard catchbasins within the subject property and assuming control of the multi-family residential blocks in the study area and owned by Tartan Homes. Per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017), the capture to the minor system is expected to be restricted to 100 l/s/ha, which is considered to be less than the rational method design flows in ***Appendix E*** - see *Stormwater Management Guidelines for New Developments Draft Report* (JFSA, May 2014) for additional details.

A detailed hydraulic gradeline (HGL) analysis will be completed for the proposed system at the detailed design level, based on the 100-year 3-hour Chicago and 24-hour SCS design storms, per the 100 l/s/ha capture rate and other requirements set out in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017). Other design storms and/or historical events may be considered at detailed design, as required. Detailed grading design and storm sewer design will be modified as required to achieve the freeboard requirements set out in ***Section 5.2*** and ***Table 5*** (per PIEDTB-2016-01).

Table 5: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	1:2 year (PIEDTB-2016-01) or 1:5 year design storm return period for the anticipated imperviousness of the site
Major System Design Return Period	1:100 year
Anticipated Minor System Capture	100 l/s/ha, per *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017) which is considered less than 1:2 year (PIEDTB-2016-01) or 1:5 year design storm return period for the anticipated imperviousness of the site
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n' for pipe flow	0.013
Minimum Depth of Cover	1.7 m from crown of sewer to grade (*based on recent residential subdivisions in City of Ottawa)*
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s
Clearance from 100-Year Hydraulic Grade Line to Building Opening	0.30 m
Max. Allowable Flow Depth on Municipal Roads	35 cm above gutter (PIEDTB-2016-01)
Extent of Major System	To be contained within the municipal right-of-way or adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100-year + 20%) and 15cm vertical clearance is maintained between spill elevation on the street and the ground elevation at the nearest building envelope (PIEDTB-2016-01)
Stormwater Management Model	DDSWMM (release 2.1), SWMHYMO (v. 5.02) and XPSWMM (v. 10)
Model Parameters	Fo = 76.2 mm/hr, Fc = 13.2 mm/hr, DCAY = 4.14/hr, D.Stor.Imp. = 1.57 mm, D.Stor.Per. = 4.67 mm
Imperviousness	Based on runoff coefficient (C) where Percent Imperviousness = (C - 0.2) / 0.7 x 100%.
Design Storms	Chicago 3-hour Design Storms and 24-hour SCS Type II Design Storms, per *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017). Maximum intensity averaged over 10 minutes.
Historical Events	July 1st, 1979, August 4th, 1988 and August 8th, 1996
Climate Change Street Test	20% increase in the 100-year, 3-hour Chicago storm
Extracted from City of Ottawa Sewer Design Guidelines, October 2012, as amended by PIEDTB-2016-01, *and based on recently approved residential subdivision designs in City of Ottawa.*	

5.5 Major System

Major system conveyance, or overland flow (OLF), will be provided in the study area to accommodate flows in excess of the minor system capacity and to accommodate overland flows from adjacent areas.

Per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017), the OLF is to be directed across the City-owned land at 2393 Longfields Drive/3392 Jockvale Road (PIN 04732-0034) to the Jock River bank. Planning, design, and construction approval requirements for the OLF route through the City-owned land are to be addressed separately, through the approval process for the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).

In the FSR study area, OLF is to be accommodated by routing surface flows along the road network towards the Jock River, as shown in ***Figure 6*** and as per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017)***.*** Specifically, per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017) and subsequent correspondence (IBI Group, personal communications, May 2017) the road network is required to provide a 0.6% slope from the existing grade of Jockvale Road at the intersection of Street 1 to the proposed OLF outlet across the City-owned land at 2393 Longfields Drive/3392 Jockvale Road, in order to convey the predicted flows.

Per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017), no surface storage is required, however an element of surface storage is expected to be provided incidental to the grading and minor system design. In these cases, water will be stored in road-sags until captured by the catchbasin or routed to the next downstream catchment towards the Jock River. The grading concept described in ***Section 5.6*** and shown in ***Figure 8*** permits a detailed saw-toothed road design in specific places within the study area, with at least 0.1% from highpoint to highpoint.

Table 5 and ***Section 5.2*** summarize the standards that will be employed in the detailed design of the on-site major system. At detailed design, the incoming flows from the upstream OLF network are to be taken directly from the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017). The proposed drainage systems are expected to safely capture and convey all storms up to and including the 100-year event in accordance with the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).

5.6 Grading and Drainage

Preliminary road grades are shown in ***Figure 8.*** Because of the nature of existing topography - ranging from 98m to 92m - and in order to achieve the planned stormwater drainage scheme while also meeting *City of Ottawa Guidelines* pertaining to road and lot grading, fill is expected to be required in the southern and western parts of the study area, while cutting is expected to be required in the north portion of the site near the secondary school. Terracing, retaining walls, and/or unique home architecture/lot grading are expected to be implemented at detailed design, in order to accommodate:

- the proposed grade transition between Street 1 and the secondary school property, which may be in the order of 3.5m;
- the proposed grade transition between Street 4 and the unnamed north-south local road, which may be in the order of 2.3m; and,
- to meet HGL freeboard requirements for the homes in Block 13, where the homes are to be raised beyond typical architectural relationships because of the limited cover on the storm sewer in this area (***Section 5.4***).

Terracing will be required within the City-owned land at 2393 Longfields Drive/3392 Jockvale Road (PIN 04732-0034), in order to accommodate the proposed grading of the 20m road south of the study area. Terracing is also proposed within the adjacent lands owned by Tartan Homes, to accommodate the proposed grading plan.

The grading plans tie into the existing Greenbank Road and Jockvale Road elevations, and meet the OLF requirements described in ***Section 5.5.***

The following additional grading criteria and guidelines will be applied to detailed design, per *City of Ottawa Guidelines*:

- Driveway slopes will have a maximum slope of 6%;
- Slope in grassed areas will be between 2% and 7%;
- Grades in excess of 7% will require terracing to a maximum of a 3:1 slope;
- Swales are to be 0.15m deep with 3:1 side slopes unless otherwise indicated on the drawings; and,
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope.

The geotechnical analysis for the site, published under separate cover in support of the development applications, provides additional information about the suitability of the site for the proposed services and grading scheme. At the time of detailed design, detailed review and signoff by a licensed Geotechnical Engineer will be required.

5.7 Infiltration

The subject property is not considered part of a significant groundwater recharge area per the MVCA/RVCA Source Water Protection Plan (August 2014), however the following Low Impact Development techniques will be implemented during detailed design as best management practices:

- Rear-yard swales should be designed with minimum grades where possible, to promote infiltration;
- Rear-yard catchbasin leads should be perforated (except for the last segment connecting to the storm sewer within the right-of-way), to promote infiltration; and,

- If eavestroughs are provided on residential units, they are to be directed to landscaped surfaces, to promote infiltration.

5.8 Stormwater Servicing Conclusions

A network of local gravity sewers is proposed within the study area to capture stormwater runoff from the study area and from the adjacent Tartan lands (PIN 04732 – 0033) and convey the flows to a future off-site trunk storm sewer. The proposed future off-site trunk storm sewer is to be installed within the City-owned lands at 261 Bren-Maur Road in the South Nepean Town Centre, in order to connect to an existing trunk sewer in the extension of Riocan Avenue that has been adequately sized to receive the incoming flows per the background studies and the most recent *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017). Prior to construction of the off-site storm sewer, as an interim condition, an open ditch is to be constructed to convey flows to the existing trunk sewer in the extension of Riocan Avenue. Under interim and ultimate conditions, the flows from the study area are to be treated for Enhanced Protection by the existing stormwater management facility before discharge to the Jock River and are to respect the capacity limitations of the existing network, as defined in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).

Overland flow from the study area is to be released directly to the Jock River, per an overland flow outlet area identified south of the study area through City-owned lands, as identified in the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017). Planning, design, and construction approvals for the off-site overland route are to proceed separately via the approval process for the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).

The stormwater management systems – including the design of the storm sewers and overland flow routes - are to be designed in conformance with all relevant City of Ottawa and *MOECC Guidelines and Policies*, except where deviations to *City of Ottawa Sewer Design Guidelines* have been triggered as part of the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017). The specific deviations proposed relate to minor system capture rates, cover over storm sewers, and springline-to-springline connections of storm sewers.

To support the proposed stormwater management scheme, the site is to be significantly altered from existing conditions. The earthworks program will be further detailed as the project proceeds through development approvals, however significant grade transitions may be proposed across some residential blocks, thereby requiring the implementation of terracing, retaining walls, and/or unique architectural/lot grading designs. Similarly, grading is proposed within the City-owned lands south of the study area and Tartan Homes lands adjacent to the study area, in order to accommodate the grade transition from existing topography to the proposed grading plan.

6.0 UTILITIES

Utility services extending to the site may require connections to multiple existing infrastructure points: consultation with Enbridge Gas, Hydro Ottawa, Rogers, and Bell is required as part of the development process to confirm the servicing plan for the study area.

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.

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

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

Catchbasins will have catchbasin inserts installed during construction to protect from silt entering the storm sewer system.

Specifically, the following recommendations to the Contractor will be included in contract documents.

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from exiting the construction area and entering existing ditches/stormwater systems.
- Install mud mat at the construction access in order to prevent mud tracking onto adjacent roads.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install catchbasin inserts.
- Plan construction at proper time to avoid flooding.

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

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

8.0 CONCLUSIONS AND RECOMMENDATIONS

The overall municipal servicing strategy for the study area was contemplated as part of the *South Nepean Town Centre Community Design Plan (City of Ottawa, 2006)* and its *Appendix I, South Nepean Town Centre Community Design Plan Preliminary Serviceability Report (CCL, December 2005)*, and subsequent project-specific design reports for the identified neighbourhood-level infrastructure. Most recently, a modified stormwater management strategy has been proposed for the lands, per the *Update to Chapman Mills SWM Servicing* (IBI Group, February 2017).

This *Functional Servicing Study* (FSR) (DSEL, June 2017) provides details on the planned on-site and off-site municipal services for the subject property, highlights proposed deviations from the background studies and *City of Ottawa Guidelines*, and demonstrates that adequate municipal infrastructure capacity is expected to be available for the planned development of the subject property.

Prior to detailed design of the infrastructure presented in this report, this FSR will require approval under the *Planning Act* as supporting information for the development applications. Project-specific approvals are also expected to be required for the infrastructure presented in this report from the City of Ottawa, Ministry of Environment and Climate Change, and Rideau Valley Conservation Authority.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Laura Maxwell, B.Sc.(Civil Eng)

Reviewed by,
David Schaeffer Engineering Ltd.

LICENSED PROFESSIONAL ENGINEER
R. M. WINGATE
100069090
June 9/17
PROVINCE OF ONTARIO

Per: Matt Wingate, P.Eng

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Appendix A

- Servicing Guidelines Checklist (DSEL, June 2017)
- Pre-Consultation Notes with City of Ottawa Staff (City of Ottawa, March 2017)
- Revised Concept Plan for 3311 Greenbank Road (Stantec, June 2017)

Laura Maxwell

From: Catherine Tremblay <CTremblay@minto.com>
Sent: Wednesday, May 10, 2017 2:02 PM
To: Matt Wingate; Laura Maxwell
Subject: FW: 3311 Greenbank Road - Preconsult Follow-up
Attachments: Plans and Study list_3311 Greenbank Road.docx; OPA 159_cost sharing for park development (2015-09-23).pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Categories: 1_High Priority_CCV

Good afternoon Laura and Matt,

Thanks for coming in the office today, it was a good meeting. As requested, please see below the meeting minutes/submission requirements from the Pre-Consultation with the City.

Regards,

Catherine Tremblay
Land Development Project Coordinator
Minto Communities - Canada
200-180 Kent St, Ottawa, ON, K1P 0B6
T 613.786.3279 | **F** 613.782.2416
minto.com

From: Bernier, John [mailto:John.Bernier@ottawa.ca]
Sent: Monday, March 13, 2017 2:20 PM
To: Catherine Tremblay <CTremblay@minto.com>; Anna Froehlich <a.froehlich@novatech-eng.com>; Susan Murphy <SMurphy@minto.com>
Cc: Moore, Sean <Sean.Moore@ottawa.ca>; Rehman, Sami <Sami.Rehman@ottawa.ca>; Hall, James <James.Hall@ottawa.ca>; Yousfani, Asad <Asad.Yousfani@ottawa.ca>; Moise, Christopher <christopher.moise@ottawa.ca>; Richardson, Mark <Mark.Richardson@ottawa.ca>; Neermul, Dhaneshwar

<Dhaneshwar.Neermul@ottawa.ca>; Herweyer, Don <Don.Herweyer@ottawa.ca>
Subject: FW: 3311 Greenbank Road - Preconsult Follow-up

Good afternoon,

It was nice meeting you for a pre-application consultation (PC2017-0080) on March 1st, 2017, regarding 3311 Greenbank Road. We met to discuss the subdivision and rezoning of the subject property for the development of 180 townhouse units (117 Minto, 63 OCLDC).

The following is a brief summary of our meeting and the requirements of a formal application:

Planning/Design:

- Residential streets are to be 20m cross sections (as per CDP)
- Follow the CDP Street Network Plan for the single loaded Half Moon Bay Drive as it ties into Longfields Drive
- Half Moon Bay Drive is an on-road cycling route, please ensure this is incorporated into the road design
- OCLDC shall transfer the District Park land (adjacent to the Jock River) to Rec, Cultural & Facility Services Dept., as per the Land Use and Greenspace Network Plan of the CDP.
- Please provide sidewalk connectivity to St. Joseph High School along Greenbank Road
- Demonstrate how the subdivision will 'fit' with the ultimate road pattern as per Schedule 2 of the CDP , given Jockvale Road needs to be closed and parcels of land need to be assembled.
- As per OPA 159 (attached) please work with other land owners on a Cost Sharing Agreement for the provision of parks in the CDP area. The agreement shall contain a financial schedule describing the estimated costs of the development of the local parks and associated studies and plans, as well as the proportionate share of the costs for each landowner
- Ensure integration with the Claridge submission (plan of subdivision) to the immediate west
- The site falls within an Urban Design Priority Area and is thus subject to the Urban Design Review Panel. We discussed that this project may not have to go to the panel given its compliance with the CDP, however after further discussions we believe a presentation on how it complies with the CDP (road pattern, lotting, product types, connectivity etc) and what the built form will look like, is beneficial to advancing this project. We would ask for the UDRP submission after the formal comment period so we can work out any engineering issues that could impact design.
- An archeological assessment will be required.

Environmental:

- Written confirmation from MNRF was provided that indicates that they have no concerns with the proposed development on potential significant habitat for threatened or endangered species on and adjacent to the subject property. Therefore, we will waive the EIS requirement.
- A permit would be needed if trees 10cm in diameter or greater are to be removed. Should there be a need to remove trees, the characteristics of the existing vegetation will not warrant retention; We will need a plan showing the cleared and uncleared areas prior to issuing a permit. You can confirm by email if there are no trees 10cm or larger in diameter to remove.
- Please produce a Landscape Plan that focuses on native species, and those that will thrive in the Ottawa area.

- A tree permit is required for this site, so a Tree Conservation Report will also be required. For further information contact Mark Richardson, City Forester, at 613-580-2424 ext. 23839 or by email at Mark.Richardson@Ottawa.ca
- Consult separately with RVCA and provide background on any discussions.

Transportation:

- A TIS is required that takes into account the existing and proposed Jockvale Rd and Greenbank Rd.
- The traffic consultant is to confirm the timing of construction of NEW Greenbank Road from City prior to conducting the analysis. It is our understanding that the construction of NEW Greenbank Road (phase 1 TMP) is uncertain.
- Ensure that north-south roads intersection with Sue Holloway Drive come in at an appropriate angle.

Should you have any questions or require additional information, please contact Asad Yousfani directly at (613) 580-2424, x 16571or by email at Asad.Yousfani@Ottawa.ca

Engineering:

Please find below City of Ottawa engineering/infrastructure information regarding an engineering design submission relevant to the proposed development.

Municipal Infrastructure:

Disclaimer:
The City of Ottawa does not guarantee the accuracy or completeness of the data and information contained on the above images and does not assume any responsibility or liability with respect to any damage or loss arising from the use or interpretation of the images provided.

Water:

- Water service is not directly available for this parcel, but water connection(s) to the backbone watermains within Jockvale Road may be possible. The final water design should be consistent with

the "Kennedy-Burnett Potable Water Master Servicing Study" prepared by Stantec, dated April 29, 2014. Note also that there is a functional design underway for a new watermain in Greenbank Road (610mm proposed). Additional information on current and future boundary conditions will be available.

- Please reference City of Ottawa Water Distribution District Plan No. **W_364-013**.
- A watermain frontage charge appears to **not** apply to the property for connections to the 406mm dia watermains in Greenbank Road. Once a proposed service connection point has been identified confirmation from Right-of-Way Approvals will be requested. A charge of $190/m of total frontage would be applied to the water permit if watermain frontage charges are applicable.
- Please provide the following information to the City of Ottawa via email to request water distribution network Boundary Conditions for hydraulic analysis and/or confirmation of fire protection. Please note that once this information has been provided to the City of Ottawa it takes approximately 10 business days to receive boundary condition results. Boundary conditions must be requested prior to submission of a Site Plan Control application (a Site Plan Control application is not complete without including Boundary Condition information in the servicing report analysis.)
    - Type of Development
    - Site Address
    - A plan clearly showing the proposed water service connection location(s)
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)
    - **Peak Hour Demand** (L/s)
    - **Fire Flow** Required(L/s)
        - Fire flow demand requirements shall be based on Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection 1999 as per the *Ottawa Design Guidelines – Water Distribution*, First Edition, Document WDG001, July 2010, City of Ottawa Clause 4.2.11.
        - The full 50% reduction for sprinklering is only available for monitored systems.
        - Reductions, where applied to fire requirement demand calculation(s), need to be justified by the engineering consultant.
        - Please provide FUS calculations with request
        - Please provide Water Demand Calculations with request

Sanitary Sewers:

- Sanitary sewer connections will be to the South Nepean Collector sewer, currently under construction. Coordination is required to ensure connections are made only to approved locations within the SNC. Note that high-level sewers may be required – no individual connections will be permitted. Please also note that the SNC is fairly deep at this location, and external drop structures will be required.
- Please note that as per the Official Plan for the City of Ottawa development in Public Service Areas must be on the basis of public wastewater services not private individual services. Please refer to sections 2.3.2-*Water and Wastewater Services* and 4.4-*Water and Wastewater Servicing* of the Official Plan.
- The engineering consultant is required to assess that the ultimate sanitary sewer condition has capacity for the proposed site use.

Storm Sewers:

- There is currently no existing storm sewer minor system in place for connection. This area has been identified within the "Nepean South Chapman Mills Stormwater Management Servicing Report – Second Addendum" prepared by IBI Group, dated September 2010, and we understand a revision to this report is currently underway. Please note that the report revision/addendum will need to be reviewed and approved prior to use of it to support an application in this area.
- As part of the servicing report, please provide confirmation that the storm sewer(s) were designed to convey stormwater flows from the subject site.

Storm Water Management Criteria:

- Stormwater management criteria have been outlined within the "Nepean South Chapman Mills Stormwater Management Servicing Report – Second Addendum" prepared by IBI Group, dated September 2010, and we understand a revision to this report is currently underway. Please note that the report revision/addendum will need to be reviewed and approved prior to use of it to support an application in this area.
- Any existing stormwater runoff from adjacent site(s) must be accommodated by the proposed stormwater management design.
- The engineering consultant must ensure that the property being developed is higher than the spill elevation of the adjacent municipal right-of-way(s). This will ensure that during extreme events, the City major system will spill to the next downstream roadway segment and not back onto the property.

Permits and Approvals:

- Please contact the Ministry of the Environment and Climate Change (MOECC) to identify all the necessary permits and approvals required to facilitate this development. Confirmation of correspondence will be required by the City of Ottawa. Please note that an MOECC Environmental Compliance Approval application submission will be subsequent to Draft Approval and subsequent to our satisfactory review of the detailed engineering. Note also that MOECC approval shall be granted prior to issuance of a Commence Work Notification. It is highly recommended that the MOECC be contacted prior to submission of the detailed engineering design.

  Ministry of the Environment and Climate Change:
  Charlie Primeau
  Environmental Officer
  Ministry of the Environment and Climate Change
  (613) 521-3450, ext. 251
  charlie.primeau@ontario.ca

  https://www.ontario.ca/laws/regulation/980525#

Relevant City of Ottawa Links to Preparing Studies and Plans:

Guide to preparing City of Ottawa Studies and Plans:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

Servicing Study Guidelines for Development Applications:
http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:

InformationCentre@ottawa.ca
(613) 580-2424 ext. 44455
Please note that supporting documentation is required to be referenced and provided in all reports.

Disclaimer:
Please note that the information provided above is only preliminary in order to assist an applicant in evaluating a site and preparing an application. As additional information regarding a development becomes available the City of Ottawa may provide additional criteria and/or alter the criteria provided above.

Should you have any questions or require additional information, please contact James Hall directly at (613) 580-2424, x 27508 or by email at James.Hall@ottawa.ca

Application and fees:

A Plan of Subdivision Application is required, which costs **$14,321.45** (click here for exact fees), plus the engineering design review and inspection fee, legal fees, as well as conservation authority fee.
A Zoning By-law Amendment Application is also required, which costs **$16,221** (click here for exact fees), plus conservation authority fees. A 10% reduction in fees will be given if these two application are submitted concurrently.

Please find attached the "Applicant's Study and Identification List" including the number of copies required for each in order for the application to be deemed complete. Here is the link to the guide for preparing studies and plans: http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

Feel free to contact me should you have any questions.

Best regards,

John Bernier
Planner
Development Review - South
Planning, Infrastructure and Economic Development Department
City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext/poste. 21576
ottawa.ca/planning / ottawa.ca/urbanisme

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.	Figure 1
☐	Plan showing the site and location of all existing services.	Figure 3
☐	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0 & Section 2.0
☐	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.4 & Appendix A
☐	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 3.0, Section 4.0, Section 5.0 & summarized in Section 8.0
☐	Statement of objectives and servicing criteria.	Section 1.0 & Section 3.2, Section 4.2, and Section 5.2
☐	Identification of existing and proposed infrastructure available in the immediate area.	Section 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 1.1 & Section 1.2
☐	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.	Figure 5
☐	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.	To be addressed under separate cover, reviewed and sign off by licensed professional
☐	Proposed phasing of the development, if applicable.	Section 1.2 – Depends on landowner preferred timing
☐	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.2 & Section 5.6
☐	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	Legal information contained on Draft Plan of Subdivision (June 2017) which forms the base of Figures 1- 5

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	Section 3.2
☐	Availability of public infrastructure to service proposed development	Water Master Servicing Study (WMSS) & Section 3.2
☐	Identification of system constraints	WMSS & Section 3.2

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

☐	Identify boundary conditions	Detailed hydraulic assessment N/A for FSR.
☐	Confirmation of adequate domestic supply and pressure	WMSS Detailed hydraulic assessment N/A for FSR.
☐	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.	Sample FUS calculations in Appendix C. Detailed hydraulic assessment N/A for FSR.
☐	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.	Detailed hydraulic assessment N/A for FSR.
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	Detailed hydraulic assessment N/A for FSR.
☐	Address reliability requirements such as appropriate location of shut-off valves	Detailed hydraulic assessment N/A for FSR.
☐	Check on the necessity of a pressure zone boundary modification	WMSS.
☐	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	WMSS & Section 3.2
☐	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.	WMSS, Section 3.2 & Figure 4. Detailed hydraulic assessment N/A for FSR.
☐	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.	WMSS.
☐	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Figure 4. Detailed hydraulic assessment N/A for FSR.

4.3 Development Servicing Report: Wastewater		
☐	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	South Nepean Collector: Phase 2 Hydraulics Review/Assessment (SNC R/A)
☐	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	SNC R/A & Section 4.1
☐	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	SNC R/A & Section 4.2
☐	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Appendix D

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

☐	Description of proposed sewer network including sewers, pumping stations, and forcemains.	SNC R/A, Section 4.2 & Figure 5
☐	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).	SNC R/A
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	SNC R/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	SNC R/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	SNC R/A
☐	Special considerations such as contamination, corrosive environment etc.	Geotechnical Report, under separate cover

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 1.1 & Section 5.1
☐	Analysis of available capacity in existing public infrastructure.	Section 5.3
☐	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Figure 6 and Figure 7
☐	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.	Chapman Mills SWM Servicing (SWMS) & Section 5.2
☐	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Enhanced. SWMS & Section 5.2
☐	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3, Section 5.4, and Appendix E
☐	Set-back from private sewage disposal systems.	To be addressed under separate cover
☐	Watercourse and hazard lands setbacks.	N/A
☐	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Consultation with RVCA and MOECC forthcoming
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 5.3, Section 5.4 Section 5.5, Section 5.6, Section 5.8
☐	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.1, Section 5.3, Appendix E
☐	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 1.1 and Section 5.1
☐	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.	SWMS, Figure 6, and Figure 7
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	Figure 6, and Figure 7

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

☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.4, Section 5.5, Section 5.6, Figure 6, Figure 7, Appendix E
☐	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.	SWMS, Section 5.3
☐	Identification of potential impacts to receiving watercourses	SWMS
☐	Identification of municipal drains and related approval requirements.	N/A
☐	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3, Section 5.4, Section 5.5 & Section 5.6
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Section 5.5 & Section 5.7
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A at FSR level, future work described in Section 5.4
☐	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	Section 2.0 and Section 5.6
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	Section 5.6

4.5 Approval and Permit Requirements: Checklist

☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.3
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	Section 1.3
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 1.3

4.6 Conclusion Checklist

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

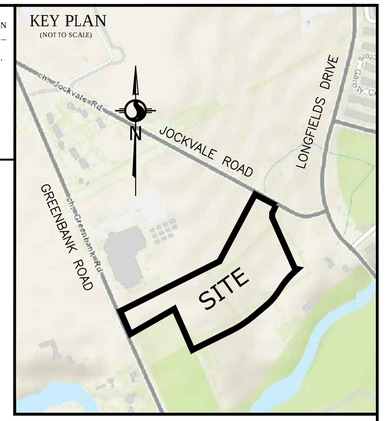
*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

6 June 2017 9:16 AM

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED _____20____
THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT. THIS____DAY OF_____,2017.

DON HERWEYER, MCIP RPP
MANAGER, DEVELOPMENT REVIEW-SOUTH
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

KEY PLAN
(NOT TO SCALE)



DRAFT PLAN OF SUBDIVISION of

PART OF LOTS 12 AND 13
CONCESSION 2 (RIDEAU FRONT)
(GEOGRAPHIC TOWNSHIP OF NEPEAN)
CITY OF OTTAWA

Scale 1:1000
20 0 20 40 60 METRES

METRIC CONVERSION
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SCHEDULE OF LAND USE			
BLOCK	USE	UNITS	AREA (Ha/ac)
1 TO 32	RESIDENTIAL	148	3.13/7.73
33	MISC.		0.04/0.09
34	RESERVE		0.004/0.01
STREETS	STREET		1.60/3.96
TOTAL		148	4.77/11.79

INFORMATION: **REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT R.S.O. 1990**

a. SEE PLAN
b. SEE PLAN
c. SEE PLAN
d. SEE PROPOSED LAND USE SCHEDULE (ABOVE)
e. SEE PLAN
f. SEE PLAN
g. SEE PLAN
h. CITY WATER AVAILABLE
i. SEE SOIL REPORT
j. SEE TOPOGRAPHICAL INFORMATION
k. ALL CITY SERVICES AVAILABLE
l. NO EASEMENTS REGISTERED ON TITLE

OWNER'S CERTIFICATE
I HEREBY AUTHORIZE STANTEC GEOMATICS LTD. TO SUBMIT THIS DRAFT PLAN OF SUBDIVISION ON MY BEHALF

DATED : _____ DATED : _____

SUSAN MURPHY
VICE PRESIDENT, DEVELOPMENT

BRENT STRACHAN
SENIOR VICE PRESIDENT, DEVELOPMENT

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE SUBJECT LANDS AND THEIR RELATIONSHIP TO ADJOINING LANDS HAVE BEEN ACCURATELY AND CORRECTLY SHOWN.

DATE

BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
stantec.com

DRAWN: CEC	CHECKED: *	PM: FP	FIELD: *	PROJECT No.: 161613630-131

W:\active\161613630_mhbc_3311 greenbank rd_fp\autodesk_draft_plan\drawing\161613630--131-3311 Greenbank_dft_r3.dwg

Appendix B

- 2017 Water Distribution System Drawing 364-013 (City of Ottawa, 2017)
- Excerpts from Draft Kennedy-Burnett Potable Water Servicing Study (Stantec, March 2014)
- Excerpts from Greenbank Road Watermain Market Place to South of the Jock River Functional Design Report (City of Ottawa, January 2017)
- Excerpts from South Nepean Collector: Phase 2 Hydraulics Review / Assessment Technical Memorandum (Novatech, August 2015)
- Interim As-Builts for South Nepean Collector (SNC) Sewer Phase 2 – Strandherd Drive to Jockvale Road (City of Ottawa, March 2017)
- Update to Chapman Mills SWM Servicing (IBI Group, Feb 2017)
- Excerpts from South Nepean Town Centre Trunk Storm Sewer Municipal Class Environmental Assessment Schedule “B” (Stantec, June 2009)
- As-Built for Southwest Transitway Extension Riocan Drive Extension Trunk Storm Sewer (City of Ottawa, December 2011)
- Existing MOECC Environmental Compliance Approvals for SWMF (MOECC, June 2007)

364-013

BARR

PAUL METIVIER
JOCKVALE
LONGFIELDS
GREENBANK
BARRHAVEN PRESSURE ZONE
BARCHAM
RIVERSTONE
WERSCH
ISLAY
HEATHERCREST
LITTLEWOOD
PONDHOLLOW
FIELDBERRY
KIRKSTONE
ABBOTT
HALF MOON
CALLISTO
TRITON
TUGANA
ESPIN
URBANCREST
LEATHERWOOD
FENCEROW
BENTGRASS
BRACEWOOD
SILVERTHORN
SHANGLEN
CALDERWOOD
GOLFLINKS
CRAIGFLOWER
BLACKSHIRE
PEARL DACE

2017 Water Distribution System

Department of Planning, Infrastructure and Economic Development

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

Scale 1:2500

Ottawa

Legend

- Public Hydrant
- Private Hydrant
- Summer only Flusher Hydrant
- Flusher Hydrant
- Acoustic Fibre Optic
- Gate Valve
- Tapping Valve
- Butterfly Valve
- Buried Valve
- Drain Pipe
- Check Valve
- Closed Valve
- Drain-Out Valve
- Left Hand Valve
- Spot Elevation
- Pressure Reducing Valve
- Air Relief Valve
- Bypass Valve
- Large Chamber Valve
- Inspection Plate
- Cap
- Reducer
- Jump
- Water Meter
- Water Service
- Backbone Pipe
- Watermain with Pipe Diameter, Material and Install Year
- Pipe in Casing
- Pressure Zone Delineation and Identifier
- Well
- Elevated Tank
- Water Pumping Station
- Water Reservoir
- Water Treatment Plant

Pipe Equivalents

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

Pipe Materials

A - ASBESTOS
CI - CAST IRON
CO - COPPER
CO0 - AWWA C300
CO1 - AWWA C301
CO2 - AWWA C302
CO3 - AWWA C303
DI - DUCTILE IRON
PE - POLYETHYLENE (DR11 TO DR21)
PVC - POLYVINYL CHLORIDE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON
UNK - UNKNOWN MATERIAL

362-014	364-014	366-014
362-013	364-013	366-013
362-012	364-012	366-012

Draft Kennedy-Burnett Potable Water Master Servicing Study

Prepared for:
City of Ottawa
100 Constellation Crescent
Ottawa, ON K2G 6G8

Prepared by:
Stantec Consulting Ltd.
400-1331 Clyde Avenue
Ottawa, ON K2C 3G4

March 25, 2014

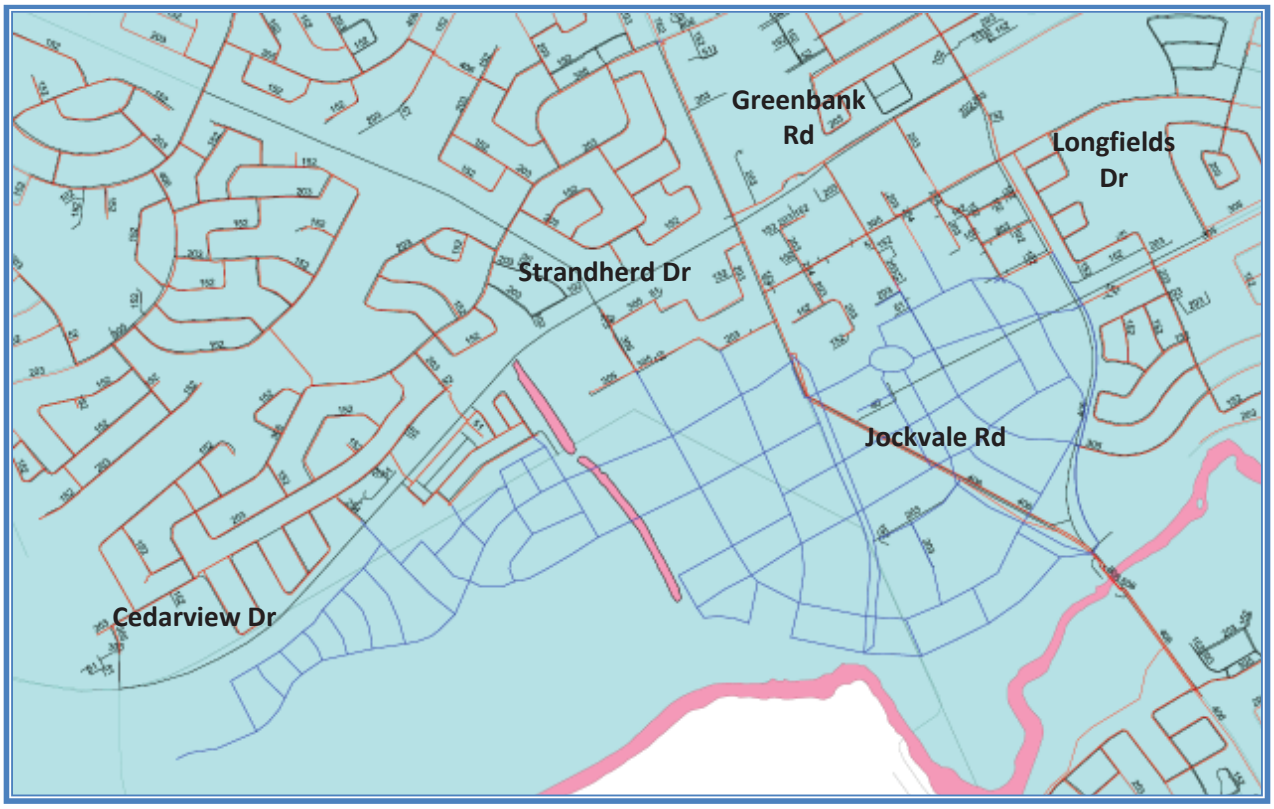


Figure 2-2: Layout of Study Area
Existing (Red) & Future (Blue) W/M (Diameter in mm)

2.5 SERVICING ALTERNATIVES

The following assessment considered scenarios where the KB lands are developed independently of the NTC lands as well as scenarios where both areas are developed concurrently and interconnected. In the case where the KB lands are developed independently of the NTC lands, the KB lands will continue to be serviced in the interim by watermain connected to the existing development north of Strandherd. If both areas (KB and NTC) are built concurrently or if the NTC lands are developed first, the KB area could be fed by watermain from the NTC area. The interconnection between KB and NTC would however, require two crossings of a future stormwater pond area.

Following the zone reconfiguration, the NTC lands will operate at Zone 3C pressure (supplied by the Greenbank 762mm diameter watermain). The KB lands can continue under Zone BARR or be converted to Zone 3C. The primary servicing alternatives for the KB area post zone reconfiguration are as follows:

1. By watermain in the existing adjacent development north of Strandherd (Zone BARR);
2. By a future 406mm diameter watermain along Strandherd (Zone BARR);
3. By future watermain in the NTC lands across the future stormwater facility (Zone 3C).

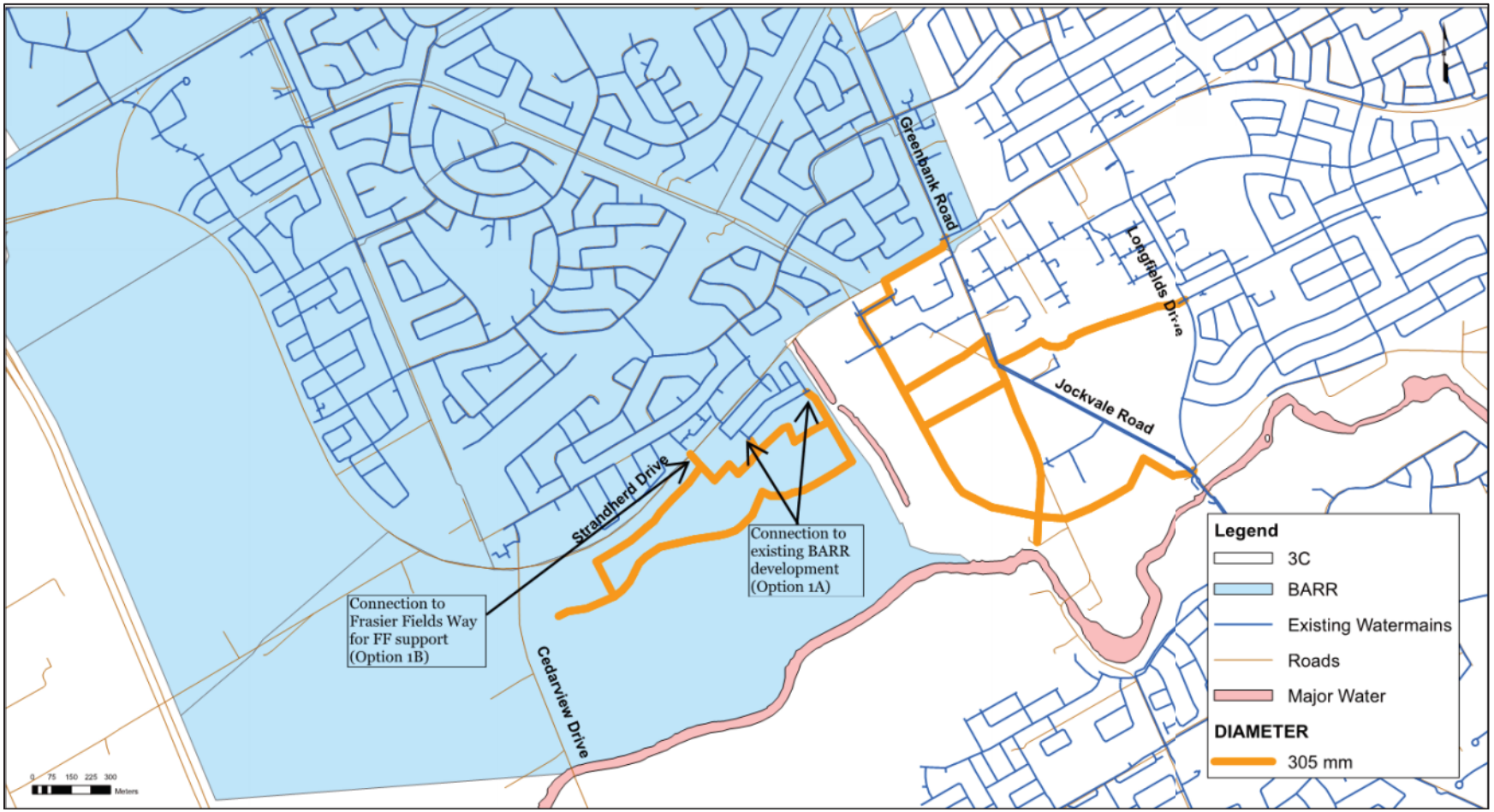


Figure 2-3: Proposed Pipe Layout Pre Zone Reconfiguration – Scenarios 1A and 1B

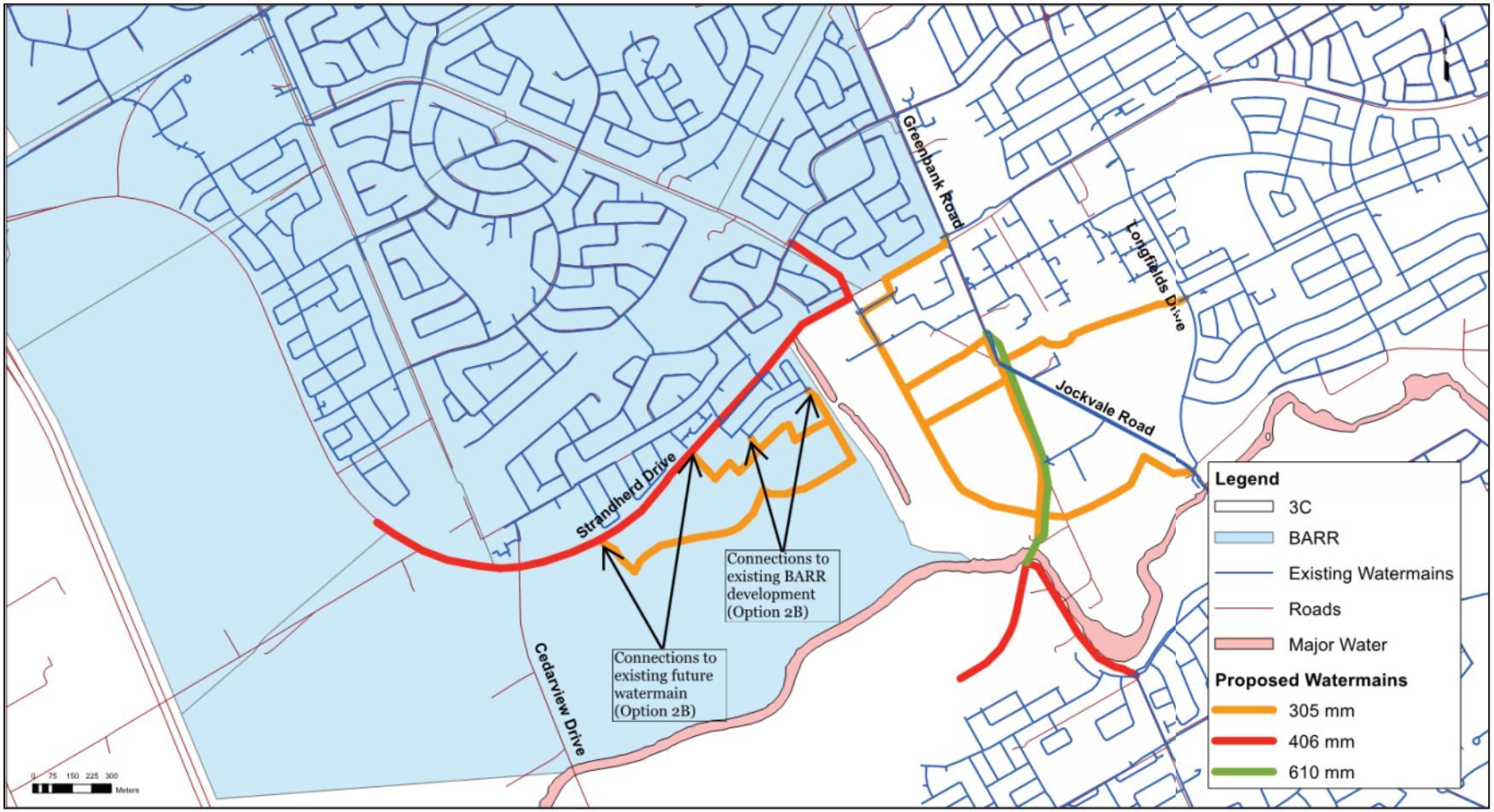


Figure 2-6: Proposed Pipe Layout Post Zone Reconfiguration – Scenario 2B

3.3 COSTING

Although, operating the KB area at 3C pressure (post zone reconfiguration) can maintain max pressures below 80 psi, a major disadvantage of this option is the cost of two 305mm diameter watermains connecting KB and NTC. Outlined in **Table 3-1** is the cost of these watermains in 2013 dollars with allowance of 13% HST, 20% engineering, 5% utilities, 10% City soft costs and a 40% contingency for budgeting/planning. The costs shown are based on the assumption of moderate construction (this would be similar to greenfield conditions with some rock excavation to contend with).

Table 3-1: Costing for Two 305mm Diameter Watermains in Option 1C & Option 3

Length (m)	Diameter (mm)	Construction Cost (2013 $)(1)	Total Costs (2013 $)(2)
310	305	$759,000	$1,435,000
305	305	$747,000	$1,412,000
	Total	$1,506,000	$2,847,000

(1) 2013 City of Ottawa Water Master Plan (WMP) Update Opinion of Probable Cost for Moderate Construction Conditions (includes HST) = (1878 * e^(0.000872 * dia[mm]) * Length [m]

(2) Total costs including 20% engineering, 5% utilities, 10% internal and 40% contingency per 2013 WMP

These opinions of probable costs do not include budget for a water crossing as it assumes the Kennedy Burnett stormwater ponds are not installed before the development. Otherwise, additional costs would be required. Two 305mm diameter watermains connecting KB and NTC are estimated to have a total cost (incl engineering, contingency, etc.) of **$2,874,000**.

3.4 PREFERRED ALTERNATIVE

The Nepean Town Centre will operate at BARR pressure under existing conditions and will operate at future 3C pressure once zone reconfigurations are in place. However, the Kennedy-Burnett area can be serviced at BARR or at 3C pressure depending on the water servicing strategy.

If the KB area is to be developed before the zone reconfiguration, individual PRVs will be required to maintain pressures in the allowable range. If pressure reducing measures are already in place, it further strengthens the recommendation that the KB lands remain within Zone BARR post zone reconfiguration. Furthermore, it is recommended that the KB lands be directly connected to the future Strandherd 406mm watermain once it is constructed. This connection provides added redundancy and increased fire flow capabilities to the KB area.

With KB and NTC operating independently, the need to cross the stormwater pond will also be eliminated, resulting in a potential savings of approximately $2,847,000. While technically feasible, the alternative of crossing below a future stormwater pond is also not desirable from an operational perspective as it would be very difficult to access the sections below the ponds if ever there was a repair to be made.

The preferred alternative pre zone reconfiguration is **Scenario 1B** and the preferred alternative post zone reconfiguration is **Scenario 2B**. It is recommended the KB lands continue to be serviced at Zone BARR pressure while the NTC area is converted to Zone 3C post zone reconfiguration.

Greenbank Road Watermain
Market Place to South of the Jock River
Functional Design Report

Prepared For:

Prepared By:

Robinson Consultants Inc.
Consulting Engineers

Project No. 15054
January 2017

2.3 Preferred Alternative

The evaluation of the three alternatives from the short list, resulted in the Horizontal Directional Drilling (HDD) alternative scoring the highest, the Micro-Tunneling option scoring second and the Open-Cut alternative scoring last. The Open-Cut method scored the lowest due to a significant concern over constructability as well as the potential for cost and schedule over-runs. It should be noted, that although the Micro-Tunneling alternative was not selected as the preferred alternative, it could still be included as an option in the ultimate tender package if more detailed information can be gathered on the control of groundwater for the shaft construction.

The preferred alternative starts at the existing valve chamber at Market Place and continues on the east side of Greenbank Road. It follows the realigned Greenbank Road on the east side and crosses the Jock River by HDD methods and continues on the east side to proposed Pearl Dace Crescent within the Half Moon Bay Subdivision, where it divides into two 406 mm diameter branches. **Figure 1, Figure 2, Figure 3 and Figure 4** on the following pages show the recommended 610 mm diameter watermain alignment plan and the crossing profile.

GREENBANK ROAD WATERMAIN
MARKET PLACE TO SOUTH OF THE
JOCK RIVER

FUNCTIONAL DESIGN I
STA. 10+000 TO STA. 10+600

John L. Moser	J. Zagorski, P.Eng.
General Manager - Planning, Infrastructure and Economic Development Department	*Senior Project Manager Policy Development and Urban Design Branch*

Robinson Consultants

Ottawa

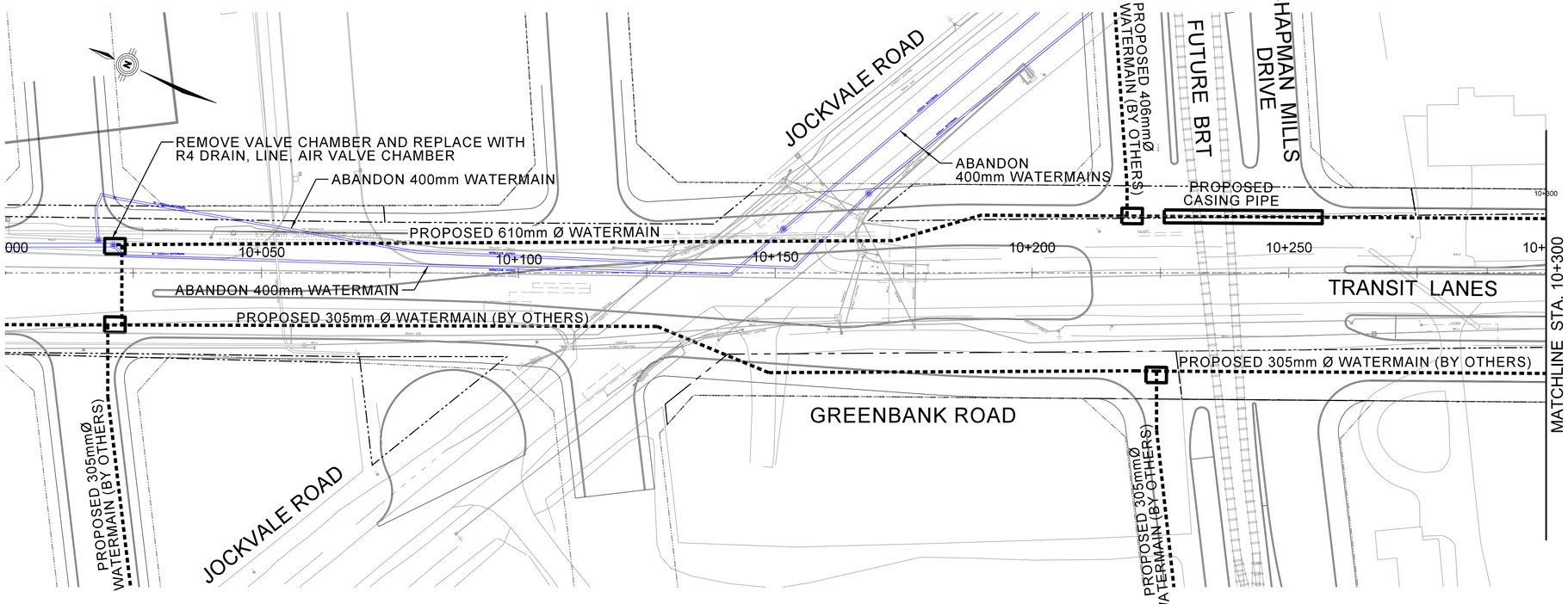
Contract No.	Dwg. No.
	FD1
Sheet	of
Asset No.	
Asset Group	
Des. I.M. / D.H.	Chk'd. P.L.
Dwn. D.H.	Chk'd. P.L.
Utility Circ. No.	Index No.
Const. Inspector	

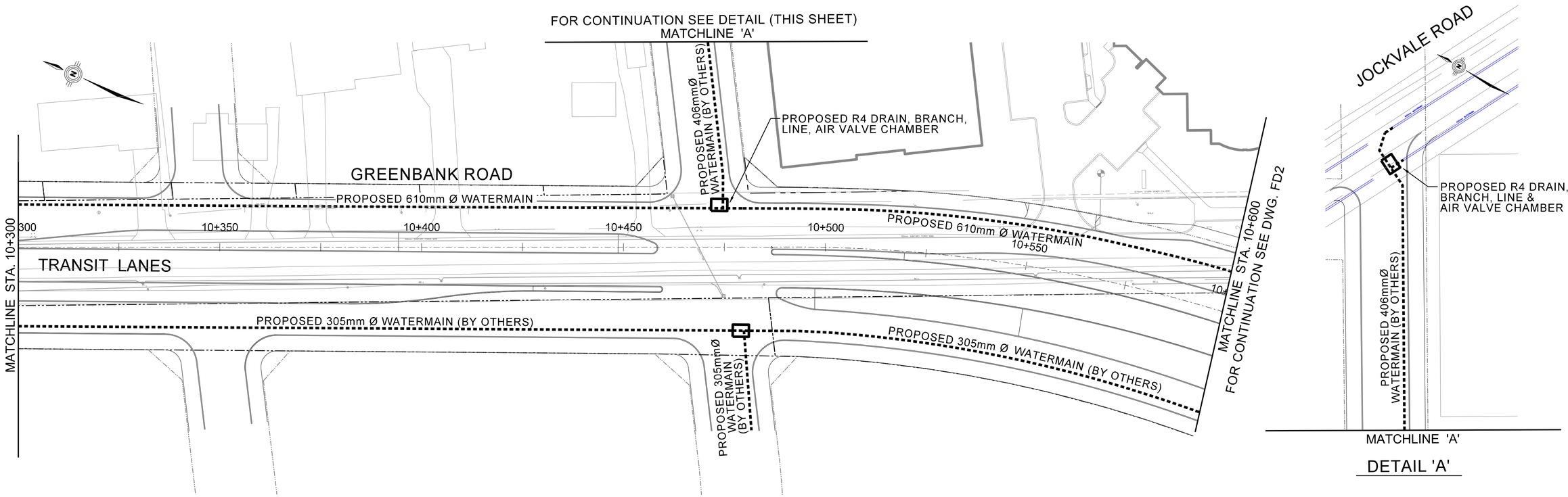
Scale: HORIZONTAL
0m 10 20

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR REVIEW	P.L.	20.01.17





DETAIL 'A'

15054-FunctionalDesign1.dgn 19/01/2017 1:31:02 PM

ST. JOSEPH HIGH SCHOOL

PROPOSED R4 DRAIN, ACCESS, LINE, AIR VALVE CHAMBER

PROPOSED 610mm Ø WATERMAIN

PROPOSED 305mm Ø WATERMAIN (BY 'OTHERS')

PROPOSED SOUTH NEPEAN COLLECTOR (BY 'OTHERS')

PROPOSED HDD SHAFT

PROPOSED 610mm Ø WATERMAIN

10+600

10+650

10+700

10+750

10+800

10+850

10+

MATCHLINE STA. 10+600
FOR CONTINUATION SEE DWG. FD1

TRANSIT LANES

GREENBANK ROAD (FUTURE)

PROPOSED 305mm Ø WATERMAIN

PROPOSED 305mm Ø WATERMAIN (BY 'OTHERS')

PROPOSED SOUTH NEPEAN COLLECTOR (BY 'OTHERS')

PROPOSED 305mm Ø WATERMAIN (BY 'OTHERS')

MATCHLINE STA. 10+900

MATCHLINE STA. 10+900

PROPOSED HDD SHAFT

PROPOSED R4 ACCESS, AIR, LINE, DRAIN VALVE CHAMBER

PROPOSED 610mm Ø WATERMAIN

PROPOSED 610mm Ø WATERMAIN

900

10+950

11+000

11+050

11+100

11+150

11+

GREENBANK ROAD (FUTURE)

TRANSIT LANES

MATCHLINE STA. 11+200
FOR CONTINUATION SEE DWG. FD3

GREENBANK ROAD WATERMAIN
MARKET PLACE TO SOUTH OF THE JOCK RIVER

FUNCTIONAL DESIGN II
STA. 10+600 TO STA. 11+200

John L. Moser *General Manager - Planning, Infrastructure and Economic Development Department*	J. Zagorski, P.Eng. *Senior Project Manager Policy Development and Urban Design Branch*

Robinson Consultants

Ottawa

Contract No.	Dwg. No. FD2
Sheet of	
Asset No.	
Asset Group	
Des. I.M. / D.H.	Chk'd. P.L.
Dwn. D.H.	Chk'd. P.L.
Utility Circ. No.	Index No.
Const. Inspector	

Scale: HORIZONTAL
0m 10 20

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS	No.	Description	By	Date (dd/mm/yy)
	1	ISSUED FOR REVIEW	P.L.	20.01.17

GREENBANK ROAD WATERMAIN
MARKET PLACE TO SOUTH OF THE
JOCK RIVER

FUNCTIONAL DESIGN III
STA. 11+200 TO STA. 11+800

John L. Moser	J. Zagorski, P.Eng.
General Manager - Planning, Infrastructure and Economic Development Department	*Senior Project Manager Policy Development and Urban Design Branch*

Robinson Consultants

Ottawa

Contract No.	Dwg. No. FD3
Sheet of	
Asset No.	
Asset Group	
Des. I.M. / D.H.	Chk'd. P.L.
Dwn. D.H.	Chk'd. P.L.
Utility Circ. No.	Index No.
Const. Inspector	

Scale: HORIZONTAL
0m 10 20

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
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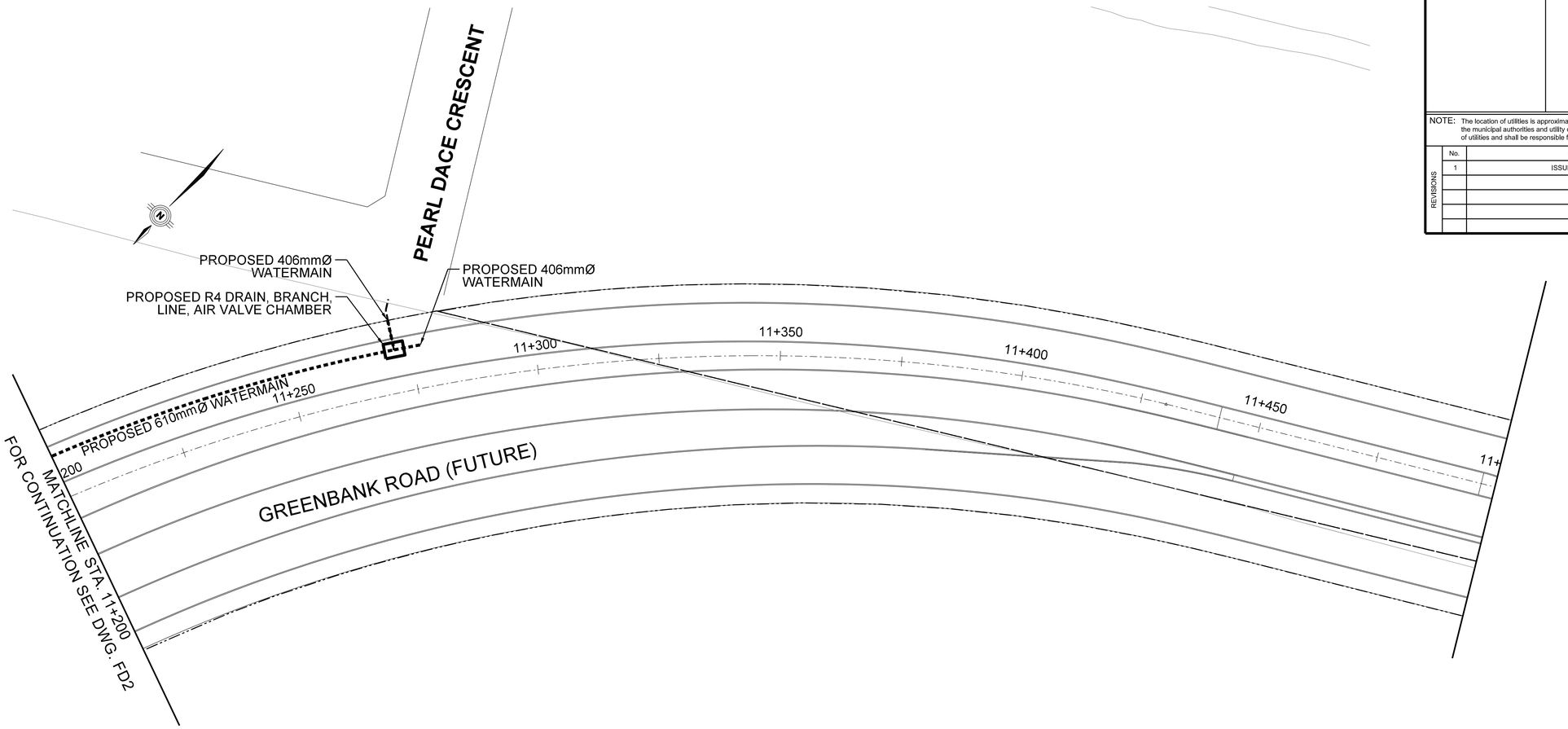
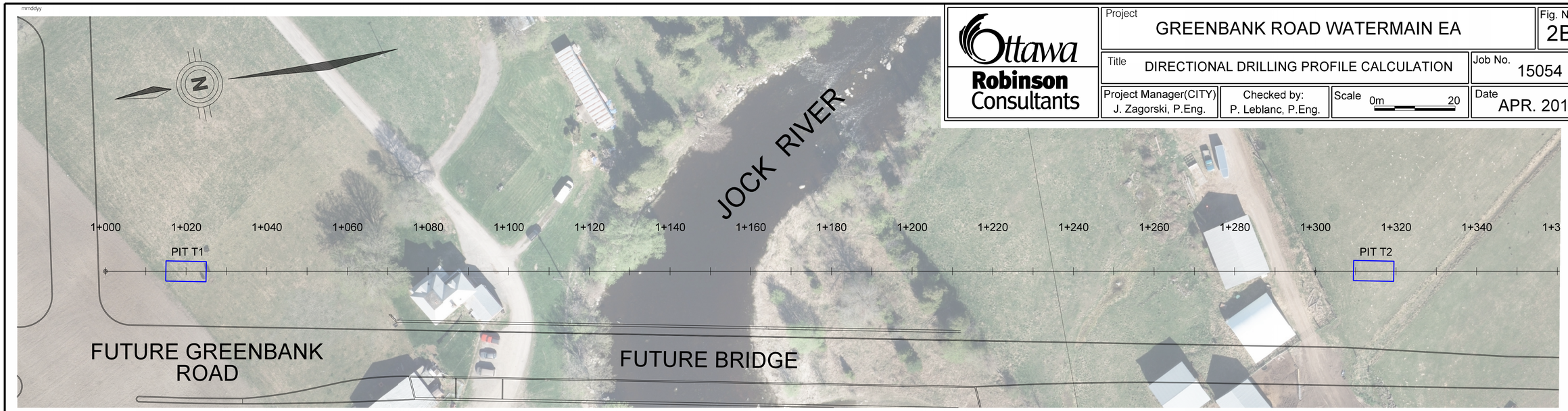
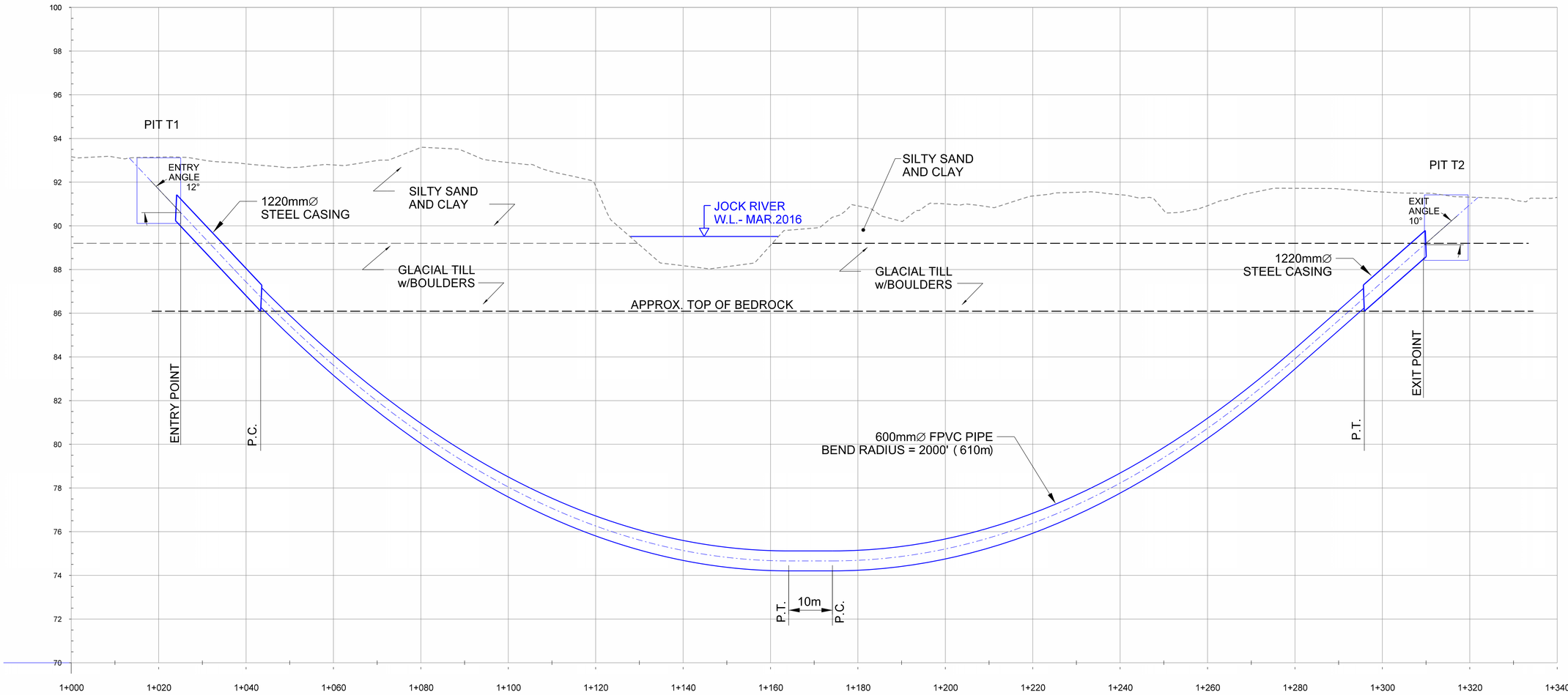


mmddyy

Ottawa Robinson Consultants

Project: GREENBANK ROAD WATERMAIN EA		Fig. No. 2B
Title: DIRECTIONAL DRILLING PROFILE CALCULATION		Job No. 15054
Project Manager(CITY): J. Zagorski, P.Eng.	Checked by: P. Leblanc, P.Eng.	Scale 0m 20 / Date APR. 2016





NOVATECH

Engineers, Planners & Landscape Architects

Engineering

- Land / Site Development
- Municipal Infrastructure
- Environmental / Water Resources
- Traffic/ Transportation
- Structural
- Recreational

Planning

- Land/Site Development
- Planning Application Management
- Municipal
- Planning Documents & Studies
- Expert Witness (OMB)
- Wireless Industry

Landscape Architecture

- Urban Design & Streetscapes
- Recreation & Parks Planning
- Environmental Restoration
- Sustainable Design

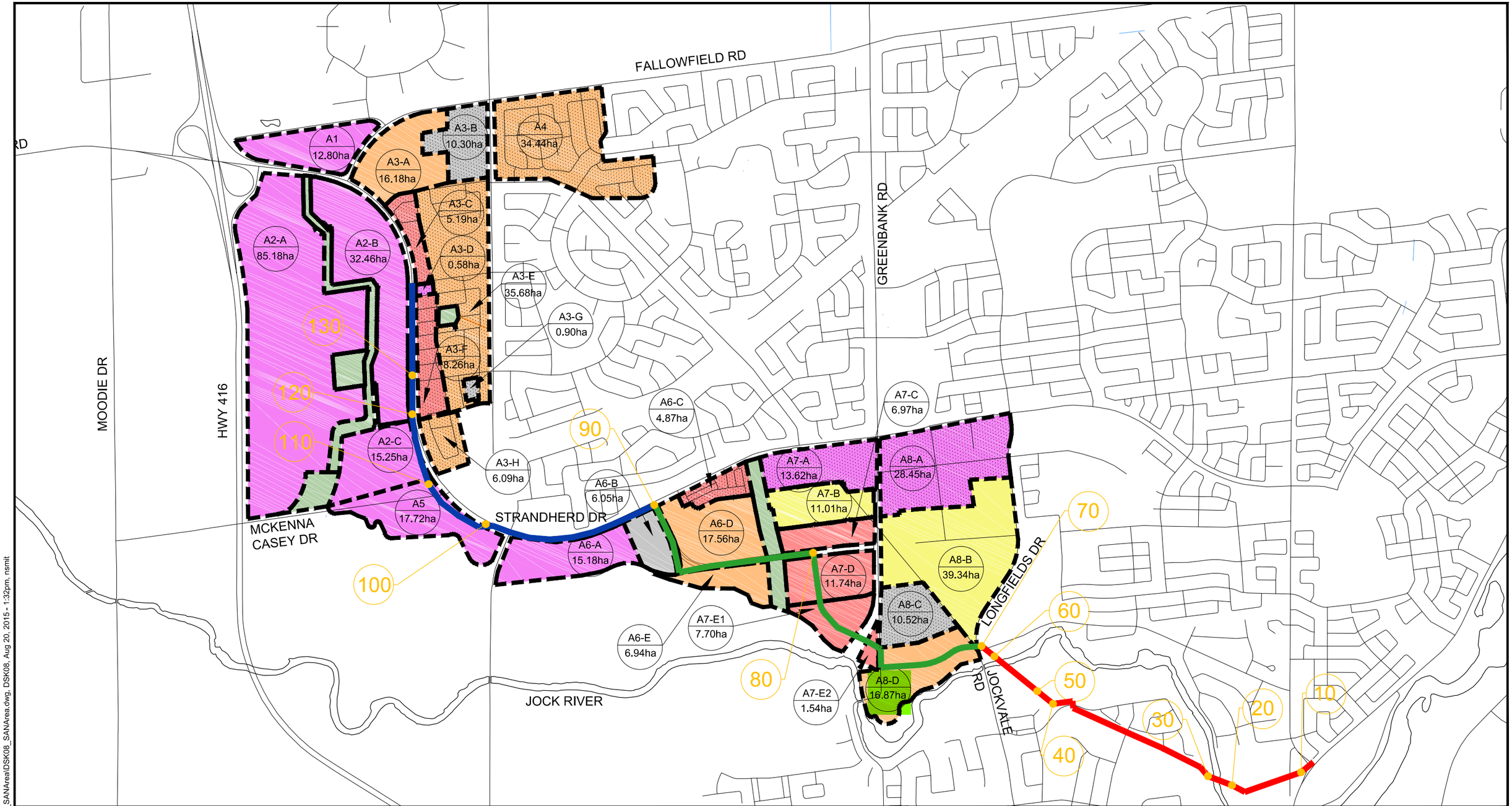
32 Years

South Nepean Collector: Phase 2

Hydraulics Review / Assessment

Technical Memorandum

Prepared for the City of Ottawa



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
- 80 SOUTH NEPEAN COLLECTOR NODE ID

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

SOUTH NEPEAN COLLECTOR SEWER

SANITARY DRAINAGE AREAS AND LAND USE

SCALE 1:20 000

DATE AUG 2015 | JOB 115075 | FIGURE FIG. 1

PROJECT #: 115075
DESIGNED BY: CMS
CHECKED BY: MJP
DATE: August 20, 2015

SANITARY SEWER DESIGN SHEET

South Nepean Collector - Phase 2 & 3

Theoretical Future Full Service Peak Wastewater Flow

NOVATECH
Engineers, Planners & Landscape Architects

Location			Areas				Population				Individual Design Flows			Cumulative Design Flows				
Area I.D.	Existing / Proposed Land Use	Upstream Node	Gross Commercial Area (ha)	Gross Institutional Area (ha)	Gross Residential Area (ha)	Total Gross Area (ha)	Residential Popultation Density (people / ha)	Individual Residential Population	Cumulative Residential Population	Residential Peaking Factor (Harmon Eqn[1])	Commercial Peak Flow Rate[2] (50,000 L/ha/d) (L/s)	Institutional Peak Flow Rate[2] (50,000 L/ha/d) (L/s)	Infiltration / Inflow Rate (0.28 L/s/ha) (L/s)	Commercial (L/s)	Institutional (L/s)	Infiltration / Inflow (L/s)	Residential Peak Flow Rate (350 L/cap/d) (L/s)	Cumulative Peak Design Flow (L/s)
A1	Commercial	130	12.80			12.80					11.1	0.0	3.6	11.1	0.0	3.6	0.0	14.7
A2-A	Commercial	130	85.18			85.18					73.9	0.0	23.9	85.1	0.0	27.4	0.0	112.5
A2-B	Commercial	130	32.46			32.46					28.2	0.0	9.1	113.2	0.0	36.5	0.0	149.8
A3-A	Low Density Residential	130			16.18	16.18	95.2	1540	1540	3.67	0.0	0.0	4.5	113.2	0.0	41.1	22.9	177.2
A3-B	Institutional	130		10.30		10.30			1540	3.67	0.0	8.9	2.9	113.2	8.9	43.9	22.9	189.0
A3-C	Medium Density Residential	130			5.19	5.19	162.0	841	2381	3.53	0.0	0.0	1.5	113.2	8.9	45.4	34.0	201.6
A3-D	Commercial	130	0.58			0.58			2381	3.53	0.5	0.0	0.2	113.7	8.9	45.6	34.0	202.2
A3-E	Low Density Residential	130			35.68	35.68	95.2	3397	5778	3.19	0.0	0.0	10.0	113.7	8.9	55.5	74.6	252.8
A3-F	Medium Density Residential	130			8.26	8.26	162	1338	7116	3.10	0.0	0.0	2.3	113.7	8.9	57.9	89.4	269.9
A3-G	Institutional	130		0.90		0.90			7116	3.10	0.0	0.8	0.3	113.7	9.7	58.1	89.4	270.9
A4	Low Density Residential	130			34.44	34.44	95.2	3279	10395	2.94	0.0	0.0	9.6	113.7	9.7	67.8	123.7	314.9
A2-C	Commercial (ex. snow dump)	120	15.25			15.25			10395	2.94	13.2	0.0	4.3	127.0	9.7	72.0	123.7	332.4
A3-H	Low Density Residential	120			6.09	6.09	95.2	580	10974	2.91	0.0	0.0	1.7	127.0	9.7	73.7	129.6	340.0
A5	Commercial	110	17.72			17.72			10974	2.91	15.4	0.0	5.0	142.4	9.7	78.7	129.6	360.3
A6-A	Commercial	100	15.18			15.18			10974	2.91	13.2	0.0	4.3	155.5	9.7	82.9	129.6	377.8
A6-B	Institutional	100		6.05		6.05			10974	2.91	0.0	5.3	1.7	155.5	15.0	84.6	129.6	384.7
A6-C	Medium Density Residential	90			4.87	4.87	162.0	789	11763	2.88	0.0	0.0	1.4	155.5	15.0	86.0	137.4	393.9
A6-D	Low Density Residential	90			17.56	17.56	95.2	1672	13435	2.83	0.0	0.0	4.9	155.5	15.0	90.9	153.8	415.2
A6-E	Low Density Residential	90			6.94	6.94	95.2	661	14096	2.81	0.0	0.0	1.9	155.5	15.0	92.9	160.2	423.6
A7-A	Commercial	90	13.62			13.62			14096	2.81	11.8	0.0	3.8	167.4	15.0	96.7	160.2	439.2
A7-B	High Density Residential	90			11.01	11.01	135.0	1486	15582	2.76	0.0	0.0	3.1	167.4	15.0	99.8	174.3	456.4
A7-C	Medium Density Residential	90			6.97	6.97	162.0	1129	16711	2.73	0.0	0.0	2.0	167.4	15.0	101.7	184.9	468.9
A7-D	Medium Density Residential	90			11.74	11.74	162.0	1902	18613	2.68	0.0	0.0	3.3	167.4	15.0	105.0	202.4	489.7
A7-E1/E2	Medium Density Residential	90			9.24	9.24	162.0	1497	20110	2.65	0.0	0.0	2.6	167.4	15.0	107.6	215.9	505.8
A8-A	Commercial	80	28.45			28.45			20110	2.65	24.7	0.0	8.0	192.0	15.0	115.5	215.9	538.5
A8-B	High Density Residential	80			39.34	39.34	135.0	5311	25421	2.55	0.0	0.0	11.0	192.0	15.0	126.6	262.4	596.0
A8-C	Institutional	80		10.52		10.52			25421	2.55	0.0	9.1	2.9	192.0	24.1	129.5	262.4	608.1
A8-D	Low Density Residential	80			16.87	16.87	120.9	2040	27461	2.52	0.0	0.0	4.7	192.0	24.1	134.2	279.8	630.2
ROW Along SNC Sewer Alignment	-	80				14.34			27461	2.52	0.0	0.0	4.0	192.0	24.1	138.2	279.8	634.2
TOTAL		***80***	***221.24***	***27.77***	***230.38***	***493.73***	***-***	***27461***	***27461***	***2.52***	***192.0***	***24.1***	***134.2***	***192.0***	***24.1***	***138.2***	***279.8***	***634.2***

Residential Land Use	Population Density (Units / ha)	Persons per Unit	Persons per ha
Low Density (singles and semis)	26 – 28 (28 used)	2.7 – 3.4 (3.4 used)	95.2
Medium Density (row/townhouse)	50 – 60 (60 used)	2.7	162.0
High Density (apartments)	60 – 75 (75 used)	1.8	135.0

Notes:

1. Harmon Equation = $1 + [14 / (4+(P/1000)^{1/2})] \times K$

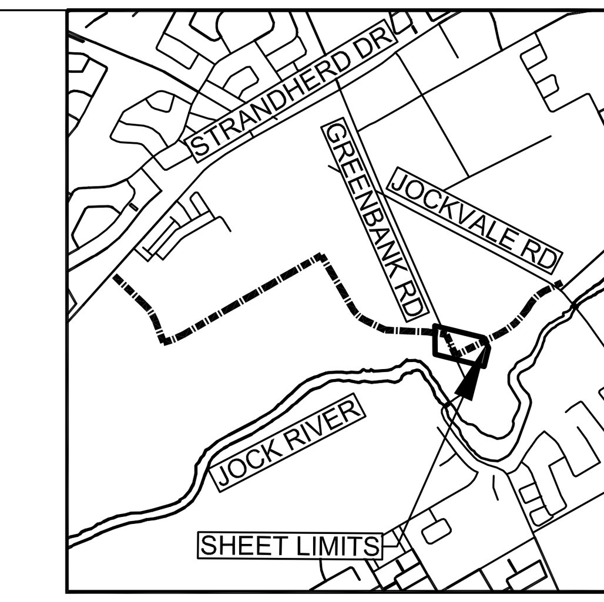
Where: P = population; K = correction factor = 1.0

2. Instituional / Commercial Peaking Factor = 1.5

Reported Design Flows / Assumptions:

1. Area A4: Existing single family units currently serviced by Jockvale pump station to be redirected to SNC

2. Area A8-D: proposed 600 medium density residential units



CITY OF OTTAWA

SOUTH NEPEAN COLLECTOR (SNC)
SEWER PHASE 2 - STRANDHERD DRIVE TO JOCKVALE ROAD

PLAN AND PROFILE
STA. 1+800 TO 2+100

WAYNE NEWELL, P.Eng. General Manager
JONATHAN KNOYLE, P.Eng. Senior Engineer

NOVATECH Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive Kanata, Ontario, Canada, K2M 1P6
Telephone: (613) 254-9643
Facsimile: (613) 254-5867
Email: novainfo@novatech-eng.com

Ottawa

Contract No.	ISD14-2033
Dwg. No.	025
Sheet	25 of 51
Asset No.	
Asset Group	ISD
Des.	RJD
Chk'd.	ERD
Dwn.	NCS
Chk'd.	RJD
Utility Circ. No.	
Index No.	
Const. Inspector	

Scale: HORIZONTAL 1:500 (0 5 10 15 20); VERTICAL 1:100 (0 1 2 3 4)

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

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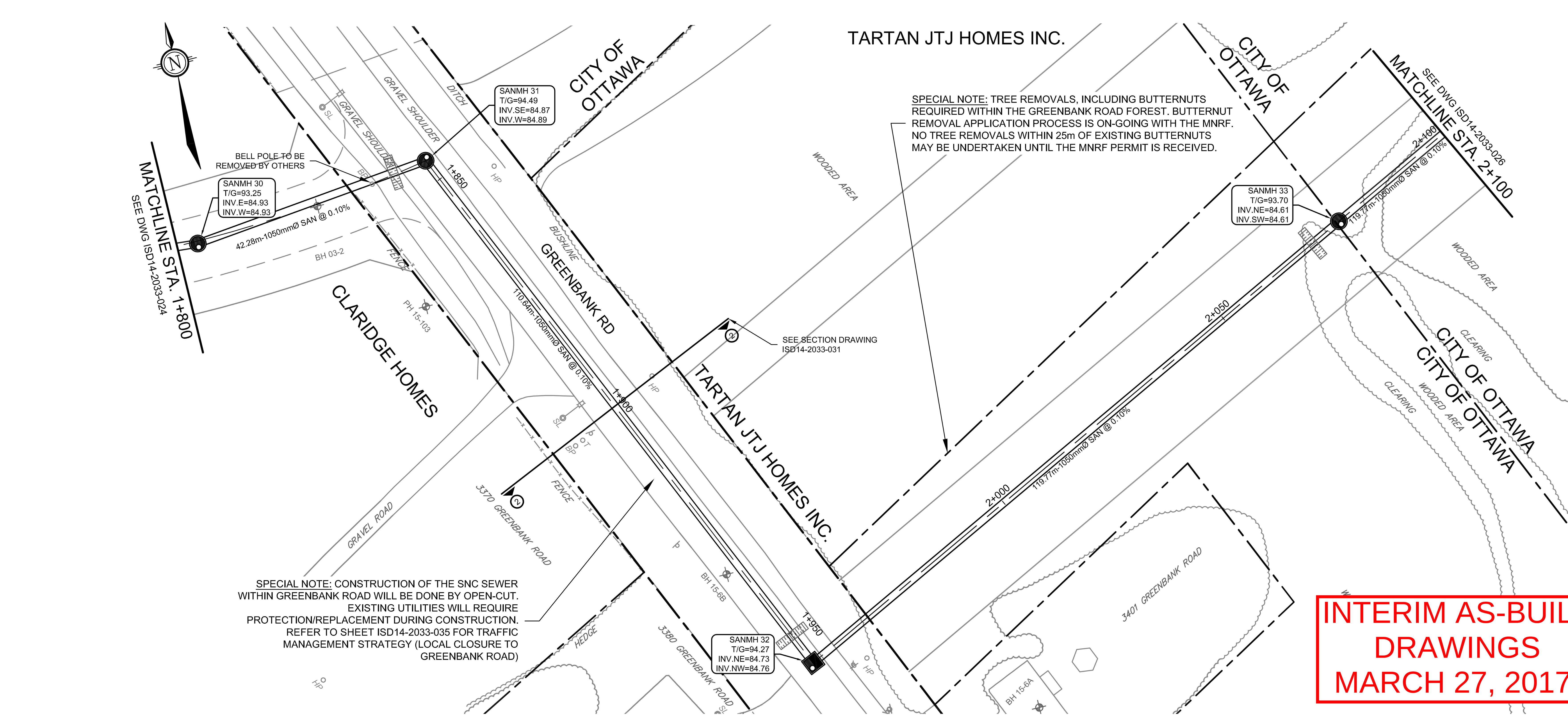
8.	SEWER ALIGNMENT SHIFT ON GREENBANK	ERD	16/09/16
9.	REVISED PER MION SERVICING	ERD	08/12/16



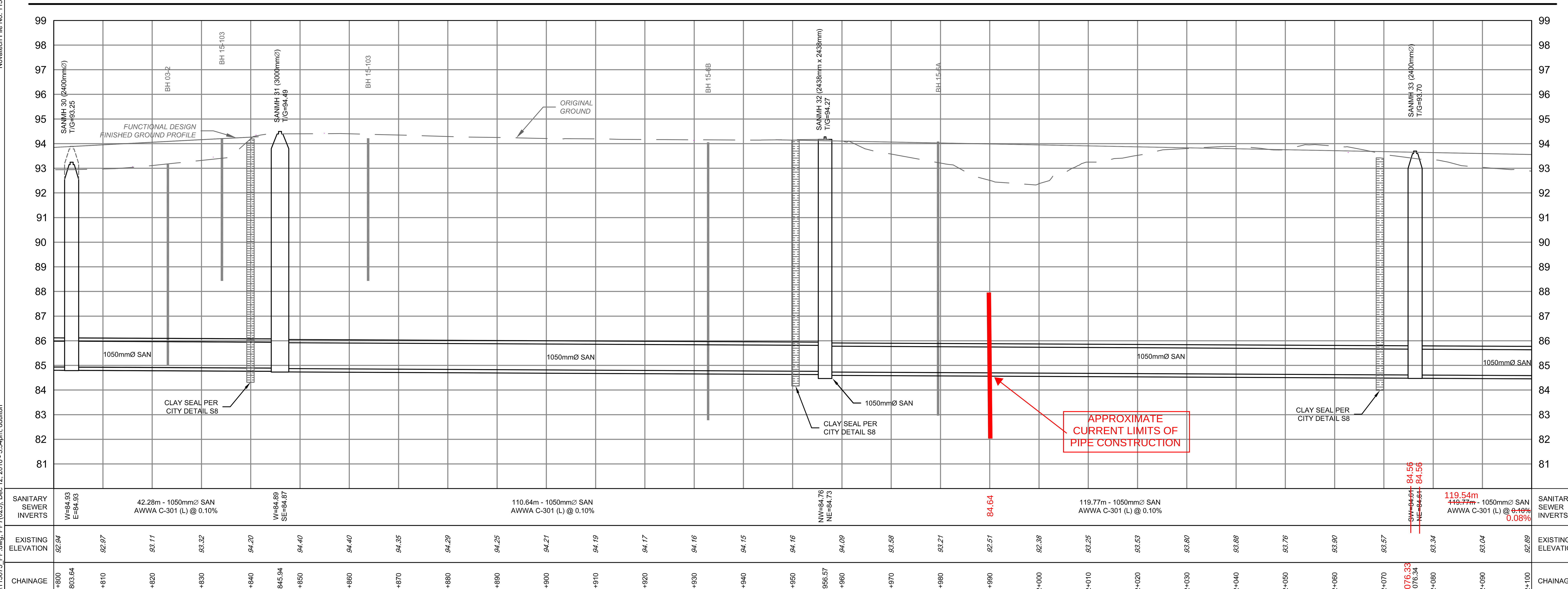
LEGEND

EXISTING ITEMS: WATERMAIN; WATERMAIN VALVE; STORM SEWER; STORM MH (STM); CATCH BASIN & LEAD (CB); CULVERT; STORM STRUCTURE; SANITARY SEWER; SANITARY MH (SAN)

PROPOSED ITEMS: SANITARY SEWER; SANITARY MH & LID; CULVERT; FUTURE STRUCTURE T/G ADJUSTMENT

NOTES:

1. CONCRETE PRESSURE PIPE SHALL BE AWWA C301 (L) CL-16. FITTING SHALL BE DESIGNED TO THE SAME CRITERIA AS THE ADJACENT PIPE.
2. CONTRACTOR TO PROVIDE PIPE CLASS CALCULATIONS, AS PER AWWA C304 (DESIGN OF PRESTRESSED CONCRETE CYLINDER PIPE), BY THE PIPE MANUFACTURER, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
3. PIPE EMBEDMENT SHALL BE AS PER CITY OF OTTAWA DETAIL S6. SAND MAY BE USED AS PIPE COVER MATERIAL ABOVE THE SPRINGLINE.
4. A CLOTH DIAPER APPROVED BY THE PIPE MANUFACTURE SHALL BE PLACED AROUND EACH EXTERIOR JOIN RECESS AND FASTENED IN PLACE WITH EITHER WIRE OR STEEL STRAPPING STITCHED INTO ITS EDGES.
5. THE JOINT SHALL BE FILLED WITH MORTAR IN ONCE CONTINUOUS OPERATION AND PATTED OR MANIPULATED TO SETTLE THE MORTAR AND EXPEL AND ENTRAPPED AIR.
6. INTERIOR JOINTS SHALL BE FILLED WITH MORTAR AFTER BACKFILLING AND FINISHED SMOOTH WITH A TROWEL. CEMENT USED SHALL MEET THE REQUIREMENTS OF TYPE HS CEMENT (HIGH-SULPHATE-RESISTANCE), OR APPROVED EQUIVALENT.
7. THE INTERIOR OF THE JOINTS SHALL BE PROTECTED FROM CORROSION WITH EPOXY AND ZINC COATING APPLIED DURING FABRICATION.
8. THE INTERIOR STRUCTURAL CONCRETE CORE SHALL BE MANUFACTURED WITH TYPE HS CEMENT (HIGH-SULPHATE-RESITANCE), OR APPROVED EQUIVALENT.
9. SEE MANHOLE DETAIL DRAWINGS ISD14-2033-36 TO ISD14-2033-45 FOR ADDITIONAL DETAILS



MAINTENANCE HOLE DATA

MH ID	STATION	OFFSET	STRUCTURE	COVER	T/G ELEV	LOW. INV.
30	1+803.64	0.43R	OPSD 701.013	S24/S25	93.25	84.93
31	1+845.94	0.00	OPSD 701.014	S24/S25	94.49	84.87
32	1+956.57	0.00	Box MH	S24/S25	94.27	84.73
33	2+076.34	0.00	OPSD 701.013	S24/S25	93.70	84.61

SANITARY SEWER PIPE DATA

CONNECTED STRUCTURES & INVERTS	DIA (mm)	LENGTH (m)	MATERIAL
SANMH 29 = 85.03 SANMH 30 = 84.93	1050	100.14	AWWA C-301 (L)
SANMH 30 = 84.93 SANMH 31 = 84.89	1050	42.28	AWWA C-301 (L)
SANMH 31 = 84.87 SANMH 32 = 84.76	1050	110.64	AWWA C-301 (L)
SANMH 32 = 84.73 SANMH 33 = 84.61	1050	119.77	AWWA C-301 (L)
SANMH 33 = 84.61 SANMH 34 = 84.49	1050	119.77	AWWA C-301 (L)

TITLE FRAME: 709mm x 534mm City of Ottawa 2008

Novatech File No. 115075

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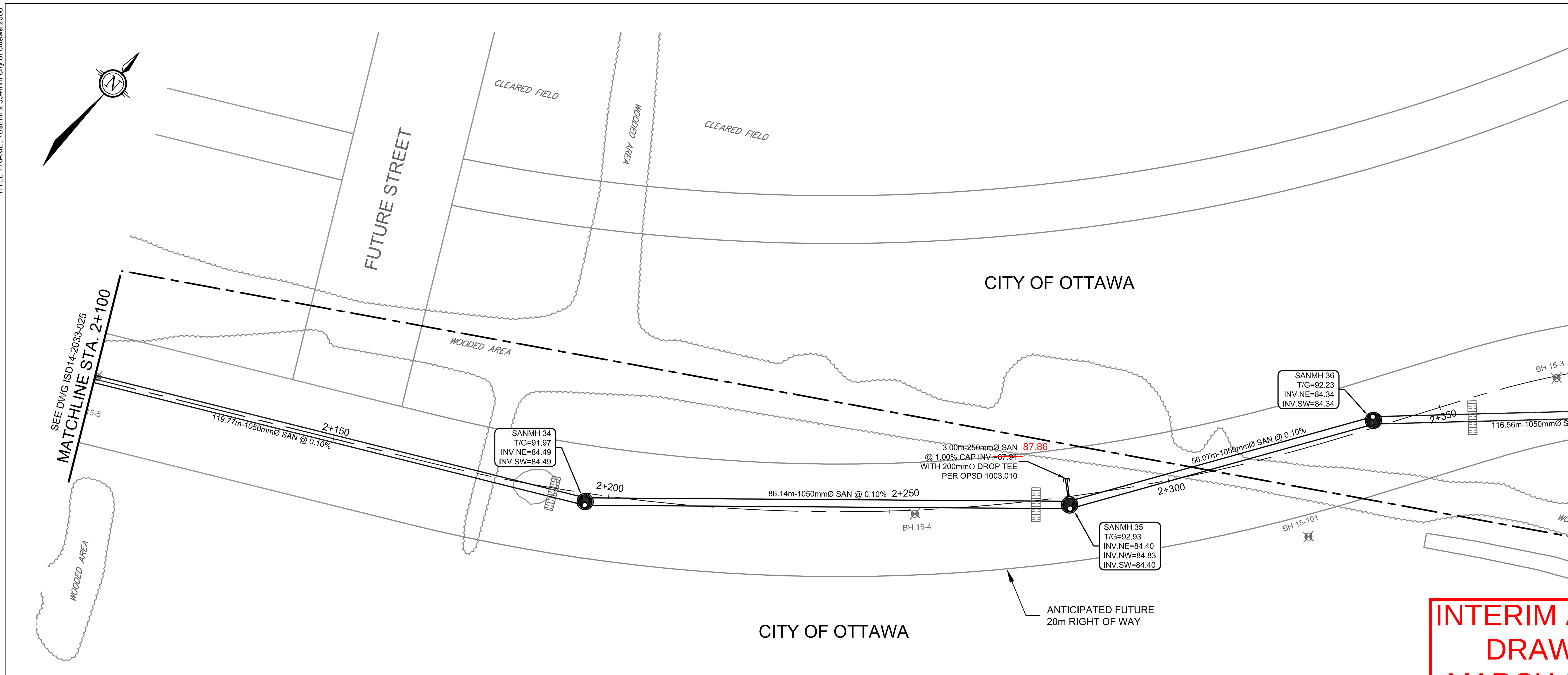
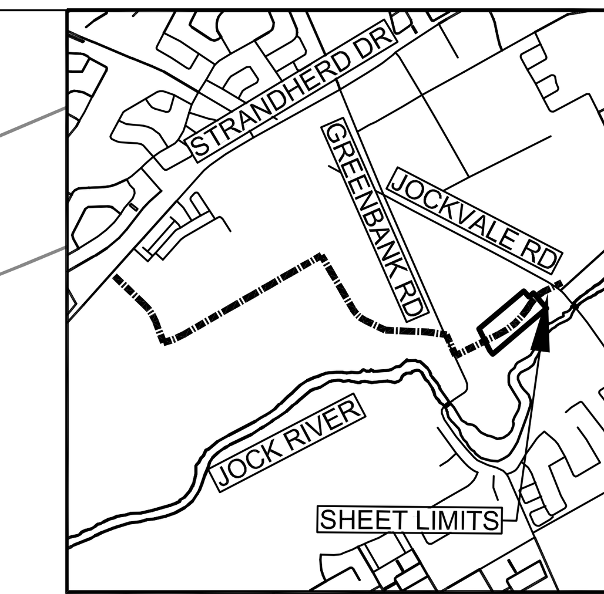


INTERIM AS-BUILT DRAWINGS MARCH 27, 2017.



CITY OF OTTAWA

SOUTH NEPEAN COLLECTOR (SNC)
SEWER PHASE 2 - STRANDHERD DRIVE TO JOCKVALE ROAD

PLAN AND PROFILE
STA. 2+100 TO 2+400

WAYNE NEWELL, P.Eng. — General Manager
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Ottawa

Contract No.	ISD14-2033
Dwg. No.	026
Sheet	26 of 51
Asset No.	
Asset Group	ISD
Des.	RJD
Chk'd.	ERD
Dwn.	NCS
Chk'd.	RJD
Utility Circ. No.	
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6.	ISSUED FOR TENDER	ERD	20/06/16
7.	ISSUED FOR CONSTRUCTION	ERD	30/08/16
8.	SEWER ALIGNMENT SHIFT ON GREENBANK	ERD	16/09/16
9.	SEWER ALIGNMENT UPDATE MH36 - MH37	ERD	18/11/16
10.	REVISED PER MION SERVICING	ERD	08/12/16

LEGEND

EXISTING ITEMS
- WATERMAIN
- WATERMAIN VALVE
- STORM SEWER
- STORM MH (STM)
- CATCH BASIN & LEAD (CB)
- CULVERT
- STORM STRUCTURE
- SANITARY SEWER
- SANITARY MH (SAN)

PROPOSED ITEMS
- SANITARY SEWER
- SANITARY MH & LID
- CULVERT
- FUTURE STRUCTURE T/G ADJUSTMENT

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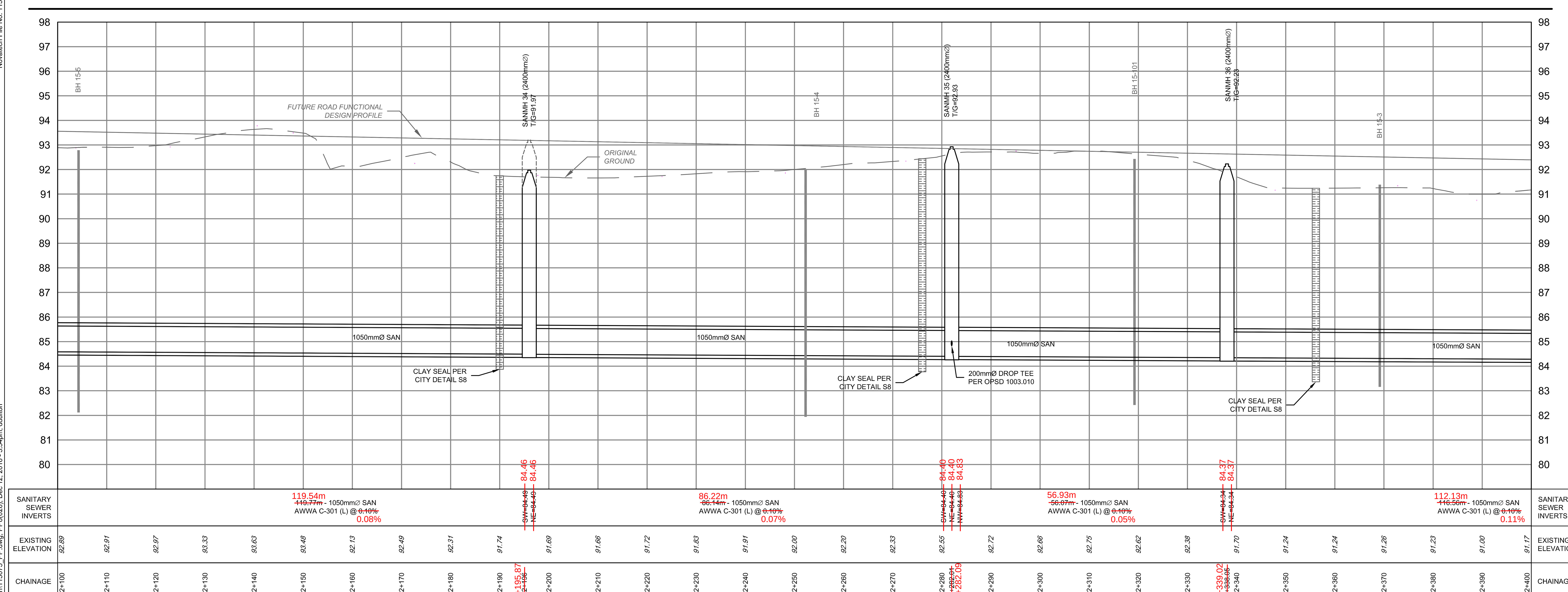
4. A CLOTH DIAPER APPROVED BY THE PIPE MANUFACTURE SHALL BE PLACED AROUND EACH EXTERIOR JOIN RECESS AND FASTENED IN PLACE WITH EITHER WIRE OR STEEL STRAPPING STITCHED INTO ITS EDGES.
5. THE JOINT SHALL BE FILLED WITH MORTAR IN ONCE CONTINUOUS OPERATION AND PATTED OR MANIPULATED TO SETTLE THE MORTAR AND EXPEL AND ENTRAPPED AIR.
6. INTERIOR JOINTS SHALL BE FILLED WITH MORTAR AFTER BACKFILLING AND FINISHED SMOOTH WITH A TROWEL. CEMENT USED SHALL MEET THE REQUIREMENTS OF TYPE HS CEMENT (HIGH-SULPHATE-RESISTANCE), OR APPROVED EQUIVALENT.
7. THE INTERIOR OF THE JOINTS SHALL BE PROTECTED FROM CORROSION WITH EPOXY AND ZINC COATING APPLIED DURING FABRICATION.
8. THE INTERIOR STRUCTURAL CONCRETE CORE SHALL BE MANUFACTURED WITH TYPE HS CEMENT (HIGH-SULPHATE-RESITANCE), OR APPROVED EQUIVALENT.
9. SEE MANHOLE DETAIL DRAWINGS ISD14-2033-36 TO ISD14-2033-45 FOR ADDITIONAL DETAILS



MAINTENANCE HOLE DATA

MH ID	STATION	OFFSET	STRUCTURE	COVER	T/G ELEV	LOW. INV.
34	2+196.00	1.50R	OPSD 701.013	S24/S25	91.97	84.49
35	2+282.01	1.50R	OPSD 701.013	S24/S25	92.93	84.40
36	2+338.05	1.26L	OPSD 701.013	S24/S25	92.23	84.34

SANITARY SEWER PIPE DATA

CONNECTED STRUCTURES & INVERTS	DIA (mm)	LENGTH (m)	MATERIAL
SANMH 33 = 84.61 SANMH 34 = 84.49	1050	119.77	AWWA C-301 (L)
SANMH 34 = 84.49 SANMH 35 = 84.40	1050	86.14	AWWA C-301 (L)
SANMH 35 = 84.40 SANMH 36 = 84.34	1050	56.07	AWWA C-301 (L)
SANMH 36 = 84.34 SANMH 37 = 84.23	1050	116.56	AWWA C-301 (L)

TITLE FRAME: 709mm x 534mm City of Ottawa 2008

Novatech File No. 115075

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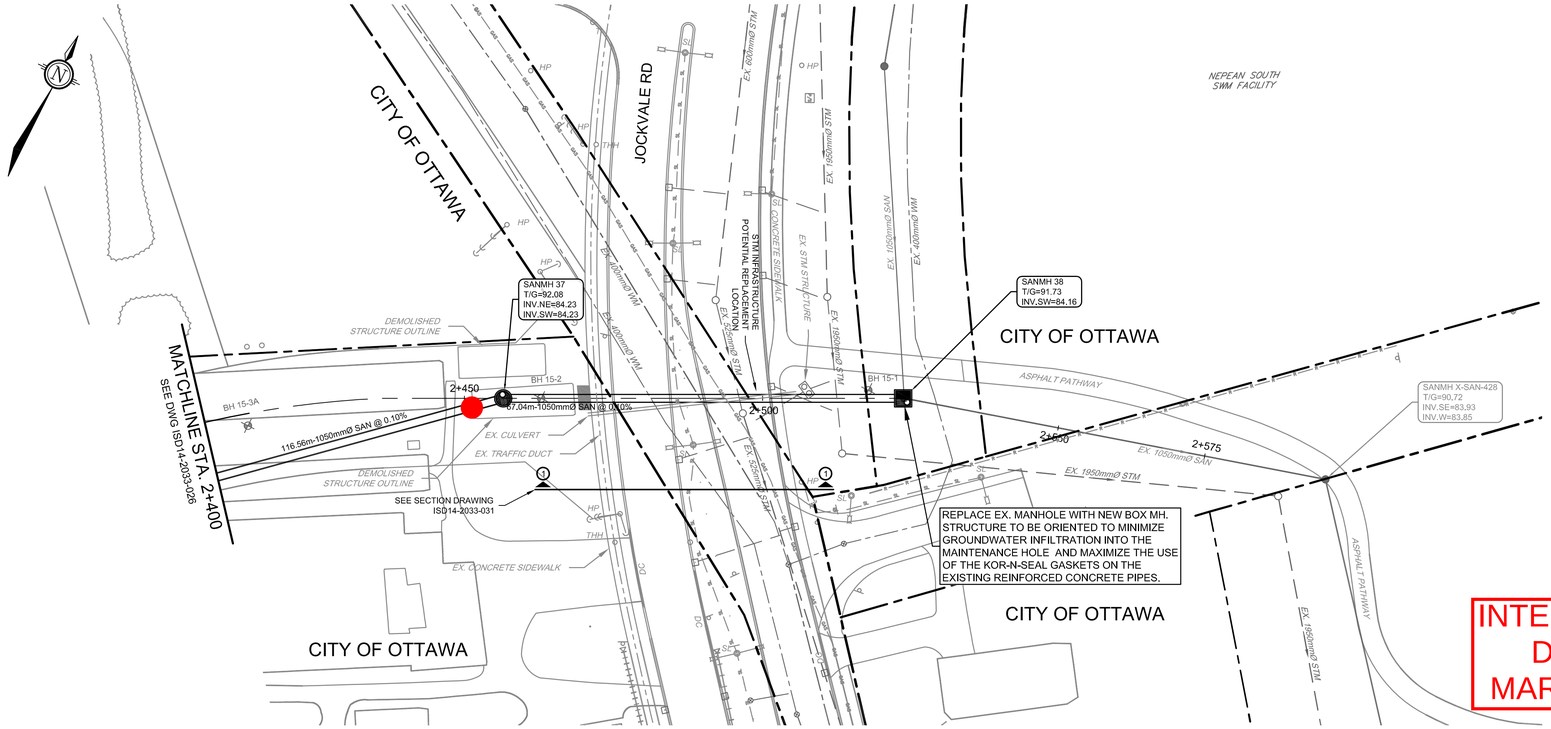
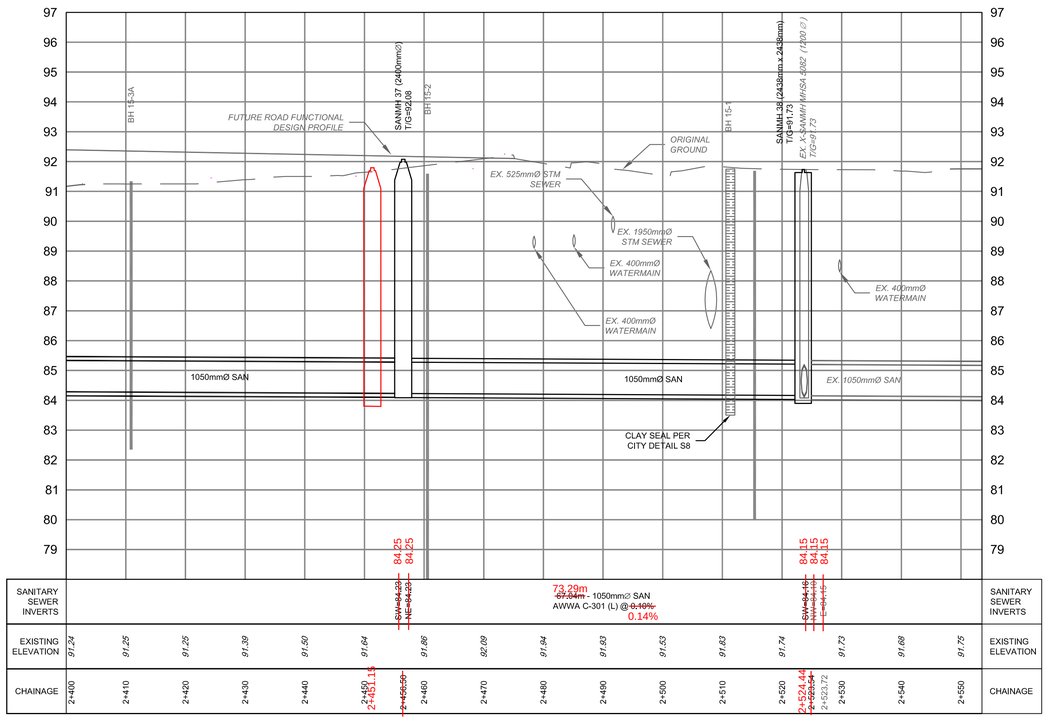
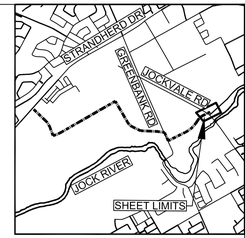


INTERIM AS-BUILT DRAWINGS MARCH 27, 2017.





CITY OF OTTAWA
SOUTH NEPEAN COLLECTOR (SNC)
SEWER PHASE 2 - STRANDHERD DRIVE TO JOCKVALE ROAD

PLAN AND PROFILE
STA. 2+400 TO 2+575

WAYNE NEWELL, P.Eng. — General Manager
JONATHAN KNOYLE, P.Eng. — Senior Engineer

NOVATECH Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario, Canada, K2M 1P6
Telephone: (613) 254-9643
Facsimile: (613) 254-5867
Email: novainfo@novatech-eng.com

Ottawa

Contract No.	Dwg. No.
ISD14-2033	027

Sheet 27 of 51

Asset No.

Asset Group: ISD

Des.	Chk'd.
RJD	ERD
Dwn.	Chk'd.
NCS	RJD
Utility Circ. No.	Index No.

Const. Inspector

Scale;
HORIZONTAL 1:500
0 5 10 15 20
0 1 2 3 4
VERTICAL 1:100

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1.	ISSUED FOR PRELIMINARY DESIGN CIRCULATION	ERD	21/12/15
2.	CHANGES TO ORIENTATION ACROSS KB SWM FACILITY	ERD	16/02/16
3.	ISSUED FOR PRELIMINARY DESIGN REPORT	ERD	02/03/16
4.	ISSUED FOR FINAL DESIGN CIRCULATION	ERD	29/04/16
5.	ISSUED FOR MOECC ECA APPLICATION	ERD	26/05/16
6.	ISSUED FOR TENDER	ERD	20/06/16
7.	ISSUED FOR CONSTRUCTION	ERD	30/08/16
8.	SEWER ALIGNMENT SHIFT ON GREENBANK	ERD	16/09/16
9.	SEWER ALIGNMENT UPDATE MH36 - MH37	ERD	18/11/16
10.	REVISED PER MION SERVICING	ERD	08/12/16

LEGEND

EXISTING ITEMS		PROPOSED ITEMS	
WATERMAIN		SANITARY SEWER	
WATERMAIN VALVE		SANITARY MH & LID	
STORM SEWER		CULVERT	
STORM MH	STM	FUTURE STRUCTURE T/G ADJUSTMENT	
CATCH BASIN & LEAD	CB		
CULVERT			
STORM STRUCTURE			
SANITARY SEWER			
SANITARY MH	SAN		

NOTES:

1. CONCRETE PRESSURE PIPE SHALL BE AWWA C301 (L) CL-16. FITTING SHALL BE DESIGNED TO THE SAME CRITERIA AS THE ADJACENT PIPE.
2. CONTRACTOR TO PROVIDE PIPE CLASS CALCULATIONS, AS PER AWWA C304 (DESIGN OF PRESTRESSED CONCRETE CYLINDER PIPE), BY THE PIPE MANUFACTURER, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
3. PIPE EMBEDMENT SHALL BE AS PER CITY OF OTTAWA DETAIL S6. SAND MAY BE USED AS PIPE COVER MATERIAL ABOVE THE SPRINGLINE.
4. A CLOTH DIAPER APPROVED BY THE PIPE MANUFACTURE SHALL BE PLACED AROUND EACH EXTERIOR JOIN RECESS AND FASTENED IN PLACE WITH EITHER WIRE OR STEEL STRAPPING STITCHED INTO ITS EDGES.
5. THE JOINT SHALL BE FILLED WITH MORTAR IN ONCE CONTINUOUS OPERATION AND PATTED OR MANIPULATED TO SETTLE THE MORTAR AND EXPEL AND ENTRAPPED AIR.
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9. SEE MANHOLE DETAIL DRAWINGS ISD14-2033-36 TO ISD14-2033-45 FOR ADDITIONAL DETAILS

MAINTENANCE HOLE DATA

MH ID	STATION	OFFSET	STRUCTURE	COVER	T/G ELEV	LOW. INV.
37	2+456.50	0.00	OPSD 701.013	S24/S25	92.08	84.23
38	2+523.54	0.00	Box MH	S24/S25	91.73	84.16

SANITARY SEWER PIPE DATA

CONNECTED STRUCTURES & INVERTS	DIA (mm)	LENGTH (m)	MATERIAL
SANMH 36 = 84.34 SANMH 37 = 84.23	1050	116.56	AWWA C-301 (L)
SANMH 37 = 84.23 SANMH 38 = 84.16	1050	67.04	AWWA C-301 (L)

IBI GROUP
400–333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Memorandum

To/Attention	City of Ottawa	**Date**	February 28, 2017
From	Meghan Black, IBI Peter Spal, IBI	**Project No**	102366-5.3.1.5 (3499-RS)
cc	Catherine Tremblay, Minto Hugo Lalonde, Minto		
Subject	Update to Chapman Mills SWM Servicing		

1. Introduction

Minto Communities Inc. retained IBI Group to prepare the stormwater management servicing plan for the Chapman Mills lands, which are part of the Nepean South development. The subject lands measure approximately 200 ha and are located in a quadrant bounded by Greenbank Road to the west, Woodroffe Road to the east, the Jock River to the south, and Strandherd Drive to the north (**Figure 1**). The storm servicing is presented "Nepean South-Chapman Mills Stormwater Management Servicing Report" (IBI Group, August 2006), which recommended a preferred stormwater management system to accommodate sustainable development while protecting the existing natural environment and the receiving Jock River.

The stormwater management system servicing Chapman Mills is comprised of two interceptor sewers, three interceptor manholes, an end-of-pipe stormwater management facility providing water quality treatment to the tributary development, and three overflow outlets to the Jock River. The system diverts the most frequent and polluted flow (first flush) to the stormwater management facility via the interceptor sewers and interceptor manholes. Flow in excess of the first flush (trunk overflow) bypasses the stormwater management facility and is discharged directly to the Jock River via three overflow outlets.

Details of the SWM facility and trunk storm sewer design are presented in "Nepean South-Chapman Mills Stormwater Management Design Brief" (IBI Group, May 2007) and three subsequent addenda to the overall SWM servicing in November 2009, September 2010 and June 2012. The addenda reflect the updates to the servicing as a result of detailed design and construction of the various phases of development. Construction of the interceptor sewers, interceptor manholes, stormwater management facility and overflow outlets is complete.

The purpose of this memo is to summarize the proposed updates to the stormwater management servicing for the future development west of Longfields Drive based on a review of proposed land use and on-site storage. The subject lands, indicated on **Figure 1**, are majority owned by Minto and the City, with a parcel owned by Tartan. Minto is initiating conceptual site servicing at two locations, which prompted the review and update to the stormwater management servicing.

2. Overview of Future Development West of Longfields Drive

The future development west of Longfields Drive is presented on **Figure 2**, and discussed below.

North of Chapman Mills Drive:

- 125 Marketplace Avenue/101A Lindenshade Drive (Minto) – Located southwest of the Longfields Drive and Marketplace Avenue intersection (north of first phase of the Ampersand development), a Serviceability Report for Waterford Retirement was prepared in September 2016. A portion of the site was accounted for in the detailed design of Ampersand Stage I, completed by EXP and IBI and accounted for in the September 2010 Stormwater Management Servicing Addendum.
- Block A (Minto) – Located northwest of Chapman Mills Drive and Longfields Drive, Minto has initiated conceptual site servicing of this second stage of the Ampersand development.
- Block H (Minto) – Future civic complex.
- Block B (Minto) – Future retail development.

Chapman Mills Drive:

- The design of Chapman Mills Drive from Longfields Drive to Greenbank Road will be completed by Minto.

South of Chapman Mills Drive:

- Block E (Minto) – Future high-rise/mixed-use development. Drainage area extends west to Greenbank.
- Block C (Minto) – Future mid-rise/mixed-use development.
- Block F (Minto) – Future high-rise residential development. Drainage area extends west to Greenbank.
- Block D (Minto and City) – Northern portion of Block D is owned by Minto, the southern portion is owned by City. Future mid-rise residential development.
- Parcel A (City) – Future mid-rise residential development.
- Parcel B (City and Tartan) – Minto is in the process of a land exchange with the City in which Minto will obtain 9.12 acres (3.83 ha) of the City's portion of Parcel B. Minto has initiated conceptual site servicing for this land. Tartan owns a 0.90 ha portion at the southwestern limit. Future land use for Parcel B is mid-rise residential development. Drainage areas have been extended south to account for future road.

3. Stormwater Evaluation

The overall evaluation completed by IBI for the stormwater management servicing is based on two models, the SWMHYMO hydrological model and XPSWMM hydraulic model. The scope of the current update of both the hydrology and hydraulic models is related to more accurately reflect proposed development conditions west of Longfields Drive. The updates to each model and the results are presented in this section.

3.1 Overview of Hydrological Evaluation

Consistent with previous evaluations, the hydrological modeling was using the following storm events:

- the 25 mm 4 hour Chicago storm event was used to evaluate the function of the interceptor sewer and interceptor manholes during first flush conditions;
- the 100 year 24 hour SCS Type II storm event was used for hydraulic grade line analysis; and
- the 100 year 3 hour Chicago storm event was used for evaluation of surface storage and routing.

The drainage areas that have been revised as part of this current exercise are all tributary to the Longfields Drive trunk storm sewer. They are summarized in the below table, and compared to the areas in the June 2012 Stormwater Management Servicing Addendum, which is the most recent submission to the City. The drainage area has increased by 1.01 ha due to the expansion of the drainage area along the southern border to accommodate the future road. Imperviousness values have been established in consultation with Minto and are reflective of the proposed land use.

Due to the topographical relief and the challenges of providing on-site storage on the subject lands, options for reducing on-site storage have been explored. Specifically, the impacts of completely eliminating storage have been evaluated: major flow from future development north of Chapman Mills Drive has been captured by the minor system while major flow from future development south of Chapman Mills Drive has been conveyed directly to the Jock River via a proposed constructed swale.

Table 3.1. Overview of Revised Drainage Areas

2012					2017				
Drainage Area ID	**Area (ha)**	**Timp (%)**	**Surface Storage (cu-m)**	**Minor System Capture (l/s)**	**Drainage Area ID**	**Area (ha)**	**Timp (%)**	**Surface Storage (cu-m)**	**Minor System Capture (l/s)**
DME-9063A (DME3)	3.25	68	252	707	DME-9063A (DME3)	1.82	66	252	435[(2)]
DME-9067 (DME4)	2.99	85	761[(1)]	254	BLOCK A	5.21	74[(3)]	0	1509[(4)(5)(6)]
R-9066	0.62	71	0	211	R-9066	0.54	71	0	211
F3	8.11	85	2499[(1)]	847	Riocan Avenue	0.33	99	0	28[(7)]
F4a	7.84	84	2200[(1)]	971	CMD1B	1.50	90[(3)]	0	518[(4)(7)]
F4	4.51	82	951[(1)]	501	CMD2	0.71	90[(3)]	0	222[(4)(5)]
H1	3.52	74	1056	560	H1	3.67	74	1056	556

2012					2017				
Drainage Area ID	**Area (ha)**	**Timp (%)**	**Surface Storage (cu-m)**	**Minor System Capture (l/s)**	**Drainage Area ID**	**Area (ha)**	**Timp (%)**	**Surface Storage (cu-m)**	**Minor System Capture (l/s)**
G1	10.4	78	0	1869	G1	10.06	78	0	1869[8]
F4b	5.29	85	1590[1]	558	B	2.89	93[3]	0	908[4]
G2	1.08	85	0	268	Block H Civic	1.96	93[3]	0	615[4]
G3	1.88	87	0	478	CMD1A	0.86	90[3]	0	264[4]
F6	7.37	37	2210[1]	626	E	3.11[9]	86	0	311[10]
F4c	11.17	85	3350[1]	1410	F	4.72[9]	86	0	472[10]
					G2	1.06	85	0	268[11][12]
					G3	1.88	87	0	478[11][12]
					F6	7.84	39	680[15]	523[15]
					C	3.52	74[13]	0	352[10]
					D	4.52	74[13]	0	452[10]
					Parcel A	5.37[14]	74[13]	0	537[10]
					Tartan	1.12[14]	74[13]	0	112[10]
					Parcel B Minto	3.83[14]	74[13]	0	383[10]
					Parcel B City	2.51[14]	74[13]	0	251[10]
	68.03 ha	77%				69.04 ha	74%		

(1) 100 year on-site storage
(2) Based on rational method for Ampersand Stage I
(3) Weighted c value (from which imperviousness was calculated) established by engineering consultant completing conceptual design
(4) Total flow capture, value presented is for flow generated on catchment during 100 year SCS Type II storm event
(5) Portion of Block A flow cascades to Chapman Mills Drive
(6) Portion of Block A drains via the storm sewer on Glenroy Gilbert Drive; the remainder drains via the storm sewer on Chapman Mills Drive
(7) Major flow from Riocan Avenue cascades to CMD1B
(8) Minor system capture per Stantec/AECOM July 2009
(9) Drainage area extended west to Greenbank Road
(10) Minor system capture increased to 100 l/s/ha
(11) Minor system capture per TSH May 2006
(12) Water quality treatment for areas G2, G3 to be provided by an independent BMP
(13) Imperviousness consistent with that of Block A
(14) Drainage area extended south to accommodate future road
(15) Per detailed design of site

Northwest of Chapman Mills Drive and Longfields Drive, the second phase of Ampersand will be developed. The engineering consultant preparing the conceptual design for Ampersand Stage II, identified as Block A on **Figure 2**, established sub-drainage areas and runoff coefficients. The engineering consultant has indicated that due to topographical relief, both park and underground storage would be required in order to provide 100 year storage. Since neither is considered desirable, the model was updated to eliminate all on-site storage requirements, with major flow being captured by the minor system. A 0.90 ha portion of Ampersand Stage II drains to the Longfields Drive trunk storm sewer via Glenroy Gilbert Drive. The remainder is tributary to the Longfields Drive trunk storm sewer via Chapman Mills Drive.

A consistent approach to on-site storage was taken with lands fronting Chapman Mills Drive to the west: that is, there is no on-site storage accounted for at the future development fronting Chapman Mills Drive on the north (Block B and the Civic Complex). Total flow is accounted for in the Longfields Drive trunk storm sewer via Riocan Avenue.

At this time no revisions have been made to the drainage areas reflective of 125 Marketplace Avenue/101A Lindenshade Drive. Per the overall stormwater management servicing, drainage from the southern portion of the site is tributary to the storm sewer on Lindenshade Drive, while

the drainage from the northern portion of the site has been accounted for in the Marketplace Avenue storm sewer. For the area tributary to Lindenshade Drive, the storage and minor system capture is per the Ampersand Stage I design (completed by DME and IBI and incorporated in the September 2010 Stormwater Management Servicing Addendum). For the area tributary to Marketplace Avenue, it is assumed that 100 year storage will be provided and the minor system capture rate corresponds to 85 l/s/ha.

The design of Chapman Mills Drive from Longfields Drive to Greenbank Road will be completed by Minto. The drainage areas and runoff coefficients are based on the preliminary design work provided by the engineering consultant. Total flow capture has been accounted for. The eastern portion of the road, measuring 0.71 ha, drains towards the Longfields Drive trunk storm sewer via Chapman Mills Drive, while the remainder 2.4 ha drains via Riocan Avenue.

The drainage areas south of Chapman Mills Drive have been revised to reflect land use per the 2006 Community Design Plan, as well as current and proposed ownership. Imperviousness values are reflective of proposed land use. The on-site storage requirement has been removed for all proposed development, with direct conveyance of the major flow to a new outlet to the Jock River. The minor system capture has been increased from 85 l/s/ha to 100 l/s/ha. It is proposed that water quality treatment for the southern portions of Greenbank Road (identified as G2 and G3 on **Figure 2**) be provided by an independent BMP to be located in proximity of Greenbank Road and the Jock River. A similar measure has been constructed south of the Jock River to provide water quality treatment of 0.77 ha of the northern portion of Jockvale Road.

3.2 Results of Hydrological Evaluation

The minor system flow hydrographs generated by the hydrological model were exported for use in the hydraulic model, discussed in **Sections 3.3** and **3.4**.

While north of Chapman Mills Drive it is proposed to capture the major flow in the minor system, south of Chapman Mills Drive it is proposed to convey the major flow to the Jock River via future street segments and ultimately a constructed swale. The proposed routing is indicated on **Figure 2**. During the 100 year 3 hour Chicago storm, considered the critical storm event for surface routing, total major flow from the proposed development south of Chapman Mills Drive measures 8.8 cms. It is estimated that a trapezoidal channel with a 9.0 m wide bottom at a 0.1% longitudinal slope will convey the 100 year flow at a depth of 0.6 m.

The above scenario is representative of full build out. In the interim, the existing Jockvale Road bisects the subject lands from northwest to southeast. Depending on timing of road decommissioning and of development, interim options can be considered. Should development south and west of Jockvale Road be the first to proceed, the swale to the river can be constructed. Should development north and east of Jockvale Road be the first to proceed, an interim drainage scenario can be investigated in which major flow from the development is picked up in the sewer.

As noted in **Section 3.1**, it is proposed that an independent BMP provide water quality treatment for the southern portion of Greenbank Road. The BMP could be a small pond or an infiltration measure. Preliminary sizing indicates that an infiltration BMP would have a required water quality storage volume of 40 cu-m. The BMP would be provided with a constructed swale to the Jock River.

3.3 Overview of Hydraulic Evaluation

Consistent with previous evaluations, the hydrological modeling was using the following storm events:

- the 25 mm 4 hour Chicago storm event was used to evaluate the function of the interceptor sewer and interceptor manholes during first flush conditions; and,
- the 100 year 24 hour SCS Type II storm event was used for hydraulic grade line analysis.

The existing XPSWMM model was updated to reflect the revised minor system hydrographs. The 25 mm 4 hour Chicago storm event was used to simulate first flush conditions and the 100 year 24 hour SCS Type II storm was used to complete hydraulic grade line analysis. Results are presented in the **Section 3.4**.

It should be noted that at the time of the Longfields Drive construction, a 750 mm diameter stub was installed at Chapman Mills Drive for drainage from the west. Based on the proposed revisions to the drainage scheme, it is possible that the stub will require upsizing. This should be evaluated at the detailed design stage of Chapman Mills Drive.

3.4 Results of Hydraulic Evaluation

Results of the hydraulic evaluation are presented in the **Table 3.2** and **Table 3.3** below, alongside the results published in the June 2012 Stormwater Management Servicing Addendum.

Table 3.2 Intercepted Flow During First Flush Conditions

	Intercepted Flow (cms) 25 mm 4 hour Chicago	
Interceptor MH	**2012**	**2017**
Eastern MH 110	1.34 + 0.77 = 2.11(1) *(XPSWMM Link65+Link157)*	1.34 + 0.77 = 2.11(1) *(XPSWMM Link65+Link157)*
Central MH 101	3.22(2) *(XPSWMM Link EAST IN)*	3.22(2) *(XPSWMM Link EAST IN)*
Western MH 9077	7.93 *(XPSWMM Link WEST IN)*	7.90 *(XPSWMM Link WEST IN)*

(1) Combined intercepted flow in two interceptor sewers from Eastern Interceptor MH
(2) Combined intercepted flow from Eastern and Central Interceptor MH

The stormwater management system performs consistently during first flush conditions and therefore performs as designed with respect to water quality.

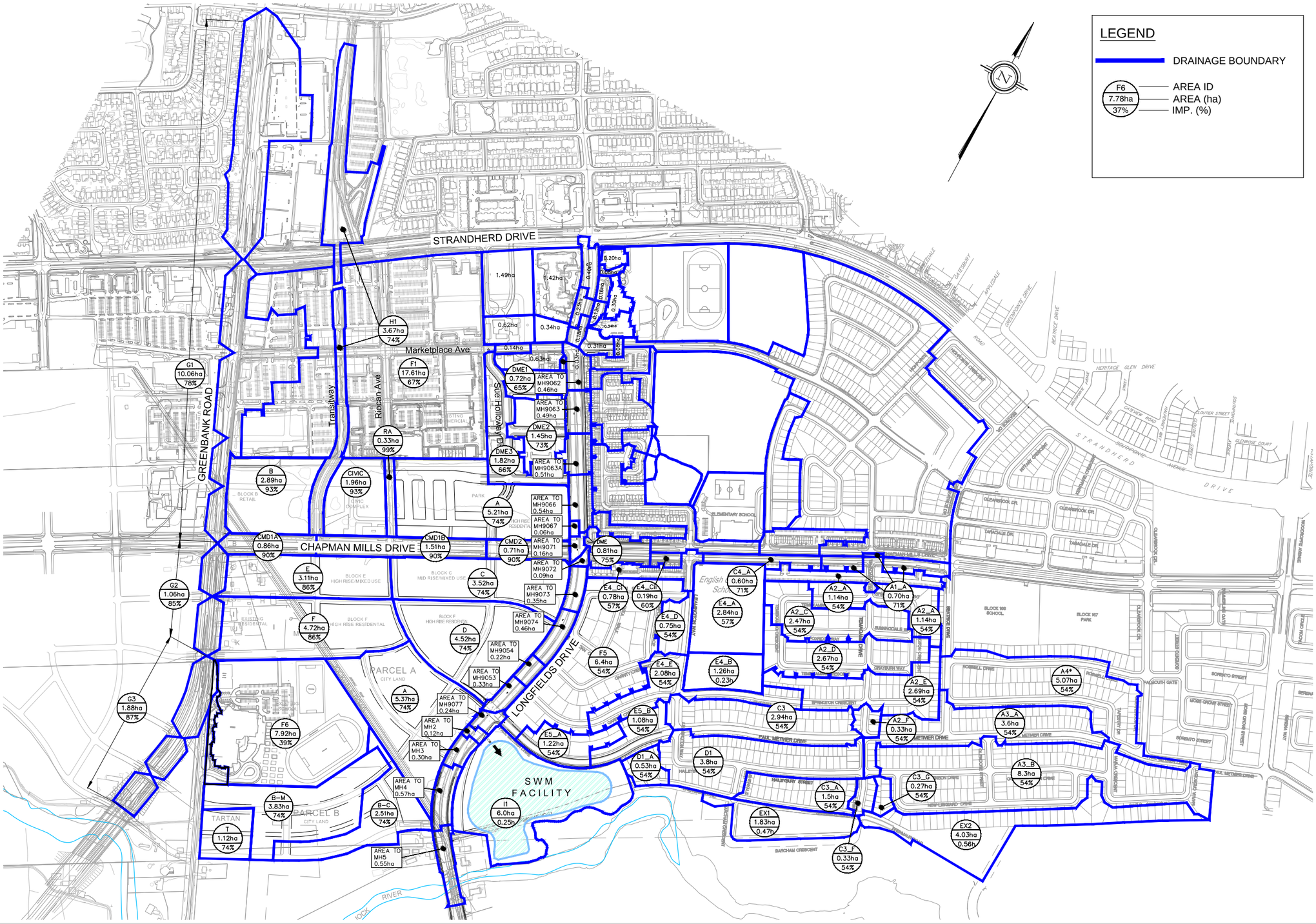
Table 3.3 Hydraulic Grade Line Elevations for Western Trunk

Trunk	MH	HGL (m) 100 year 24 hour SCS Type II	
		2012	**2017**
Western (Longfields)	9074	N/A	N/A
	9054	N/A	N/A
	9053	89.77	89.77
	TO11/9076	90.04	90.05
	1	89.08	88.99

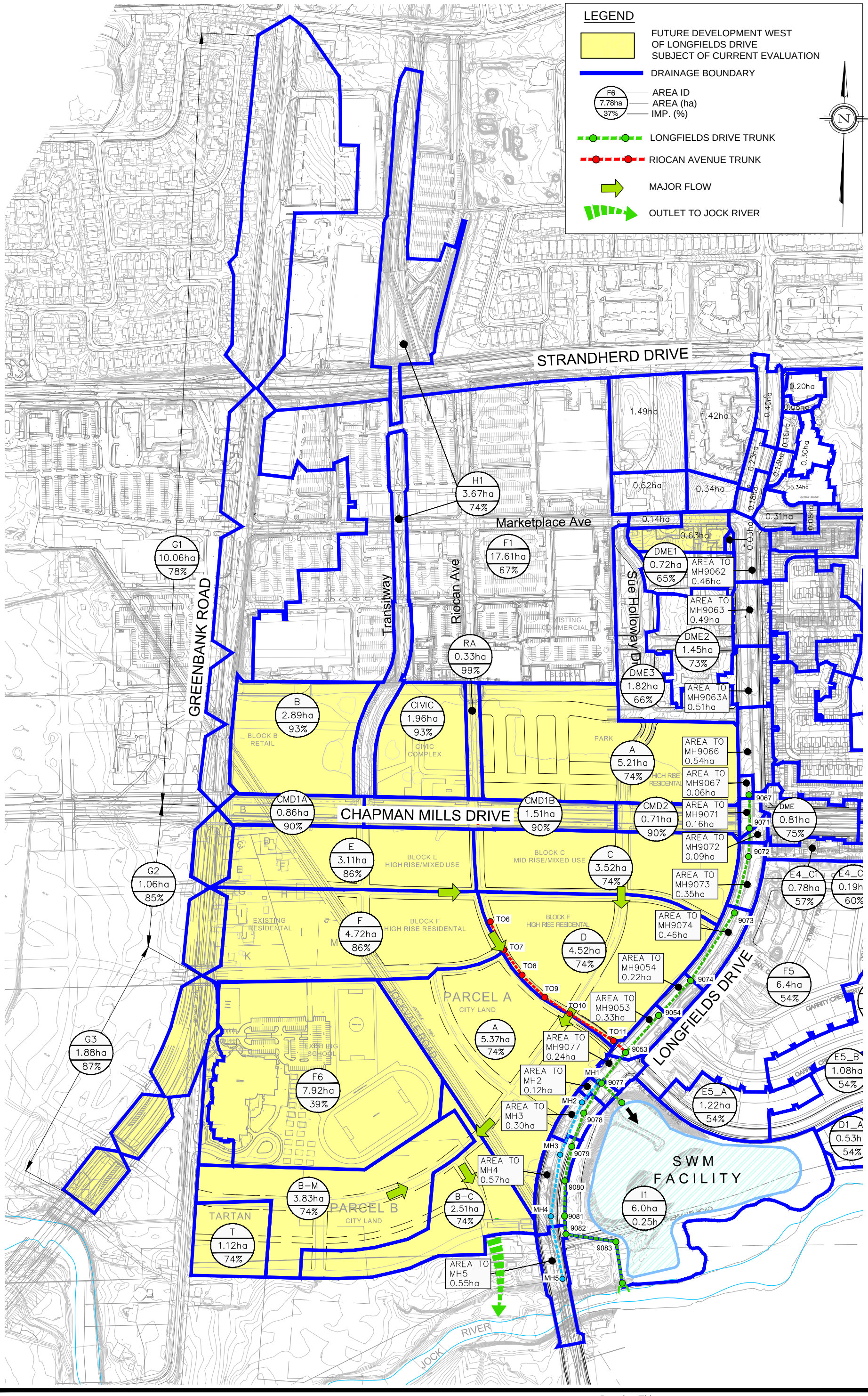
Trunk	MH	HGL (m) 100 year 24 hour SCS Type II	
		2012	2017
	Western Interceptor MH 9077	N/A	N/A
	9078	N/A	N/A
	9079	N/A	N/A
	9080	N/A	N/A
	9081	N/A	N/A
	9082	N/A	N/A
	9083	N/A	N/A
	Western Overflow	N/A	N/A
SWM Facility		88.53	88.47

N/A indicates free flow conditions

The critical HGL location in the western trunk is MH 9053, located on Longfields Drive at Paul Métivier Drive. The resulting HGL at this location is 89.77 m, consistent with the June 2012 submission. There are free flow conditions at all other locations along the Longfields Drive trunk storm sewer. There are free flow conditions along the Riocan Avenue sewer with the exception of MH TO11 (located approximately 25 m upstream of MH 9053), where the HGL has increased slightly from the June 2012 submission. It is concluded that the hydraulic grade line is maintained at acceptable levels during the 100 year storm event.



Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	NEPEAN SOUTH-CHAPMAN MILLS SWM SERVICING	OVERALL DRAINAGE AREA PLAN	FIGURE 1



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Scale	Project Title	Drawing Title	Sheet No.
1:5000	NEPEAN SOUTH-CHAPMAN MILLS SWM SERVICING	DRAINAGE AREA PLAN FUTURE DEVELOPMENT WEST OF LONGFIELDS DRIVE	FIGURE 2

SOUTH NEPEAN TOWN CENTRE
TRUNK STORM SEWER

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
SCHEDULE "B"

Prepared for:

City of Ottawa
Infrastructure Services Department
100 Constellation Crescent
Ottawa ON K2G 6J8

Prepared by:

Stantec Consulting Limited
1505 Laperriere Avenue
Ottawa ON K1Z 7T1

June 2009

Stantec

SOUTHWEST TRANSITWAY SOUTH OUTLET SEWER

FUNCTIONAL DESIGN
PREFERRED ALIGNMENT – OPTION 'D'
DRAINAGE AREA PLAN

30m 0 20 40m

B.M. MASON, P.ENG. Manager Construction Services
C. NEWCOMBE, P.ENG. Senior Project Manager Infrastructure Projects

Dwn: K.D.M. Chkd: J.G.L. Des: M.A.T. Chkd: S.O.D.

Ottawa

CONTRACT NO. 163600662
DWG. NO. FIGURE 4
SHEET 1 OF 1
Date: MARCH 2008
Scale: 1:2000

LEGEND:

- AREA IDENTIFICATION, AREA HECTARE, RUNOFF COEFFICIENT
- MH.905JA — PROPOSED STORM MANHOLE AND IDENTIFICATION NUMBER AND IDENTIFICATION NUMBER
- MH.906J — PROPOSED LONGFIELDS DRIVE STORM MANHOLE AND IDENTIFICATION NUMBER
- PROPOSED STORM SEWER AND FLOW DIRECTION
- PROPOSED OPTION 'D' STORM SEWER AND FLOW DIRECTION
- DRAINAGE AREA LIMIT

STRANDHERD PARK AND RIDE

STRANDHERD DRIVE

TRANSITWAY PROFILE
SAG ELEV=95.61

GREENBANK ROAD

FUTURE TRANSITWAY TRUNK SEWER

CHAPMAN MILLS MARKETPLACE

FUTURE MARKETPLACE

LONGFIELDS DRIVE

G1 10.4 0.75

F2 1.02 0.8

NOTE:
AREAS G1, G2 AND G3 BASED ON INFORMATION PROVIDED BY AECOM (JAN. 2009)

TRANSITWAY LIMITING PEAK FLOW 560 L/S

F3 3.86 0.8

NOTE:
EAST DRAINAGE AREA BOUNDARY COORDINATED WITH INFORMATION PROVIDED BY DME (JAN. 2009)

MH.T03
MH.T02
MH.T01

TRUNK SEWER OUTLET PREFERRED ALIGNMENT (FUTURE RIOCAN EXTENSION)

ROAD GRID SOURCE: SOUTH NEPEAN TOWN CENTRE COMMUNITY DESIGN PLAN, 2006 (TYPICAL)

G2 1.08 0.80

F4a 7.34 0.8

MH.T05
MH.T06
MH.T07
MH.T08
MH.T09
MH.T10
MH.T11

FUTURE RIOCAN DRIVE EXTENSION

FUTURE LONGFIELDS DRIVE EXTENSION

F4b 5.29 0.8

FUTURE STORM SEWER BY OTHERS

MH905J

EXISTING TRUNK SEWER OUTLET

FUTURE BORDEN FARM DRIVE

SWM POND

F6 7.37 0.46

G3 1.68 0.80

F4c 11.17 0.8

BOYCE ROAD

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Manning's n = 0.013 Return Frequency = 5 years

Location			AREA (Ha)								FLOW (Development and Local Roads)					FLOW (Arterial Roads)					FLOW		SEWER DATA							
STREET	FROM M.H.	TO M.H.	R= 0.46 Local Rd	R= 0.8 Local Rd	R= 0.68 Arterial Rd	R= 0.73 Arterial Rd	R= 0.76 Arterial Rd	R= 0.8 Arterial Rd	R= 0.83 Arterial Rd	R= 0.87 Arterial Rd	Indiv. 2.78AC	Cumm. 2.78 AC	Time of Conc. (min)	5yr Rainfall Intensity (mm/hr)	Rational Method Peak Flow (l/s)	Indiv. 2.78AC	Cumm. 2.78 AC	Time of Conc. (min)	10yr Rainfall Intensity (mm/hr)	Rational Method Peak Flow (l/s)	Controlled Flow (l/s)	Total (l/s)	NOM. DIA. (mm)	MATERIAL	SLOPE (%)	LENGTH (M)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	TIME OF FLOW (min)	Q/Qcap (%)
Transitway to Chapman Mills	T10	TO1									0.00	0.00	28.44	60.2	0	0.00	0.00	28.44	70.4	0		560	900	CONC	0.10	33	597	0.9	0.6	94%
Greenbank Road (Area G1)	GB1	TO1			1.16	5.82	1.05		2.37		0.00	0.00	19.80	70.7	0	21.63	21.63	19.80	82.7	1,789		1,789								
Chapman Mills Drive	TO1	TO2		4.47							9.94	9.94	26.04	58.3	589	0.00	21.63	26.04	69.3	1,499		2,709	1500	CONC	0.15	78	2,856	1.6	0.8	95%
	TO2	TO3									0.00	9.94	26.86	58.1	577	0.00	21.63	26.86	67.9	1,469		2,666	1500	CONC	0.15	78	2,856	1.6	0.8	93%
Riocan Drive	TO3	TO4		11.20							24.91	34.85	27.69	56.9	1,963	0.00	21.63	27.69	66.6	1,439		4,043	1650	CONC	0.20	24	4,252	1.9	0.2	95%
	TO4	TO5									0.00	34.85	27.90	56.8	1,974	0.00	21.63	27.90	66.2	1,432		4,026	1650	CONC	0.20	97	4,252	1.9	0.8	95%
	TO5	TO6									0.00	34.85	28.74	55.5	1,935	0.00	21.63	28.74	64.9	1,404		3,959	1650	CONC	0.20	46	4,252	1.9	0.4	93%
	TO6	TO7									0.00	34.85	29.13	55.0	1,917	0.00	21.63	29.13	64.3	1,391		3,920	1650	CONC	0.20	45	4,252	1.9	0.4	92%
Greenbank Road (Area G2+G3)	GB2	TO7	7.37	5.29			0.93	1.09		0.80	21.19	21.19	11.30	97.8	2,072	6.65	28.28	11.30	114.6	3,241		5,313								
Riocan Drive	TO7	TO8									0.00	56.04	29.52	54.5	3,055	0.00	49.90	29.52	63.7	3,180		6,855	1800	CONC	0.35	44	7,094	2.7	0.3	97%
	TO8	TO9									0.00	56.04	29.80	54.2	3,036	0.00	49.90	29.80	63.3	3,161		6,817	1800	CONC	0.35	48	7,094	2.7	0.3	96%
	TO9	TO10									0.00	56.04	30.07	53.8	3,017	0.00	49.90	30.07	62.9	3,141		6,778	1800	CONC	0.35	43	7,094	2.7	0.3	96%
	TO10	TO11		11.17							24.84	80.88	30.34	53.5	4,329	0.00	49.90	30.34	62.8	3,122		8,071	1950	CONC	0.30	23	8,131	2.6	0.5	99%
	TO11	9053									0.00	80.88	30.80	53.0	4,285	0.00	49.90	30.80	61.9	3,090		7,995	1950	CONC	0.30	22	8,131	2.6	0.1	98%

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min Velocity = 0.80 m/sec and Max Velocity = 6.0m/s
3) Inlet Times = 15 minutes residential land use with split lot drainage and 10 minutes ICI landuse

Designed: MT	Southwest Transitway Longfields Sewer 183600662
Checked: SD	City of Ottawa
Dwg. Reference: Figure 5	Date: Jun-09
	Sheet No 1 of 1

SOUTHWEST TRANSITWAY EXTENSION
RIOCAN DRIVE EXTENSION
TRUNK STORM SEWER

PLAN AND PROFILE
RIOCAN DRIVE
STA. 1+800 TO STA. 2+013

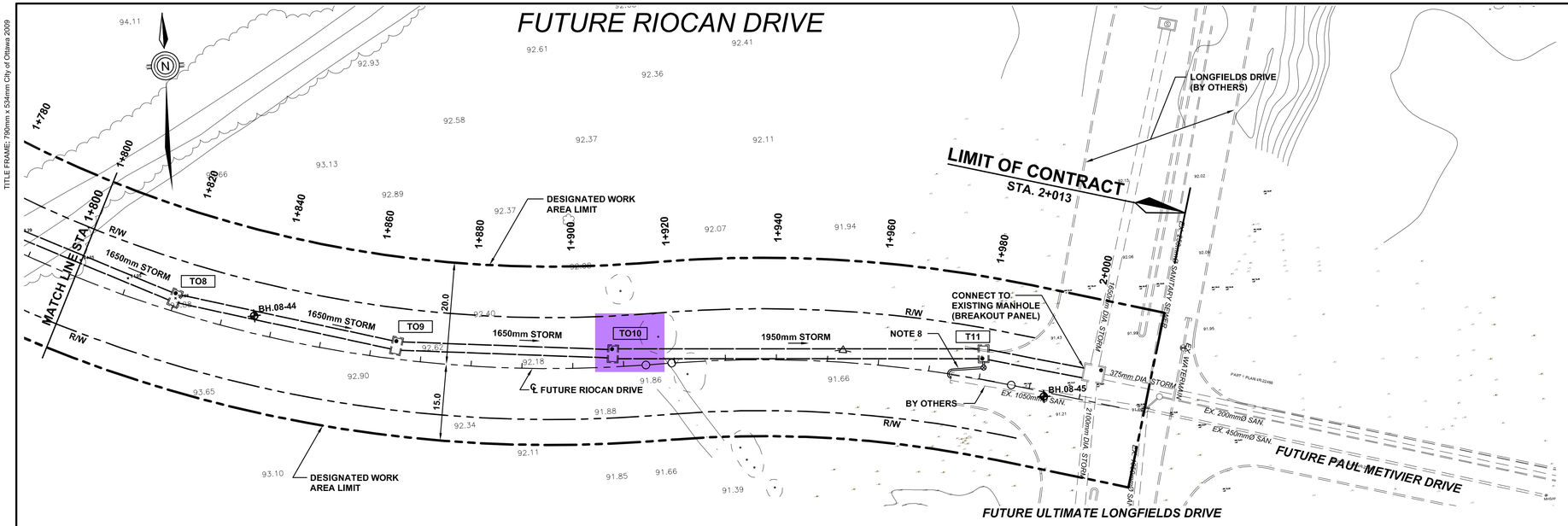
B.M. MASON, P.ENG.
Manager
Design and Construction - West

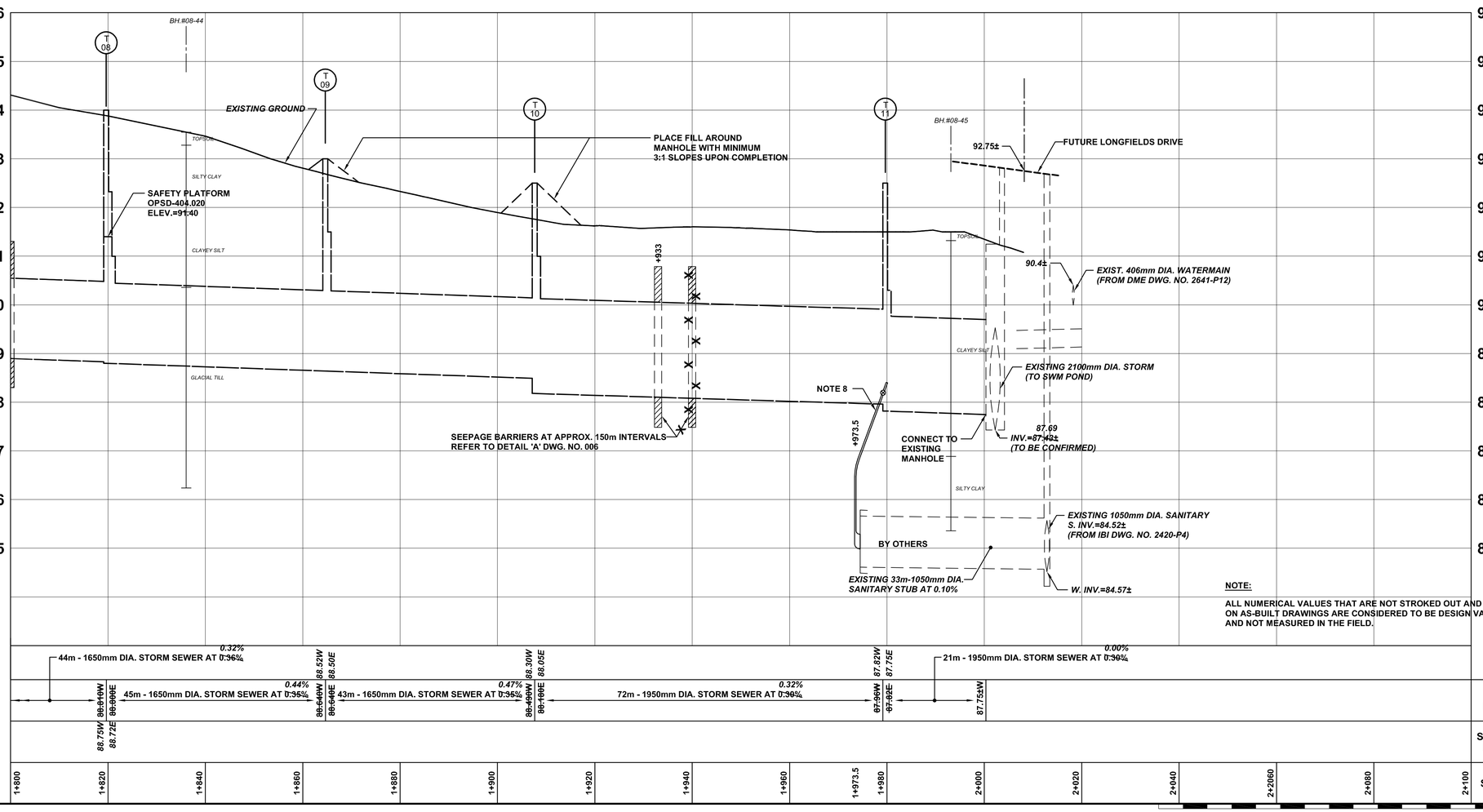
C. NEWCOMBE, P.ENG.
Senior Engineer
Infrastructure Projects

Ottawa

Contract No. ISB09-2019	Dwg. No. 008
Sheet 8 of 9	
Asset No,	
Asset Group	
Des. S.G.D.	Chk'd. J.G.L.
Dwn. K.D.M.	Chk'd. J.G.L.
Utility Circ. No,	Index No.
Const. Inspector	

Scale:
HORIZONTAL 1:500
0m 5 10 20
0m 1 2
VERTICAL 1:50





NOTE:
The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. 613.722.4420
Fax. 613.722.2799
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REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR MOE APPROVAL	J.G.L.	08/07/2009
2	RE ISSUED FOR MOE APPROVAL	J.G.L.	17/07/2009
3	ISSUED FOR TENDER	J.G.L.	20/07/2009
4	ISSUED FOR CONSTRUCTION	J.G.L.	01/10/2009
5	AS-BUILT	J.G.L.	09/12/2011

CATCHBASIN & MAINTENANCE HOLE DATA

NO.	STATION	OFFSET (m)	TYPE		ELEVATION		
			Structure	Cover	Grate	Low Inv.	
T08	1+820.000	2.6 LT	1680X2440	S24.1/S25	~~94.000~~	~~88.800~~	93.88 88.72
T09	1+865.000	2.6 LT	1680X2440	S24.1/S25	~~93.000~~	~~88.040~~	92.66 88.50
T10	1+908.000	2.6 LT	1680X3050	S24.1/S25	~~92.500~~	~~88.100~~	92.30 88.05
T11	1+979.7	5.0LT	1680X3050	S24.1/S25	~~92.50~~	~~87.920~~	95.28 87.75

STORM SEWER DATA

NO. to NO.		SIZE (mm)	LENGTH (m)	CLASS	INVERTS	
					Inlet	Outlet
T08	T09	1650	45	100-D	~~88.800~~	~~88.040~~ 88.72 88.52
T09	T10	1650	43	100-D	~~88.040~~	~~88.490~~ 88.50 88.30
T10	T11	1950	72	100-D	~~88.100~~	~~87.56~~ 88.05 87.82
T11	EXIST.	1950	21	100-D	~~87.82~~	87.75± 87.75

NOTES:

1. ALL MATERIALS AND CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH THE LATEST CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS. REFER TO SECTION E OF THE SPECIFICATIONS.
2. OFFSETS AND GRATE ELEVATIONS FOR MAINTENANCE HOLES REFER TO CENTER OF STRUCTURE. TOP OF GRATE ELEVATIONS ARE TEMPORARY ONLY. FINAL ELEVATION ADJUSTMENTS WILL BE CARRIED OUT BY OTHERS UNDER A SEPARATE CONTRACT.

   ALL MAINTENANCE HOLES TO BE BENCHED TO SEWER SPRINGLINE PER OPSD-701.021
3. FOR SEWER PIPE BEDDING/BACKFILL, REFER TO CITY OF OTTAWA STD. NO. S6. BACKFILL WITH APPROVED NATIVE FILL TO MATCH ADJACENT MATERIAL EXPOSED ON TRENCH WALL AND COMPACT TO A MINIMUM OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY FOR FULL HEIGHT OF BACKFILL. GRADE TO MATCH EXISTING GROUND LEVEL OR AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
4. SEWER SERVICE AND LATERAL CONNECTIONS ARE TO COMPLY WITH CITY OF OTTAWA STD. NOS. S11 AND S11.1
5. ACCESS SHAFTS TO MAINTENANCE HOLES THAT ARE DEEPER THAN 5.0m TO BE 1500mm DIAMETER AS PER OPSD-701.040 (RISER) AND OPSD-701.030 (TAPERED TOP OR FLAT TOP).
6. GEOTECHNICAL INFORMATION IS AVAILABLE WITH REFERENCE TO GOLDERS CONSULTING ENGINEERS, GEOTECHNICAL INVESTIGATION - PROPOSED SOUTHWEST TRANSITWAY EXTENSION, STAGE 2, DATED JULY 2009.

   "BOREHOLE DATA IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL REFER TO GOLDER REPORT 07-1121-0172-8001. REFER TO SPECIAL PROVISION-GENERAL D-003".
7. THE CONTRACTOR SHALL WORK WITHIN THE DESIGNATED WORK AREA LIMITS AS DESIGNATED ON THE DRAWINGS, UNLESS OTHERWISE APPROVED BY THE CONTRACT ADMINISTRATOR. APPROXIMATE LIMITS FOR THE DESIGNATED WORK AREAS ARE DEFINED AND THE CONTRACTOR SHALL CONFIRM THE ACTUAL WORK AREA LIMITS ONSITE WITH THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.

   EXISTING TOPSOIL WITHIN THE DESIGNATED WORK AREA LIMITS SHALL BE STRIPPED AND STOCKPILED OUTSIDE THE TRENCH EXCAVATION LIMITS ALONG THE EDGE OF THE DESIGNATED WORK AREA LIMITS IN A "WINDROW" PRIOR TO TRENCHING OPERATIONS. THE STOCKPILED TOPSOIL SHALL BE LEFT IN PLACE UPON COMPLETION OF CONSTRUCTION. THE FINISHED GRADE OF THE TRENCH BACKFILLING OPERATIONS SHALL MAKE ALLOWANCE FOR RE-APPLICATION OF THE TOPSOIL UNDER A SEPARATE CONTRACT.

   EXCAVATED MATERIAL FROM THE TRENCHING OPERATIONS THAT IS UNSUITABLE FOR OR IN EXCESS OF THE TRENCH BACKFILL REQUIREMENTS SHALL BE DISPOSED OF OFFSITE OUTSIDE THE CONTRACT LIMITS IN WASTE AREAS ARRANGED FOR BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.
8. UNDER ISB09-6000 A TEMPORARY INTERCONNECT BETWEEN THE STORM SEWER AND THE SANITARY SEWER WAS PERFORMED. UPSTREAM END OF INTERCONNECT WAS PLUGGED AND VALVE CLOSED UPON COMPLETION OF ISB09-6000.

NOTE:
ALL NUMERICAL VALUES THAT ARE NOT STROKED OUT AND REPLACED ON AS-BUILT DRAWINGS ARE CONSIDERED TO BE DESIGN VALUES ONLY AND NOT MEASURED IN THE FIELD.

Ontario

Ministry of the Environment **Ministère de l'Environnement**

CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 1814-73VJMC
Issue Date: June 7, 2007

Minto Developments Inc.
427 Laurier Ave W
Ottawa, Ontario
K1R 7Y2

Site Location: Nepean South
Lot 13, Concession 2
Ottawa City,

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

Stormwater management pond, sewers and appurtenances for a proposed residential development with an area of 197 hectares, bounded by Greenback Road to the west, Woodroff Avenue to the east, Stranderd Drive to the north and Jock River to the south in the City of Ottawa. The proposed SWM pond is located in the north east quadrant of Jock River and Jockwell Rd.

SEWERS, INTERCEPTOR MANHOLES AND HEADWALLS CONSISTING OF:

Western Area:

- approx. 360 metre long, 1950 millimetre diameter sewer including manholes from manhole 9077 (western interceptor manhole) to the Jock River as shown in Drawing Nos. 3499-SW107 -108 via the western overflow headwall;

- the western overflow headwall as shown in Drawing No. 3499-SW203;

- a 350 millimetre x 3810 millimetre western interceptor manhole (MH 9077) consisting of a weir with a crest geodetic elevation of 88.03 as shown in Drawing No. 3499-SW206;

- approx. 33 metre long, 1800 millimetre diameter sewer from MH 9077 discharges to the central stormwater management pond (CSWM) as shown in Drawing No. 3499-SW103 via the western inlet headwall;

- the western inlet headwall as shown in Drawing No. 3499-SW200.

Central Area:

- approx. 21 metre long, 1500 millimetre diameter sewer from manhole 101/9050 (central interceptor manhole) to the Jock River as shown in Drawing No. 3499-SW108 via the central overflow headwall;

- the central overflow headwall as shown in Drawing No. 3499-SW204;

- a 2700 millimetre x 3300 millimetre central interceptor manhole (MH 101/9050) consisting of a weir with a crest geodetic elevation of 87.75 as shown in Drawing No. 3499-SW206.

Eastern Area:

- approx. 120 metre long, 1500 millimetre diameter sewer from manhole 110/9035 (eastern interceptor manhole) to the ravine as shown in Drawing No. 3499-SW111 via the eastern overflow headwall;

- the eastern overflow headwall as shown in Drawing No. 3499-SW205;

- a 2440 millimetre x 2440 millimetre central interceptor manhole (MH 110/9035) consisting of a weir with a crest geodetic elevation of 89.4 as shown in Drawing No. 3499-SW206;

- approx. 74 metre long, 1050 millimetre diameter sewer from MH 110/9035 to MH 213 as shown in Drawing Nos. 3499-SW109-111;

- approx. 533 metre long, 1350 millimetre diameter sewer from MH 213 to MH 205 as shown in Drawing Nos. 3499-SW109-111;

- approx. 45 metre long, 1650 millimetre diameter sewer from MH 205 to MH 100 as shown in Drawing Nos. 3499-SW108-109;

- approx. 31 metre long, 1500 millimetre diameter sewer from MH 100 to MH 110/9035 as shown in Drawing Nos. 3499-SW108-109;

- approx. 12 metre long, 1350 millimetre diameter sewer from MH 100 to the CSWM as shown in Drawing Nos. 3499-SW109-103 via the eastern inlet headwall;

- the eastern inlet headwall as shown in Drawing No. 3499-SW201;

Overland Flow to the CWSM:

- a reinforced grass inlet swale to the pond as shown in Drawing No. 3499-SW102;

THE CENTRAL STORMWATER MANAGEMENT POND (CWSM) CONSISTING OF:

Eastern forebay:

- a 20 metres wide by 0.7 metres deep and 81 metres long forebay discharging over rock check dam to the main pond cell;

Western forebay:

- a 25 metres wide by 0.7 metres deep and 85 metres long forebay discharging over rock check dam to the main pond cell;

Active Storage:

- a permanent pool volume (including the forebay of 37,149 cubic metres;

- an active storage of 47,900 cubic metres above the permanent pool;

Outlet Control Structure:

- a 2500 millimetre by 2500 millimetre outlet control structure (OSC) as shown in Drawing Nos. 3499-SW202 with a 1000 millimetre x 1000 millimetre opening with a crest elevation of 87.00 metres;

- a 850 millimetre x 750 millimetre bottom opening in the OSC for maintenance purposes and equipped with a sluice gate;

- approx. 96 metre long, 1200 millimetre diameter outlet from the OSC to the central interceptor.

Emergency Overflow:

- a grass swale from the pond to the Jock River;

including appurtenance, erosion /sedimentation control measure to minimize the effects on external lands and to reduce the amount of silt carried to the storm water detention pond.

the drawings referred to in the above description are dated December 2006, with the latest revision dated May 3, 2007.

all in accordance with the Application for Approval of Municipal and Private Sewage Works received February 22, 2007, Nepean South Chapman Mills Stormwater Management Servicing Report dated August 2006 with the latest revision dated May 3, 2007, Nepean South Chapman Mills Stormwater Management Pond Design Brief dated December 2006 with the latest revision dated May 3, 2007 and other supporting documents prepared and submitted by the IBI Group.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Certificate*" means this entire certificate of approval document, issued in accordance with Section 53 of the Ontario Water Resources Act, and includes any schedules;

"*Director*" means any *Ministry* employee appointed by the Minister pursuant to section 5 of the Ontario Water Resources Act;

"*District Manager*" means the District Manager of the Ottawa District Office of the *Ministry*;

"*Ministry*" means the Ontario Ministry of the Environment;

"*Owner*" means Minto Developments Inc.and includes its successors and assignees;

"*Works*" means the sewage works described in the *Owner*'s application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(2) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(3) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. CHANGE OF OWNER

The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of *Owner*;

(b) change of address of the *Owner*;

(c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*; and

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*.

4. EFFLUENT OBJECTIVES

(1) The Owner shall use best efforts to design, construct and operate the works with the objective that the concentrations of the materials named in Table 1 as effluent parameters are not exceeded in the effluent from the works.

Table 1 - Effluent Objectives

Effluent Parameter	Concentration Objective (milligrams per litre unless otherwise indicated)
E-Coli	100 cfu/100 ml
Total Suspended Solids	25

(2) The Owner shall include in all reports submitted in accordance with Condition 4, a summary of the efforts made and results achieved under this Condition.

5. EFFLUENT MONITORING AND RECORDING

The Owner shall, upon commencement of operation of the sewage works, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this certificate are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected and analysed for the parameters at the following sampling point(s), and the sampling frequencies listed in Table 2, commencing no later than May 15 and ending not before September 15 of each year :

Table 2 - Effluent Monitoring - from the Outlet Control Structure

Frequency	Weekly
Sample Type	Composite
Parameters	Total Suspended Solids and E-Coli

(3) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(b) the publication "Standard Methods for the Examination of Water and Wastewater" (20th edition) as amended from time to time by more recently published editions; and,

(4) The measurement frequencies specified in subsection (2) in respect of any parameter are minimum requirements which may, after 80 percent build up of the entire development in accordance with this Condition, be modified by the District Manager in writing.

(6) The Owner shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this certificate.

6. OPERATION AND MAINTENANCE.

(1) The *Owner* shall ensure that a minimum liquid retention volume of 37,149 cubic metre is maintained at all times.

(2) The *Owner* shall inspect the *Works* at least once a year and, if necessary, clean and maintain the *Works* to prevent the excessive buildup of sediments and/or vegetation.

(3) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall make the logbook available for inspection by the *Ministry*. The logbook shall include the following:

(a) the name of the *Works*; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed.

7. RECORD KEEPING

The *Owner* shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this *Certificate*.

8. TEMPORARY SEDIMENT AND EROSION CONTROL

(1) The *Owner* shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every two weeks and after each significant storm event. The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required at which time they shall be removed and all disturbed areas reinstated properly.

(2) The *Owner* shall maintain records of inspections and maintenance activities undertaken to maintain the temporary sediment and erosion control measures, which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment..

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.

4. Condition 4 is imposed to establish non-enforceable effluent quality objectives which the *Owner* is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

5. Condition 5 is included to enable the *Owner* to evaluate and demonstrate the performance of the *Works*, on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the design objectives specified in the *Certificate* and that the *Works* does not cause any impairment to the receiving watercourse.

6. Condition 6 is included to require that the *Works* be properly operated and maintained such that the environment is protected .

7. Condition 7 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the *Works*.

8. Condition 8 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction until they are no longer required.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*****
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 7th day of June, 2007

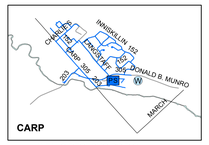
Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

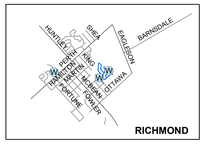
SK/
c: District Manager, MOE Ottawa
Peter Spal, IBI Group

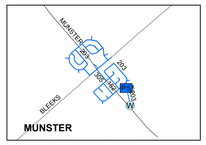
Appendix C

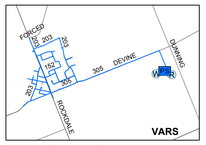
- Water Distribution System Facilities & Feedermains (City of Ottawa, February 2015)
- Water Demand Calculations (DSEL, June 2017)
- Fire Flow Estimation per Fire Underwriters Survey (DSEL, June 2017)

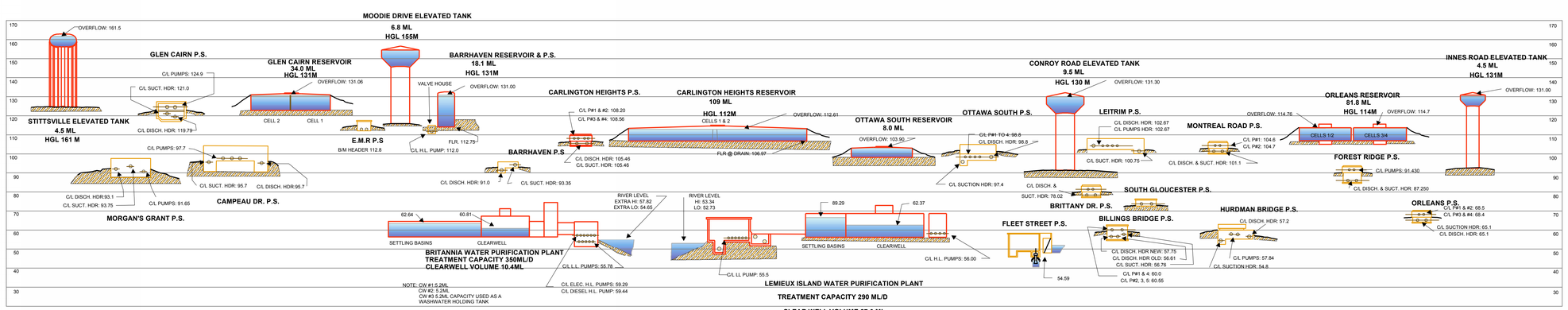
City of Ottawa - Water Distribution System
Facilities & Feedermains











Legend

Water System Structure

- Pump Station
- Backup Pump Station
- Water Treatment Plant
- Well
- Elevated Tank
- Reservoir

WATERMAINS

Priority, Internal Diameter

- Backbone 1524mm - 1981mm
- Backbone 1067mm - 1372mm
- Backbone 610mm - 914mm
- Backbone 406mm - 508mm
- Backbone 152mm - 305mm
- Distribution 1676mm - 1981mm
- Distribution 1067mm - 1372mm
- Distribution 610mm - 914mm
- Distribution 406mm - 508mm
- Distribution 305mm - 381mm

PRESSURE ZONES

- 1E
- 1W
- 2C
- 2E
- 2W
- 3C
- 3W
- 4C
- BARR
- EMR
- ME
- MG
- MONT
- SHAD

N W E S

Ottawa

Infrastructure Services & Community Sustainability
Infrastructure Services

0 1,000 2,000 4,000 6,000

Meters

FIGURE 1-1

DRAWN BY: D. HESS DATE: 03 Feb 2015

Minto Communities
3311 Greenbank Road
Proposed Site Conditions

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

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7	146	395
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1	183	385
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	780	273.0	189.6	682.5	474.0	1501.5	1042.7

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Church w/ Kitchen Facility*	30.0 L/seat/day		0.00	0.0	0.0	0.0	0.0	0.0
Office	75 L/9.3m^2/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
		Total I/CI Demand	0.0	0.0	0.0	0.0	0.0	0.0
		Total Demand	**273.0**	**189.6**	**682.5**	**474.0**	**1501.5**	**1042.7**

*Water Demand for Church with Kitchen Facility from City of Ottawa Sewer Design Guidelines, Appendix 4A

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1920.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	9639.9	L/min	
	10000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**8500.0 L/min**

3. Reduction for Sprinkler Protection

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

4. Increase for Separation Distance

N	0m-3m	25%	
S	20.1m-30m	10%	
E	0m-3m	25%	
W	20.1m-30m	10%	
	% Increase	**70%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**5950.0 L/min**	

Total Fire Flow

Fire Flow	14450.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:

-Calculations based on Fire Underwriters Survey - Part II

Appendix D

- Sanitary Servicing Plan (DSEL, June 2017)
- Sanitary Sewer Design Sheet (DSEL, June 2017)

FUTURE GREENBANK ROAD ALIGNMENT

EXISTING SCHOOL

CITY LAND

JOCKVALE RD

EXISTING POND

STREET 1

STREET 2

STREET 3

STREET 4

SAN 30

SAN 31

SAN108

SAN107

SAN106

SAN105

SAN104

SAN103

SAN102

SAN101

SAN110

SAN109

SAN CTRL1

SAN CTRL2

0.46Ha 14 38

0.21Ha 6 17

0.34Ha 11 30

0.13Ha 4 11

0.20Ha 5 14

0.42Ha 12 33

0.20Ha 6 17

0.73Ha 26 71

1.01Ha 103 217

0.81Ha 25 63

0.71Ha 25 68

0.21Ha 5 14

0.34Ha 9 25

0.85Ha 80 168

6 UNITS

5 UNITS

4 UNITS

3 UNITS

2 UNITS

103 UNITS

80 UNITS

93.7m 200Ø SAN @ 1.0%

74.1m - 200Ø SAN @ 0.35%

34.6m - 200Ø SAN @ 0.35%

48.3m - 200Ø SAN @ 0.35%

45.3m - SAN 200mmØ @ 1.0%

25.6m - SAN 200mmØ @ 1.0%

6.0m - SAN 200mmØ @ 0.32%

35.4m - 200Ø SAN @ 0.65%

81.6m - 200Ø SAN @ 0.32%

62.8m - 200Ø SAN @ 0.32%

106.5m - 200Ø SAN @ 0.65%

103.6m - 200Ø SAN @ 1.0%

143.0m - 200Ø SAN @ 0.32%

64.3m - 200Ø SAN @ 0.65%

23.6m - SAN 200mmØ @ 1.0%

17.6m - SAN 200mmØ @ 0.32%

EX 1050Ø SAN

Ex 200Ø SAN

Ex 450Ø SAN

SAN 32
T/G=94.27
INV.NE=84.73
INV.NW=84.78

SAN 33
2400mmØ
T/G=93.70
INV.NE=84.61
INV.SW=84.61

SAN 34
2400mmØ
T/G=91.97
INV.NE=84.49
INV.SW=84.49

SAN 35
2400mmØ
T/G=92.93
INV.NE=84.40
INV.NW=84.83
INV.SW=84.40

EX. SAN STUB
INV=87.86m

SAN 36
2400mmØ
T/G=91.23
INV.NE=84.34
INV.SW=84.34

SAN 37
2400mmØ
T/G=91.08
INV.NE=84.23
INV.SW=84.23

LEGEND:

- SITE BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY MANHOLE
- 0.78Ha / 80 / 168 — TOTAL SANITARY DRAINAGE AREA, # OF UNITS, POPULATION
- SANITARY DRAINAGE BOUNDARY
- 93.56TG / 88.780BV — PROPOSED SANITARY MH TOP OF GRADE, PROPOSED SANITARY OBVERT

MINTO COMMUNITIES
3311 GREENBANK ROAD
SANITARY SERVICING PLAN

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

PROJECT No.:	17-911
SCALE:	1:2000
DATE:	JUNE 2017
FIGURE:	D1

SANITARY SEWER CALCULATION SHEET

PROJECT: **Minto Communities**
LOCATION **3311 Greenbank Road**
FILE REF: **17-911**
DATE: **5-Jun-17**

DESIGN PARAMETERS

Avg. Daily Flow Res.	300 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28 L/s/ha
Avg. Daily Flow Comm	17,000 L/ha/d	Peak Fact. Comm.	1	Min. Pipe Velocity	0.60 m/s full flowing
Avg. Daily Flow Instit.	10,000 L/ha/d	Peak Fact. Instit.	1	Max. Pipe Velocity	3.00 m/s full flowing
Avg. Daily Flow Indust	10,000 L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013

Location			Residential Area and Population										Commercial		Institutional		Industrial			Infiltration				Pipe Data								
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
	SAN108	SAN107	0.46			14		38.0	0.46	38.0	4.00	0.53		0.00		0.00		0.00	0.0	0.46	0.46	0.129	0.66	200	1.00	93.7	0.031	0.050	1.04	32.8	0.02
	SAN CTRL2	SAN107	1.01			103		217.0	1.01	217.0	4.00	3.01		0.00		0.00		0.00	0.0	1.01	1.01	0.283	3.30	200	1.00	25.6	0.031	0.050	1.04	32.8	0.10
	SAN107	SAN106	0.21			6		17.0	1.68	272.0	4.00	3.78		0.00		0.00		0.00	0.0	0.21	1.68	0.470	4.25	200	1.00	45.3	0.031	0.050	1.04	32.8	0.13
	SAN110	SAN106	0.73			26		71.0	0.73	71.0	4.00	0.99		0.00		0.00		0.00	0.0	0.73	0.73	0.204	1.19	200	0.65	106.5	0.031	0.050	0.84	26.4	0.05
	SAN106	SAN105	0.34			11		30.0	2.75	373.0	4.00	5.18		0.00		0.00		0.00	0.0	0.34	2.75	0.770	5.95	200	0.35	74.1	0.031	0.050	0.62	19.4	0.31
	SAN109	SAN105	0.71			25		68.0	0.71	68.0	4.00	0.94		0.00		0.00		0.00	0.0	0.71	0.71	0.199	1.14	200	1.00	103.6	0.031	0.050	1.04	32.8	0.03
	SAN105	SAN104	0.13			4		11.0	3.59	452.0	4.00	6.27		0.00		0.00		0.00	0.0	0.13	3.59	1.005	7.28	200	0.35	34.6	0.031	0.050	0.62	19.4	0.38
	SAN104	SAN103	0.20			5		14.0	3.79	466.0	3.99	6.46		0.00		0.00		0.00	0.0	0.20	3.79	1.061	7.52	200	0.35	48.3	0.031	0.050	0.62	19.4	0.39
	SAN115	SAN114	0.34			9		25.0	0.34	25.0	4.00	0.35		0.00		0.00		0.00	0.0	0.34	0.34	0.095	0.44	200	0.65	64.3	0.031	0.050	0.84	26.4	0.02
	SAN CTRL1	SAN114	0.85			80		168.0	0.85	168.0	4.00	2.33		0.00		0.00		0.00	0.0	0.85	0.85	0.238	2.57	200	1.00	23.6	0.031	0.050	1.04	32.8	0.08
	SAN114	SAN113	0.21			5		14.0	1.40	207.0	4.00	2.88		0.00		0.00		0.00	0.0	0.21	1.40	0.392	3.27	200	0.32	62.8	0.031	0.050	0.59	18.6	0.18
	SAN113	SAN111	0.00					0.0	1.40	207.0	4.00	2.88		0.00		0.00		0.00	0.0	0.00	1.40	0.392	3.27	200	0.32	6.0	0.031	0.050	0.59	18.6	0.18
	SAN112	SAN111	0.20			6		17.0	0.20	17.0	4.00	0.24		0.00		0.00		0.00	0.0	0.20	0.20	0.056	0.29	200	0.65	33.4	0.031	0.050	0.84	26.4	0.01
	SAN111	SAN103	0.42			12		33.0	2.02	257.0	4.00	3.57		0.00		0.00		0.00	0.0	0.42	2.02	0.566	4.14	200	0.32	81.6	0.031	0.050	0.59	18.6	0.22
	SAN103	SAN102	0.81			23		63.0	6.62	786.0	3.86	10.55		0.00		0.00		0.00	0.0	0.81	6.62	1.854	12.40	200	0.32	113.0	0.031	0.050	0.59	18.6	0.67
	SAN102	SAN101	0.00					0.0	6.62	786.0	3.86	10.55		0.00		0.00		0.00	0.0	0.00	6.62	1.854	12.40	200	0.32	17.6	0.031	0.050	0.59	18.6	0.67
	SAN101	EX. SAN35	0.00					0.0	6.62	786.0	3.86	10.55		0.00		0.00		0.00	0.0	0.00	6.62	1.854	12.40	250	1.0	3.0	0.049	0.063	1.21	59.5	0.21

Appendix E

- Storm Servicing Plan (DSEL, June 2017)
- Storm Sewer Design Sheet (DSEL, June 2017)

FUTURE GREENBANK ROAD ALIGNMENT

GREENBANK RD

JOCKVALE RD

LONGFIELDS DR

EXISTING SCHOOL

CITY LAND

CITY LAND

BENM

EXISTING POND

JOCK RIVER

CONNECT DITCH TO STORM 1500mmØ STM
DITCH INV=88.78
STM INV=88.78

PROPOSED 1.3m DEEP V-DITCH
173.0m @ 0.15%
(FUT. 1500mmØ STM)

DIRECT EXISTING CULVERT TO PROPOSED 0.50m DEEP V-DITCH
25.5m @ 1.0%

EXISTING ROADSIDE DITCH TO BE RETAINED, CONVEYS FLOWS FROM EXISTING HIGH SCHOOL

EXISTING 800mm CSP CULVERT #1 TO BE RETAINED, CONVEYS FLOW FROM EXISTING HIGH SCHOOL

EXISTING 800mm CSP CULVERT #2 TO BE RETAINED, CONVEYS FLOW FROM EXISTING HIGH SCHOOL

OBVERT TO OBVERT CONNECTION @ EX. 1950mmØ STM
OBV=89.95

MH T08

MH T09

MH T10

MH T11

Ex 1650Ø STM

Ex 1350Ø STM

Ex 975Ø STM

EXSTM INLET PIPE

Ex HWY (BY OTHERS)

Ex 675Ø STM

Ex 2100Ø STM

Ex 1950Ø STM OVERFLOW

3.04Ha 831 L/s

5.37Ha 0.74

0.15Ha 0.70

0.20Ha 0.70

0.21Ha 0.70

0.33Ha 0.70

0.15Ha 0.70

0.48Ha 0.70

0.49Ha 0.70

0.19 0.70

0.72 0.70

0.83Ha 0.80

0.79 0.70

0.95Ha 0.70

0.98Ha 0.80

0.85Ha 0.70

HW1 INV=89.04

SL TO SL CONNECTION S. INV=89.34

28.8m - 1200mmØ STM @ 0.15%

21.8m - 1200mmØ STM @ 0.15%

95.6m - 975mmØ STM @ 0.15%

46.8m - 900mmØ STM @ 0.15%

36.7m - 900mmØ STM @ 0.15%

74.1m - 825mmØ STM @ 0.15%

44.0m 525mmØ STM @ 1.0%

88.9m - 375mmØ STM @ 1.0%

20.4m - 525mmØ STM @ 1.0%

64.3m - 750mmØ STM @ 0.50%

68.4m 375mmØ STM @ 0.50%

19.8m - 450mmØ STM @1.0%

102.7m - 450mmØ STM @ 0.35%

102.1m - 450mmØ STM @ 0.50%

110.2m - 450mmØ STM @ 0.50%

STM101 STM102 STM103 STM104 STM105 STM106 STM107 STM108 STM109 STM110 STM111 STM112 STM113 STM CTRL1

LEGEND:

- SITE BOUNDARY
- RVCA 100-YEAR FLOODPLAIN BOUNDARY
- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING DITCH
- PROPOSED DITCH
- PROPOSED EXTERNAL STORM SEWER
- PROPOSED EXTERNAL STORM MANHOLE
- MAJOR STORM DRAINAGE BOUNDARY
- 0.5Ha / 0.65 — POST-DEVELOPMENT STORM DRAINAGE AREA; RUN-OFF COEFFICIENT / CONTROLLED RELEASE RATE PER IBI SWM REPORT
- 93.47TG / 90.87OBV — PROPOSED STORM MH TOP OF GRADE; PROPOSED STORM OBVERT
- * SPRINGLINE CONNECTIONS

MINTO COMMUNITIES
3311 GREENBANK ROAD
STORM SERVICING PLAN

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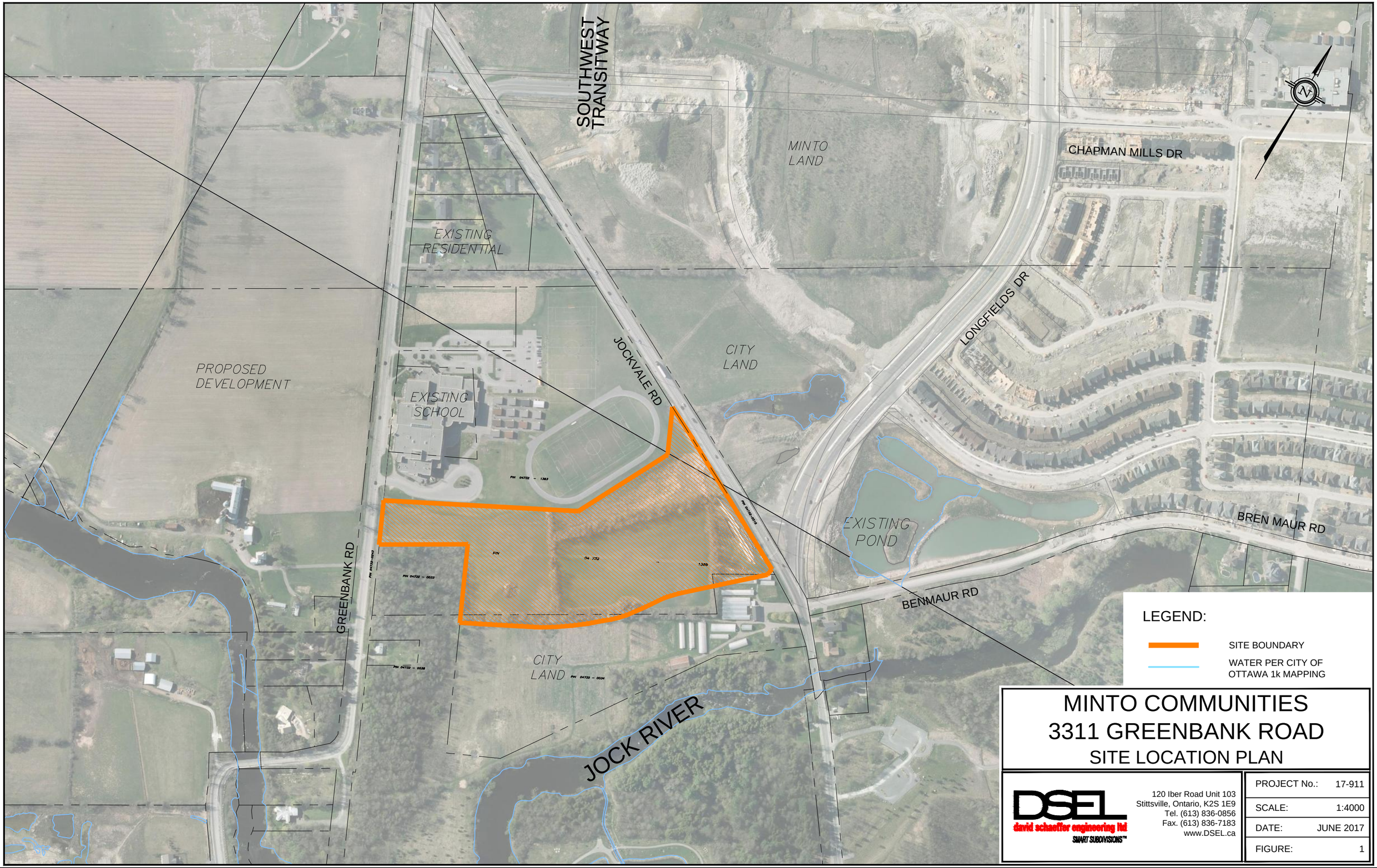
PROJECT No.:	17-911
SCALE:	1:2500
DATE:	JUNE 2017
FIGURE:	E1

			2-Year	5-Year	2-Year	5-Year	2-Year	5-Year	2-Year	5-Year		2-Year	5-Year	2-Year	5-Year	Total	Sewer Data								
Area ID	Up	Down	Area	Area	C	C	Indiv AxC	Indiv AxC	Acc AxC	Acc AxC	T_C	I	I	Q	Q	Q	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Qcap	Time Flow	Q / Q full
			(ha)	(ha)	(-)	(-)					(min)	(mm/hr)	(mm/hr)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(min)	(-)
	Internal Sewers																								
	STM108	STM107		0.49		0.70		0.34	0.00	0.34	10.0	0	104.2	0.0	99.3	99.3	375	1.00	88.9	0.110	0.094	1.59	175.3	0.9	0.57
											10.9														
	STM CTRL2	STM107		0.98		0.80		0.78	0.00	0.78	10.0	0	104.2	0.0	226.9	226.9	525	1.00	20.4	0.216	0.131	1.99	430.1	0.2	0.53
											10.2														
	STM107	STM106		0.21		0.70		0.15	0.00	1.27	10.9	0	99.5	0.0	352.1	352.1	525	1.00	44.9	0.216	0.131	1.99	430.1	0.4	0.82
											11.3														
	STM113	STM106	0.79		0.70		0.55	0.00	0.55	0.00	10.0	76.8	0.0	118.0	0.0	118.0	450	0.35	102.7	0.159	0.113	1.06	168.7	1.6	0.70
											11.6														
	STM106	STM105		0.33		0.70		0.23	0.55	1.51	11.6	71.1	96.4	109.2	402.9	512.2	825	0.15	74.1	0.535	0.206	1.04	555.9	1.2	0.92
											12.8														
	STM112	STM105	0.85		0.70		0.60	0.00	0.60	0.00	10.0	76.8	0.0	126.9	0.0	126.9	450	0.50	102.1	0.159	0.113	1.27	201.6	1.3	0.63
											11.3														
	STM105	STM104		0.15		0.70		0.11	1.15	1.61	12.8	67.5	91.4	215.2	408.8	624.0	900	0.15	36.7	0.636	0.225	1.10	701.1	0.6	0.89
	STM104	STM103		0.20		0.70		0.14	1.15	1.75	13.4	65.9	89.3	210.3	434.0	644.2	900	0.15	46.8	0.636	0.225	1.10	701.1	0.7	0.92
											14.1														
	STM111	STM103	0.95		0.70		0.67	0.00	0.67	0.00	10.0	76.8	0.0	141.9	0.0	141.9	450	0.50	110.2	0.159	0.113	1.27	201.6	1.4	0.70
											11.4														
	STM103	STM102		0.48		0.70		0.34	1.81	2.09	14.1	64.1	86.7	322.7	502.4	825.1	975	0.15	95.6	0.747	0.244	1.16	868.0	1.4	0.95
											15.4														
	STM110	STM109	0.72		0.70		0.50	0.00	0.50	0.00	10.0	76.8	0.0	107.5	0.0	107.5	375	0.50	66.4	0.110	0.094	1.12	124.0	1.0	0.87
											11.0														
	STM CTRL1	STM109	0.83		0.80		0.66	0.00	0.66	0.00	10.0	76.8	0.0	141.7	0.0	141.7	450	1.00	19.8	0.159	0.113	1.79	285.1	0.2	0.50
											10.2														
	STM109	STM102	0.19		0.70		0.13	0.00	1.30	0.00	11.0	73.2	0.0	264.6	0.0	264.6	525	0.50	64.3	0.216	0.131	1.40	304.1	0.8	0.87
											11.7														
	STM102	STM101		0.15		0.70		0.34	3.11	2.42	15.4	60.8	82.2	525.6	552.9	1078.5	1200	0.15	28.8	1.131	0.300	1.34	1510.0	0.4	0.71
	STM101	STM EX1					0.00	0.00	3.11	2.42	15.8	60.0	81.1	518.6	545.5	1064.1	1200	0.15	21.8	1.131	0.300	1.34	1510.0	0.3	0.70
Existing Sewer Sizing - Includes 831 L/s Flow from Existing High School																									
Culvert1	Existing School	Existing Ditch					0.00	0.00	0.00	0.00	10.0	76.8	104.2	0.0	831.0	831.0	800	1.60	11.9	0.503	0.200	3.33	1672.7	0.1	0.50
											10.1														
Culvert2	Existing Ditch	Proposed Ditch					0.00	0.00	0.00	0.00	10.1	76.6	103.9	0.0	831.0	831.0	800	0.20	15.1	0.503	0.200	1.18	591.4	0.2	1.41
Future Sewer Sizing - Includes 831 L/s Flow from Existing High School																									
	STMEX1	DICB2		5.37		0.74	0.00	3.97	3.11	6.40	16.1	59.4	80.3	513.5	1344.5	2380.9	1500	0.15	184.4	1.767	0.375	1.55	2737.8	2.0	0.87
											18.1														

All highlighted sewers have been designed with a 2-year storm intensity for the City of Ottawa. All other pipes have been sized according to a 5-year storm intensity for the City of Ottawa.

									Ditch Data												
Up	Down	Area	C	Indiv AxC	Acc AxC	T_C	I	Q	depth	Side Slope	Bot. Width	Mannings	Slope	Length	A_{flow}	Wet. Per.	R	Velocity	Qcap	Time Flow	Q / Q full
		(ha)	(-)			(min)	(mm/hr)	(L/s)	(mm)	(X:1)	(m)	n	(%)	(m)	(m^2)	(m)	(m)	(m/s)	(L/s)	(min)	(-)
Existing Ditch Capacity																					
EXISTING CULVER	PROPOSED 0.5m DITCH							831.0	550	2	0	0.03	4.00	34.8	0.605	2.460	0.25	2.62	1,583.4	0.2	0.52
Temporary Drainage Ditch Capacity																					
HW1	PROPOSED 1500mm	5.37	0.74	3.97	9.26	15.8	81.1	4466.8	1300	3	0	0.03	0.15	173.0	5.070	8.222	0.62	0.94	4,741.9	3.1	0.94
EXISTING CULVER	PROPOSED 1.3m DITCH							831.0	500	3	0	0.03	1.00	25.5	0.750	3.162	0.24	1.28	957.9	0.3	0.87

FIGURES



MINTO COMMUNITIES
3311 GREENBANK ROAD
SITE LOCATION PLAN

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PROJECT No.:	17-911
SCALE:	1:4000
DATE:	JUNE 2017
FIGURE:	1

GREENBANK RD

SOUTHWEST TRANSITWAY

RIOCAN A

CHAPMAN MILLS DR

LONGFIELDS D

CHAPMAN MILLS DR

MINTO LAND

JOCKVALE RD

JOCKVALE RD

LONGFIELDS DR

CITY LAND

EXISTING HIGH SCHOOL
PIN 04732 – 1363

STREET 1

STREET 1

STREET 2

STREET 3

STREET 4

6 UNITS
5 UNITS
4 UNITS
3 UNITS
2 UNITS

20.00m
18.0m

FUTURE RESIDENTIAL
OTHER OWNER
PIN 04732 – 0033
103 UNITS

AREA OWNED BY OTHERS

80 UNITS
1.36ha

EXISTING POND

CITY LAND
PIN 04732 – 0024

FUTURE GREENBANK ROAD ALIGNMENT

GREENBANK RD

BENMAUR RD

JOCK RIVER

LEGEND:

- SITE BOUNDARY
- RVCA 100-YEAR FLOODPLAIN BOUNDARY
- TOWNHOMES (CITY)
- TOWNHOMES (MINTO)
- BACK TO BACK / STACKED TOWNS (CITY)
- BACK TO BACK / STACKED TOWNS (BY OTHERS)

MINTO COMMUNITIES
3311 GREENBANK ROAD
LAND USE PLAN

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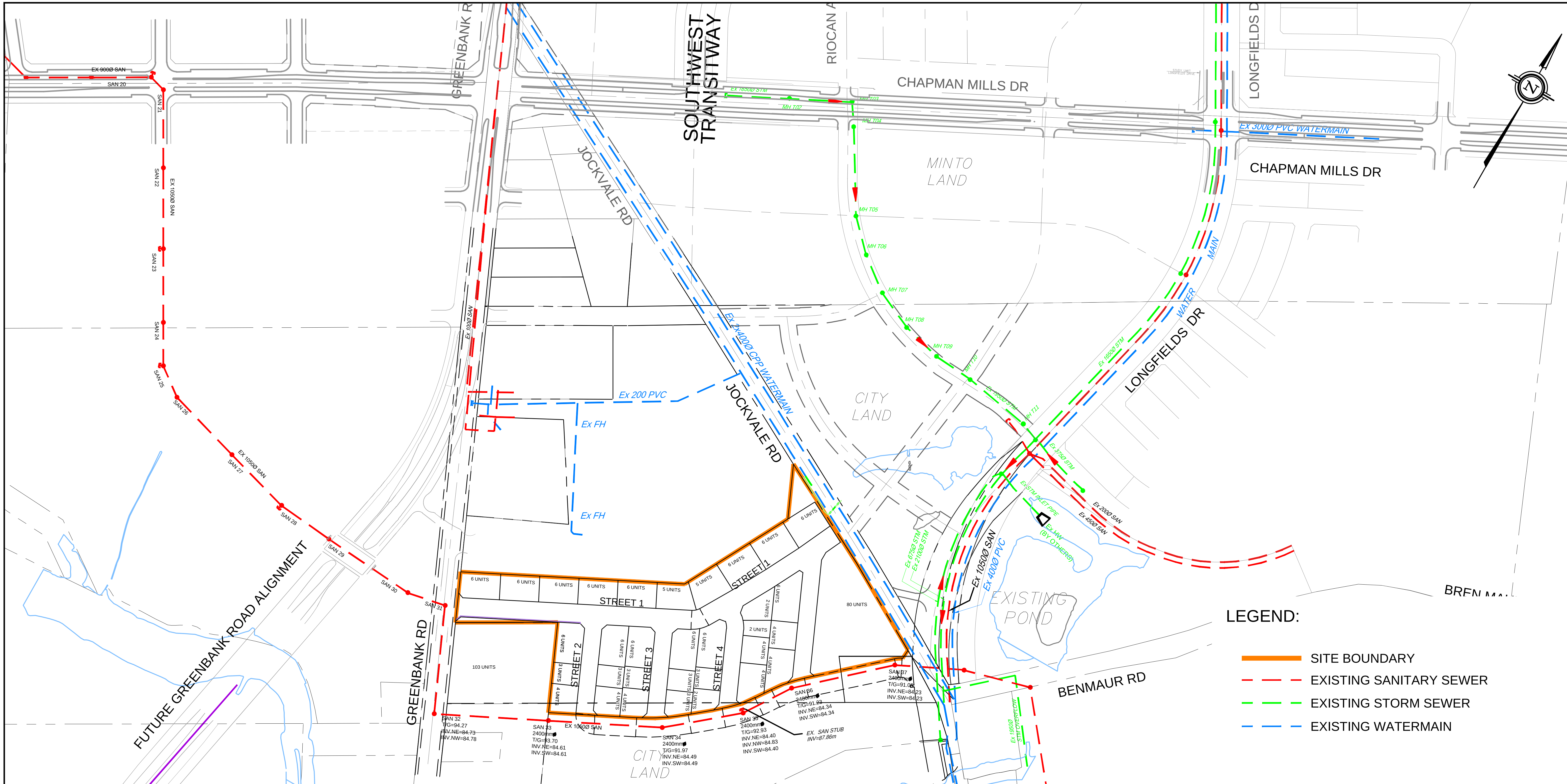
PROJECT No.:	17-911
SCALE:	1:4000
DATE:	JUNE 2017
FIGURE:	2



MINTO COMMUNITIES
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PROJECT No.:	17-911
SCALE:	1:4000
DATE:	JUNE 2017
FIGURE:	3

PROPOSED DEVELOPMENT

EXISTING SCHOOL

Ex 200 PVC

Ex FH

Ex FH

EXISTING HIGH SCHOOL

Ex 2x400Ø CPP WATERMAIN

JOCKVALE RD

PARCEL A

CITY LAND

LONGFIELDS DR

FUT. 300mm WM (B.O.)

FUT. 600mm WM (B.O.)

FUTURE GREENBANK ROAD ALIGNMENT

FUT. 300mm WM (B.O.)

GREENBANK RD

FUTURE RESIDENTIAL OTHER OWNER

103 UNITS

STREET 1

6 UNITS | 6 UNITS | 6 UNITS | 6 UNITS | 6 UNITS | 5 UNITS

STREET 1

5 UNITS | 6 UNITS | 6 UNITS | 6 UNITS

STREET 2

6 UNITS | 3 UNITS | 4 UNITS

STREET 3

6 UNITS | 6 UNITS | 3 UNITS | 4 UNITS

STREET 4

6 UNITS | 6 UNITS | 3 UNITS | 2 UNITS

2 UNITS | 4 UNITS | 4 UNITS | 4 UNITS | 6 UNITS

AREA OWNED BY OTHERS

80 UNITS

AREA OWNED BY OTHERS

Ex 400Ø PVC

EXISTING POND

CITY LAND

JOCK RIVER

LEGEND:

- SITE BOUNDARY
- EXISTING WATERMAIN
- PROPOSED LOCAL WATERMAIN
- FUTURE WATERMAIN (BY OTHERS)
- PROPOSED 300mm WATERMAIN (per KENNEDY BURNETT POTABLE WATER MSS - REALIGNED PER NEW ROAD NETWORK)

MINTO COMMUNITIES
3311 GREENBANK ROAD
WATERMAIN SERVICES PLAN

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PROJECT No.:	17-911
SCALE:	1:2500
DATE:	JUNE 2017
FIGURE:	4

LEGEND:

- SITE BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY MANHOLE
- 0.78Ha / 80 / 168 — TOTAL SANITARY DRAINAGE AREA / # OF UNITS / POPULATION
- SANITARY DRAINAGE BOUNDARY
- 93.56TG / 88.78OBV — PROPOSED SANITARY MH TOP OF GRADE / PROPOSED SANITARY OBVERT

FUTURE GREENBANK ROAD ALIGNMENT

EXISTING SCHOOL

JOCKVALE RD

Ex 1050Ø SAN

STREET 1

STREET 2

STREET 3

STREET 4

SAN 31

SAN108 — 200Ø SAN — SAN107 — 200Ø SAN — SAN106 — 200Ø SAN — SAN105 — 200Ø SAN — SAN104 — 200Ø SAN — SAN103 — 200Ø SAN — SAN111 — 200Ø SAN — SAN112

SAN113 — 200Ø SAN — SAN114 — 200Ø SAN — SAN115 — 200Ø SAN — SAN116 — 200Ø SAN — SAN101 — 200Ø SAN — SAN102 — 200Ø SAN — SAN110 — 200Ø SAN — SAN109

SAN CTRL1 — SAN 200mmØ

SAN CTRL2 — SAN 200mmØ

0.46Ha	14	38	
0.21Ha	6	17	
0.34Ha	11	30	
0.13Ha	4	11	
0.20Ha	5	14	
0.20Ha	6	17	
0.42Ha	12	33	
0.21Ha	5	14	
0.85Ha	80	168	
0.81Ha	23	63	
0.73Ha	26	71	
0.71Ha	25	68	
0.34Ha	9	25	
1.01Ha	103	217	

6 UNITS · 5 UNITS · 2 UNITS · 4 UNITS · 3 UNITS · 80 UNITS · 103 UNITS

94.74TG / 90.570BV · 94.56TG / 89.630BV · 94.46TG / 89.180BV · 95.51TG / 88.920BV · 95.45TG / 88.800BV · 95.18TG / 88.630BV · 93.54TG / 88.950BV · 92.99TG / 89.130BV · 92.83TG / 89.430BV · 92.43TG / 89.190BV · 92.51TG / 88.950BV · 93.54TG / 89.870BV · 93.64TG / 89.960BV · 93.52TG / 88.240BV · 92.86TG / 88.160BV · 93.21TG / 89.610BV

SAN 32
T/G=94.27
INV.NE=84.73
INV.NW=84.78

SAN 33
2400mmØ
T/G=93.70
INV.NE=84.61
INV.SW=84.61

EX 1050Ø SAN

SAN 34
2400mmØ
T/G=91.97
INV.NE=84.49
INV.SW=84.49

SAN 35
2400mmØ
T/G=92.93
INV.NE=84.40
INV.NW=84.83
INV.SW=84.40

SAN 36
2400mmØ
T/G=91.23
INV.NE=84.34
INV.SW=84.34

SAN 37
2400mmØ
T/G=91.08
INV.NE=84.23
INV.SW=84.23

EX. SAN STUB
INV=87.86m

CITY LAND

MINTO COMMUNITIES
3311 GREENBANK ROAD
SANITARY SERVICES PLAN

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PROJECT No.:	17-911
SCALE:	1:1500
DATE:	JUNE 2017
FIGURE:	5

FUTURE GREENBANK ROAD ALIGNMENT

JOCKVALE RD

GREENBANK RD

LONGFIELDS DR

CITY LAND

EXISTING SCHOOL

EXISTING HIGH SCHOOL
PIN 04732 – 1363

3.04Ha
831 L/s

5.35Ha
0.74

7.30Ha
0.73

MH T08

MH T09

MH T10

MH T11

Ex 1650Ø STM

Ex 1350Ø STM

Ex 975Ø STM

EX STM INLET PIPE

Ex HWY (BY OTHERS)

Ex 675Ø STM

Ex 2100Ø STM

Ex 1950Ø STM OVERFLOW

6 UNITS

5 UNITS

80 UNITS

2 UNITS

4 UNITS

3 UNITS

AREA OWNED BY OTHERS
1365

FUTURE RESIDENTIAL
OTHER OWNER
PIN 04732 – 0033
103 UNITS

PIN 04732-0243

PIN 04732-0215

PIN 04732 – 0038

CITY LAND PIN 04732 – 0034

EXISTING POND

BENM

JOCK RIVER

LEGEND:

- SITE BOUNDARY
- RVCA 100-YEAR FLOODPLAIN BOUNDARY
- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING DITCH
- PROPOSED DITCH
- STORM OVERLAND FLOW ARROW
- OVERLAND FLOW ROUTE (BY OTHERS) REFER TO NEPEAN SOUTH-CHAPMAN MILLS SWM SERVICING REPORT PREPARED (IBI GROUP, AUGUST 2006, UPDATED FEBRUARY 2017)
- PROPOSED EXTERNAL STORM SEWER
- PROPOSED EXTERNAL STORM MANHOLE
- MAJOR STORM DRAINAGE BOUNDARY (BY OTHERS) REFER TO IBI SWM SERVICING TO BE UPDATED
- MAJOR STORM DRAINAGE BOUNDARY
- 0.5Ha / 0.65 — POST-DEVELOPMENT STORM DRAINAGE AREA; RUN-OFF COEFFICIENT / CONTROLLED RELEASE RATE PER IBI SWM REPORT

MINTO COMMUNITIES
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STORM SERVICES PLAN

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PROJECT No.:	17-911
SCALE:	1:2500
DATE:	JUNE 2017
FIGURE:	6

FUTURE GREENBANK ROAD ALIGNMENT

GREENBANK RD

JOCKVALE RD

LONGFIELDS DR

BENMAUR R

EXISTING SCHOOL

CITY LAND

CITY LAND

EXISTING POND

MH T07

MH T08

MH T09

MH T10

MH T11

1500mmØ STM

CONNECT DITCH TO STORM 1500mmØ STM
DITCH INV=88.78
STM INV=88.78

PROPOSED 1.3m DEEP V-DITCH 173m @ 0.15% (FUT. 1500mmØ STM)

PROPOSED 0.5m DEEP V-DITCH 26m @ 1.0%

OBVERT TO OBVERT CONNECTION @ EX. 1950mmØ STM
OBV=89.95

Ex 1650Ø STM

Ex 1950Ø STM

Ex 975Ø STM

EXISTING ROADSIDE DITCH TO BE RETAINED, CONVEYS FLOWS FROM EXISTING HIGH SCHOOL

EXISTING 800mm CULVERT #1 TO BE RETAINED, CONVEYS FLOW FROM EXISTING HIGH SCHOOL

EXISTING 800mm CSP CULVERT #2 TO BE RETAINED, CONVEYS FLOW FROM EXISTING HIGH SCHOOL

3.04Ha 831 L/s

5.37Ha 0.74

0.15Ha 0.70

0.20Ha 0.70

0.21Ha 0.70

0.33Ha 0.70

0.15Ha 0.70

0.48Ha 0.70

0.49Ha 0.70

0.19 0.70

0.72 0.70

0.83Ha 0.80

0.79 0.70

0.95Ha 0.70

0.98Ha 0.80

0.85Ha 0.70

1200mmØ STM

900mmØ STM

825mmØ STM

375mmØ STM

525mmØ STM

450mmØ STM

975mmØ STM

STM CTRL1

STM CTRL2

STREET 1

STREET 2

STREET 3

STREET 4

STM101

STM102

STM103

STM104

STM105

STM106

STM107

STM108

STM109

STM110

STM111

STM112

STM113

STM115

HW1
INV=89.04
1200mmØ STM

EX. STM

Ex 6750 STM

Ex 2100Ø STM

EX STM INLET PIPE

Ex HWY (BY OTHERS)

Ex 1950Ø STM OVERFLOW

93.03TG 90.170BV

92.87TG 90.210BV

94.74TG 91.940BV

94.58TG 91.020BV

94.47TG 90.380BV

95.06TG 90.350BV

95.45TG 90.420BV

92.70TG 90.720BV

95.58TG 90.980BV

93.47TG 90.870BV

92.43TG 90.180BV

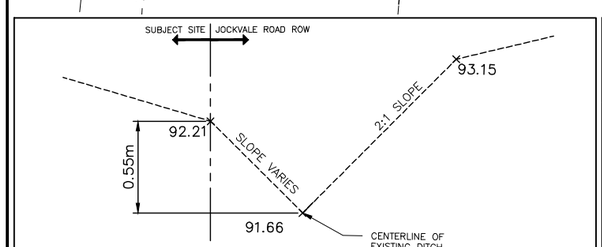
92.83TG 90.350BV

93.11TG 90.320BV

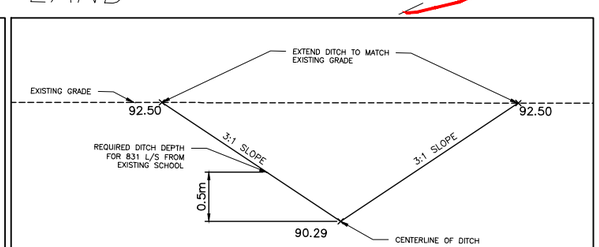
93.58TG 90.940BV

LEGEND:

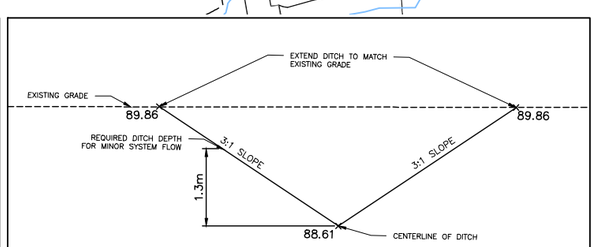
- SITE BOUNDARY
- RVCA 100-YEAR FLOODPLAIN BOUNDARY
- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING DITCH
- PROPOSED DITCH
- STORM OVERLAND FLOW ARROW
- EMERGENCY OVERLAND FLOW ARROW
- PROPOSED EXTERNAL STORM SEWER
- PROPOSED EXTERNAL STORM MANHOLE
- MINOR STORM DRAINAGE BOUNDARY
- 0.5Ha / 0.65 — POST-DEVELOPMENT STORM DRAINAGE AREA; RUN-OFF COEFFICIENT / CONTROLLED RELEASE RATE PER IBI SWM REPORT
- 93.4TTG / 90.870BV — PROPOSED STORM MH TOP OF GRADE; PROPOSED STORM OBVERT
- * SPRINGLINE CONNECTIONS



SECTION A-A
N.T.S.



SECTION B - B
N.T.S.



SECTION C - C
N.T.S.

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STORM SERVICES PLAN

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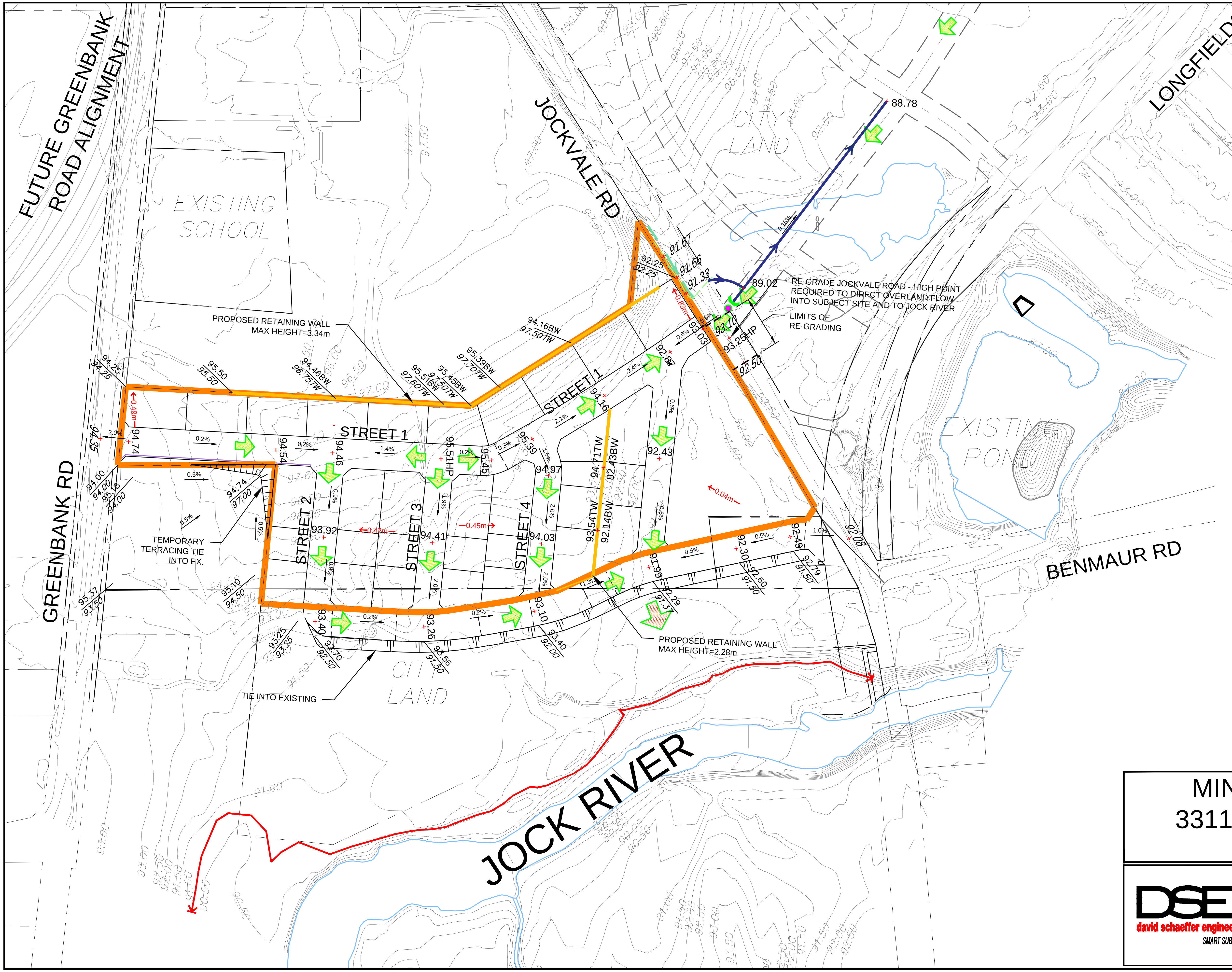
SCALE:	1:2500
DATE:	JUNE 2017
FIGURE:	7



LEGEND:

- SITE BOUNDARY
- RVCA 100-YEAR FLOODPLAIN BOUNDARY
- STORM OVERLAND FLOW ARROW
- EMERGENCY OVERLFOW DIRECTION
- 94.33 — PROPOSED CENTERLINE ELEVATION
- 0.3% — PROPOSED GRADE AND DIRECTION
- 89.62 / 89.62 — PROPOSED ELEVATION/ EXISTING ELEVATION
- 92.00 — EXISTING CONTOUR
- 91.83 — EXISTING SPOT ELEVATION
- 94.33 — EXISTING CENTERLINE ELEVATION
- PROPOSED RETAINING WALL
- EXISTING DITCH
- PROPOSED DITCH

MINTO COMMUNITIES
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DATE:	JUNE 2017
FIGURE:	8