REPORT
PROJECT: 120031-5.2.2

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
RIVERSIDE SOUTH PHASE 12 LANDS
RIVERSIDE SOUTH COMMUNITY
RIDEAU RIVER AREA

Prepared for URBANDALE CORPORATION
by IBI GROUP

MARCH 2019

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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to investigate and confirm the adequacy of public services for the proposed site. This report will review major municipal infrastructure including water supply, wastewater collection and disposal and management of stormwater. This report will also include a Sedimentation and Erosion Control Plan. A review of traffic components will be the subject of a separate report.

This report is being prepared as a technical document in support of the subdivision submission for the subject site, and was prepared in accordance with the November 2009 “Servicing Study Guidelines for Development Applications” in the City of Ottawa. **Appendix A** contains a customized copy of those guidelines which can be used as a quick reference for the location of each of the guideline items within the study report.

1.2 Background

The Riverside South Community, formerly known as South Urban Community (SUC), is a part of the former City of Gloucester. The Council of the City of Gloucester adopted the first Official Plan for the community in September 1990. The original concept plan for the community served as the basis for both a Gloucester and a Regional OPA. A Master Drainage Plan (MDP) for the community was formulated in June 1992 based on the preliminary land use plan prepared by J. Bousfields and Associates Ltd. in December 1991.

The South Urban Community became a part of the City of Ottawa through amalgamation in 2001 and the new Official Plan of the City of Ottawa designated the areas as “General Urban Area” and “Employment Area” with some adjustments to the urban boundaries. In 2003, the City of Ottawa initiated a Community Design Plan (CDP) for the Riverside South area. The basis of the CDP is the land use plan for the community, which has evolved over the time and has changed significantly since the original plan prepared in early 1990’s.

The South Urban Community River Ridge Master Infrastructure Plan (SUC RR MIP) prepared by Ainley Graham and Associates in 1994 presented a preferred servicing strategy for potable water, sanitary and storm infrastructure in the Riverside South community. The Riverside South Infrastructure Servicing Study Update (ISSU) was issued in 2008 as an update to the SUC RR MIP, to account for modifications to the MDP and CDP since 1994.

There have been significant revisions to the CDP, MDP and City of Ottawa Design Guidelines since 2008 so in June 2017, Stantec helped the City of Ottawa complete an update to the 2008 ISSU for a portion of the Riverside Community called Rideau River Area and which includes the lands proposed to be tributary to Pond 5. The 2017 Riverside South Community Infrastructure Servicing Study Update – Rideau River Area (2017 ISSU) report recognized the approved 2016 CDP which considers changes in land use planning and development densities in accordance with Official Plan objectives. For reference a copy of the 2016 Riverside South Community Design Plan – Land use Plan is included in **Appendix A**. The infrastructure analyses also accounted for existing sewer and infrastructure and the stormwater management pond within the study area. The purpose of the 2017 ISSU report was to present a new preferred potable water, sanitary and stormwater infrastructure servicing strategy for the Rideau River Study area. A copy of Figure 1.1, Riverside South Community and Study Area Boundary, from the 2017 report, is also included in **Appendix A** for reference.

Subsequent to the completion of the revised ISSU, construction of the Riverside South Pond 5 and the River Road reconstruction has been substantially completed.

1.3 Previous Studies

Since the South Urban Community and Riverside South Community have been planned and developed for over twenty five years, there have been numerous background studies dealing with major municipal infrastructure. Many of those reports are listed in the 2017 Updated Report. For reference, pages 1.4 and 1.5 which list these previous studies from that report, are included in **Appendix A**. The following reports however, were referenced prior to completing this assessment:

1. **Riverside South Community Infrastructure Servicing Study Update (ISSU) – Rideau River Area (Stantec, 2017)** The report is the most current approved document which reviews the provision of major municipal infrastructure, including water supply, wastewater collection and treatment of storm runoff, in the Rideau River Area of the larger Riverside South Community. The report reviewed many of the recommendations from relevant earlier reports including:

   a) 2016 Land Use Plan for the Riverside South Community Design Plan

   b) Riverside South Master Servicing Study (Stantec 2008)

   The report provided a macro level servicing plan for the Rideau River Area portion of the Riverside South Community. The subject property is proposed to be developed in accordance with the recommendations of the 2017 Updated report. The more specific details of the development will be part of the final engineering design of the lands.

2. **Design Brief River Road Reconstruction prepared for Riverside South Development Corporation (IBI Group, 2018)** The report is the current approved document which provides details on the now existing water supply, major and minor storm systems and sanitary sewers located in River Road adjacent to and south of the subject lands.

3. **Design Brief Summerhill Village Phase 2 prepared for Claridge Homes (IBI Group, November 2011)** The report provides details on the proposed water supply, major and minor storm systems and sanitary sewers also located in River Road adjacent to the site and within the existing residential subdivision across River Road from the proposed lands.

4. **Design Report for Phase 9 - Riverside South Development Corporation(JL Richards, 2012)** The report provides details on the water supply, major and minor storm systems and sanitary sewers adjacent to the proposed site within the existing residential subdivision across River Road from the proposed lands.

1.4 Subject Property

The current draft plan of subdivision for the subject property is shown on **Figure 1.2** which is included in **Appendix A**. The proposed subdivision is split into two sections, the north portion is 8.9 Ha is size while the south portion is 2.4 Ha.

The proposed development will include a mix of single family and townhouse residential units. Additionally the north portion contains a block of lands to be further developed though the City's Site Plan Application process at a later date into a mid-density residential area.

1.5 Existing Infrastructure

Figure 1.3 shows the location of existing major municipal infrastructure in the vicinity of the Riverside South Phase 12 development. The 2017 ISSU report recommended that the subject site be serviced with a 305/406 mm diameter watermains which are existing along River Road Road.

Previous studies recommend that wastewater flows from the subject site be routed to two outlets, the majority of the subject lands, all of the south site and the south half of the north site, are to connect to the existing sanitary sewers in River Road and flow eastwards through the River Road sub-trunk sewer located within the Summerhill Street ROW. A smaller portion of the site, the north half of the north section is designed to flow into a sanitary outlet constructed during the Phase 9 Lands development in Ballinville Circle. At the time of detailed design the feasibility of directing all sanitary flows from the subject lands to the River Road/Summerhill Street sub-trunk sewer will likely be examined.

All minor stormwater runoff from the site is proposed to be routed to future Pond 5 which is located south of the subject site west of River Road. All trunk sewers required to convey stormwater from the subject lands to the pond have been constructed and are complete, and the pond is currently under construction and is substantially complete.

1.6 Pre-Consultation

There was a pre-consultation meeting with the City of Ottawa on August 30, 2018. The meeting notes can be found in **Appendix A**. The following are some of the topics reviewed and discussed:

- Zoning information
- Official plan
- Infrastructure
- Noise Study needed
- Traffic Study needed
- Geotechnical conditions
- Assessment of Adequacy of Public Services Report needed

It should be noted that consultation with the Rideau Valley Conservation Authority and the Ontario Ministry of Environment, Conservation and Parks and Parks Canada are to be scheduled forthwith.

1.7 Existing Topography

The property generally slopes from east to west towards the Rideau River. Contours for the site range between 90 and 85 meters. **Figure 1.4,** which is included in **Appendix A**, shows the general topography of the subject property.

Most surface drainage from the property currently flow directly to the Rideau River.

Once developed, the intent will be to maintain existing drainage patterns. For reference, a copy of Drawing GCP-1, Macro Grading Plan from the 2017 report is included in **Appendix A**.

Figure 1.5, located in **Appendix A**, shows the proposed macro-grading plan for the subject lands.

1.8 Geotechnical Considerations

The subject lands are covered under two geotechnical reports, the following geotechnical investigation report has been prepared by Paterson Group in support of the north section lands.

- Report No. PG3320-1 dated November 26

The following geotechnical investigation report has been prepared by Golder in support of the south section lands.

- Report No. 1406631-3-Rev2 dated August 2018

Among other items, the reports comments on the following:

- Site grading
- Foundation design
- Pavement design
- Sub-surface Conditions
- Seismic design
- Corrosion potential
- Site Servicing

  Groundwater Control

In general, the subsurface profile of the north lands include topsoil, underlain by stiff silty clay. While the south lands consist of topsoil underlain by clayey silt and silt.

One of the recommendations from the Paterson Group study included grade raise restrictions for the north side development. A general grade raise restriction for the north site of 2.0m has been provided; however, it is anticipated that the grade raise recommendation will be further refined in the near future and an increase to the maximum permitted grade raise in localized areas is anticipated.

Regarding the south side, Golder has established a 2.1m grade raise restriction for these lands.

1.9 Watercourses and Setbacks

There are no identified Municipal Drains in the 2017 ISSU report.

The September 2016 Environmental Impact Statement by Dillon Consulting states that the site is not located near any provincially significant wetlands, significant woodlands, areas of natural and scientific interest, significant wildlife habitat, or any other designated natural heritage system constraints. The Dillon study does identify 2 headwater drainage features within the subject lands; however, their study determined that these features had limited functions and they deemed that “no management required”.

2 WATER SUPPLY

2.1 Existing Conditions

As noted in Section 1.5 there is an existing 300 mm watermain on River Road along the north block. The 300 mm watermain was recently extended south on River Road, at Borbridge Avenue the River Road watermain increases to 400 mm in diameter, adjacent to the south block. . **Figure 1.3** in **Appendix A** shows the location of the existing watermains.

2.2 Riverside South Community Infrastructure Servicing Study Update – Rideau River Area (2017 ISSU)

The report provided trunk watermain servicing for the Rideau River Area, the location and size of the proposed watermains is shown on Drawing WAT-1 in **Appendix B**.

A hydraulic analysis was conducted for the Rideau River Area trunk watermain as part of the report. The analysis was conducted with the Barrhaven Pump Station operating at a discharge HGL of 147 m and the Ottawa South Pump Station operating at a discharge HGL of 146 m to Zone SUC which includes the Rideau River Area. Water demands were based on recent projections presented in the Riverside South Community Design Plan (CDP) 2016.

Results of the hydraulic modeling under basic day condition shows some areas where the pressure exceeds 552 kPa (80 psi). The high pressure areas are in the low lying land near the Rideau River, and is shown on Figure 5.4 from the Servicing Study Update which is included in **Appendix B**. Buildings in the high pressure area will require pressure reducing valves in accordance with Technical bulletin ISDTB-204.02. The hydraulic analysis showed that no areas fell below the minimum pressure of 276 kPa (40 psi) under peak hour conditions. A fire flow analysis was also conducted which showed that all nodes can provide more than a 13,000 l/min fire flow while maintaining a minimum system pressure of 138 kPa (20 psi).

2.3 Design Criteria

2.3.1 Water Demands

Water demands have been calculated for the site based on per unit population density and consumption rates taken from Tables 4.1 and 4.2 of the City of Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Single Family 3.4 person per unit
- Townhouse and Semi-Detached 2.7 person per unit
- Average Apartment 1.8 person per unit
- Residential Average Day Demand 350 l/cap/day
- Residential Peak Daily Demand 875 l/cap/day
- Residential Peak Hour Demand 1,925 l/cap/day
- ICI Average Day Demand 50,000 l/gross ha/day
- ICI peak Daily Demand 75,000 l/gross ha/day
- ICI Peak Hour Demand 135,000 l/gross ha/day

Residential units in the subject site consists of street townhouses, single family lots and multi-density units. A watermain demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 2.13 l/s
- Maximum Day 5.34 l/s
- Peak Hour 11.70 l/s

2.3.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in Clause 4.2.2 of the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls will be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.3.3 Fire Flow Rates

In the recent Technical Bulletin 'ISDTB-2014-02, Revisions to Ottawa Design Guidelines – Water', the fire flow requirements for single detached dwellings and traditional town and row houses can be capped at 10,000 l/min provided that there is a minimum separation of 10 meters between the backs of adjacent units and that the town and row house blocks are limited to 600 square meters of building areas and seven dwelling units. The street townhouses in this development meet the requirements of ISDTB-2014-02, the fire flow rate of 10,000 l/min (166.7 l/s) is used in the fire flow analysis.

There are several locations where the rear of the single family home faces the side of an adjacent unit. At these locations the distance between the rear and side of the adjacent building is less than 10 meters which appears to violate item 4.1 of Technical Bulletin ISDTB-2014-02 which requires a 10 meter separation between the backs of the adjacent units. Without the 10,000 l/min cap the Fire Underwriters Survey (FUS) method of determining fire flow rates cannot be used as wood frame buildings separated by less than 3 meters is considered on fire unit. As the side yard distances between houses are usually less than 3 meters then all adjacent houses are considered one fire unit which results in a very large fire flow which is impractical to achieve. In order to keep the 10,000 l/min fire flow cap the side wall of a building which is less than 10 meters from an adjacent rear facing building is to be constructed as a fire wall. The locations of the buildings potentially requiring a fire wall construction is shown on **Figure 2.1**.

There are several multi-unit buildings proposed at the north end of the north block. Without details of the building, a conservative fire flow rate of 15,000 l/min (250 l/s) is used in the fire flow analysis for these buildings.

2.3.4 Boundary Conditions

The City of Ottawa has provided five boundary conditions in the Riverside South area for various projects. There are two boundary conditions which are near the site. One at River Road at Summerhill Street opposite the north block and another on Borbridge Avenue at Southbridge Street. There are two sets of boundary conditions provided, one for pre-configuration and another for post-configuration. As the post configuration values are higher than the pre-configuration, the post configuration value for maximum HGL is used in the analysis for maximum pressure and the pre-configuration peak hour and max day plus fire values are used for minimum pressure and fire flow. A copy of the boundary condition is included in Appendix B and summarized as follows for the two adjacent locations.

	CONNECTION RIVER ROAD & SUMMERHILL	CONNECTION BORBIRDGE & SOUTHBRIDGE
Max HGL (Basic Day)	147.8 m	147.8 m
Peak Hour	123.9 m	123.9 m
Max Day + Fire (10,000 l/min Fire Flow) (15,000 l/min Fire Flow	 111.9 m 117.3 m	 121.3 m 117.3 m

2.3.5 Hydraulic Model

A computer model for the subject site has been added to the model for the adjacent Riverside South Phase 15-1 & 2 developments including the River Road watermain and the Rivers Edge Phase 1 development. The model includes existing watermains and the boundary conditions.

2.4 Proposed Water Plan

2.4.1 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Water pipes are sized to provide sufficient pressure and to deliver the required fire flows.

Results of the hydraulic model are include in **Appendix B,** with the Phase 12 nodes highlighted, and summarized as follows:

Scenario	
Basic Day (Max HGL) Pressure Range	559.3 to 585.9 kPa
Peak Hour Pressure Range	325.2 to 350.5 kPa
Max Day + 10,000 l/min Fire Flow	178.2 l/s to 398.4 l/s
Max Day + 15,000 l/min Fire Flow	270.8 l/s to 297.5 l/s

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	All nodes have basic day pressures over 552 kPa, therefore pressure reducing control is required for this development.
Minimum Pressure	All nodes in the model exceed the minimum value of 276 kPa (40 psi).

Fire Flow	All townhouse and single family lots exceed the fire flow requirement of 166.7 l/s (10,000 l/min). The nodes at the multi-unit residential building exceed 250 l/s (15,000 l/min).

2.4.2 Watermain Layout

Figure 2.1 shows the proposed Water Plan for the proposed development.

The north block is serviced by three connections to the existing 300 mm watermains on River Road. 200 mm watermains are required to service the single family lots and 250 mm watermains for the multi-unit area at the north end. For the south block, two connections to the recently constructed 400 mm watermain on River Road are required, 200 mm watermains will service the site.

3 SANITARY SEWERS

3.1 Existing Conditions

As noted earlier in Section 1.5, sanitary flows from the subject site will be routed either to the existing River Road/Summerhill Street sub-trunk sanitary sewer and/or to the existing sanitary stub left during the Phase 9 Lands development in Ballinville Circle. Again, at the time of detailed design the feasibility of directing all sanitary flows form the subject lands to the River Road/Summerhill Street sub-trunk sewer will likely be examined.

3.2 Riverside South Community Infrastructure Servicing Study Update – Rideau River Area (2017 ISSU)

The report provided a macro level servicing plan for the portion of the Riverside South Community that will be tributary to Pond 5, which is referred to as the Rideau River Study Area. The limits of the study area are shown on Figure 1.1 from the study and a copy is included in **Appendix A**. The subject property is located within the Rideau River Drainage Area.

For reference, a copy of Drawing SAN-1, Sanitary Drainage Plan from the 2017 study is included in **Appendix C**. The 2017 ISSU study recommended that drainage area 2A be tributary to the River Road sewer. A copy of Figure 4.2, Recommended Sanitary Servicing (2017 Update), from the 2017 ISSU Report, together with a related design sheet are both included in **Appendix C**.

3.3 River Road Reconstruction (2018 IBI)

Drainage area plan 114373-400 and the sanitary sewer design sheet for this project have been included in **Appendix C** as they demonstrate that the southern portion of the subject lands have been included in the design calculations for the sanitary sewer recently extended in River Road, the subject lands are identified as drainage area 8A.

3.4 Summerhill Village Phase 1 (2011 IBI)

Drainage area plan 3766-501 and the sanitary sewer design sheet for this project have been included in **Appendix C** as they demonstrate that a portion of the norther lands have been included in the design calculations for the existing sanitary sewer in Summerhill Street. The proposed connection is at MH100A at the intersection of River Road and Summerhill Street. The lands are identified as drainage area “FROM MSS 2b.”.

3.5 Riverside South Phase 9 (2012 JLR)

Drainage area plan D1-SAN and the sanitary sewer design sheet for this project have been included in **Appendix C** as they demonstrate that the north portion of the northern lands have been included in the design calculations for the existing sanitary sewer in Ballinville Circle. The proposed connection is at stub 73A. The lands are identified as drainage area “Future Phase 12 Residential”.

3.6 Design Criteria

The estimated wastewater flows from the subject site are based on the revised City of Ottawa design criteria. Among other items, these include:

- Average residential flow = 280 l/c/d
- Peak residential flow factor = (Harmon Formula) x 0.80

- Average commercial flow = 28,000 l/s/ha
- Average institutional flow = 28,000 l/s/ha
- Peak ICI flow factor = 1.5 if ICI area is ≤ 20% total area
  1.0 if ICI area is > 20% total area
- Inflow and Infiltration Rate = 0.33 l/s/ha
- Minimum Full Flow Velocity = 0.60 m/s
- Maximum Full Flow Velocity = 3.0 m/s
- Minimum Pipe Size = 200 mm diameter

In accordance with the City of Ottawa Sewer Design Guidelines table 4.2, the following density rates are estimated for the subject site:

- Single units = 3.4
- Semi units = 2.7
- Townhouse and back to back units = 2.7
- Apartment units = 1.8

3.7 Recommended Sanitary Plan

As noted above the whole of the subject lands have been accounted for in the design and construction of the existing adjacent sanitary sewer systems. The current approved plans call for 3 separate connections to existing sanitary sewer systems. A preliminary sanitary plan is included in **Figure 3.1** in **Appendix C**.

In an effort to reduce disruptions to River Road and cost, the detailed design phase will likely include an analysis to explore the possibility of eliminating the northernmost sanitary connection for the northern section of lands. A preliminary sanitary plan demonstrating this concept is also included in **Figure 3.1A** in **Appendix C**.

No external sanitary flows are anticipated to cross the subject lands. As such, all sanitary sewers are proposed to be at normal depth and size.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

The ultimate storm runoff outlet from the property is the Riverside South Pond 5 which is currently under construction and is located west of River Road.

The lands currently drain westward directly into the Rideau River.

4.2 Riverside South Community Infrastructure Servicing Study Update – Rideau River Area (2017 ISSU) Criteria

The report provided a macro level servicing plan for the Riverside South Community that will be tributary to future Pond 5. That area is referred to as the Rideau River Area and includes the subject property. The limits of the study are shown in Figure 1.1 from the study and a copy is included in **Appendix A**.

The 2017 ISSU report recommended that stormwater runoff from the study area be routed to Riverside South Pond 5, which is currently under construction. Minor storm runoff is proposed to be routed to the trunk storm sewer on River Road. For reference a copy of Drawing STM1, Storm Sewers from the 2017 study is included in **Appendix D**.

4.3 River Road Reconstruction (2018 IBI)

Drainage area plans 114373-500, 114373-501 and the storm sewer design sheet for this project have been included in **Appendix D** as they demonstrate that the whole of the subject lands have been included in the design calculations for the trunk storm sewer recently extended in River Road, the subject lands are identified as drainage area 154 and EXT-1.

It should be noted that during the modelling for the River Road trunk sewers that the subject lands were included in the model with 100 year capture into the minor storm system. Flows in excess of the 100 year event will be provided with an emergency route direct to the Rideau River.

4.4 Summerhill Village Phase 1 (2011 IBI)

Drainage area plan 3766-500A and the storm sewer design sheet for this project have been included in **Appendix D** as they demonstrate that the norther lands have been included in the design calculations for the trunk storm sewer in River Road. The design proposed two connections to River Road.

4.5 Minor Storm Sewer Design Criteria

The minor system storm sewers for the subject site are proposed to be sized based on the rational method, applying standards of both the City of Ottawa and MECP. Some of the key criteria for this site include the following:

- Sewer Sizing: Rational Method
- Design Return Period: 1:2 year (local streets)
  1:5 year (collector streets)
- Initial Time of Concentration 10 minutes
- Manning's: 0.013

- Minimum Velocity: 0.80 m/s
- Maximum Velocity: 3.00 m/s

PIPE DIAMETER (MM)	SLOPE (%)
250	0.43
300	0.34
375	0.25
450	0.20
525	0.16
600	0.13
675	0.11
750 and larger	0.1

- Runoff Coefficients (per ISSU Update, to be confirmed at detailed design stage):

LAND USE		RUNOFF COEFFICIENT
Residential	Low Density	0.65
	Medium Density	0.70
	High Density	0.80
Commercial		0.75
Green Space		0.30
Institutional		0.75
Park		0.20
Transitway		0.82
Arterial Road		0.82
Collector Road		0.82

4.6 Recommended Minor Storm Plan

As noted above the whole of the subject lands have been accounted for in the design and construction of the existing adjacent trunk storm sewer systems. The current approved plans call for 3 separate connections to existing storm sewer systems. A preliminary storm plan is included in **Figure 4.1** in **Appendix D**.

In an effort to reduce disruptions to River Road and cost, similar to the sanitary section, the detailed design phase will likely include an analysis to explore the possibility of eliminating the northernmost storm connection for the northern section of lands. A preliminary storm plan demonstrating this concept is also included in **Figure 4.1A** in **Appendix D**.

Some of the storm sewers recommended to service the Rideau River Area are subject to cost sharing as noted in the Draft 2013 Development Changes Study Report Update. For reference a copy of a relevant portion of Table F-2, Stormwater Services South, and Figure STM 4, Riverside South Storm Sewers are included in **Appendix D**. The report identified the larger storm sewers in the Riverside South Community including the River Road Area and the subject site.

4.7 Dual Drainage

Development of the subject site will include a stormwater strategy using the dual drainage system. The system features a combination of on-site detention (surface ponding) with inlet control devices (ICDs) and direct conveyance with no ponding. It accommodates both minor and major stormwater runoff. During frequent storms the effective runoff collected by catchment areas is directly released via catch basin inlets into the network of storm sewers, called the minor system. During less frequent storms, the balance of the flow (in excess of the minor flow) is accommodated by a system of rear yard swales and street segments (or other forms of underground storage or surface storage such as dry ponds). The main advantage of this arrangement is its ability to adjust the rate of total inflow into the minor system to satisfy the required level of service. The required total inflow is typically maintained by the restriction of the capacity and the density of the inlets directly connected into this system. As noted, during less frequent storms, the balance of the flow is accommodated by the major system. Typically, this accommodation is achieved by the attenuation on catchment surfaces called on-site detention and/or direct conveyance of the flow to a recipient.

River Road, a collector road with a rural cross-section, is a constraint with respect to conveyance of major flow across the road's surface. Specifically, as a collector road, there should be no cross flow during events up to the 100 year event.

5 EROSION AND SEDIMENTATION CONTROL PLAN

During construction, existing conveyance systems and water courses can be exposed to sediment loading. Development of a subdivision such as this project can potentially create deleterious material which can enter the natural environment and gain access to fish and amphibian habitat. In order to prevent site generated sediments from entering the environment, an Erosion and Sedimentation Control Plan (ESCD) will be implemented prior to development. Although a generic ESCP can be developed as part of this report and subsequent Design Briefs, the final plan will be developed and implemented by the Owner's general contractor.

The erosion and sedimentation control strategy for the subject site could include erection of silt fences, straw bale barriers and rock check dams. These measures will ensure protection of both adjacent developments and the natural environment adjacent to and downstream of the site.

A copy of a potential Erosion and Sedimentation Control Plan (ESCP) is shown on **Figure 5.1**, which is included in **Appendix E**.

Other elements of an ESCP could also include installation of bulkhead barriers at the nearest existing downstream manholes to ensure deleterious material does not gain access to those sewers and potentially the Riverside South Pump Station and/or Pond 5. Also, the final ESCP will incorporate features to deal with disposal of any taken water. Some of the features or general requirements are sometimes conditions of a Permit To Take Water.

6 APPROVALS AND PERMIT REQUIREMENTS

6.1 City of Ottawa

The City of Ottawa will review all development documents including final working drawings and related reports. Upon completion, the City will approve the local watermains, under Permit No. 008-202; submit the sewer extension MECP application to the province and eventually issue a Commence Work Notification.

6.2 Province of Ontario

The Ministry of Environment, Conservation and Parks (MECP) will approve the local sewers under Section 53 of the Ontario Water Resources Act and issue an Environmental Compliance Approval. A Permit To Take Water may also need to be issued by the MECP.

6.3 Conservation Authority

At this time it is understood that there are no required permits, authorizations or approvals needed expressly for this development from the Conservation Authority; however, this will be confirmed through a subsequent pre-consultation with the RVCA.

6.4 Federal Government

At this time it is understood that there are no required permits, authorizations or approvals needed expressly for this development from the Federal Government; however, this will be confirmed through subsequent consultation with Parks Canada as a minimum.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusion

All infrastructure which is needed to help service the subject site already exists. The development plan will include connections to the infrastructure to adequately service the site with water supply, wastewater collection and disposal and management of stormwater runoff. The extension of the existing watermains through the subject site will provide a reliable source of both drinking water and fire flows. The ultimate wastewater outlets are already in place. A new stormwater management facility, Pond 5, is currently under construction and once completed will provide the necessary treatment for runoff from the subject site. Development of the subject property will include the recommended storm sewer plan. Therefore, there are suitable public services in place to service the subject site.

7.2 Recommendation

From an assessment of major municipal infrastructure perspective, it is recommended that the development application for the Urbandale property known as Riverside South Phase 12 be accepted and that the development of the property move forward.

Terry Brule, P. Eng.
Associate

James Battison

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APPENDIX A

Development Servicing Study Checklist

The following table is a customized copy of the current City of Ottawa's Development Servicing Study Checklist. It is meant to be a quick reference for location of each of the items included on the list. The list contains the various item description and the study section in which the topic is contained.

GENERAL CONTENT

	ITEM DESCRIPTION	LOCATION
	Executive Summary (for larger reports only)	N/A
√	Date and revision number of the report	Front Cover
√	Location Map and plan showing municipal address, boundary, and layout of proposed development.	Figure 1.1
√	Plan showing the site and location of all existing services.	Figure 1.3
√	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 2.2, 3.2, 3.3, 4.3 Figure 1.1
√	Summary of Pre-consultation Meeting with City and other approval agencies.	Section 1.6
√	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.	Sections 1.3, 2.2, 3.2
√	Statement of objectives and servicing criteria	Section 1.1, 2.2.3, 3.3 & 4.3
√	Identification of existing and proposed infrastructure available in the immediate area.	Figure 1.3
√	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).	Sections 1.9
√	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.	Section 1.8 Detail Design
√	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
	Proposed phasing of the development, if applicable.	N/A
√	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.8

√	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	Noted

DEVELOPMENT SERVICING REPORT: WATER

	ITEM DESCRIPTION	LOCATION
√	Confirm consistency with Master Servicing Study, if available	Section 2.2
√	Availability of public infrastructure to service proposed development	Section 2.1
√	Identification of system constraints – external water needed	Sections 2.2
√	Identify boundary conditions	N/A
√	Confirmation of adequate domestic supply and pressure	Section 2.3 & Appendix B
√	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 2.2
√	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.	Section 2.2 Appendix B
	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defining phases of the project including the ultimate design.	Section 2.4
	Address reliability requirements such as appropriate location of shut-off valves.	Detail Design
√	Check on the necessity of a pressure zone boundary modification.	N/A
√	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Section 2.2
√	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.	Detail Design
√	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities and timing of implementation.	N/A
√	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 2.3
√	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Detailed Design

DEVELOPMENT SERVICING REPORT: WASTEWATER

	ITEM DESCRIPTION	LOCATION
√	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 3.3
√	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 3.2
√	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 condition of sewers.	Detail Design
√	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 3.2, Appendix C
√	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 3.1, 3.2, 3.4
	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix "C") format.	Section 3.3 & Detail Design
√	Description of proposed sewer network including sewers, pumping stations and forcemains.	Section 3.1, 3.4 & Figure 3.1 in Appendix C
√	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	Section 1.9
√	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	Section 3.1
√	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
√	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
√	Special considerations such as contamination, corrosive environment etc.	Detail Design

DEVELOPMENT SERVICING REPORT: STORMWATER CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 4.1, 4.4 Appendix D
√	Analysis of available capacity in existing public infrastructure.	Section 4.1, 4.4,
√	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Section 1.7, Figure 1.4 in Appendix A

√	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 4.5
√	Water quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 4.5
√	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 4.3, 4.4, 4.5
√	Set-back from private sewage disposal systems.	N/A
√	Watercourse and hazard lands setbacks.	Section 1.9, 4.8
√	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Section 1.6
√	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 4.2
√	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 4.5 Detail Design
√	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 1.9, 4.8
	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.	Detail Design
√	Any proposed diversion of drainage catchment areas from one outlet to another.	Section 1.7, 4.4
√	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 4.2, 4.4, Appendix D
	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
√	Identification of potential impacts to receiving watercourses	N/A
√	Identification of municipal drains and related approval requirements.	Section 1.9
√	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 4.5 Detail Design
√ √	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Section 4.5 Detail Design
	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Section 4.6
√	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 5
√	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
√	Identification of fill constraints related to floodplain and geotechnical investigation.	Section 1.8,

APPROVAL AND PERMIT REQUIREMENTS: CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	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 Act. 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 1.6, 1.9
	Application for Certification of Approval (CofA) under the Ontario Water resources Act.	Section 1.6 Detail Design
√	Changes to Municipal Drains	N/A
√	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 6

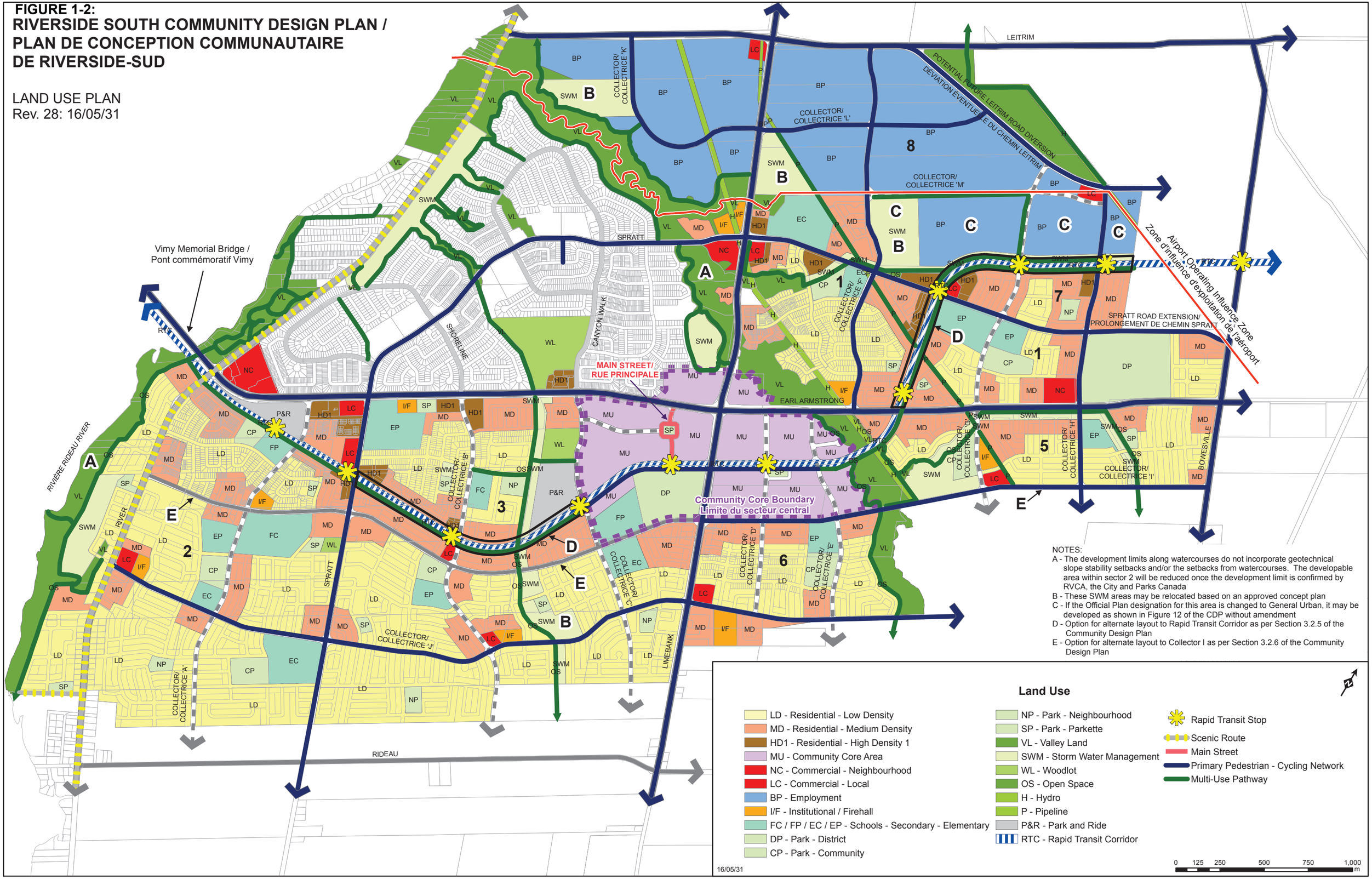
CONCLUSION CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	Clearly stated conclusions and recommendations	Section 7.1 & 7.2
	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.	Detail Design
√	All draft and final reports shall be signed and stamped by professional Engineer registered in Ontario.	Completed

FIGURE 1-2:

RIVERSIDE SOUTH COMMUNITY DESIGN PLAN / PLAN DE CONCEPTION COMMUNAUTAIRE DE RIVERSIDE-SUD

LAND USE PLAN
Rev. 28: 16/05/31



NOTES:

A - The development limits along watercourses do not incorporate geotechnical slope stability setbacks and/or the setbacks from watercourses. The developable area within sector 2 will be reduced once the development limit is confirmed by RVCA, the City and Parks Canada

B - These SWM areas may be relocated based on an approved concept plan

C - If the Official Plan designation for this area is changed to General Urban, it may be developed as shown in Figure 12 of the CDP without amendment

D - Option for alternate layout to Rapid Transit Corridor as per Section 3.2.5 of the Community Design Plan

E - Option for alternate layout to Collector I as per Section 3.2.6 of the Community Design Plan

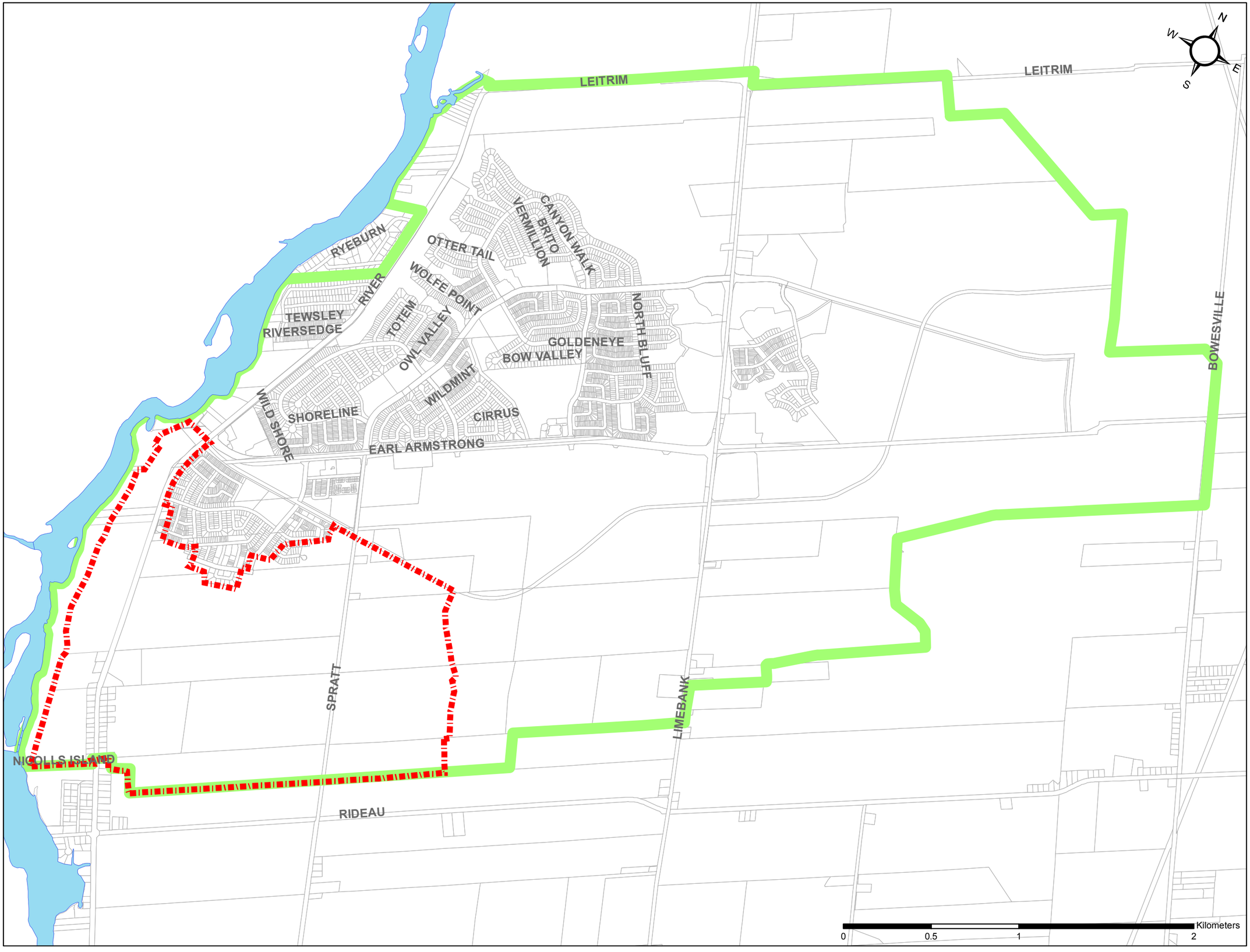
Land Use

- LD - Residential - Low Density
- MD - Residential - Medium Density
- HD1 - Residential - High Density 1
- MU - Community Core Area
- NC - Commercial - Neighbourhood
- LC - Commercial - Local
- BP - Employment
- I/F - Institutional / Firehall
- FC / FP / EC / EP - Schools - Secondary - Elementary
- DP - Park - District
- CP - Park - Community
- NP - Park - Neighbourhood
- SP - Park - Parkette
- VL - Valley Land
- SWM - Storm Water Management
- WL - Woodlot
- OS - Open Space
- H - Hydro
- P - Pipeline
- P&R - Park and Ride
- RTC - Rapid Transit Corridor
- Rapid Transit Stop
- Scenic Route
- Main Street
- Primary Pedestrian - Cycling Network
- Multi-Use Pathway

16/05/31

0 125 250 500 750 1,000 m

I:\AA_Staff\Sarah\DonMorse\RiversideSouthCDP_Update_2015\RiversideSouthCDP_LandUse2015_enRev28.mxd



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Legend

- Rideau River Study Area
- Riverside South Community Boundary

Client / Project:

CITY OF OTTAWA

RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

RIVERSIDE SOUTH COMMUNITY AND STUDY AREA BOUNDARY

Project No.:

163401101

Figure No.:

1-1

Revision 28 of the Riverside South Community Design Plan (CDP) (Bousfields, May 2016) was approved by the City of Ottawa Council in June 2016. The current Riverside South Community Infrastructure Servicing Study Update (Stantec, June 2017) is completed to reflect the CDP and Master Drainage Plan (MDP). The CDP Land Use Plan is shown in **Figure 1-2.**

1.3 PREVIOUS RELEVANT STUDIES

The following, previously completed, studies and design briefs were considered in the completed analyses.

1.3.1 Master Drainage Studies

"South Urban Community Drainage Planning Study" (UMA Engineering Ltd. and Golder Associates, May 1990)

"City of Gloucester South Urban Community Master Drainage Plan" (Gore & Storrie, July 1992)

"Riverside South Community Master Drainage Plan Update – Final Report" (Stantec Consulting Ltd., September 2008)

"Riverside South Community Master Drainage Plan Update – Rideau River Study Area – Final Report" (Stantec Consulting LTD., March 2016)

1.3.2 Master Servicing Studies

"Riverside South Master Servicing Study" (Stantec Consulting Ltd., September 2008)

"South Urban Community River Ridge Master Infrastructure Plan" (Ainley Graham and Associates, December 1994)

Pressure Zones Infrastructure Assessment" (Stantec Consulting, 2002)

"Water Master Plan" (Stantec Consulting, 2013)

1.3.3 Sanitary Studies

"South Urban Community Master Water and Sanitary Sewage Study" (Gore & Storrie, 1992)

"South Urban Community Rideau River Crossing – Facilities Phase" (Gore & Storrie, 1995)

"Wastewater Master Plan" (RMOC, July 1997)

"Wastewater IMP" (Stantec, 2013)

1.3.4 Design Briefs/Reports

"Design Report - Riverside South Development Corporation - Riverside South Community Phase 9" (J.L. Richards & Associates Limited, December 2011)

"Riverside South Elevated Water Storage Rank Class Environmental Assessment" (Stantec, 2014)

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EARL ARMSTRONG ROAD

RAPID TRANSIT CORRIDOR

RAPID TRANSIT

PHASE 9

SUMMERHILL STREET

BORBRIDGE AVENUE

RIVER ROAD

SUBJECT PROPERTY

RIVERSIDE SOUTH PHASE 12 (NORTH)

SUBJECT PROPERTY

SUBJECT PROPERTY

SWM POND 5

RIVERSIDE SOUTH PHASE 12 (SOUTH)

RIDEAU RIVER

Scale	Project Title	Drawing Title	Sheet No.
IBI			
1:2000	RIVERSIDE SOUTH PHASE 12	LOCATION PLAN	FIGURE 1.1

DRAFT PLAN OF SUBDIVISION OF

PART OF LOTS 20, 21 AND 22
AND
PART OF THE ROAD ALLOWANCE
BETWEEN LOTS 20 AND 21
(Closed by By-Law 2008-244, Inst. OC1049346)
BROKEN FRONT CONCESSION (RIDEAU FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA
Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1000

40 30 20 10 0 20 40 Metres

Metric

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

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

Date

Andre Roy
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

This is to certify that I am the owner / agent of the lands to be subdivided and that this plan was prepared in accordance with my instructions.

Date

Marcel Denomme
Vice President of Land Development
Urbandale Corporation
I have the authority to bind the corporation

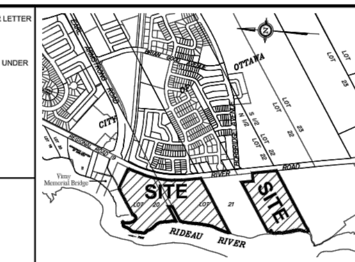
ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

(a) see plan
(b) see plan
(c) see plan
(d) single and multi-family residential housing, open space and storm water management lands
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
(l) see plan

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

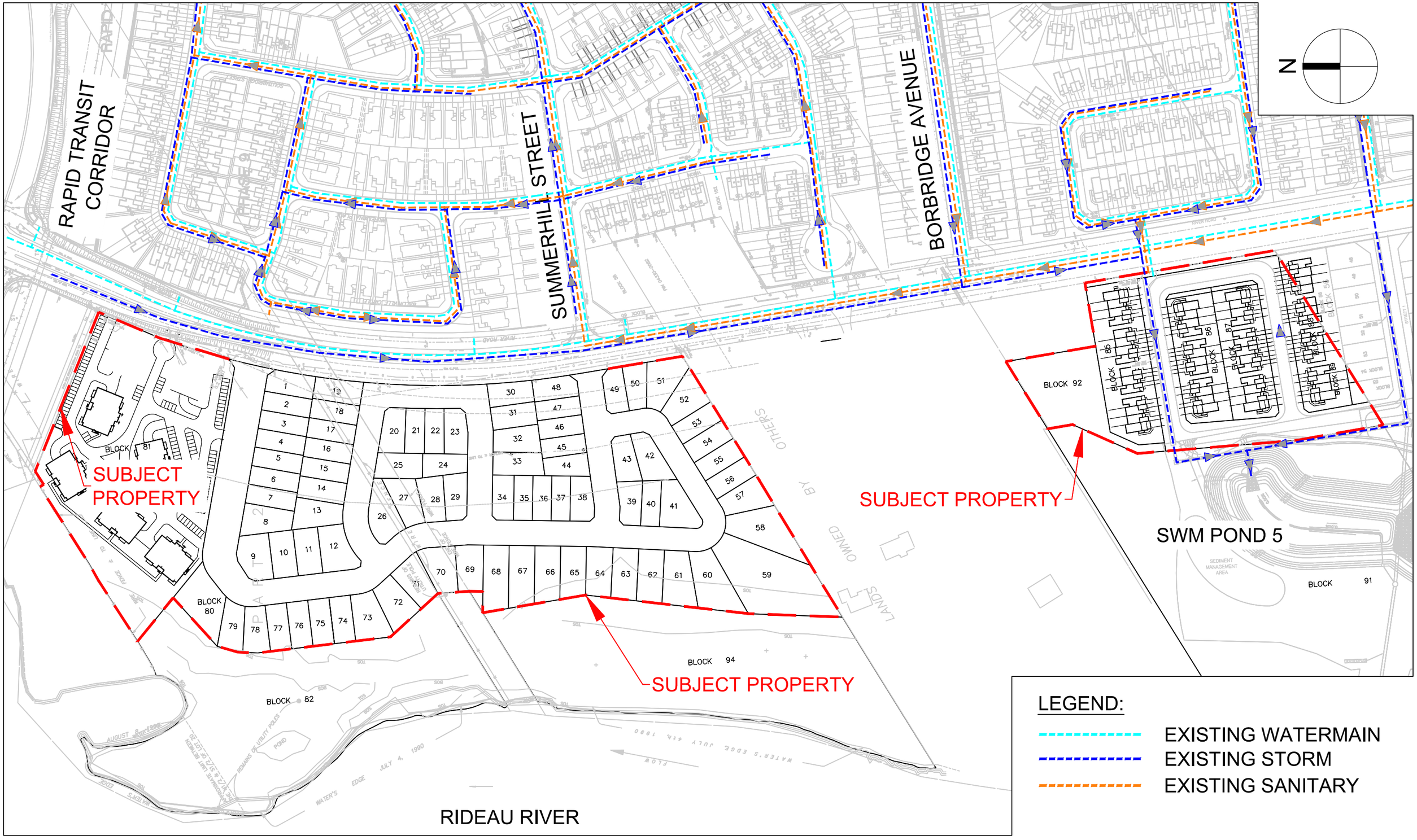
THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS ____ DAY OF ____________, 20__.

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



KEY MAP
NOT TO SCALE

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	DRAFT PLAN	FIGURE 1.2



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IBI

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	LOCATION OF EXISTING MAJOR MUNICIPAL INFRASTRUCTURE	FIGURE 1.3

RAPID TRANSIT CORRIDOR

SUMMERHILL STREET

BORBRIDGE AVENUE

N

SUBJECT PROPERTY

SUBJECT PROPERTY

SUBJECT PROPERTY

SWM POND 5

RIDEAU RIVER

RIVER ROAD

BLOCK 92

BLOCK 80

BLOCK 81

BLOCK 82

BLOCK 94

BLOCK 91

PHASE 9

OTHERS

WATER'S EDGE, JULY 4th, 1990

FLOW

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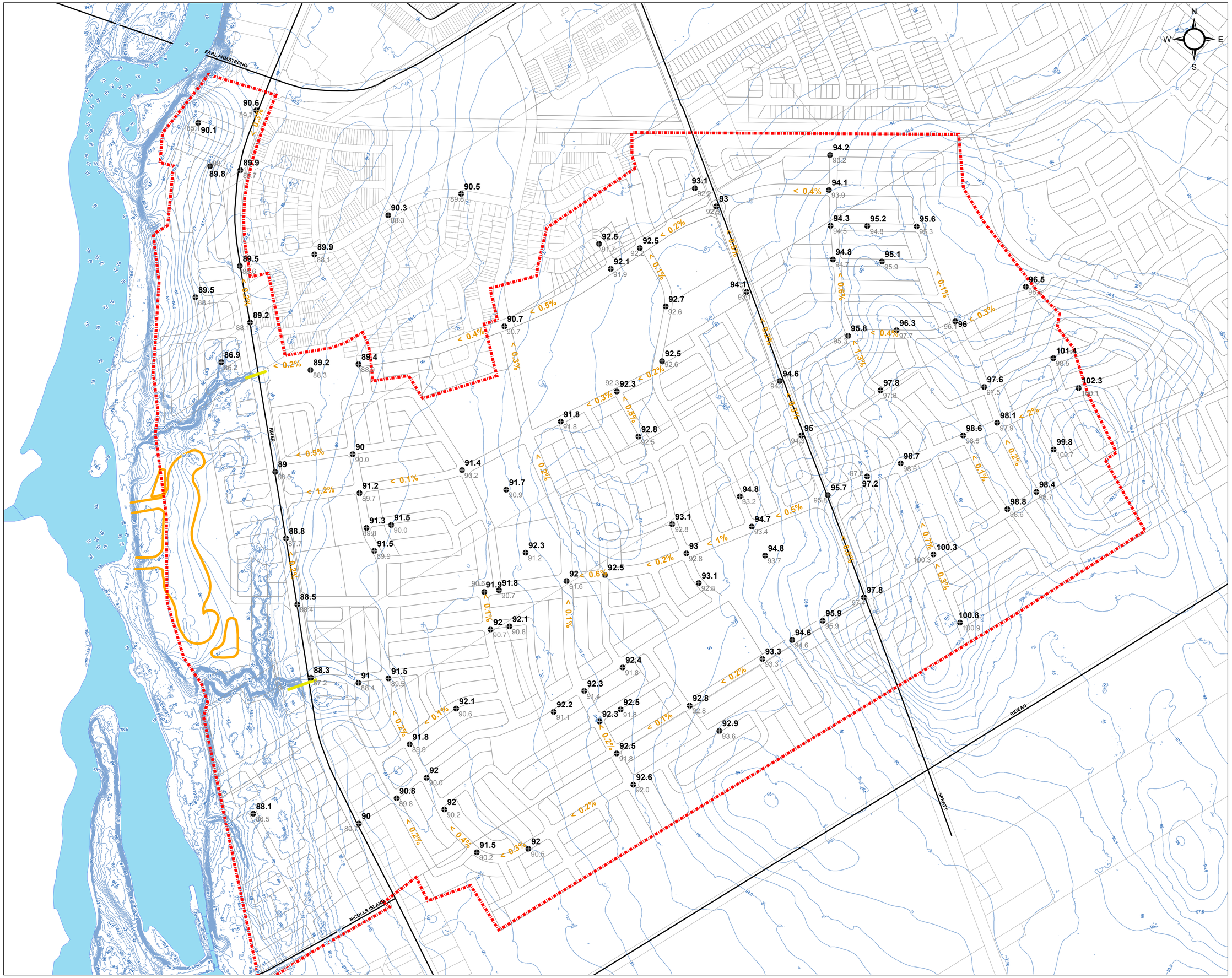
Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	SITE TOPOGRAPGY	FIGURE 1.4



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Legend

- Major Water
- Parcels
- Rideau River Study Area
- Pond 5
- Streets
- Proposed Elevation (m)
- Existing Elevation (m)
- Existing Contours (m)
- < Slope% — Proposed Slope
- Culverts

Client / Project:

CITY OF OTTAWA

RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

MACRO-GRADING PLAN

Project No.: **163401101**

Scale: 0 50 100 200 Meters

Drawing No.: **GCP-1**

Sheet: **1 of 7**

Revision: **0**

MEMO

Date:

To / Destinataire	Sean Moore, Planner
From / Expéditeur	Natasha Baird, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** *708 River Road, Ward 22*

File No. PC2018-0225

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

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

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

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)
   - ⇨ Ottawa Standard Tender Documents (latest version)
   - ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

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

4. The servicing (stormwater, sanitary and water), for the subject lands, is to be based on the Riverside South Community Infrastructure Servicing Study Update – Rideau River Area (June 2017) and the Riverside South Community Master Drainage Plan Update – Rideau River Study Area (March 2016).

5. The development will not be permitted until Pond 5 is constructed and has an approved outlet, the sanitary sewer and watermain are extended to 750 River Road.

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

    i. Location of service

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

    iii. Average daily demand: ___ l/s.

    iv. Maximum daily demand: ___l/s.

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

7. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

8. This area has a grade raise restriction of 1.8m.

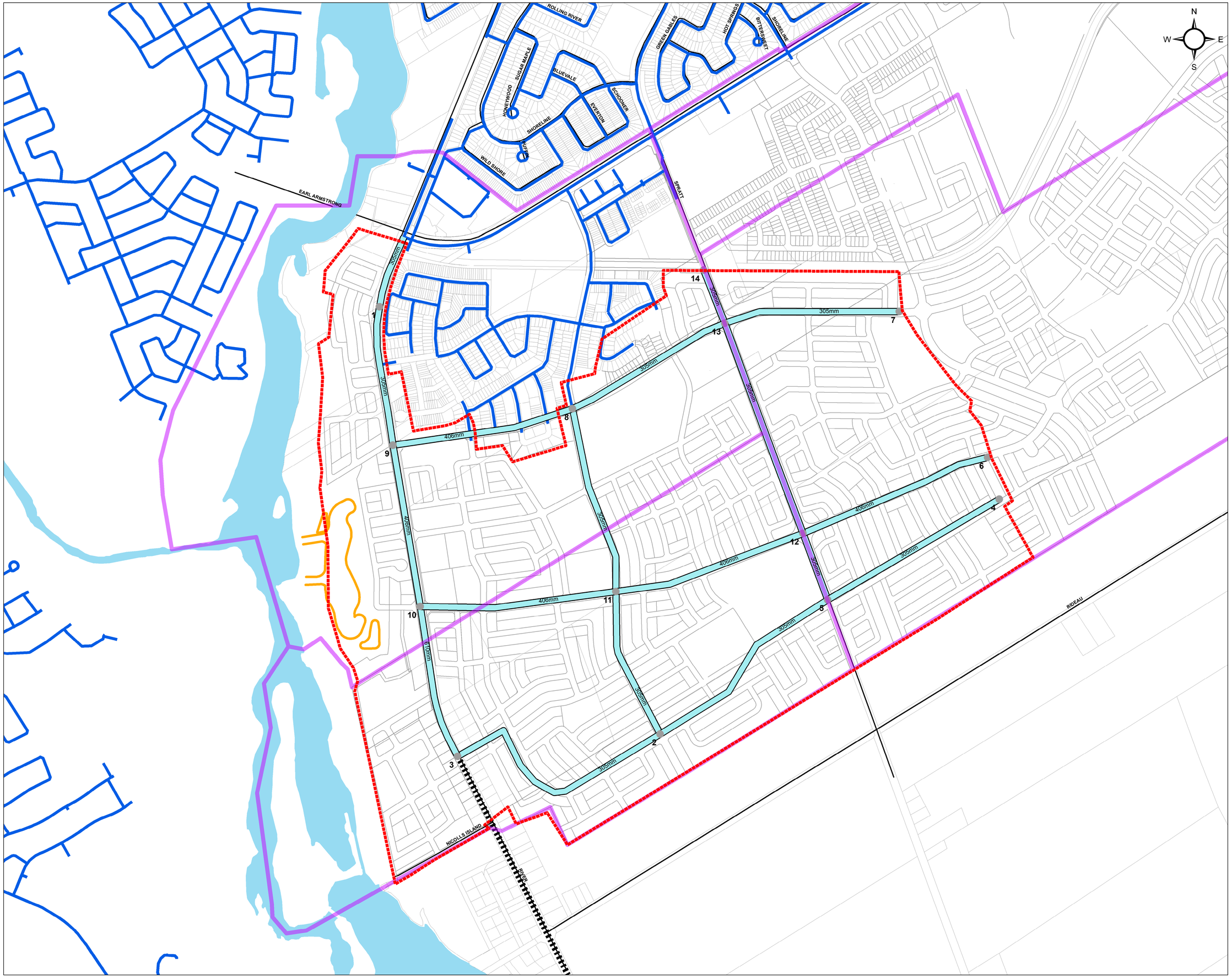
9. I will need the following studies and plans:

    - Assessment of Adequacy of Public Services Brief
    - Watermain Analysis
    - Draft Plan of Subdivision

- geotechnical report
- slope stability analysis

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, 27995 or by email at natasha.baird@ottawa.ca.

APPENDIX B



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Legend

- Major Water
- Parcels
- Growth Polygons
- Rideau River Study Area
- Pond 5
- Streets
- Watermain Node
- Proposed Watermain
- Future Watermain to Manotick
- Existing Watermains

Client / Project:

CITY OF OTTAWA

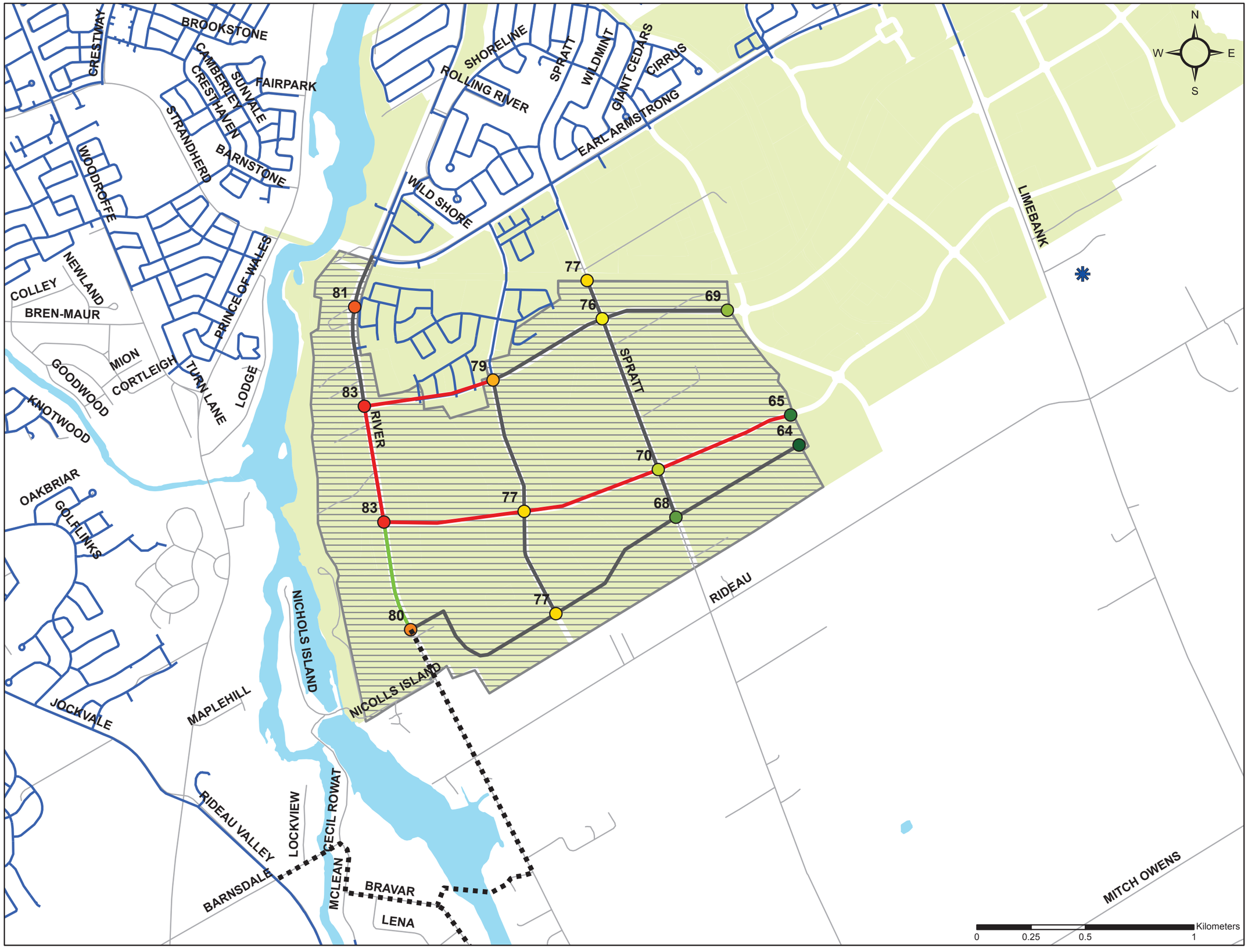
RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

POTABLE WATER SERVICING PLAN

Project No.:	Scale:	
163401101	0 125 250 Meters	
Drawing No.:	**Sheet:**	**Revision:**
WAT-1	**7 of 7**	**0**



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Legend

- Rideau River Study Area
- Riveside South Area
- Future Elevated Tank Location
- Future Pipes to Manotick
- Existing Watermains

Proposed Pipes

Dia. (mm)

- 305
- 406
- 610

Model Nodes Maximum Pressure (psi)

- 64
- 65
- 68
- 69
- 70
- 76
- 77
- 79
- 80
- 81
- 83

Client / Project:

CITY OF OTTAWA

RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

Maximum Pressure During BSDY

Project No.:

163401101

Figure No.:

5-4

RAPID TRANSIT CORRIDOR

SUMMERHILL STREET

BORBRIDGE AVENUE

N

CONNECT TO EXISTING WATERMAIN

CONNECT TO EXISTING WATERMAIN

CONNECT TO EXISTING WATERMAIN

SUBJECT PROPERTY

SUBJECT PROPERTY

SUBJECT PROPERTY

BLOCK 81

BLOCK 80

BLOCK 82

BLOCK 94

BLOCK 92

BLOCK 86

BLOCK 87

BLOCK 88

BLOCK 89

BLOCK 91

SWM POND 5

SEDIMENT MANAGEMENT AREA

RIDEAU RIVER

LEGEND:

- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- POTENTIAL FIREWALL (IBI)

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	CONCEPTUAL WATER PLAN	FIGURE 2.1

BOUNDARY CONDITIONS

Boundary Conditions For: Riverside South Phase 15-2 & 760 River Road &4725 Spratt Rd & 4623 Spratt Rd

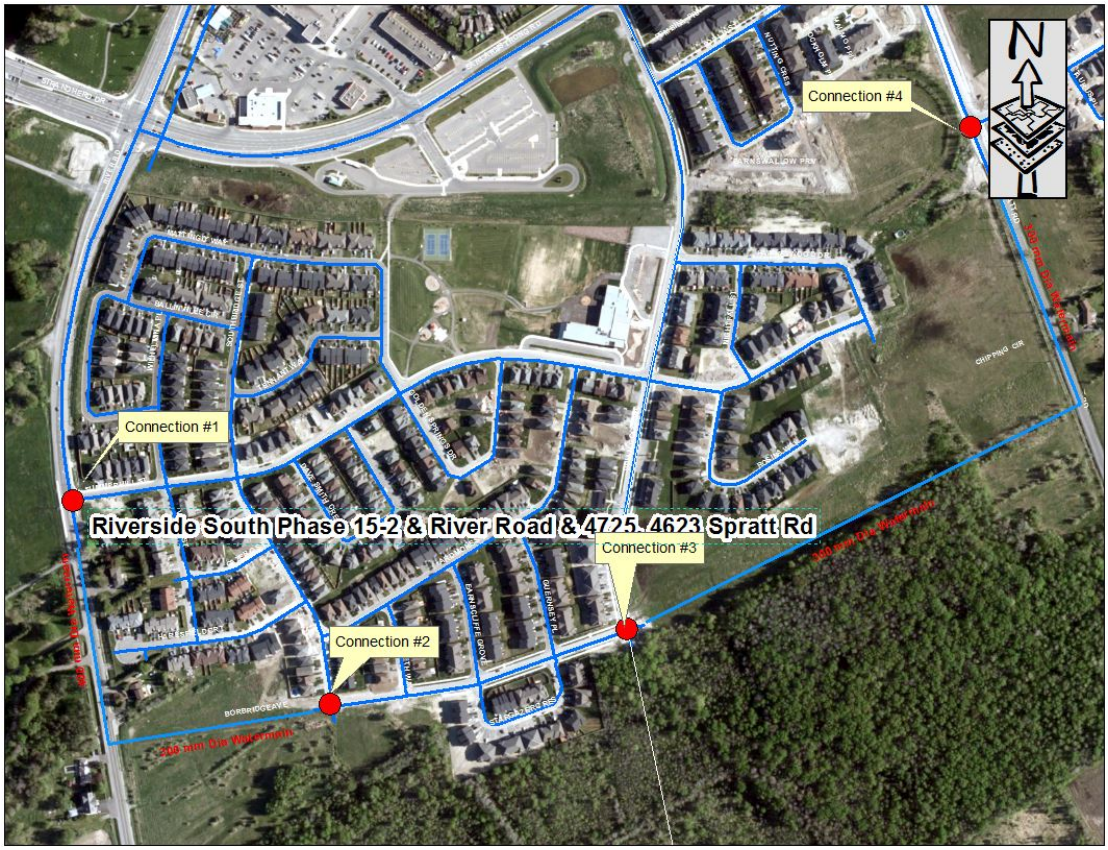
Date of Boundary Conditions: 2018-Dec-06

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	991.8	16.53
Maximum Daily Demand	2137.2	35.62
Peak Hour	4498.8	75.0
Fire Flow #1 Demand	10,000	166.7
Fire Flow #2 Demand	12,000	200.0
Fire Flow #3 Demand	15,000	250.0

Number Of Connections: 5

Location:



BOUNDARY CONDITIONS

Location 4263 Spratt Road – Connection 5

BOUNDARY CONDITIONS

Results:

Pre_Configuration

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	61.3
Peak Hour	123.9	48.7
Max Day Plus Fire (10,000) L/min	119.9	42.9
Max Day Plus Fire (12,000) L/min	117.9	40.0
Max Day Plus Fire (15,000) L/min	117.3	38.8

[1]Elevation: **89.71 m**

Connection #: 2

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	60.8
Peak Hour	123.9	48.3
Max Day Plus Fire (10,000) L/min	121.3	44.4
Max Day Plus Fire (12,000) L/min	119.8	42.3
Max Day Plus Fire (15,000) L/min	117.3	38.8

[1]Elevation: **90.00 m**

BOUNDARY CONDITIONS

Connection #: 3

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	59.4
Peak Hour	124.0	46.9
Max Day Plus Fire (10,000) L/min	121.7	43.7
Max Day Plus Fire (12,000) L/min	120.4	41.9
Max Day Plus Fire (15,000) L/min	118.2	38.7

[1]Elevation: **99.99 m**

Connection #: 4

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.9	58.3
Peak Hour	124.0	45.9
Max Day Plus Fire (10,000) L/min	121.3	41.9
Max Day Plus Fire (12,000) L/min	119.8	39.8
Max Day Plus Fire (15,000) L/min	117.2	36.1

[1]Elevation: **91.79 m**

Connection #: 5

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.8	57.8
Peak Hour	123.7	45.0
Max Day Plus Fire (10,000) L/min	112.8	29.4
Max Day Plus Fire (12,000) L/min	107.9	22.5

[1]Elevation: **92.06 m**

BOUNDARY CONDITIONS

Post_Configuration

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	82.6
Peak Hour	144.6	78.0
Max Day Plus Fire (10,000) L/min	142.6	75.2
Max Day Plus Fire (12,000) L/min	141.3	73.3
Max Day Plus Fire (15,000) L/min	139.0	70.1

[1]Elevation: **89.71 m**

Connection #: 2

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	82.2
Peak Hour	144.6	77.6
Max Day Plus Fire (10,000) L/min	142.9	75.2
Max Day Plus Fire (12,000) L/min	141.7	73.5
Max Day Plus Fire (15,000) L/min	139.6	70.6

[1]Elevation: **90.00 m**

BOUNDARY CONDITIONS

Connection #: 3

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	80.7
Peak Hour	144.6	76.2
Max Day Plus Fire (10,000) L/min	143.4	74.5
Max Day Plus Fire (12,000) L/min	142.3	73.0
Max Day Plus Fire (15,000) L/min	140.6	70.5

[1]Elevation: **99.99 m**

Connection #: 4

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	79.7
Peak Hour	144.6	75.2
Max Day Plus Fire (10,000) L/min	143.2	73.1
Max Day Plus Fire (12,000) L/min	142.0	71.5
Max Day Plus Fire (15,000) L/min	140.0	68.7

[1]Elevation: **91.79 m**

Connection #: 5

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	79.3
Peak Hour	144.6	74.8
Max Day Plus Fire (10,000) L/min	137.7	65.1
Max Day Plus Fire (12,000) L/min	134.5	60.5

[1]Elevation: **92.06 m**

BOUNDARY CONDITIONS

Notes:

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

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

2) Watermains extending from Connection #1 to Connection #2 and watermains extending from Connection #4 to Connection #3 as per connection location figure in this boundary condition must be as per Riverside South Community Infrastructure Servicing Study dated June 21 2017 update.

3) 4623 Spratt Road proposed development will require an additional connection if the number of homes exceed 50 units.

Disclaimer

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

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : RIVERSIDE SOUTH PHASE 12
LOCATION : CITY OF OTTAWA
DEVELOPER : RIVERSIDE SOUTH DEVELOPMENT CORPORATION

FILE: 120031.5.7
DATE PRINTED: 14-Mar-19
DESIGN: LE
PAGE : 1 OF 1

NODE	RESIDENTIAL UNITS SF	RESIDENTIAL UNITS SD & TH	RESIDENTIAL UNITS APT	POP'N	NON-RESIDENTIAL INDTRL (ha.)	NON-RESIDENTIAL COMM. (ha.)	NON-RESIDENTIAL INST. (ha.)	AVERAGE DAILY DEMAND (l/s) Res.	AVERAGE DAILY DEMAND (l/s) Non-res.	AVERAGE DAILY DEMAND (l/s) Total	MAXIMUM DAILY DEMAND (l/s) Res.	MAXIMUM DAILY DEMAND (l/s) Non-res.	MAXIMUM DAILY DEMAND (l/s) Total	MAXIMUM HOURLY DEMAND (l/s) Res.	MAXIMUM HOURLY DEMAND (l/s) Non-res.	MAXIMUM HOURLY DEMAND (l/s) Total	FIRE DEMAND (l/min)
RSS Phase 12																	
J01	11			37				0.15	0.00	0.15	0.38	0.00	0.38	0.83	0.00	0.83	10,000
J02	12			41				0.17	0.00	0.17	0.41	0.00	0.41	0.91	0.00	0.91	10,000
J03	8			27				0.11	0.00	0.11	0.28	0.00	0.28	0.61	0.00	0.61	10,000
J04	8			27				0.11	0.00	0.11	0.28	0.00	0.28	0.61	0.00	0.61	10,000
J05	7			24				0.10	0.00	0.10	0.24	0.00	0.24	0.53	0.00	0.53	10,000
J06	5			17				0.07	0.00	0.07	0.17	0.00	0.17	0.38	0.00	0.38	10,000
J07	5			17				0.07	0.00	0.07	0.17	0.00	0.17	0.38	0.00	0.38	10,000
J08	9			31				0.12	0.00	0.12	0.31	0.00	0.31	0.68	0.00	0.68	10,000
J09	7			24				0.10	0.00	0.10	0.24	0.00	0.24	0.53	0.00	0.53	10,000
J10	2			7				0.03	0.00	0.03	0.07	0.00	0.07	0.15	0.00	0.15	10,000
J11			36	65				0.26	0.00	0.26	0.66	0.00	0.66	1.44	0.00	1.44	15,000
J12			12	22				0.09	0.00	0.09	0.22	0.00	0.22	0.48	0.00	0.48	15,000
J13			12	22				0.09	0.00	0.09	0.22	0.00	0.22	0.48	0.00	0.48	15,000
j14	6			20				0.08	0.00	0.08	0.21	0.00	0.21	0.45	0.00	0.45	10,000
J17		12		32				0.13	0.00	0.13	0.33	0.00	0.33	0.72	0.00	0.72	10,000
J19		15		41				0.16	0.00	0.16	0.41	0.00	0.41	0.90	0.00	0.90	10,000
J21		12		32				0.13	0.00	0.13	0.33	0.00	0.33	0.72	0.00	0.72	10,000
J23		15		41				0.16	0.00	0.16	0.41	0.00	0.41	0.90	0.00	0.90	10,000
Total	80	54	60	526						2.13			5.34			11.70	

ASSUMPTIONS

RESIDENTIAL DENSITIES
- Single Family (SF) 3.4 p / p / u
- Semi Detached (SD) & Townhouse (TH) 2.7 p / p / u
- Apartment (APT) 1.8 p / p / u
- Other 66 u / p / ha

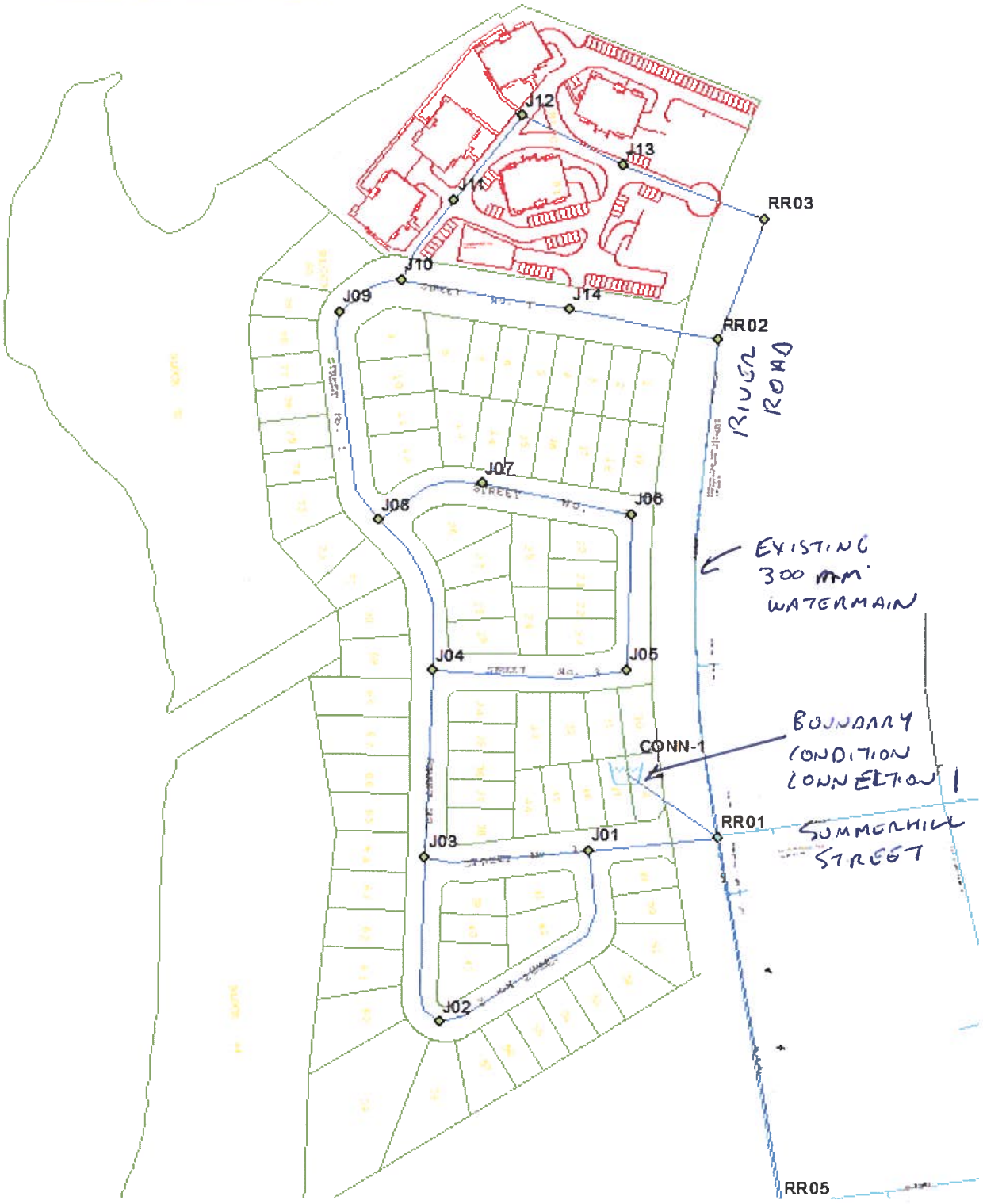
AVG. DAILY DEMAND
- Residential 350 l / cap / day
- ICI 50,000 l / ha / day

MAX. DAILY DEMAND
- Residential 875 l / cap / day
- ICI 75,000 l / ha / day

MAX. HOURLY DEMAND
- Residential 1,925 l / cap / day
- ICI 135,000 l / ha / day

FIRE FLOW
- SF, SD, TH & ST 10,000 l / min
- Back to Back TH 12,000 l / min
- ICI/MD 15,000 l / min

NORTH BLOCK


J12
J13
J11
RR03
J10
J09
J14
RR02
RIVER ROAD
J07
J08
J06
EXISTING 300 mm WATERMAIN
J04
J05
BOUNDARY CONDITION CONNECTION 1
CONN-1
RR01
SUMMERHILL STREET
J03
J01
J02
RR05

SOUTH BLOCK


BOUNDARY CONDITION
CONNECTION 2
CONN-2
RIVER ROAD
RR05
RR10
RR15
RR25
BORROW AVE
1A-05
1A-10
1A-20
1A-25
1A-30
1A-35
1A-40
1A-45
1A-50
1A-55
1A-60
1A-65
1A-70
J15
J17
J19
J21
J23
Ex 400 mm
WATERMAIN

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
101	☐	D-08	0.34	93.00	147.79	536.86	0.00
102	☐	D-10	0.40	93.45	147.78	532.43	0.00
103	☐	D-12	0.43	93.85	147.78	528.50	0.00
104	☐	D-14	0.31	95.00	147.78	517.23	0.00
105	☐	D-16	0.27	92.90	147.78	537.83	0.00
106	☐	D-18	0.16	92.80	147.79	538.81	0.00
107	☐	D-20	0.05	92.90	147.78	537.83	0.00
108	☐	D-22	0.19	92.90	147.78	537.81	0.00
109	☐	D-24	0.18	92.90	147.78	537.82	0.00
110	☐	D-26	1.70	95.00	147.78	517.23	0.00
111	☐	J01	0.15	89.85	147.80	567.86	0.00
112	☐	J02	0.17	90.00	147.80	566.39	0.00
113	☐	J03	0.11	90.70	147.80	559.53	0.00
114	☐	J04	0.11	90.20	147.80	564.43	0.00
115	☐	J05	0.10	90.20	147.80	564.43	0.00
116	☐	J06	0.07	90.00	147.80	566.39	0.00
117	☐	J07	0.07	90.00	147.80	566.39	0.00
118	☐	J08	0.12	90.30	147.80	563.45	0.00
119	☐	J09	0.10	90.60	147.80	560.51	0.00
120	☐	J10	0.03	90.20	147.80	564.43	0.00
121	☐	J11	0.26	90.00	147.80	566.39	0.00
122	☐	J12	0.09	90.20	147.80	564.43	0.00
123	☐	J13	0.09	90.40	147.80	562.47	0.00
124	☐	J14	0.08	90.10	147.80	565.41	0.00
125	☐	J15	0.00	89.70	147.79	569.26	0.00
126	☐	J17	0.13	88.50	147.79	581.02	0.00
127	☐	J19	0.16	88.00	147.79	585.92	0.00
128	☐	J21	0.13	88.50	147.79	581.02	0.00
129	☐	J23	0.16	88.00	147.79	585.92	0.00
130	☐	RR01	0.00	89.85	147.80	567.86	0.00
131	☐	RR02	0.00	89.40	147.80	572.27	0.00
132	☐	RR03	0.00	89.40	147.80	572.27	0.00
133	☐	RR05	0.00	89.15	147.80	574.70	0.00
134	☐	RR10	0.23	88.91	147.80	577.04	0.00
135	☐	RR15	0.00	89.15	147.79	574.66	0.00
136	☐	RR25	0.08	88.90	147.79	577.09	0.00
137	☐	RR30	0.00	90.50	147.79	561.38	0.00
138	☐	SP-01	0.00	92.55	147.80	541.41	0.00
139	☐	SP-02	0.07	93.20	147.79	534.95	0.00
140	☐	SP-03	0.09	93.00	147.79	536.86	0.00
141	☐	SP-04	1.70	90.87	147.79	557.73	0.00

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
101	☐	D-08	1.86	93.00	123.81	301.89	0.00
102	☐	D-10	2.23	93.45	123.80	297.36	0.00
103	☐	D-12	2.35	93.85	123.79	293.36	0.00
104	☐	D-14	1.68	95.00	123.79	282.09	0.00
105	☐	D-16	1.50	92.90	123.80	302.78	0.00
106	☐	D-18	0.90	92.80	123.81	303.83	0.00
107	☐	D-20	0.30	92.90	123.80	302.78	0.00
108	☐	D-22	1.02	92.90	123.79	302.68	0.00
109	☐	D-24	0.96	92.90	123.80	302.75	0.00
110	☐	D-26	1.70	95.00	123.79	282.09	0.00
111	☐	J01	0.83	89.85	123.89	333.58	0.00
112	☐	J02	0.91	90.00	123.89	332.09	0.00
113	☐	J03	0.61	90.70	123.89	325.23	0.00
114	☐	J04	0.61	90.20	123.89	330.11	0.00
115	☐	J05	0.53	90.20	123.89	330.11	0.00
116	☐	J06	0.38	90.00	123.89	332.07	0.00
117	☐	J07	0.38	90.00	123.89	332.07	0.00
118	☐	J08	0.68	90.30	123.89	329.13	0.00
119	☐	J09	0.53	90.60	123.89	326.21	0.00
120	☐	J10	0.15	90.20	123.89	330.14	0.00
121	☐	J11	1.44	90.00	123.89	332.10	0.00
122	☐	J12	0.48	90.20	123.89	330.14	0.00
123	☐	J13	0.48	90.40	123.89	328.19	0.00
124	☐	J14	0.45	90.10	123.89	331.13	0.00
125	☐	J15	0.00	89.70	123.75	333.67	0.00
126	☐	J17	0.72	88.50	123.76	345.50	0.00
127	☐	J19	0.90	88.00	123.76	350.43	0.00
128	☐	J21	0.72	88.50	123.76	345.53	0.00
129	☐	J23	0.90	88.00	123.77	350.49	0.00
130	☐	RR01	0.00	89.85	123.90	333.66	0.00
131	☐	RR02	0.00	89.40	123.89	338.00	0.00
132	☐	RR03	0.00	89.40	123.89	338.00	0.00
133	☐	RR05	0.00	89.15	123.86	340.13	0.00
134	☐	RR10	1.26	88.91	123.84	342.26	0.00
135	☐	RR15	0.00	89.15	123.78	339.33	0.00
136	☐	RR25	0.45	88.90	123.74	341.40	0.00
137	☐	RR30	0.00	90.50	123.68	325.18	0.00
138	☐	SP-01	0.00	92.55	124.00	308.18	0.00
139	☐	SP-02	0.36	93.20	123.88	300.61	0.00
140	☐	SP-03	0.48	93.00	123.82	301.98	0.00
141	☐	SP-04	1.70	90.87	123.81	322.82	0.00

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
85	☐	C1-52	166.86	265.81	C1-52	139.96	105.58	265.81	139.96	139.96
86	☐	C1-54	166.86	268.63	C1-54	139.96	105.43	268.63	139.96	139.96
87	☐	C1-56	166.79	249.39	C1-56	139.96	105.73	249.39	139.96	139.96
88	☐	C1-60	166.97	263.81	C1-60	139.96	105.28	263.81	139.96	139.96
89	☐	C1-62	166.82	278.78	C1-62	139.96	105.78	278.78	139.96	139.96
90	☐	C1-64	166.79	252.90	C1-64	139.96	105.93	252.91	139.96	139.96
91	☐	C1-66	166.82	221.78	C1-66	139.96	105.83	221.78	139.96	139.98
92	☐	C1-68	166.75	231.65	C1-68	139.96	106.03	231.65	139.96	139.99
93	☐	C1-70	166.71	197.54	C1-70	139.96	106.13	197.54	139.96	139.97
94	☐	C1-72	166.77	207.76	C1-72	139.96	106.28	207.76	139.96	139.97
95	☐	C1-74	166.84	214.80	C1-74	139.96	106.18	214.80	139.96	139.97
96	☐	C1-76	166.81	224.43	C1-76	139.96	105.98	224.43	139.96	139.98
97	☐	C1-78	166.78	213.46	C1-78	139.96	106.08	213.46	139.96	139.97
98	☐	D-02	166.99	401.65	D-14	124.12	107.67	374.85	139.96	156.40
99	☐	D-04	166.98	311.53	D-14	133.58	108.63	302.67	139.96	146.36
100	☐	D-06	166.85	253.39	D-14	135.06	108.78	247.80	139.96	144.87
101	☐	D-08	167.01	266.46	D-08	139.96	107.28	266.46	139.96	139.96
102	☐	D-10	167.07	218.65	D-10	139.96	107.73	218.65	139.96	139.96
103	☐	D-12	167.10	217.55	D-12	139.96	108.13	217.55	139.96	139.96
104	☐	D-14	166.98	196.50	D-14	139.96	109.28	196.50	139.96	139.96
105	☐	D-16	166.94	225.03	D-20	139.96	107.18	225.03	139.96	139.96
106	☐	D-18	166.83	262.75	D-18	139.96	107.08	262.75	139.96	139.97
107	☐	D-20	166.72	144.10	D-20	139.96	107.18	144.10	139.96	139.96
108	☐	D-22	166.86	251.12	D-14	125.02	107.76	235.24	139.96	155.56
109	☐	D-24	166.85	231.05	D-24	139.96	107.18	231.05	139.96	139.96
110	☐	J01	167.05	308.48	J01	139.96	104.13	308.48	139.96	139.96
111	☐	J02	167.08	221.91	J02	139.96	104.28	221.91	139.96	139.96
112	☐	J03	166.95	260.04	J03	139.96	104.98	260.05	139.96	139.96
113	☐	J04	166.95	230.38	J04	139.96	104.48	230.38	139.96	139.96
114	☐	J05	166.91	181.27	J05	139.96	104.48	181.27	139.96	139.96
115	☐	J06	166.84	178.22	J06	139.96	104.28	178.22	139.96	139.96
116	☐	J07	166.84	192.49	J07	139.96	104.28	192.49	139.96	139.96
117	☐	J08	166.98	229.05	J08	139.96	104.58	229.05	139.96	139.96
118	☐	J09	166.91	268.91	J09	139.96	104.88	268.91	139.96	139.96
119	☐	J10	166.74	325.41	J10	139.96	104.48	325.41	139.96	139.97
120	☐	J11	250.66	308.77	J11	139.96	104.28	308.77	139.96	139.96
121	☐	J12	250.22	299.63	J12	139.96	104.48	299.63	139.96	139.96
122	☐	J13	250.22	303.99	J13	139.96	104.68	303.99	139.96	139.96
123	☐	J14	166.88	326.68	J14	139.96	104.38	326.68	139.96	139.96
124	☐	J17	167.00	300.28	J17	139.96	102.78	300.28	139.96	139.96
125	☐	J19	167.08	271.21	J19	139.96	102.28	271.21	139.96	139.96
126	☐	J21	167.00	264.90	J21	139.96	102.78	264.90	139.96	139.96

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
127	☐	J23	167.08	398.40	J23	139.96	102.28	398.40	139.96	139.96
128	☐	RR01	166.67	6,363.33	J03	131.76	104.15	6,179.03	139.96	148.32
129	☐	RR05	166.67	844.68	RR05	139.96	103.43	844.69	139.96	139.96
130	☐	RR10	166.90	1,269.00	RR10	139.97	103.19	1,269.02	139.96	139.96
131	☐	RR15	166.67	964.93	C1-72	133.33	105.61	941.42	139.96	147.57
132	☐	RR25	166.75	829.39	C1-72	122.27	104.48	778.37	139.96	159.11
133	☐	RR30	166.67	592.61	C1-72	135.87	105.87	583.56	139.96	144.36
134	☐	SP-02	166.74	567.08	SP-02	139.96	107.48	567.08	139.96	139.96
135	☐	SP-03	166.76	509.96	D-14	121.20	107.37	470.30	139.96	158.86

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	1A-97	251.72	481.71	1A-97	139.96	105.15	481.71	139.96	139.97
2	☐	1B-30	250.12	484.92	1B-30	139.96	105.68	484.93	139.96	139.96
3	☐	2-05	250.11	497.39	2-05	139.96	106.33	497.40	139.96	139.97
4	☐	2-100	252.29	634.14	2-100	139.96	105.08	634.15	139.96	139.98
5	☐	2-110	253.57	518.03	2-110	139.96	105.87	518.03	139.96	139.98
6	☐	J11	250.66	279.52	J11	139.96	104.28	279.52	139.96	139.96
7	☐	J12	250.22	270.84	J12	139.96	104.48	270.84	139.96	139.96
8	☐	J13	250.22	274.38	J13	139.96	104.68	274.38	139.96	139.96
9	☐	RR30	250.00	516.20	RR30	139.96	104.78	516.21	139.96	139.97

APPENDIX C

Stantec

STANTEC CONSULTING LTD.
400 1331 CLYDE AVENUE
OTTAWA, ON
TEL. 613.722.4420
WWW.STANTEC.COM

Legend

- Major Water
- Parcels
- Streets
- Rideau River Study Area
- Pond 5

Catchments

- **Catchment Name**
  Catchment Size (ha)

Sanitary Manholes

- **Sanitary Manholes**
- Existing Sanitary Sewers
- Recommended Sanitary Sewers

Client / Project:

CITY OF OTTAWA

RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

SANITARY DRAINAGE PLAN

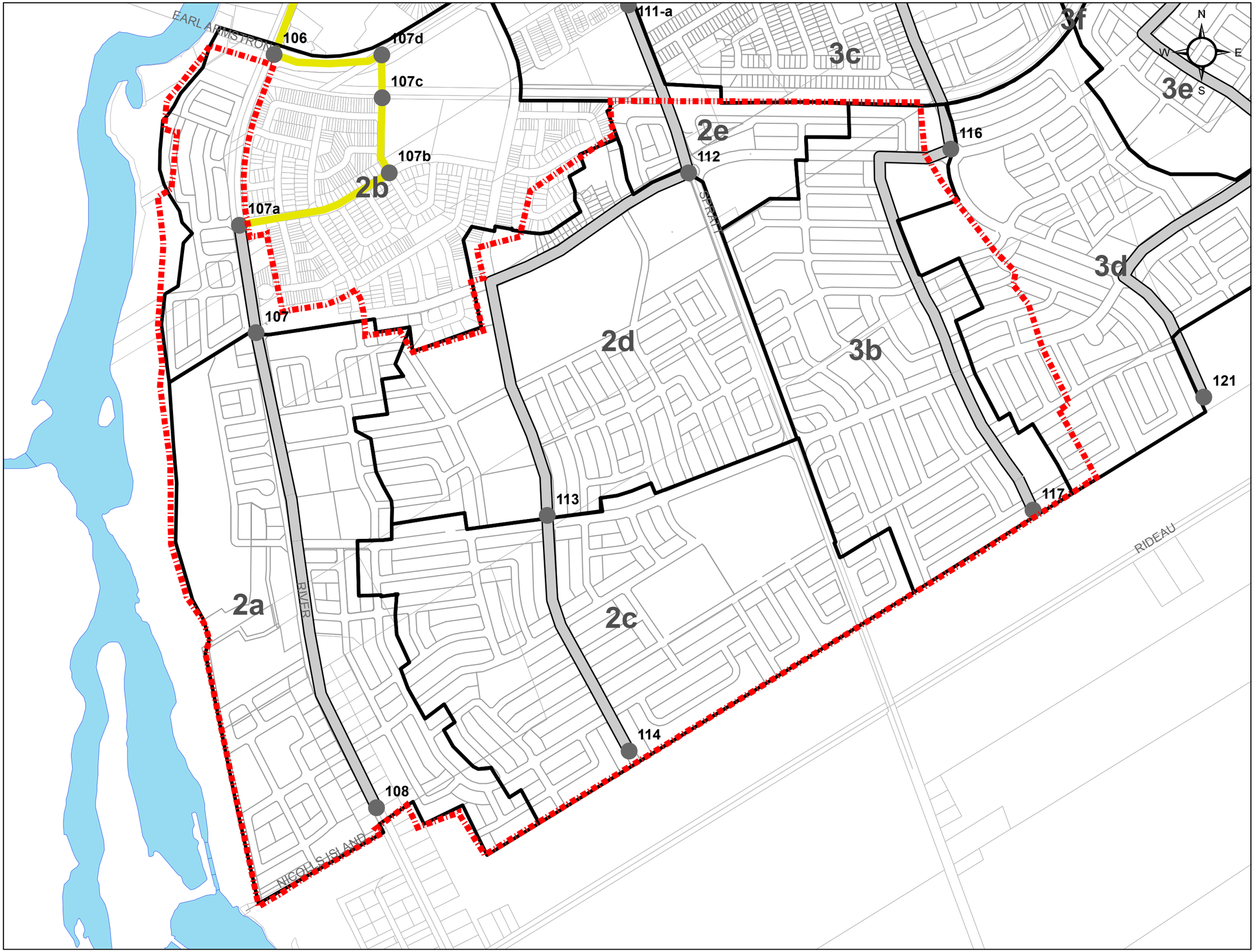
Project No.: **163401101**

Scale: 0 125 250 500 Meters

Drawing No.: **SAN-1**

Sheet: **6 of 7**

Revision: **0**



Stantec

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Legend

- Rideau River Study Area
- Recomended Sanitary Catchments
- Sanitary Manholes
- Constructed Sanitary Sewers
- Recommended Sanitary Sewers

Client / Project:

CITY OF OTTAWA

RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

RECOMMENDED SANITARY SERVICING (2017 UPDATE)

Project No.: **163401101**

Scale: 0 62.5 125 250 Meters

Figure No.: **4-2**

Stantec

Riverside South Community
Infrastructure Servicing Study

Revision Date: June 5, 2017
Revison : 3
Designed by: Megan Young
Checked By: Amanda Lynch

SANITARY SEWER DESIGN SHEET

CITY CRITERIA & DENSITIES
Approved area

File Number: 1634-01101

DESIGN PARAMETERS

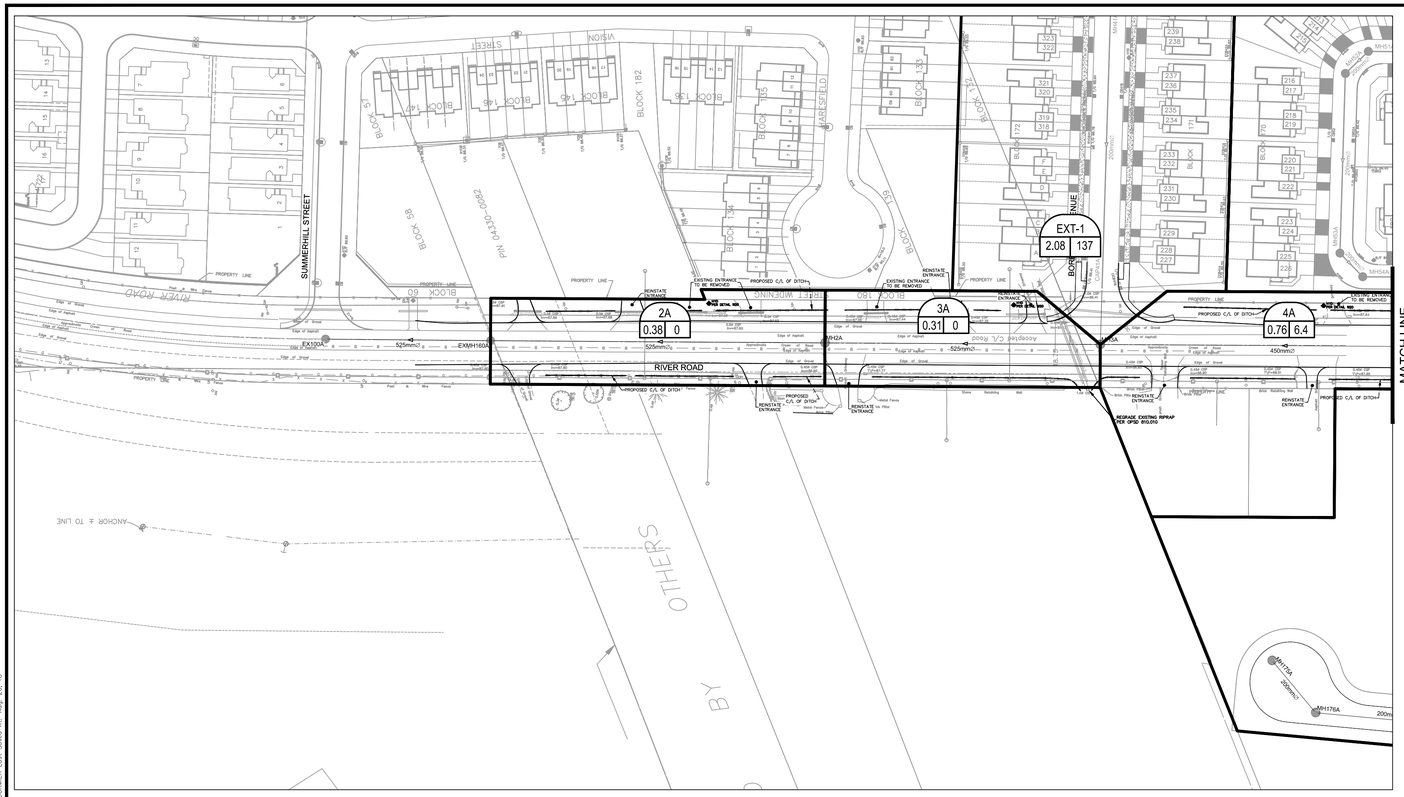
Average Daily Flow / Person:	350	l/p/day	Commercial:	0.579	l/s/ha
Minimum Velocity:	0.60	m/s	Employment	0.579	l/s/ha
n =	0.013		Institutional:	0.579	l/s/ha
Max Peaking Factor:	4.0		Infiltration:	0.280	l/s/ha
Min. Peaking Factor:	2.0				
Peaking Factor Industrial:	Based on Appendix 4-B		Low Density:	@ 3.2	pers/unit
Peaking Factor Comm. / Inst.:	1.5		Medium Density:	@ 2.4	pers/unit
			High Density:	@ 1.9	pers/unit

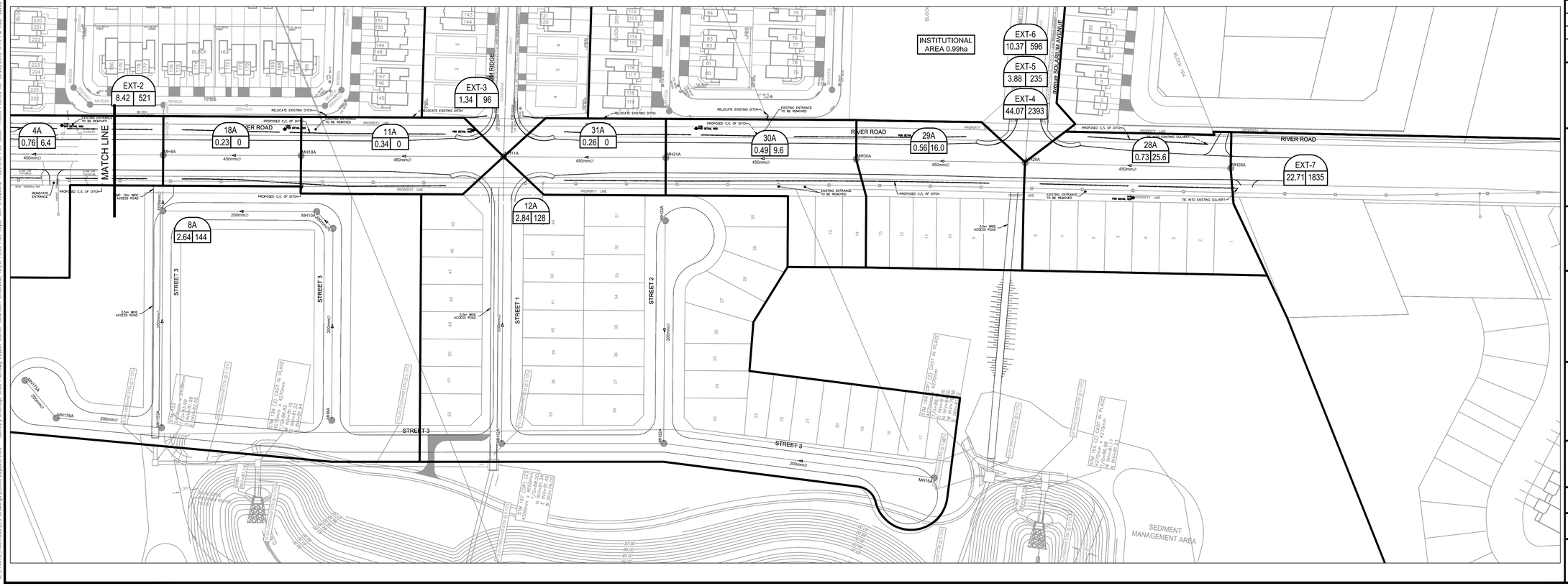
Existing Sanitary Sewer flows estimated by existing land use. Existing Phase 9 area contribution based on JLR 2011 report

STREET	ID Area	From MH	To MH	RESIDENTIAL AREA (ha)	LOW Area (ha)	LOW Pop.	LOW Accum. Pop.	MED Area (ha)	MED Pop.	MED Accum. Pop.	HIGH Area (ha)	HIGH Pop.	HIGH Accum. Pop.	Units	Accum. Units	Total Accum. Pop.	Peak Factor	Peak Flow (l/s)	COMMERCIAL Area (ha)	COMMERCIAL Accum. Area (ha)	EMPLOYMENT Area (ha)	EMPLOYMENT Accum. Area (ha)	INSTITUTIONAL Area (ha)	INSTITUTIONAL Accum. Area (ha)	C+I+I Peak Flow (l/s)	ROAD Area (ha)	ROAD Accum. Area (ha)	INFILTRATION Total Area (ha)	INFILTRATION Accum. Area (ha)	INFILTRATION Infilt. Flow (l/s)	Total Flow (l/s)	PIPE Distance (m)	PIPE Diameter (mm)	PIPE Slope (%)	PIPE Qa/Qc	PIPE Capacity (Full) (l/s)	PIPE Velocity (Full) (m/s)	PIPE Velocity (Actual) (m/s)
RIVER ROAD	**2a**	108	107	50.51	44.40	2189	2189	6.11	389	389	0.00	0	0	846	846	2578	3.5	36.5	1.19	1.19	0.00	0.00	1.01	1.01	1.9	4.48	4.48	57.18	57.18	16.0	54.4	1255	450	0.12	0.53	103.0	0.63	0.63
RIVER ROAD	**2b Future**	107	107a	12.21	10.22	502	2691	1.99	127	516	0.00	0	0	210	1056	3207	3.4	44.4	0.00	1.19	0.00	0.00	0.00	1.01	1.9	2.64	7.12	14.85	72.03	20.2	66.5	254	525	0.12	0.43	155.4	0.70	0.66
RIVER ROAD	**2b Existing (Phase 9)**	107a	107b	43.20	43.20	2351	5042	0.00	0	516	0.00	0	0	N/A	1056	5558	3.2	72.1	0.00	1.19	0.00	0.00	2.46	3.47	4.0	0.00	7.12	45.66	117.69	33.0	109.1	**405**	**525**	**0.10**	**0.76**	**144.5**	**0.65**	**0.71**
RIVER ROAD		107b	107c	0.00	0.00	0	5042	0.00	0	516	0.00	0	0	0	1056	5558	3.2	72.1	0.00	1.19	0.00	0.00	0.00	3.47	4.0	0.00	7.12	0.00	117.69	33.0	109.1	**217**	**525**	**0.12**	**0.72**	**152.3**	**0.68**	**0.74**
RIVER ROAD		107c	107d	0.00	0.00	0	5042	0.00	0	516	0.00	0	0	0	1056	5558	3.2	72.1	0.00	1.19	0.00	0.00	0.00	3.47	4.0	4.70	11.82	4.70	122.39	34.3	110.4	**107**	**525**	**0.10**	**0.77**	**143.9**	**0.64**	**0.71**
		107d	106	0.00	0.00	0	5042	0.00	0	516	0.00	0	0	0	1056	5558	3.2	72.1	0.00	1.19	0.00	0.00	0.00	3.47	4.0	0.00	11.82	0.00	122.39	34.3	110.4	**278**	**525**	**0.08**	**0.90**	**123.3**	**0.55**	**0.63**
	Ex3	106	103	17.90	10.04	413	5455	7.86	564	1080	0.00	0	0	364	1420	6535	3.1	83.0	5.35	6.54	0.00	0.00	0.00	3.47	8.7	0.00	11.82	23.25	145.64	40.8	132.5	**835**	**525**	**0.10**	**0.93**	**141.9**	**0.63**	**0.73**
	Ex2	103	102	16.42	16.42	573	6028	0.00	0	1080	0.00	0	0	179	1599	7108	3.1	89.3	0.00	6.54	0.00	0.00	0.00	3.47	8.7	5.11	16.93	21.53	167.17	46.8	144.8	**1100**	**525**	**0.10**	**1.02**	**141.9**	**0.63**	**0.74**
SPRATT SOUTH	**2c**	114	113	53.79	51.84	2554	2554	1.95	125	125	0.00	0	0	850	850	2679	3.5	37.8	0.00	0.00	0.00	0.00	7.68	7.68	6.7	5.93	5.93	67.41	67.41	18.9	63.4	695	450	0.11	0.64	98.6	0.60	0.64
SPRATT SOUTH	**2d**	113	112	39.28	28.89	1424	3978	10.40	665	790	0.00	0	0	722	1572	4768	3.3	63.0	0.00	0.00	0.00	0.00	14.95	22.63	19.7	5.45	11.38	59.69	127.09	35.6	118.3	1155	525	0.11	0.79	148.8	0.67	0.74
SPRATT SOUTH	**2e**	112	111-a	17.48	0.00	0	3978	13.28	847	1637	4.19	479	479	605	2177	6094	3.2	78.1	2.55	2.55	0.00	0.00	0.00	22.63	21.9	6.14	17.52	26.17	153.26	42.9	142.9	470	525	0.12	0.92	155.4	0.70	0.80
SPRATT SOUTH		111-a	111	0.00	0.00	0	3978	0.00	0	1637	0.00	0	479	0	2177	6094	3.2	78.1	0.00	2.55	0.00	0.00	0.00	22.63	21.9	0.00	17.52	0.00	153.26	42.9	142.9	215	525	0.11	0.96	148.8	0.67	0.77
SPRATT SOUTH	**Ex4**	111	110	14.93	13.31	90	4068	1.62	468	2105	0.00	0	479	223	2400	6652	3.1	84.3	0.91	3.46	0.00	0.00	0.00	22.63	22.7	0.00	17.52	15.84	169.10	47.3	154.3	**600**	**525**	**0.12**	**0.99**	**155.4**	**0.70**	**0.81**
SHORELINE DRIVE	**3b**	117	116	48.13	43.40	2138	2138	4.73	302	302	0.00	0	0	794	794	2440	3.5	34.8	0.66	0.66	0.00	0.00	0.05	0.05	0.6	2.77	2.77	51.60	51.60	14.4	49.8	1270	450	0.11	0.51	98.6	0.60	0.60
SHORELINE DRIVE	**3c**	116	115	47.51	27.40	1350	3488	15.47	989	1291	4.64	530	530	1113	1907	5309	3.2	69.3	0.00	0.66	0.00	0.00	11.13	11.17	10.3	10.02	12.79	68.67	120.26	33.7	113.2	990	450	0.17	0.92	122.6	0.75	0.86
SHORELINE DRIVE	**Ex5**	115	110	20.60	14.47	480	3968	6.13	302	1593	0.00	0	530	276	2183	6091	3.2	78.1	0.80	1.46	0.00	0.00	3.16	14.33	13.7	0.00	12.79	24.56	144.82	40.6	132.3	**480**	**450**	**0.20**	**0.99**	**133.0**	**0.81**	**0.94**
SPRATT SOUTH	**Ex6**	110	109	25.47	20.32	822	8858	5.15	288	3986	0.00	0	1009	377	4960	13853	2.8	157.9	0.00	4.92	0.00	0.00	2.39	39.36	38.5	0.00	30.31	27.86	341.78	95.7	292.0	**675**	**675**	**0.12**	**0.96**	**303.8**	**0.82**	**0.95**
CANYON WALK DRIVE	**3d**	121	120	46.05	35.39	1744	1744	10.66	679	679	0.00	0	0	828	828	2423	3.5	34.5	0.60	0.60	0.00	0.00	3.72	3.72	3.8	5.41	5.41	55.78	55.78	15.6	53.9	820	450	0.15	0.47	115.2	0.70	0.69
CANYON WALK DRIVE	**3e**	120	119	54.06	40.27	1984	3728	13.79	881	1560	0.00	0	0	987	1815	5288	3.2	69.0	0.00	0.60	0.00	0.00	3.91	7.63	7.2	9.21	14.62	67.19	122.97	34.4	110.6	925	525	0.18	0.58	190.3	0.85	0.89
CANYON WALK DRIVE	**3f-4a**	119	118	17.44	0.00	0	3728	3.06	194	1754	14.38	1007	1007	577	2392	6489	3.1	82.5	6.01	6.61	0.00	0.00	5.28	12.92	17.0	16.75	31.37	45.49	168.46	47.2	146.6	880	525	0.19	0.75	195.6	0.88	0.97
internal south	**6a**	123	122	49.84	31.53	1555	1555	18.31	1169	1169	0.00	0	0	973	973	2724	3.5	38.4	1.18	1.18	0.00	0.00	5.33	5.33	5.7	6.44	6.44	62.80	62.80	17.6	61.6	600	525	0.14	0.37	167.9	0.75	0.68
ARMSTRONG ROAD	**4b**	122	118	58.24	0.00	0	1555	0.00	0	1169	58.24	4070	4070	2005	2978	6794	3.1	85.8	24.34	25.53	0.00	0.00	0.00	5.33	26.8	24.91	31.35	107.49	170.29	47.7	160.3	1810	600	0.13	0.69	231.0	0.79	0.86
CANYON WALK DRIVE	**Ex1**	118	124	45.64	22.12	896	6179	23.52	1687	4610	0.00	0	5077	983	6353	15866	2.8	177.0	1.55	33.69	0.00	0.00	0.00	18.25	45.1	0.00	62.72	47.19	385.94	108.1	330.2	**860**	**750**	**0.15**	**0.73**	**449.8**	**0.99**	**1.08**
SPRATT ROAD	**5c**	130	129	25.52	20.06	989	989	5.46	348	348	0.00	0	0	454	454	1337	3.7	20.1	0.00	0.00	0.00	0.00	2.38	2.38	2.1	4.86	4.86	32.77	32.77	9.2	31.4	420	600	0.15	0.13	248.1	0.85	0.56
SPRATT ROAD	**1a**	129	128	10.26	7.00	346	1335	3.26	209	557	0.00	0	0	195	649	1892	3.6	27.6	0.00	0.00	0.00	0.00	0.00	2.38	2.1	7.76	12.63	18.02	50.79	14.2	43.9	450	675	0.15	0.13	339.6	0.92	0.61
SPRATT ROAD	**1b**	128	127	18.80	4.11	202	1537	13.56	866	1423	1.13	129	129	492	1141	3089	3.4	42.9	0.00	0.00	0.00	0.00	2.82	5.20	4.5	5.34	17.97	26.97	77.76	21.8	69.2	490	675	0.15	0.20	339.6	0.92	0.70
internal north	**5b**	135	134	17.31	10.06	496	496	7.25	463	463	0.00	0	0	348	348	959	3.8	14.8	0.00	0.00	0.00	0.00	0.03	0.03	0.0	1.32	1.32	18.66	18.66	5.2	20.1	385	375	0.15	0.28	70.8	0.62	0.53
internal north	**1d**	134	127	21.95	12.43	611	1107	9.52	607	1070	0.00	0	0	444	792	2177	3.6	31.4	2.66	2.66	0.00	0.00	0.01	0.04	2.3	4.33	5.66	28.95	47.61	13.3	47.0	550	375	0.15	0.66	70.8	0.62	0.67
	BP-1	137	127	39.70	20.70	1173	1173	17.00	1019	1019	2.00	398	398	891	891	2590	3.5	36.7	0.00	0.00	16.18	16.18	0.00	0.00	9.4	6.81	6.81	62.69	62.69	17.6	63.6	725	375	0.15	0.90	70.8	0.62	0.71
SPRATT ROAD	**1c**	127	126	14.01	0.00	0	3817	8.98	574	4086	5.03	574	1101	541	3365	9004	3.0	109.4	0.74	3.40	0.00	16.18	6.60	11.84	22.6	6.42	36.86	27.77	215.82	60.4	192.4	795	750	0.15	0.43	449.8	0.99	0.94
internal north	**5a**	133	132	11.48	4.65	230	230	6.83	437	437	0.00	0	0	254	254	667	3.9	10.6	1.02	1.02	0.00	0.00	1.15	1.15	1.9	4.02	4.02	17.68	17.68	5.0	17.4	410	375	0.15	0.25	70.8	0.62	0.50
internal north	**1e**	132	126	34.06	22.08	1088	1318	11.98	766	1203	0.00	0	0	659	913	2521	3.5	35.8	0.00	1.02	0.00	0.00	1.37	2.52	3.1	6.18	10.21	41.61	59.29	16.6	55.5	810	450	0.15	0.48	115.2	0.70	0.69
	BP-2	138	126	0.11	0.00	0	0	0.11	7	7	0.00	0	0	3	3	7	4.0	0.1	0.00	0.00	15.00	15.00	0.00	0.00	8.7	1.48	1.48	16.59	16.59	4.6	13.4	440	375	0.15	0.19	70.8	0.62	0.46
SPRATT ROAD	**1g**	126	125	14.19	1.66	83	5218	9.47	605	5901	3.05	348	1449	461	4742	12568	2.9	145.4	0.98	5.40	0.00	31.18	10.12	24.48	44.0	3.45	52.00	28.74	320.44	89.7	279.1	710	750	0.17	0.58	478.9	1.05	1.09
SPRATT ROAD	**1f**	131	125	9.29	5.05	250	250	4.24	271	271	0.00	0	0	191	191	521	4.0	8.4	0.00	0.00	0.00	0.00	0.00	0.00	0.0	3.48	3.48	12.77	12.77	3.6	11.9	420	300	0.20	0.26	45.1	0.62	0.51
	BP3	136	125	0.00	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0	0.0	0.0	0.00	0.00	38.46	38.46	0.00	0.00	22.3	5.69	5.69	44.15	44.15	12.4	34.6	986	375	0.14	0.51	68.4	0.60	0.60
SPRATT ROAD	**1h**	125	124	1.69	0.00	0	5468	1.69	108	6280	0.00	0	1449	45	4978	13197	2.8	151.5	2.20	7.60	0.00	69.64	1.66	26.14	69.6	3.04	64.20	8.59	385.95	108.1	329.2	**830**	**900**	**0.15**	**0.45**	**731.4**	**1.11**	**1.07**
SPRATT ROAD	**Ex7**	124	109	17.26	11.40	768	12415	3.00	250	11140	2.86	327	6853	516	11847	30408	2.5	304.4	0.64	41.93	0.00	69.64	0.00	44.39	115.3	0.00	126.93	17.90	789.79	221.1	640.9	**515**	**1050**	**0.15**	**0.58**	**1103.3**	**1.23**	**1.28**
CANYON WALK DRIVE	**Ex8**	109	102	56.40	54.40	2150	23423	2.00	134	15260	0.00	0	7862	728	17535	46545	2.3	432.5	0.00	46.85	0.00	69.64	0.00	83.75	153.7	5.45	162.68	61.85	1193.42	334.2	920.4	**1100**	**1050**	**0.15**	**0.83**	**1103.3**	**1.23**	**1.39**
SPRATT ROAD	**BP-4**	139	102	0.00	0.00	0	0	0.00	0	0	0.00	0	0	0	0	0	0.0	0.0	0.00	0.00	127.52	127.52	0.00	0.00	169.8	19.76	19.76	147.28	147.28	41.2	211.1	2790	675	0.15	0.62	339.6	0.92	0.97
CROSSING		102	101	0			29451			16340			7862		**19134**	**53653**	2.2	486.0		53.39		197.16		87.21	384.7		199.37	0	1507.87	422.2	1292.9	**145**	**1200**	**0.11**	**0.96**	**1349.0**	**1.16**	**1.33**

CROSSING

***Note:**
Area BP-4 also accounts for additional 39ha area outside the CDP that was accounted for in calculation of Employment Area
PIPE Capacity (Full) calculated using ACTUAL PIPE SIZE
Limiting Capacity Calculated based on 1200 mm pipe @ 0.11% between Rideau Road and River
Additional sanitary flow of 29.21 L/s from Rideau Carleton Raceway (RCR) is not included in the above calculation, as it is proposed that flow from this area be pumped into the system at off-peak times





NOTES:

1. ALL CULVERTS TO BE GALVANIZED CSP 68x13 CORR. x2.8mm THICK CLASS "B" BEDDING. ALL JOINTS TO BE WRAPPED WITH NON-WOVEN GEOTEXTILE, MINIMUM 1.0m WIDTH.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5	REVISED AS PER CITY COMMENTS	LE	20-08-18
4	PRELIM. ISSUED TO CONTRACTOR	LE	16-08-18
3	ISSUED FOR TENDER	LE	06-07-18
2	REVISED AS PER CITY COMMENTS	LE	29-06-18
1	ISSUED FOR CITY REVIEW	LE	27-04-18

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

Project Title

RIVER ROAD RECONSTRUCTION

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
20/08/18
PROVINCE OF ONTARIO

N

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale: 1:1000

Design	Date
LE	APR 2018
Drawn	Checked
CC	TB
Project No.	Drawing No.
114373	400

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

SANITARY SEWER DESIGN SHEET

River Road
City of Ottawa
Riverside South Development Corporation

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		PEAK FACTOR	CORR. FACTOR	PEAK FLOW (L/s)	AREA (Ha)						PEAK FLOW (L/s)	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
															INSTITUTIONAL		COMMERCIAL		INDUSTRIAL														
STREET	AREA ID	FROM MH	TO MH		SF	SD	TH	APT		IND	CUM				IND	CUM	IND	CUM	IND	CUM		IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
River Road	EXT - 7								22.71	1,835.0	1,835.0	3.61	0.80	17.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.71	22.71	7.49	0.00	0.00	24.69							
	28A	MH28A	MH29A	0.73	8					25.6	1,860.6	3.61	0.80	17.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	23.44	7.74	0.00	0.00	25.15	103.03	101.51	450	0.12	0.628	77.89	75.59%
Solarium Avenue	EXT - 4, 5, 6	STUB	MH29A	58.32	652		474			3,224.0	3,224.0	3.42	0.80	28.55	0.99	0.99	0.00	0.00	0.00	0.00	0.48	59.31	59.31	19.57	0.00	0.00	48.60	81.80	25.00	375	0.20	0.717	33.20	40.58%
River Road	29A	MH29A	MH30A	0.56	5					16.0	5,100.6	3.24	0.80	42.80	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.56	83.31	27.49	0.00	0.00	70.78	103.03	83.34	450	0.12	0.628	32.26	31.31%
	30A	MH30A	MH31A	0.49	3					9.6	5,110.2	3.24	0.80	42.88	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.49	83.80	27.65	0.00	0.00	71.01	103.03	93.99	450	0.12	0.628	32.02	31.08%
River Road	31A	MH31A	MH11A	0.25						0.0	5,110.2	3.24	0.80	42.88	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.25	84.05	27.74	0.00	0.00	71.09	103.03	80.00	450	0.12	0.628	31.94	31.00%
Atrium Ridge	EXT - 3	STUB	MH11A	1.34			40			96.0	96.0	4.00	0.80	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.34	1.34	0.44	0.00	0.00	1.44	41.91	25.04	200	1.50	1.292	40.47	96.57%
Street No. 1 West	12A	STUB	MH11A	2.84	40					128.0	128.0	4.00	0.80	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.84	2.84	0.94	0.00	0.00	2.26	24.19	22.70	200	0.50	0.746	21.93	90.64%
River Road	11A	MH11A	MH18A	0.34						0.0	5,334.2	3.22	0.80	44.51	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.34	88.57	29.23	0.00	0.00	74.22	103.03	100.00	450	0.12	0.628	28.81	27.96%
	18A	MH18A	MH4A	0.23						0.0	5,334.2	3.22	0.80	44.51	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.23	88.80	29.30	0.00	0.00	74.30	103.03	68.01	450	0.12	0.628	28.73	27.89%
Capricorn Circle	EXT - 2	STUB	MH4A	8.42	69		125			520.8	520.8	3.97	0.80	5.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.42	8.42	2.78	0.00	0.00	8.13	20.24	18.89	200	0.35	0.624	12.11	59.83%
Street 3 West	8A	STUB	MH4A	2.64			60			144.0	144.0	4.00	0.80	1.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.64	2.64	0.87	0.00	0.00	2.36	24.19	17.13	200	0.50	0.746	21.83	90.23%
River Road	4A	MH4A	MH3A	0.76	2					6.4	6,005.4	3.17	0.80	49.36	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.76	100.62	33.20	0.00	0.00	83.05	103.03	129.23	450	0.12	0.628	19.99	19.40%
Borbridge Avenue	EXT - 1	STUB	MH3A	2.08			57			136.8	136.8	4.00	0.80	1.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08	2.08	0.69	0.00	0.00	2.11	19.36	20.00	200	0.32	0.597	17.25	89.12%
River Road	3A	MH3A	MH2A	0.31						0.0	6,142.2	3.16	0.80	50.34	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.31	103.01	33.99	0.00	0.00	84.81	155.42	97.77	525	0.12	0.696	70.61	45.43%
	2A	MH2A	*EX. MH160A*	0.38						0.0	6,142.2	3.16	0.80	50.34	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.38	103.39	34.12	0.00	0.00	84.94	155.42	118.68	525	0.12	0.696	70.48	45.35%
		EX MH106A	*EX MH 100A*	*0.19*						0.0	6,142.2	3.16	0.80	50.34	0.00	0.99	0.00	0.00	0.00	0.00	0.48	0.19	103.58	34.18	0.00	0.00	85.00	141.88	*58.85*	*525*	*0.10*	0.635	56.88	40.09%

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.2	p/p/u				
TH/SD	2.4	p/p/u	INST	28,000	L/Ha/day	1.5
APT	1.9	p/p/u	COM	28,000	L/Ha/day	1.5
Other	81	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands
   Correction Factor = 0.8

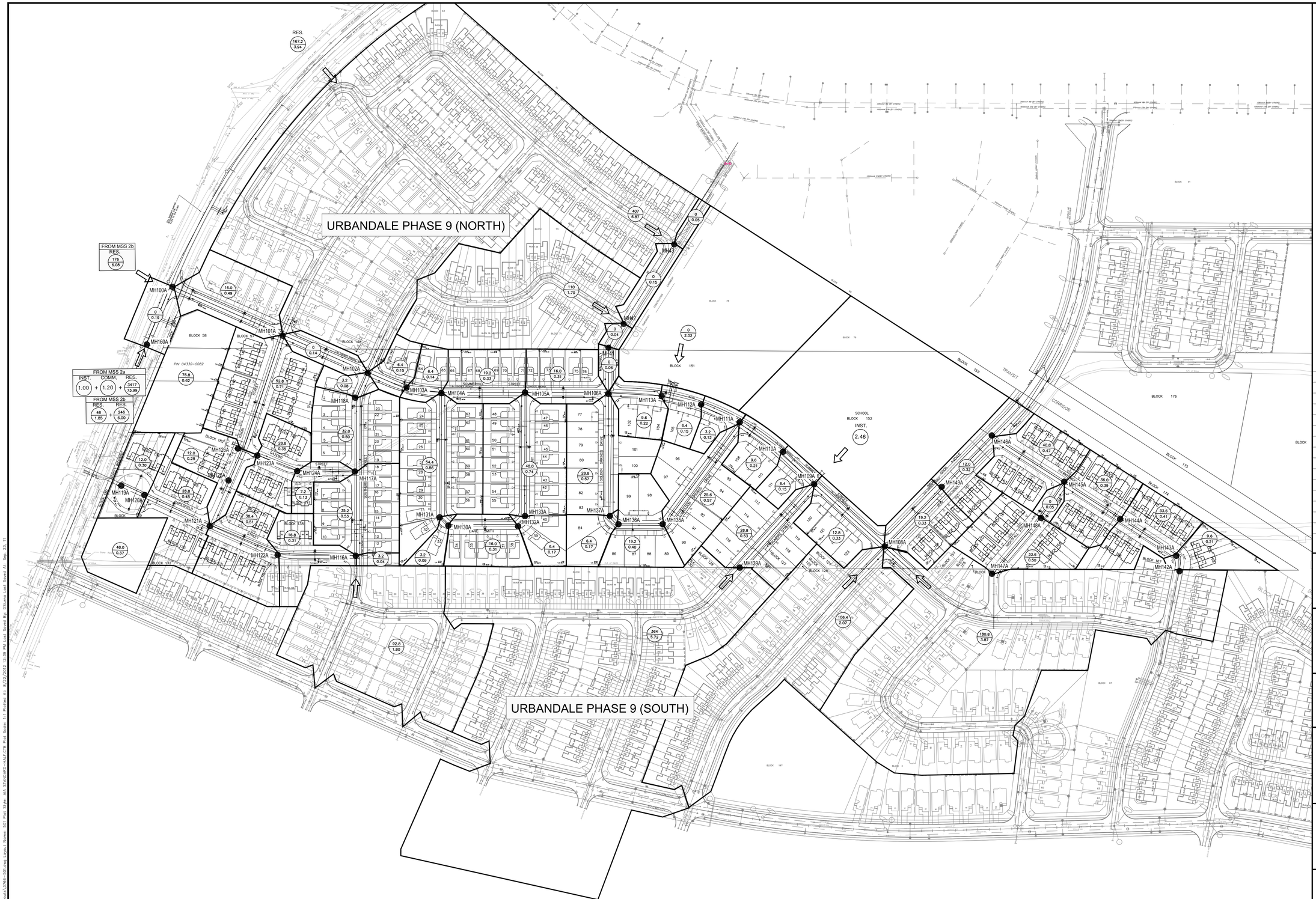
Designed: LME

Checked:

Dwg. Reference: 114373-501

No.	Revision	Date
1.	Submission No. 1	27/04/2018
2.	Submission No. 2	3/07/2018
3.	Submission No. 3	20/08/2018

File Reference: 114373.5.7.1
Date: 2018-08-20
Sheet No: 1 of 1



LEGEND:

2.46 / 0.40 — POPULATION / AREA IN HECTARES

SINGLES 3.2 ppu
TOWNHOUSES 2.4 ppu

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6	ISSUED FOR MOE APPROVAL		11:09:23
5	SUBMISSION NO. 5 FOR CITY REVIEW	JIM	11:08:19
4	SUBMISSION NO. 4 FOR CITY REVIEW	JIM	11:07:15
3	SUBMISSION NO. 3 FOR CITY REVIEW	JIM	11:05:30
2	REVISED PER CITY COMMENTS, LEGAL & JL RICHARDS PLANS	JIM	11:03:11
1	ISSUED FOR CITY COMMENTS	JIM	10:07:23

CLARIDGE HOMES

IBI GROUP
333 Preston Street
Tower 1, Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title

SUMMERHILL VILLAGE

PHASE 1

LICENCED PROFESSIONAL ENGINEER
J. I. MOFFATT
PROVINCE OF ONTARIO

N

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale: 1:1500

Design	Date
J.I.M.	JULY '10
Drawn	Checked
M.M.	P.K.
Project No.	Drawing No.
3766	501

IBI GROUP
IBI Group
333 Preston Street - Suite 400
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: SUMMERHILL VILLAGE - PHASE 1
LOCATION: CITY OF OTTAWA
CLIENT: CLARIDGE HOMES

LOCATION			RESIDENTIAL								INSTITUTIONAL COMMERCIAL INDUSTRIAL							INFILTRATION ALLOWANCE			TOTAL FLOW	PROPOSED SEWER DESIGN						
			UNIT TYPES					POPULATION		CUMULATIVE FLOW	AREA (ha)																
Street	From MH	To MH	Singles	Semis	Towns	Stacked	Area (Ha.)	INDIV.	CUM.	Peaking Factor	Peak Flow (l/s)	INSTITUTION Indiv	INSTITUTION Cumm.	COMMERCIAL Indiv	COMMERCIAL Cumm.	INDUSTRIAL Indiv	INDUSTRIAL Cumm.	Pk. Flow (l/s)	Incr. Area (Ha.)	Cum. Area (Ha.)	Flow (l/s)	(l/s)	Capacity (l/s)	Pipe Size (mm)	Length (M)	Slope (%)	Velocity(f) M/sec	Avail. Cap. L/s	Avail. Cap. (%)
External (River Road South) Area 2a		MH160A					73.99	3417.0	3417.0			1.00	1.00	1.20	1.20				76.19	76.19									
External (River Road South) Area 2b		MH160A					1.85	68.0	3485.0				0.00		0.00				1.85	78.04									
External (River Road West) Area 2b		MH160A					5.81	246.0	3731.0										5.81	83.85									
	MH160A	MH160A					0.19	0.0	3731.0	3.36	50.79	0.00	1.00	0.00	1.20			1.91	0.19	84.04	23.53	76.23	141.88	525	58.60	0.10	0.64	65.65	46.27
External (River Road West) Area 2b		MH100A					6.08	176.0	3907.0									0.00	6.08	6.08									
Summerhill Street	MH100A	MH101A	5				0.49	16.0	3923.0	3.34	53.09	0.00	1.00	0.00	1.20			1.91	0.49	90.61	25.37	80.37	141.95	525	107.88	0.10	0.64	61.58	43.38
Vision Street	MH125A	MH126A			4		0.28	9.6	9.6	4.00	0.16							0.00	0.28	0.28	0.08	0.24	26.50	200	29.51	0.60	0.82	26.26	99.10
Future Medium Residential	Bulkhead	MH126A			32		0.62	76.8	76.8	4.00	1.24							0.00	0.62	0.62	0.17	1.41	19.36	200	29.51	0.32	0.60	17.95	92.70
Vision Street	MH126A	MH101A			21		0.71	50.4	136.8	4.00	2.22							0.00	0.71	1.61	0.45	2.67	26.50	200	107.43	0.60	0.82	23.83	89.92
Summerhill Street	MH101A	MH102A					0.14	0.0	4059.8	3.33	54.72		1.00		1.20			1.91	0.14	92.36	25.86	82.49	141.88	525	83.00	0.10	0.64	59.39	41.86
Haresfield Street	MH119A	MH120A			5		0.30	12.0	12.0	4.00	0.19							0.00	0.30	0.30	0.08	0.27	48.70	200	26.00	2.03	1.50	48.43	99.44
Future Medium Residential	Bulkhead	MH120A			20		0.37	48.0	48.0	4.00	0.78							0.00	0.37	0.37	0.10	0.88	0.00	200	17.00	0.00	0.00	-0.88	#DIV/0!
	MH120A	MH121A			12		0.45	28.8	88.8	4.00	1.44							0.00	0.45	1.12	0.31	1.75	0.00	200	61.73	0.00	0.00	-1.75	#DIV/0!
Haresfield Street	MH121A	MH122A			16		0.51	38.4	127.2	4.00	2.06							0.00	0.51	1.63	0.46	2.52	19.38	200	65.89	0.32	0.60	16.86	87.02
Haresfield Street	MH122A	MH116A			8		0.31	19.2	146.4	4.00	2.37							0.00	0.31	1.94	0.54	2.91	19.41	200	68.70	0.32	0.60	16.50	84.99
			Information provided by JL Richards(See JLR spreadsheet in Appendix E)																										
Southbridge Street (External South)		Bulkhead	29				1.80	92.8	92.8	4.00	1.50							0.00	1.80	1.80	0.50	2.00							
Southbridge Street	Bulkhead	MH116A	1				0.04	3.2	96.0	4.00	1.56							0.00	0.04	1.84	0.52	2.08	19.35	200	9.17	0.32	0.60	17.27	89.28
Southbridge Street	MH116A	MH117A	11				0.53	35.2	277.6	4.00	4.50							0.00	0.53	4.31	1.21	5.71	19.36	200	73.82	0.32	0.60	13.65	70.52
Gazebo Street	MH123A	MH124A			12		0.35	28.8	28.8	4.00	0.47							0.00	0.35	0.35	0.10	0.57	28.63	200	37.56	0.70	0.88	28.06	98.02
Gazebo Street	MH124A	MH117A			3		0.13	7.2	36.0	4.00	0.58							0.00	0.13	0.48	0.13	0.71	28.63	200	53.84	0.70	0.88	27.92	97.50
Southbridge Street	MH117A	MH118A	10				0.50	32.0	345.6	4.00	5.60							0.00	0.50	5.29	1.48	7.08	19.36	200	66.24	0.32	0.60	12.28	63.42
Southbridge Street	MH118A	MH102A	1				0.08	3.2	348.8	4.00	5.65							0.00	0.08	5.37	1.50	7.15	19.40	200	24.27	0.32	0.60	12.25	63.13
Summertime Street	MH102A	MH103A	2				0.15	6.4	4415.0	3.29	58.92	1.00		1.20				1.91	0.15	97.88	27.41	88.24	141.79	525	36.04	0.10	0.64	53.55	37.77
Summertime Street	MH103A	MH104A	2				0.14	6.4	4421.4	3.29	59.00	1.00		1.20				1.91	0.14	98.02	27.45	88.36	141.09	525	32.36	0.10	0.63	52.73	37.38
Rideau Lawn Crescent	MH130A	MH131A	1				0.09	3.2	3.2	4.00	0.05							0.00	0.09	0.09	0.03	0.08	26.42	200	9.56	0.60	0.82	26.34	99.72
Rideau Lawn Crescent	MH131A	MH104A	17				0.86	54.4	57.6	4.00	0.93							0.00	0.86	0.95	0.27	1.20	26.50	200	110.18	0.60	0.82	25.30	95.49
Summertime Street	MH104A	MH105A	6				0.33	19.2	4498.2	3.29	59.90	1.00		1.20				1.91	0.33	99.30	27.80	89.61	141.88	525	74.00	0.10	0.64	52.27	36.84
Rideau Lawn Crescent	MH130A	MH132A	5				0.31	16.0	16.0	4.00	0.26							0.00	0.31	0.31	0.09	0.35	26.51	200	60.49	0.60	0.82	26.16	98.69
Rideau Lawn Crescent	MH132A	MH133A	2				0.17	6.4	22.4	4.00	0.36							0.00	0.17	0.48	0.13	0.49	26.43	200	9.55	0.60	0.82	25.94	98.13
Rideau Lawn Crescent	MH133A	MH105A	15				0.74	48.0	70.4	4.00	1.14							0.00	0.74	1.22	0.34	1.48	19.36	200	110.29	0.32	0.60	17.88	92.35
Summertime Street	MH105A	MH106A	5				0.31	16.0	4584.6	3.28	60.91	1.00		1.20				1.91	0.31	100.83	28.23	91.05	141.88	525	73.99	0.10	0.64	50.83	35.82
Hawkeswood Drive	MH142A	MH143A			4		0.21	9.6	9.6	4.00	0.16							0.00	0.21	0.21	0.06	0.22	29.61	200	12.15	0.75	0.91	29.39	99.26
Hawkeswood Drive	MH143A	MH144A			14		0.41	33.6	43.2	4.00	0.70							0.00	0.41	0.62	0.17	0.87	29.63	200	61.20	0.75	0.91	28.76	97.05
Hawkeswood Drive	MH144A	MH145A			15		0.39	36.0	79.2	4.00	1.28							0.00	0.39	1.01	0.28	1.56	37.48	200	58.93	1.20	1.16	35.92	95.83
Nightfall Street	MH147A	MH148A			14		0.50	33.6	33.6	4.00	0.54							0.00	0.50	0.50	0.14	0.68	26.49	200	65.41	0.60	0.82	25.81	97.43
Nightfall Street	MH148A	MH145A					0.05	0.0	33.6	4.00	0.54							0.00	0.05	0.55	0.15	0.69	26.49	200	37.72	0.60	0.82	25.80	97.38
Hawkeswood Street	MH145A	MH146A			16		0.47	38.4	151.2	4.00	2.45							0.00	0.47	2.03	0.57	3.02	19.34	200	75.41	0.32	0.60	16.32	84.39
Brian Good Avenue	MH146A	MH149A			5		0.32	12.0	163.2	4.00	2.64							0.00	0.32	2.35	0.66	3.30	19.35	200	64.39	0.32	0.60	16.05	82.96
Brian Good Avenue	MH149A	MH108A			8		0.33	19.20	182.40	4.00	2.96							0.00	0.33	2.68	0.75	3.71	19.38	200	72.35	0.32	0.60	15.67	80.85

Designed: P.K.	5. Submission 5 for City Comments		19/08/2011
	4. Submission 4 for City Comments		15/07/2011
	3. Submission 3 for City Comments		30/05/2011
Checked: J.I.M.	2. Submission 2 for City Comments		11/03/2011
	1. Submission 1 for City Comments		7/23/2010
	REVISION		DATE
Dwg Reference: 3766 - 501	File Ref: 3766 - 5.7	Date: 28/2/2011	Sheet No. 1 of 3

Population Per Unit: 3.2 For Singles; 2.4 Townhouses/Semis; 1.9 Mixed Use
Avg. Per Capita Flow Rate: 350 l/day
Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5)) where P = pop'n in thousands

ICI Rates		Peak Factor
Institution	50000 l/ha/day	1.5
Commercial	50000 l/ha/day	1.5
Industrial	35000 l/ha/day	MOE Guidelines

Infiltration Allowance: 0.28 l/sec/Ha

Assumed pipe roughness coefficient = 0.013

EX. PARK+ RIDE

FUTURE RTC

RAPID TRANSIT

FUTURE PHASE 12

PHASE 9

SUMMERHILL VILLAGE
BY OTHERS

SUMMERHILL VILLAGE
BY OTHERS

PHASE 9

FUTURE

EARL ARMSTRONG ROAD

RIVER ROAD

SUMMERHILL STREET

FUTURE PHASE 12 RESIDENTIAL
3.94 ha
167pp

FUTURE PHASE 12 RESIDENTIAL
6.08 ha
176pp

81.84 ha
3732pp
+ 1.20 COM
+ 1.00 INST

118.39 ha
5575pp
+ 1.20 COM
+ 3.46 INST

1.06 INST

FUTURE PROVISIONAL RESIDENTIAL

LEGEND

- PROPOSED ELBOW CATCHBASIN
- PROPOSED TEE CATCHBASIN
- CATCH BASIN
- HYDRANT
- SANITARY SEWER & MANHOLE
- 113 LOT NUMBER
- DRAINAGE BOUNDARY
- 0.35 / 7 AREA IN HECTARES / NUMBER OF UNITS
- PHASING LIMIT

NO.	ISSUE	DATE
10	REVISED LOT NUMBERS	OCT. 16, 2012
9	ISSUED FOR MYLARS	AUG. 23, 2012
8	REVISED STORM SEWER ON SPRATT ROAD AND STUBS ON POPIN STREET	JUNE 27, 2012
7	ISSUED FOR CONSTRUCTION	MAY 30, 2012
6	REVISED PER CITY COMMENTS & LEGAL	MAY 18, 2012
5	REVISED PER CITY COMMENTS / TENDER	MAR. 05, 2012
4	REVISED PER CITY COMMENTS	DEC. 09, 2011
3	REVISED PER CITY COMMENTS	SEPT. 06, 2011
2	REVISED PER CITY COMMENTS & LEGAL	APR. 28, 2011
1	SUBMITTED TO CITY FOR REVIEW	OCT. 13, 2010

SCALE: 1:1000

RIVERSIDE SOUTH DEVELOPMENT CORPORATION
(RSDC)

J.L.Richards
ENGINEERS·ARCHITECTS·PLANNERS

J.L. Richards
& Associates Limited
864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:
RIVERSIDE SOUTH
PHASE 9

CITY OF OTTAWA

DRAWING:
SANITARY
DRAINAGE PLAN

DESIGN: G.D.	DRAWING NO.: D1-SAN
DRAWN: T.S.	
CHECKED: J.P.	JLR NO: 21464-09
PLOTTED: Jan 10, 2019	

File Location: R:\2000\21464-09\LDP\21464-09 C-D-SAN.dwg

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

CITY OF OTTAWA
RIVERSIDE SOUTH DEVELOPMENT CORPORATION
RIVERSIDE SOUTH PHASE 9

SANITARY SEWER CALCULATION SHEET

DESIGN PARAMETERS

Population Density (Singles)	=	3.2	pers/unit	Commercial	=	50,000 L/d/ha	(Peaking Factor = 1.5)
Population Density (Stacks, Towns)	=	2.4	pers/unit	Institutional	=	50,000 L/d/ha	(Peaking Factor = 1.5)
Population Density (Mixed)	=	1.9	pers/unit	Light Industrial	=	35,000 L/d/ha	(Peaking Factor = Per MOE Graph)
Per Capita Flow (Residential)	=	350	L/cap/d	Infiltration (Residential)	=	0.28 L/s/ha	
				Manning's Coefficient, n	=	0.013	

LEGEND

- DENOTES FUTURE OR EXISTING SEWERS, AND EXTERNAL FLOWS
- DENOTES AS-CONSTRUCTED INFORMATION (MEASURED)
- DENOTES AS-CONSTRUCTED INFORMATION (CALCULATED)

BY: G.C. Dumencu, EIT	**PROJECT:** Riverside South Development Corporation, Riverside South Phase 9
CHECKED: J.L. Párraga, P.Eng.	**LOCATION:** City of Ottawa
JLR NO.: 21464-09	**DATE:** Oct-11 / **REVISED:** Apr-11, Aug-11 / **REVISED:** Dec-11, Feb-12 / **REVISED:** May-12, Jun-12 / **REVISED:** Sep-12, FINAL / **AS-BUILT:** Oct-12, Dec-12

STREET	PHASE	MH NUMBER		RESIDENTIAL									COMMERCIAL			INSTITUTIONAL				ICI	INFILTRATION			Peak	Qd/Qcap	SEWER DATA						UPSTREAM					DOWNSTREAM					REMARKS	CAPACITY OK?
				NUMBER OF UNITS					CUMULATIVE		Peaking	Pop.												Design		Dia.	Slope	Q full	V full	V partial	Length	Prop.	Obvert	Obvert	Invert	Cover	Prop.	Obvert	Obvert	Invert	Cover		
		FROM	TO	Singles	Towns	Stacks	Total Units	Pop. (people)	Area (ha)	Pop. (people)	Area (ha)	Factor	Flow (L/s)	Area (ha)	Cum. Area (L/s)	Comm. Flow (L/s)	Area (ha)	Cum. Area (L/s)	Peaking Factor	Institut. Flow (L/s)	Peak ICI Flow (L/s)	Total Area (ha)	Cum. Area (ha)	Infiltration Flow (L/s)	Flow (L/s)		(mm)	(%)	(L/s)	(m/s)	(m/s)	(m)	Centreline	Drop				Centreline	Drop					
Northwest Quadrant (Flow North to Ex. Stub in Rapid Transit Corridor at Park 'N Ride via Mattingly Way)																																										
BALLINVILLE CIRCLE	9	74	75	3			3	10	0.21	10	0.21	4.00	0.16									0.21	0.21	0.06	0.21	0.01	200	0.62	26.91	0.83	0.22	72.94	89.86		86.660	86.521	3.20	89.84		86.209	86.070	3.63		Y
BALLINVILLE CIRCLE	9	75	76	1			1	3	0.08	13	0.29	4.00	0.21									0.08	0.29	0.08	0.29	0.01	200	0.44	22.80	0.70	0.25	13.51	89.84		86.209	86.070	3.63	89.88		86.149	86.010	3.73		Y
BALLINVILLE CIRCLE	9	76	77	10			10	32	0.55	45	0.84	4.00	0.73									0.55	0.84	0.24	0.96	0.04	200	0.41	21.93	0.68	0.35	73.05	89.88		86.149	86.010	3.73	89.80		85.849	85.710	3.95		Y
WILHELMINA PLACE	9	80	81	3			3	10	0.23	10	0.23	4.00	0.16									0.23	0.23	0.06	0.22	0.01	200	0.73	29.23	0.90	0.23	38.65	89.68		86.427	86.302	3.25	89.53		86.145	86.020	3.38		Y
WILHELMINA PLACE	9	81	77	2			2	6	0.14	16	0.37	4.00	0.26									0.14	0.37	0.10	0.36	0.01	200	0.55	25.36	0.78	0.28	31.87	89.53		86.145	86.012	3.38	89.80	0.121	85.970	85.837	3.83		Y
WILHELMINA PLACE	9	77	82	2			2	6	0.14	67	1.35	4.00	1.09									0.14	1.35	0.38	1.47	0.07	200	0.40	21.63	0.67	0.41	30.79	89.80		85.849	85.715	3.95	89.62		85.726	85.592	3.89		Y
WILHELMINA PLACE	9	82	83	6			6	19	0.36	86	1.71	4.00	1.40									0.36	1.71	0.48	1.88	0.09	200	0.40	21.65	0.67	0.45	60.94	89.62		85.726	85.586	3.89	89.75		85.482	85.342	4.27		Y
WILHELMINA PLACE	9	83	71						0.04	86	1.75	4.00	1.40									0.04	1.75	0.49	1.89	0.08	200	0.45	22.95	0.71	0.45	21.78	89.75		85.482	85.322	4.27	90.00	0.215	85.384	85.224	4.62		Y
BALLINVILLE CIRCLE	9	74	73	1			1	3	0.18	3	0.18	4.00	0.05									0.18	0.18	0.05	0.10	0.00	200	0.65	27.61	0.85	0.16	53.31	89.86		85.877	85.737	3.98	89.73		85.530	85.390	4.20		Y
BALLINVILLE CIRCLE	FUT	STUB	73	11	55		66	167	3.94	167	3.94	4.00	2.71									3.94	3.94	1.10	3.81	0.19	200	0.33	19.66	0.61	0.49	9.00	89.87		85.560	85.360	4.31	89.73		85.530	85.330	4.20	Cross Over - River Road STM OBV 84.97	
BALLINVILLE CIRCLE	9	73	72A						0.02	170	4.14	4.00	2.76									0.02	4.14	1.16	3.92	0.20	200	0.33	19.59	0.60	0.48	7.32	89.73		85.530	85.380	4.20	89.78		85.506	85.356	4.27		Y
BALLINVILLE CIRCLE	9	72A	72						0.02	170	4.16	4.00	2.76									0.02	4.16	1.16	3.93	0.16	200	0.49	23.98	0.74	0.55	10.18	89.78		85.506	85.356	4.27	89.88		85.456	85.306	4.42		Y
BALLINVILLE CIRCLE	9	72	49	1	1		2	6	0.12	176	4.28	4.00	2.85									0.12	4.28	1.20	4.05	0.18	200	0.45	23.05	0.71	0.54	20.72	89.88		85.456	85.301	4.42	90.10		85.362	85.207	4.74		Y
MATTINGLY WAY	9	48 (S)	49		11		11	26	0.42	26	0.42	4.00	0.43									0.42	0.42	0.12	0.55	0.01	200	1.36	39.84	1.23	0.42	74.50	90.16		86.372	86.232	3.79	90.10		85.362	85.222	4.74		Y
BALLINVILLE CIRCLE	9	49	71	4	4		8	22	0.32	225	5.02	4.00	3.64									0.32	5.02	1.41	5.05	0.23	200	0.40	21.55	0.66	0.57	48.65	90.10		85.362	85.200	4.74	90.00		85.169	85.007	4.83		Y
BALLINVILLE CIRCLE	9	71	64	5	9		14	38	0.55	349	7.32	4.00	5.65									0.55	7.32	2.05	7.70	0.13	300	0.33	58.20	0.80	0.59	83.84	90.00		85.169	84.950	4.83	90.10		84.890	84.671	5.21		Y
SOUTHBRIDGE STREET	9	60	61	4			4	13	0.24	13	0.24	4.00	0.21									0.24	0.24	0.07	0.27	0.01	200	0.66	27.83	0.86	0.24	41.12	89.77		86.462	86.336	3.31	89.65		86.190	86.064	3.46		Y
SOUTHBRIDGE STREET	9	61	57	4	1		5	15	0.24	28	0.48	4.00	0.45									0.24	0.48	0.13	0.59	0.03	200	0.40	21.74	0.67	0.29	37.39	89.65		86.190	86.062	3.46	90.00		86.039	85.911	3.96		Y
SOUTHBRIDGE STREET	9	57	62	2	1		3	9	0.18	37	0.66	4.00	0.60									0.18	0.66	0.18	0.78	0.03	200	0.58	26.16	0.81	0.39	24.13	90.00		86.039	85.911	3.96	89.77		85.898	85.770	3.87		Y
SOUTHBRIDGE STREET	9	62	64	1	2		3	8	0.20	45	0.86	4.00	0.73									0.20	0.86	0.24	0.97	0.03	200	0.84	31.29	0.96	0.43	50.00	89.77		85.898	85.761	3.87	90.10	0.590	85.480	85.343	4.62		Y
SOUTHBRIDGE STREET	9	64	46		7		7	17	0.33	410	8.51	4.00	6.65									0.33	8.51	2.38	9.03	0.16	300	0.30	54.99	0.75	0.56	84.14	90.10		84.890	84.669	5.21	90.20		84.640	84.419	5.56		Y
MATTINGLY WAY	9	48 (E)	47		2		2	5	0.10	5	0.10	4.00	0.08									0.10	0.10	0.03	0.11	0.00	200	0.73	29.20	0.90	0.16	10.30	90.16		86.519	86.412	3.64	90.17		86.444	86.337	3.73		Y
MATTINGLY WAY	9	47	46		31		31	74	0.96	79	1.06	4.00	1.28									0.96	1.06	0.30	1.58	0.04	200	1.58	43.02	1.33	0.63	114.13	90.17		86.444	86.336	3.73	90.20		84.640	84.532	5.56		Y
MATTINGLY WAY	9	46	45		25		25	60	0.79	550	10.36	3.95	8.80									0.79	10.36	2.90	11.70	0.21	300	0.29	54.79	0.75	0.61	92.21	90.20		84.640	84.394	5.56	90.05		84.368	84.122	5.68		Y
MATTINGLY WAY	9	45	43		15		15	36	0.46	586	10.82	3.94	9.34									0.46	10.82	3.03	12.37	0.22	300	0.32	56.81	0.78	0.65	58.66	90.05		84.368	84.111	5.68	90.00		84.182	83.925	5.82		Y
TENNANT WAY	9	57 (E)	56		1		1	2	0.07	2	0.07	4.00	0.04									0.07	0.07	0.02	0.06	0.00	200	0.42	22.16	0.68	0.12	25.76	90.00		86.378	86.222	3.62	89.75		86.270	86.114	3.48		Y
TENNANT WAY	9	56	55		7		7	17	0.25	19	0.32	4.00	0.31									0.25	0.32	0.09	0.40	0.02	200	0.37	20.91	0.64	0.26	23.30	89.75		86.270	86.108	3.48	89.75		86.183	86.021	3.57		Y
TENNANT WAY	9	55	54		9		9	22	0.29	41	0.61	4.00	0.66									0.29	0.61	0.17	0.83	0.04	200	0.41	21.93	0.68	0.33	35.78	89.75		86.183	86.017	3.57	89.93		86.036	85.870	3.89		Y
TENNANT WAY	9	54	53		5		5	12	0.17	53	0.78	4.00	0.86									0.17	0.78	0.22	1.07	0.05	200	0.41	21.78	0.67	0.36	19.25	89.93		86.036	85.865	3.89	90.03		85.958	85.787	4.07		Y
TENNANT WAY	9	53	52		2		2	5	0.10	58	0.88	4.00	0.93									0.10	0.88	0.25	1.18	0.05	200	0.46	23.27	0.72	0.40	13.40	90.03		85.958	85.787	4.07	90.13		85.896	85.725	4.23		Y
TENNANT WAY	9	52	51		2		2	5	0.11	62	0.99	4.00	1.01									0.11	0.99	0.28	1.29	0.06	200	0.40	21.74	0.67	0.40	10.40	90.13		85.896	85.725	4.23	90.11		85.854	85.683	4.26		Y
TENNANT WAY	9	51	42		17		17	41	0.57	103	1.56	4.00	1.67									0.57	1.56	0.44	2.11	0.10	200	0.42	22.05	0.68	0.46	75.40	90.11		85.854	85.683	4.26	90.07	1.246	85.541	85.370	4.53	Drop Pipe	Y

RAPID TRANSIT CORRIDOR

PHASE 9

SUMMERHILL STREET

BORBRIDGE AVENUE

CONNECT TO EXISTING SANITARY STUB OBVERT = 85.56

CONNECT TO EXISTING SANITARY MH CONNECTION OBVERT = 85.06

CONNECT TO EXISTING SANITARY MH OBVERT = 85.15

SUBJECT PROPERTY

OBVERT = 86.22

OBVERT = 86.55

SUBJECT PROPERTY

SUBJECT PROPERTY

SWM POND 5

RIDEAU RIVER

N

LEGEND:

PROPOSED SANITARY (IBI)

EXISTING SANITARY

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	CONCEPTUAL SANITARY PLAN	FIGURE 3.1

J:\120031_RSPhase12\5.9 Drawings\59civil\current\Assessment Report\120031-fig-3.1-SANITARY.dwg Layout Name: SANITARY Plot Scale: 1:5.13 Plotted At: 3/25/2019 Last Saved By: James.Battison Last Saved At: Mar. 25, 19

RAPID TRANSIT CORRIDOR

RAPID

PHASE 9

SUMMERHILL STREET

BORBRIDGE AVENUE

N

CONNECT TO EXISTING SANITARY MH
CONNECTION OBVERT = 85.06

CONNECT TO EXISTING SANITARY MH
OBVERT = 85.15

SUBJECT PROPERTY

SUBJECT PROPERTY

SUBJECT PROPERTY

BLOCK 92

SWM POND 5

BLOCK 91

BLOCK 94

BLOCK 82

BLOCK 80

BLOCK 81

RIDEAU RIVER

LEGEND:

PROPOSED SANITARY (IBI)

EXISTING SANITARY

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	ALTERNATE CONCEPTUAL SANITARY PLAN	FIGURE 3.1a

APPENDIX D

STANTEC CONSULTING LTD.
400 1331 CLYDE AVENUE
OTTAWA, ON
TEL. 613.722.4420
WWW.STANTEC.COM

Legend

- Major Water
- Parcels
- Streets
- Rideau River Study Area
- Pond 5
- Catchments
- Minor System Nodes
- Culverts
- Storm Sewers

Note:
The presented imperviousness values represent directly connected imperviousness

Client / Project:

CITY OF OTTAWA

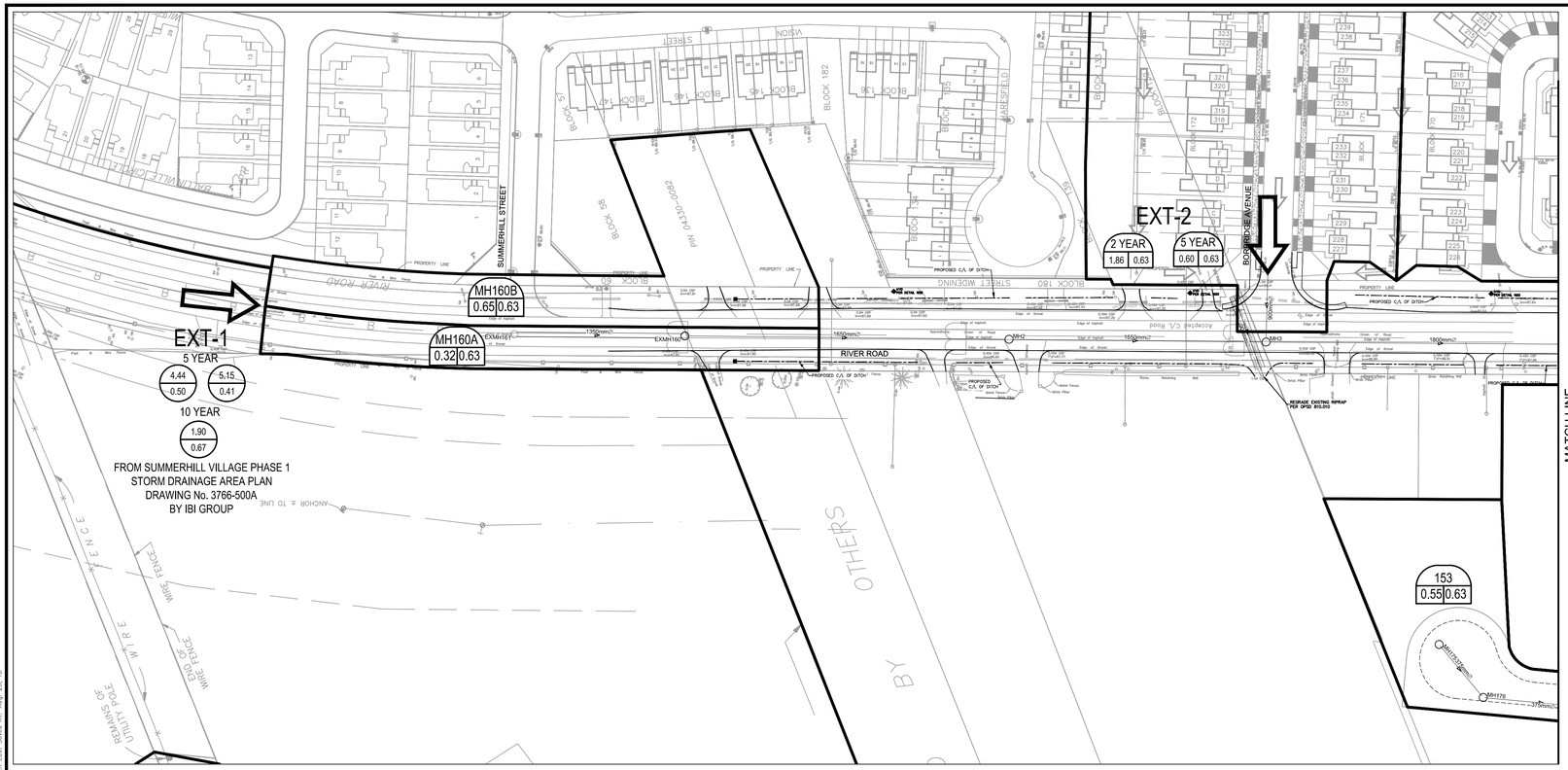
RIVERSIDE SOUTH ISSU UPDATE

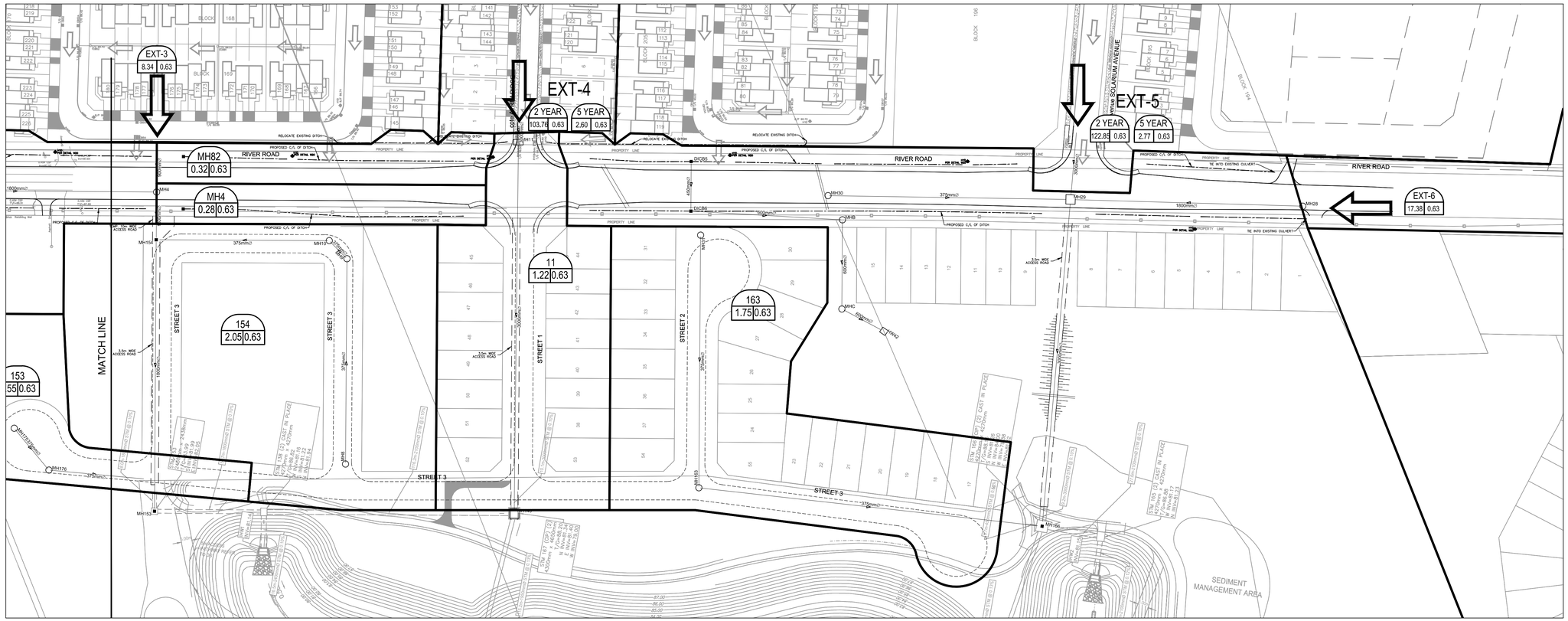
OTTAWA, ON

Title:

STORM SEWERS

Project No.:	Scale:	
163401101	0 50 100 200 Meters	
Drawing No.:	Sheet:	Revision:
STM-1	**3 of 7**	**0**





NOTES:

1. ALL CULVERTS TO BE GALVANIZED CSP 68x13 CORR. x2.8mm THICK CLASS "B" BEDDING. ALL JOINTS TO BE WRAPPED WITH NON-WOVEN GEOTEXTILE, MINIMUM 1.0m WIDTH.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5	REVISED AS PER CITY COMMENTS	LE	20-08-18
4	PRELIM. ISSUED TO CONTRACTOR	LE	16-08-18
3	ISSUED FOR TENDER	LE	06-07-18
2	REVISED AS PER CITY COMMENTS	LE	29-06-18
1	ISSUED FOR CITY REVIEW	LE	27-04-18

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

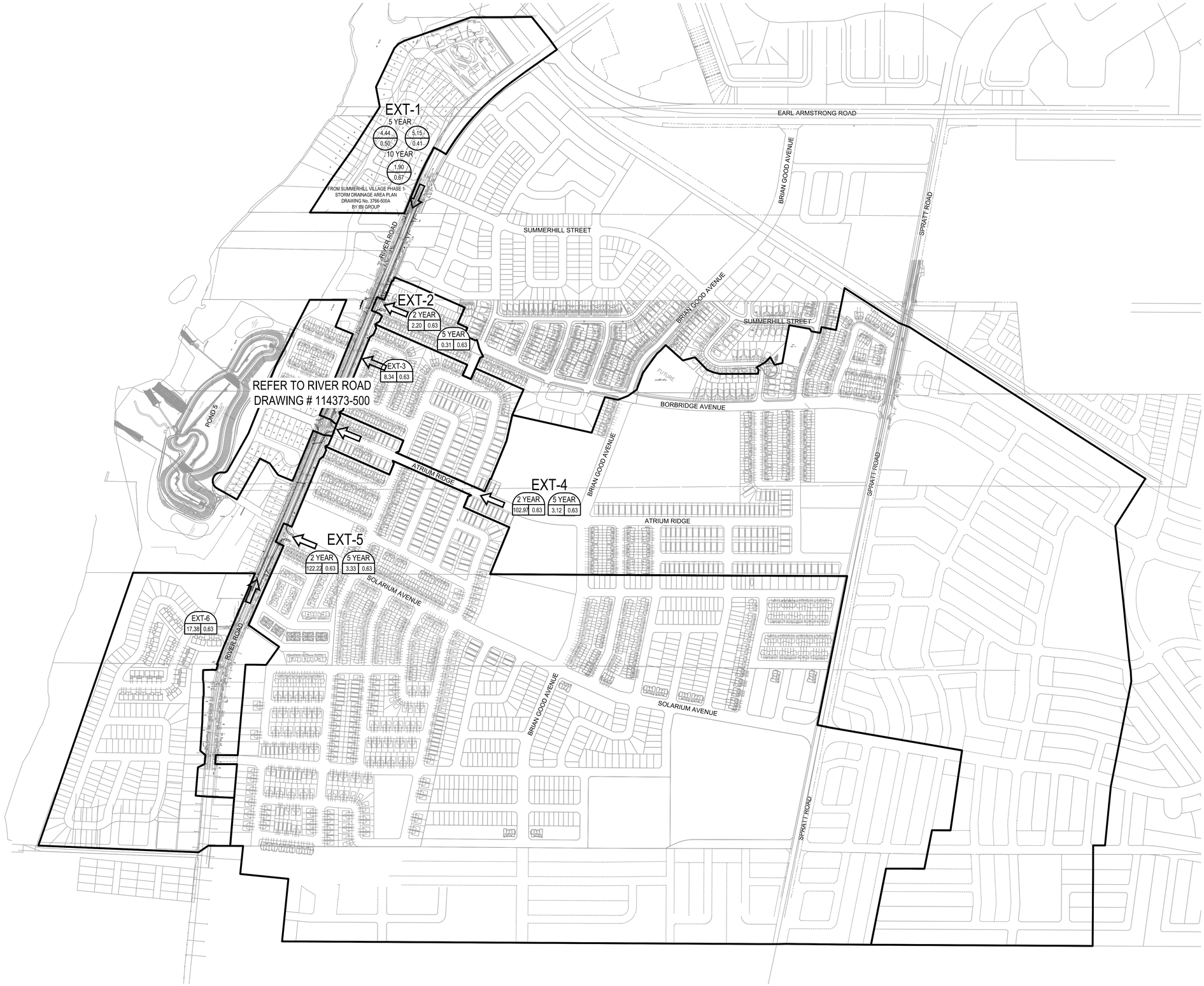
Project Title
RIVER ROAD RECONSTRUCTION

LICENSED PROFESSIONAL ENGINEER
L. M. LYNN
13379508
20/08/18
PROVINCE OF ONTARIO

Drawing Title
STORM DRAINAGE AREA PLAN

Scale
1:1000

Design	Date
LE	APR 2018
Drawn	Checked
CC	TB
Project No.	Drawing No.
114373	500



NOTES:

1. ALL CULVERTS TO BE GALVANIZED CSP 68x13 CORR. x2.8mm THICK CLASS "B" BEDDING. ALL JOINTS TO BE WRAPPED WITH NON-WOVEN GEOTEXTILE, MINIMUM 1.0m WIDTH.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8	REVISED AS PER CITY COMMENTS	LE	20-11-18
7	ISSUED FOR CONSTRUCTION	LE	18-09-18
6	REVISED AS PER CITY COMMENTS	LE	12-09-18
5	REVISED AS PER CITY COMMENTS	LE	20-08-18
4	PRELIM. ISSUED TO CONTRACTOR	LE	16-08-18
3	ISSUED FOR TENDER	LE	06-07-18
2	REVISED AS PER CITY COMMENTS	LE	29-06-18
1	ISSUED FOR CITY REVIEW	LE	27-04-18

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

Project Title

RIVER ROAD RECONSTRUCTION

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
20/11/18
PROVINCE OF ONTARIO

Drawing Title

EXTERNAL STORM DRAINAGE AREA PLAN

Scale: 1:4000

Design	Date
LE	APR 2018
Drawn	**Checked**
CC	TB
Project No.	**Drawing No.**
114373	501

D07-16-17-0023

PLAN # 17743

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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ibigroup.com

STORM SEWER DESIGN SHEET

River Road
City of Ottawa
Riverside South Development Corporation

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW															SEWER DATA						
				Existing	Single Family		Townhouse		Walden	2 Year		5 Year		10 Year																	
STREET	AREA ID	FROM	TO	C= 0.25	C= 0.41	C= 0.50	C= 0.63	C= 0.63	C= 0.67	IND 2.78AC	CUM 2.78AC	IND 2.78AC	CUM 2.78AC	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PE SIZE (m DIA	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (L/s)	AVAIL CAP (%)
North Outlet																															
River Road	EXT-1		EXMH160		5.15	4.44			1.90	0.00	0.00	12.04	12.04	3.54	3.54	12.78			67.56	91.50	107.20	0.00	1,101.80	379.36		1,481.16						
River Road	160A&B	EXMH160	MH2					0.97		0.00	0.00	1.70	13.74	0.00	3.54	12.78	1.45	14.23	67.56	91.50	107.20	0.00	1,257.24	379.36		1,636.60	3,006.86	118.40	1650	0.10	1.362	1370.26	45.57%
River Road		MH2	MH3							0.00	0.00	0.00	13.74	0.00	3.54	14.23	1.15	15.37	63.66	86.14	100.89	0.00	1,183.64	357.06		1,540.70	3,006.86	93.83	1650	0.10	1.362	1466.16	48.76%
Borbridge Avenue	EXT-2	CAP	MH3				1.86	0.60		3.26	3.26	1.05	1.05	0.00	0.00	12.56	0.21	12.77	68.21	92.39	108.24	222.21	97.08	0.00		319.29	572.93	25.02	600	0.80	1.963	253.64	44.27%
River Road		MH3	MH4							0.00	3.26	0.00	14.79	0.00	3.54	15.37	1.49	16.87	60.90	82.37	96.45	198.38	1,218.32	341.34		1,758.04	3,792.13	129.25	1800	0.10	1.444	2034.09	53.64%
Capricorn Circle	EXT-3, 83	CAP	MH4				8.34	0.32		14.61	14.61	0.56	0.56	0.00	0.00	16.67	0.22	16.89	58.09	78.53	91.94	848.57	44.01	0.00		892.58	1,117.30	22.89	900	0.35	1.701	224.72	20.11%
Street No. 3 West		MH4	MH154				0.28	0.28		0.49	18.35	0.49	15.84	0.00	3.54	16.87	0.26	17.12	57.69	77.98	91.29	1,058.82	1,235.29	323.06		2,617.18	3,792.13	22.11	1800	0.10	1.444	1174.95	30.98%
Street No. 3 West	154	MH154	CAP				2.05			3.59	21.95	0.00	15.84	0.00	3.54	17.12	1.36	18.48	57.17	77.28	90.47	1,254.71	1,224.20	320.15		2,799.06	3,792.13	117.91	1800	0.10	1.444	993.07	26.19%
Atrium Ridge	EXT-4	CAP	MH11				103.76	2.60		181.73	181.73	4.55	4.55	0.00	0.00	33.75	0.08	33.83	36.97	49.75	58.15	6,718.47	226.56	0.00		6,945.03	14,807.43	9.29	3000	0.10	2.029	7862.40	53.10%
Street No. 1 West	11	MH11	CAP				1.22			2.14	183.86	0.00	4.55	0.00	0.00	33.83	1.33	33.75	36.91	49.68	58.06	6,786.97	226.21	0.00		7,013.18	14,807.43	162.00	3000	0.10	2.029	7794.25	52.64%
South Outlet																															
River Road	EXT-6		MH28				17.38			30.44	30.44	0.00	0.00	0.00	0.00	16.67			58.09	78.53	91.94	1,768.36	0.00	0.00		1,768.36						
River Road		MH28	MH29							0.00	30.44	0.00	0.00	0.00	0.00	16.67	1.05	17.72	58.09	78.53	91.94	1,768.36	0.00	0.00		1,768.36	4,486.91	107.73	1800	0.14	1.708	2718.55	60.59%
Solarium Avenue	EXT-5	CAP	MH29				122.85	2.77		215.16	245.60	4.85	4.85	0.00	0.00	23.33	0.27	23.60	47.22	63.69	74.51	11,597.38	309.00	0.00		11,906.38	14,807.43	33.00	3000	0.10	2.029	2901.05	19.59%
River Road		MH30	MH29							0.00	0.00	0.00	0.00	0.00	0.00	10.00	1.65	11.65	76.81	104.19	122.14	0.00	0.00	0.00		0.00	129.34	112.57	375	0.50	1.134	129.34	100.00%
		MH29	CAP							0.00	276.04	0.00	4.85	0.00	0.00	23.60	1.17	24.78	46.87	63.22	73.95	12,938.66	306.70	0.00		13,245.36	14,807.43	142.90	3000	0.10	2.029	1562.08	10.55%
Roadside Ditch Conveyance																															
Culvert STA 1+280	S1B, S2B*	MHA	Outlet																						190*	325.00	2,178.02	28.32	900	1.33	3.317	1853.02	85.08%
Culvert STA 1+680	S3B, XS4B*	DICB3	DICB4																						137*	150.00	162.91	23.00	450	0.30	0.992	12.91	7.93%
	S3A, XS4A*	DICB4	MHB																						116*	311.00	350.85	70.37	600	0.30	1.202	39.85	11.36%
		MHB	MHC																							311.00	350.85	41.32	600	0.30	1.202	39.85	11.36%
		MHC	HW42																							311.00	350.85	22.06	600	0.30	1.202	39.85	11.36%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

* Drainage Areas per Figure 4.3 and 100 year flows from Table 4.2 of the Design Brief

Designed: LME

Checked:

Dwg. Reference: 114373-500

No.	Revision	Date
1.	City submission No. 1	27-04-2018
2.	City submission No. 2	03-07-2018
3.	City submission No. 3	20-08-2018

File Reference:	Date:	Sheet No:
114373.5.7.1	8/20/2018	1 of 1

Inlet Time

External Draiinage Area	Length of Pipe Upstream (m)	Velocity (m/s)	Travel Time (min)	Inlet Time (min)
EXT-1	250	1.50	2.78	12.78
EXT-2	230	1.50	2.56	12.56
EXT-3	600	1.50	6.67	16.67
EXT-4	2,850	2.00	23.75	33.75
EXT-5	1,600	2.00	13.33	23.33
EXT-6	600	1.50	6.67	16.67

CONTINUED ON DRWG. 3766-500

LEGEND:

2.46 — AREA IN HECTARES
0.40 — RUNOFF COEFFICIENT

SINGLES	0.40
TOWNHOUSE	0.50
PARK	0.20
SCHOOL	0.40
MIXED	0.45

⇨ REAR YARD DRAINAGE DIRECTION

⇨ EXTERNAL DRAINAGE AREA FLOW DIRECTION

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	ISSUED FOR MOE APPROVAL		11:09:23
1	SUBMISSION NO. 5 FOR CITY REVIEW	JIM	11:08:19

CLARIDGE HOMES

IBI GROUP
333 Preston Street
Tower 1, Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title
SUMMERHILL VILLAGE
PHASE 1

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
PROVINCE OF ONTARIO

N

Drawing Title
STORM DRAINAGE
AREA PLAN

Scale
1:1500

Design J.I.M.	Date JULY '10
Drawn M.M.	Checked P.K.
Project No. 3766	Drawing No. 500A

IBI GROUP

IBI Group
333 Preston Street - Suite 400
Ottawa, Ontario
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: SUMMERHILL VILLAGE - PHASE 1
LOCATION: CITY OF OTTAWA
CLIENT: CLARIDGE HOMES

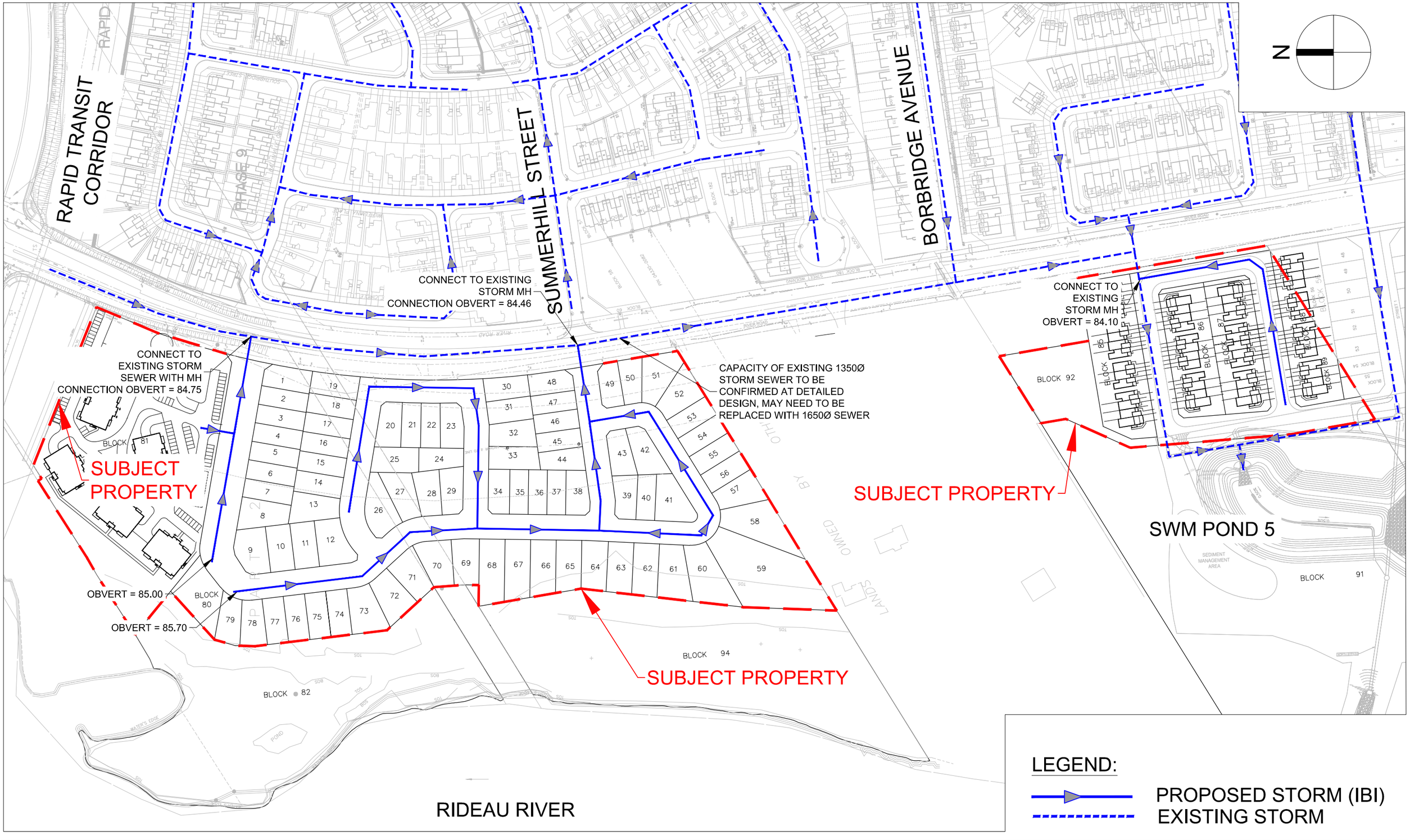
LOCATION			AREA (Ha)									RATIONAL DESIGN FLOW					GENERIC CAPTURE RATES				SEWER DATA						
STREET	FROM MH	TO MH	C= 0.20	C= 0.40	C= 0.41	C= 0.45	C= 0.50	C= 0.67	C= 0.82	INDIV. 2.78AC	ACCUM. 2.78AC	INLET (min.)	TIME IN PIPE	TOTAL (min.)	I (mm/Hr)	PEAK FLOW (L/s)	AREA (ha) INDIV.	AREA (ha) ACCUM.	FLOW (L/s) INDIV.	FLOW (L/s) ACCUM.	CAP. (L/s)	LENGTH (M)	PIPE (mm)	SLOPE (%)	VEL. (M/s)	AVAIL. CAP. (L/s)	AVAIL. CAP. (%)
Summerhill Street	MH108	MH109		0.24						0.27	10.33	21.09	1.41	22.51	67.94	**701.84**	0.24	8.37	19.92	**694.71**	**900.98**	85.52	1050	0.10	1.008	199.14	22.10%
Ardmore Street (External South)		MH139		0.26		1.54	4.23			8.10	8.10	**Tc = 22.75, areas and pipe info from J.L. Richards (See JLR spreadsheet in Appendix F)**											975	0.12			
Ardmore Street	MH139	MH109		0.67						0.75	8.85	22.75	1.83	24.58	64.74	**572.96**	0.67	6.70	55.61	**556.10**	739.10	105.45	975	0.10	0.959	166.15	22.48%
												Tc = (340.00m ÷ 1m/s ÷ 60) + 15min = 20.67min															
School	Bulkhead	MH109		2.46						2.74	2.74	20.67	0.20	20.87	68.81	**188.55**	2.46	2.46	204.18	**204.18**	**239.62**	10.00	600	0.14	0.821	51.07	21.31%
Summerhill Street	MH109	MH110								0.00	21.92	24.58	0.52	25.10	61.57	**1,349.61**	0.00	17.53	0.00	**1454.99**	**1,761.25**	37.18	1350	0.10	1.192	411.64	23.37%
Summerhill Street	MH110	MH111		0.18						0.20	22.12	25.10	0.66	25.76	60.73	**1,343.39**	0.18	17.71	14.94	**1469.93**	**1,761.25**	47.21	1350	0.10	1.192	417.86	23.72%
Golden Spring Drive	MH135	MH111		0.80						0.89	0.89	15.00	2.38	17.38	83.56	**74.37**	0.80	0.80	54.40	**54.40**	**91.44**	114.33	375	0.25	0.802	17.07	18.67%
Summerhill Street	MH111	MH112								0.00	23.01	25.76	0.52	26.29	59.70	**1,373.80**	0.00	18.51	0.00	**1536.33**	**1,761.25**	37.36	1350	0.10	1.192	387.45	22.00%
Park	CBMH	MH112-113	2.02							1.12	1.12	26.29	0.15	26.44	58.92	**65.99**	2.02	2.02	167.66	**167.66**	**199.47**	11.00	450	0.45	1.215	133.48	66.92%
Summerhill Street	MH112	MH113		0.52						0.58	24.71	26.29	0.55	26.83	58.92	**1,455.89**	0.52	21.05	43.16	**1747.15**	**1,745.00**	38.71	1350	0.10	1.181	289.11	16.57%
Summerhill Street	MH113	MH106								0.00	24.71	26.83	0.58	27.41	58.12	**1,436.18**	0.00	21.05	0.00	**1747.15**	**1,761.25**	41.66	1350	0.10	1.192	325.07	18.46%
Golden Spring Drive	MH135	MH136		0.41		0.25				0.77	0.77	15.00	0.81	15.81	83.56	**64.34**	0.66	0.66	44.88	**44.88**	**91.32**	38.88	375	0.25	0.801	26.98	29.55%
Golden Spring Drive	MH136	MH137								0.00	0.77	15.81	0.23	16.04	81.03	**62.39**	0.00	0.66	0.00	**44.88**	**91.21**	11.25	375	0.25	0.800	28.81	31.59%
Golden Spring Drive	MH137	MH106		0.38						0.42	1.19	16.04	2.28	18.32	80.33	**95.60**	0.38	1.04	25.84	**70.72**	133.14	110.90	450	0.20	0.811	37.55	28.20%
Mattingly Way	MH106	541					0.13			0.18	39.42	27.41	0.45	27.86	57.30	**2,258.60**	0.13	33.13	8.84	**2252.84**	3,006.23	36.74	1650	0.10	1.362	747.63	24.87%
Mattingly Way	541	542								0.00	39.42	27.86	0.33	28.20	56.68	**2,234.18**	0.00	33.13	0.00	**2252.84**	3,006.23	27.10	1650	0.10	1.362	772.05	25.68%
Mattingly Way		542					0.90			1.25	40.67						0.90	34.03	61.20	**2314.04**							
Mattingly Way	542	543					0.38			0.53	41.20	28.20	0.87	29.06	56.23	**2,316.62**	0.38	34.41	25.84	**2339.88**	**5,720.52**	83.10	2100	0.10	1.600	3,403.90	59.50%
Mattingly Way		543		2.64		0.81	3.76			9.18	50.38						7.21	41.62	490.28	**2830.16**							
easement	543	544								0.00	50.38	29.06	0.34	29.40	55.10	**2,775.80**	0.00	41.62	0.00	**2830.16**	**5,720.52**	32.49	2100	0.10	1.600	2,944.72	51.48%
easement	544	EX. Outlet								0.00	50.38	29.40	0.31	29.71	54.67	**2,754.24**	0.00	41.62	0.00	**2830.16**	**5,720.52**	30.03	2100	0.10	1.600	2,966.28	51.85%
Brian Good Avenue	MH 151	Stub (JLR)						3.90		7.26	7.26	15.00	0.23	15.23	97.85	**710.40**	3.90	3.90	323.70	**323.70**	**900.98**	13.93	1050	0.10	1.008	190.58	21.15%
												The following information in yellow was provided by JL Richards. Refer to design sheets and Drainage area plan in Appendix F															
Brian Good Avenue	Stub (JLR)	MH 512					0.00			0.00	0.00	15.23			82.82	**0.00**	0.00	3.90	0.00	**323.70**							
LRT Corridor at 10 year Intensity								0.00		0.00	7.26	15.23			96.99	**710.40**	0.00	0.00	0.00	**323.70**							
Total LRT and Brian Good Avenue												15.23	1.08	16.31	82.82	**710.40**	0.00	3.90	0.00	**323.70**	**900.98**	65.20	1050	0.10	1.008	190.58	21.15%
Brian Good Avenue	MH 512	MH 511					0.32			0.44	0.44	16.31			79.56	**35.00**	0.32	4.22	26.56	**350.26**							
LRT Corridor at 10 year Intensity								0.00		0.00	7.26	16.31			93.15	**676.25**	0.00	0.00	0.00	**323.70**							
Total LRT and Brian Good Avenue												16.31	0.81	17.12	79.55	**711.25**	0.00	4.22	0.00	**350.26**	**900.98**	48.74	1050	0.10	1.008	189.73	21.06%
Park And Ride (External-west)	Stub	MH 511							2.09	4.77	4.77	11.50	0.19	11.69	96.89	**461.78**	2.09	2.09	142.12	**142.12**	**480.21**	15.09	675	0.30	1.300	18.43	3.84%
(External Lands-east)	Stub	MH 511					6.07		3.59	16.42	16.42	24.40	0.30	24.70	61.87	**1,015.92**	9.66	9.66	656.88	**656.88**	**1,286.53**	20.00	1200	0.10	1.102	270.61	21.03%
Brian Good Avenue	MH 511	*Ex MH 102*					0.26			0.36	21.99	24.70			61.38	**1,349.43**	0.26	16.23	21.58	**1347.09**							
LRT Corridor at 10 year Intensity								0.00		0.00	7.26	24.70			71.79	**521.17**	0.00	0.00	0.00	**656.88**							
Total LRT and Brian Good Avenue												24.70	1.20	25.90	61.38	**1,870.60**	0.00	16.23	0.00	**1347.09**	**2,331.26**	92.00	1500	0.10	1.278	460.66	19.76%
River Road External							4.44			6.17	6.17						4.44	4.44	444.00	**444.00**							
								0.90		1.68	1.68						0.90	5.34	198.90	**642.90**							
River Road (5 yr)	Ex MH	162			0.00					0.00	6.17	27.50			57.18	**352.78**	0.00	5.34	0.00								
(10 yr)								0.31		0.58	2.26	27.50			66.86	**151.10**	0.31	5.65	19.22	**662.12**							
Total												27.50	1.08	28.58		**503.88**	0.31	5.65	19.22	**662.12**	1,761.25	77.00	1350	0.10	1.192	1,257.37	71.39%
River Road (5 yr)	162	161			0.00					0.00	6.17	28.58			55.72	**343.82**	0.00	5.65	0.00	**0.00**							
(10 yr)					0.00			0.44		0.82	3.08	28.58			65.15	**200.67**	0.44	6.09	78.76	**78.76**							
Total												28.58	1.08	29.65		**544.50**	0.44	6.09	78.76	**819.64**	1,761.25	77.00	1350	0.10	1.192	1,216.75	69.08%
River Road (5 yr)	161	160			5.15					5.87	12.04	29.65			54.35	**654.41**	5.15	11.24	319.30	**1138.94**							
(10 yr)								0.25		0.47	3.55	29.65			63.54	**225.58**	0.25	11.49	44.75	**1183.69**							
Total												29.65	0.87	30.53		**879.99**	5.40	11.49	367.20	**1550.89**	1,761.25	62.50	1350	0.10	1.192	881.26	50.04%

Designed: P.K.	5. **Submission 5 for City Comments**		01/09/2011
	4. Submission 4 for City Comments		15/07/2011
	3. Submission 3 for City Comments		30/05/2011
Checked: J.I.M.	2. Issued for City Comments		11/03/2011
	1. Issued for City Comments		23/07/2010
	Revision		**Date**
Dwg. Reference: 3766 - 500	**File Ref:** 3766 - 5.7	**Date:** 9/3/2011	**Sheet No:** 2 of 3

Q = 2.78AIC, where:
Q = Peak Flow in Litres per Second (l/s)
A = Area in Hectares (ha.)
I = Rainfall Intensity in Millimeters per Hour (mm/hr)
[I=998.071/(TC+6.053)0.814]
[I=1174.184/(TC+6.014)0.816] For LRT Corrodor
River Road

Level of Service= 1-1	68.00 L/s/Ha
Level of Service= 1-4	83.00 L/s/Ha
Level of Service= 5-1	100.00 L/s/Ha
Level of Service= 5-1A	221.00 L/s/Ha
Level of Service= 5-2	62.00 L/s/Ha
Level of Service= 5-2A	179.00 L/s/Ha

Mannings Coefficient (n) = 0.013



J:\120031_RSPhase12\5.9 Drawings\59civil\current\Assessment Report\120031-fig-4.1-STORM.dwg Layout Name: STORM Plot Scale: 1:5.13 Plotted At: 3/25/2019 Last Saved By: James.Battison Last Saved At: Mar. 25, 19

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	CONCEPTUAL STORM PLAN	FIGURE 4.1

RAPID TRANSIT CORRIDOR

RAPID

PHASE 2

SUMMERHILL STREET

BORBRIDGE AVENUE

N

CONNECT TO EXISTING STORM MH
CONNECTION OBVERT = 84.46

CAPACITY OF EXISTING 1350Ø STORM SEWER TO BE CONFIRMED AT DETAILED DESIGN, MAY NEED TO BE REPLACED WITH 1650Ø SEWER

CONNECT TO EXISTING STORM MH
OBVERT = 84.10

SUBJECT PROPERTY

SUBJECT PROPERTY

SUBJECT PROPERTY

SWM POND 5

BLOCK 81

BLOCK 80

BLOCK 82

BLOCK 94

BLOCK 92

BLOCK 91

RIDEAU RIVER

LEGEND:

PROPOSED STORM (IBI)

EXISTING STORM

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	ALTERNATE CONCEPTUAL STORM PLAN	FIGURE 4.1A

Table F-2: Storm Water Sewers - South

Line ID	Project Name	Description	Storm Pipe Attributes					Estimated Construction Year	2013 DC Growth Related Costs					Comments
			From	To	Pipe Size (mm)	Pipe Length (m)	Green/ Brown		2013 Oversizing Cost w/o F.E.A. Unit Cost	2013 Oversizing Cost w/o F.E.A. Total Cost	F.E.A. Approved	Paid	2013 DC Project Outstanding Cost	
	South Leitrim													
	Leitrim Storm Sewers (STM5)													
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	825	230	1800	672	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	230	730	3000	510	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	730	770	3000	398	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	770	790	3600	240	Green	Pre 2013	-	-				Existing 3000 by 3600 box equivalent to 3600 dia. Under FEA
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	790	Pond 1	3600	215	Green	Pre 2013	-	-				3000 by 3600 box equivalent to 3600 dia. (**not** in 2009 DC study table) Part of the pond cost.
1A	***Subtotal Storm Sewers on Tartan Lands***							Pre 2013			**$ 6,572,444**		**$ 6,572,444**	ACS2006-PGM-APR-0061 In March 2006 Council approved 18.185M for land pond and oversizing. The oversizing costs and applicable sewers where amended from the 2004 -303 By-Law resulting from changes to the back ground study. Overpayment balance continues on DC repayment. Includes $500,000 for land and expropriation costs (2008)
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	401	400	1800	349	Green	Pre 2013	$ 501	$ 174,892				Existing Sewer Not Under FEA
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	400	230	1950	440	Green	Pre 2013	$ 988	$ 434,674				Existing Sewer Not Under FEA
1B	***Subtotal Findlay Creek Drive Sewers***							Pre 2013		**$ 609,566**			**$ 609,566**	
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	616	629	1800	348	Green	2015	$ 501	$ 174,391				
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	629	636	1950	376	Green	2015	$ 988	$ 371,448				
	Final Servicibility report, Leitrim Development Area, 2007	Residential Storm	636	770	2100	245	Green	2015	$ 1,509	$ 369,696				
1C	***Subtotal Storm Sewers on Tartan/Reimer Lands***	Storm Sewer on Tartan/Reimer Lands						2021		**$ 915,536**			**$ 915,536**	
	Final Servicibility report, Leitrim Development Area, 2007	Storm Sewer from Analdea to Pond 1	1060	Pond 1	1950	800	Green	2010	$ 988	$ 790,316				
1D	***Subtotal Storm Sewer from Analdea to Pond 1***									**$ 790,316**			**$ 790,316**	Paid through subdivision agreement
	Final Servicibility report, Leitrim Development Area, 2007	Industrial Storm	1260	1270	1800	300	Green	2025	$ 501	$ 150,337				
	Final Servicibility report, Leitrim Development Area, 2007	Industrial Storm	1270	1285	1950	280	Green	2025	$ 988	$ 276,611				
	Final Servicibility report, Leitrim Development Area, 2007	Industrial Storm	1285	830	2100	390	Green	2025	$ 1,509	$ 588,495				
1E	***Subtotal Sewers to Pond 2***									**$ 1,015,443**			**$ 1,015,443**	
	Final Servicibility report, Leitrim Development Area, 2007	Industrial Storm	1102	1100	1800	201	Green	2015	$ 501	-				FEA (no internal order)
	Final Servicibility report, Leitrim Development Area, 2007	Industrial Storm	1100	830	2100	315	Green	2015	$ 1,509	-				FEA (no internal order)
	Final Servicibility report, Leitrim Development Area, 2007	Industrial Storm	830	Pond 2	3000	45	Green	2015	$ 5,546	-				FEA (no internal order)
1F	***Subtotal Industrial Sewers to Pond 2***									-	**$ 741,961**		**$ 741,961**	ACS2011-ICS-PGM-0220 (Nov, 2011) approved $741,961 for storm trunk o/s.
1	***Subtotal Leitrim (S-2)***									**$ 3,330,861**	**$ 7,314,405**		**$ 10,645,266**	Oversizing cost for storm sewers is a blended mix of existing with FEA and new that will require a future FEA
	Riverside South													
	Riverside South SWM Pond 1 Storm Sewers													
	Riverside South Infrastructure Servicing Study Update 2008				2100	107	Green	Pre 2013	-	-				
	Riverside South Infrastructure Servicing Study Update 2008			N	2100	100	Green	Pre 2013	-	-				
	Riverside South Infrastructure Servicing Study Update 2008				2100	100	Green	Pre 2013	-	-				
	Riverside South Infrastructure Servicing Study Update 2008				2100	185	Green	Pre 2013	-	-				
	Riverside South Infrastructure Servicing Study Update 2008				2100	32	Green	Pre 2013	-	-				
	Riverside South Infrastructure Servicing Study Update 2008				2100	83	Green	Pre 2013	-	-				

Table F-2: Storm Water Sewers - South

Line ID	Project Name	Description	Storm Pipe Attributes					Estimated Construction Year	2013 DC Growth Related Costs					Comments
			From	To	Pipe Size (mm)	Pipe Length (m)	Green/ Brown		2013 Oversizing Cost w/o F.E.A. Unit Cost	2013 Oversizing Cost w/o F.E.A. Total Cost	F.E.A. Approved	Paid	2013 DC Project Outstanding Cost	
	Riverside South Infrastructure Servicing Study Update 2008				2100	31	Green	Pre 2013	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N1-12	N1-13	1800	1200	Green	2020	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N1-13	N1-14	1950	321	Green	2020	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N1-14	N1-15	2100	646	Green	2015	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N1-15	N1-16	2400	115	Green	2015	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N1-16	Ex.	2400	220	Green	Pre 2013	-	-				
2A	***Subtotal Pond 1 Storm Sewers***									-	**$ 4,032,000**		**$ 4,032,000**	FEA not found. Reference made in Lynn Lowes table to the to 2009 DC background study. The 2008 DC oversizing cost for Stm to pond 1 is $4,032,000
	Riverside South SWM Pond 2 Storm Sewers													
	Riverside South Infrastructure Servicing Study Update 2008		N2-2	N2-3	1950	539	Green	2020	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		N2-3	N2-4	2100	149	Green	2018	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		N2-4	303	2100	275	Green	2016	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		N2-8	307	2700	216	Green	2015	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		307	306	2700	85.2	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		306	305	2700	91.3	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		305	304	2700	120	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		304	303	2700	110	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		303	302	2700	111.5	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		302	301	2700	69.7	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		301	Pond #2	2700	41	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		N2-11	303	2250	254	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Riverside South Infrastructure Servicing Study Update 2008		N2-11	N2-10	1800	304	Green	Pre 2013	-	-				Existing Sewer Under FEA
	Subtotal									-	**$ 4,924,975**	**$ -**	**$ 4,924,975**	ACS2005-PGM-APR-0159 - FEA Trunk Storm Sewer Oversizing for sewers which are tributary to Pond 2
	Riverside South Infrastructure Servicing Study Update 2008	Part of Sewers East of Limebank	N2-5	N2-7	1800	383	Green		$ 501	$ 191,931				
	Riverside South Infrastructure Servicing Study Update 2008		N2-6	N2-7	2250	645	Green		$ 2,079	$ 1,341,115				
	Riverside South Infrastructure Servicing Study Update 2008		N2-7	N2-8	2550	343	Green		$ 3,514	$ 1,205,269				
	Subtotal									**$ 2,738,314**			**$ 2,738,314**	
2B	***Subtotal Pond 2 Storm Sewers***									-			**$ 7,663,289**	
	Riverside South SWM Pond 3	**POND 3**												
	Riverside South Infrastructure Servicing Study Update 2008		N3-1	N3-2	1800	455	Green	2030	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-2	N3-3	2250	490	Green	2030	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-4	N3-3	1800	590	Green	2030	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-5	N3-3	2100	600	Green	2025	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-3	N3-7	3000	800	Green	2025	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-8	N3-7	1950	1005	Green	2020	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-7	N3-9b	3000	435	Green	2015	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-9b	N3-IN2	3000	100	Green	2015	-	-				
	Riverside South Infrastructure Servicing Study Update 2008		N3-6	N3-IN1	1950	160	Green	2015	-	-				
2C	***Subtotal Pond 3 Storm Sewers***									**$ 9,877,000**		**$ -**	**$ 9,877,000**	ACS2011-ICS-PGM-0199. Requires an internal order number.
	Riverside South SWM Pond 4 Storm Sewers	**POND 4**												
	Riverside South Infrastructure Servicing Study Update 2008		N4-1	N4-6	1950	530	Green	Post 2031	$ 988	$ 523,584				
	Riverside South Infrastructure Servicing Study Update 2008		N4-6	N4-7	2700	571	Green	Post 2031	$ 4,225	$ 2,412,517				
	Riverside South Infrastructure Servicing Study Update 2008		N4-7	N4-8	3000	900	Green	Post 2031	$ 5,546	$ 4,991,287				
	Riverside South Infrastructure Servicing Study Update 2008		N4-8	N4-9	3000	150	Green	Post 2031	$ 5,546	$ 831,881				
	Riverside South Infrastructure Servicing Study Update 2008		N4-10	N4-3	1800	570	Green	Post 2031	$ 501	$ 285,641				
	Riverside South Infrastructure Servicing Study Update 2008		N4-3	N4-9	2100	590	Green	Post 2031	$ 1,509	$ 890,288				

Table F-2: Storm Water Sewers - South

Line ID	Project Name	Description	Storm Pipe Attributes					Estimated Construction Year	2013 DC Growth Related Costs					Comments
			From	To	Pipe Size (mm)	Pipe Length (m)	Green/ Brown		2013 Oversizing Cost w/o F.E.A. Unit Cost	2013 Oversizing Cost w/o F.E.A. Total Cost	F.E.A. Approved	Paid	2013 DC Project Outstanding Cost	
	Riverside South Infrastructure Servicing Study Update 2008		N4-9	4-inlet	3000	45	Green	Post 2031	$ 5,546	$ 249,564				
2D	***Subtotal Pond 4 Storm Sewers***									**$ 10,184,763**				Post 2031 cost. **Not included in total 2013 outstanding cost.**
	Riverside South SWM Pond 5 Storm Sewers	**POND 5**												
	Rverside South Infrastructure Servicing Study Update 2008		N5-0	N5-0b	1800	615	Green	Post 2031	$ 501	$ 308,191				
	Riverside South Infrastructure Servicing Study Update 2008		N5-0b	N5-4	1800	345	Green	Post 2031	$ 501	$ 172,888				
	Riverside South Infrastructure Servicing Study Update 2008		N5-4	N5-5	1800	431	Green	Post 2031	$ 501	$ 215,985				
	Riverside South Infrastructure Servicing Study Update 2008		N5-5	N5-6	1800	509	Green	Post 2031	$ 501	$ 255,072				
	Riverside South Infrastructure Servicing Study Update 2008		N5-6	N5-7	1800	441	Green	Post 2031	$ 501	$ 220,996				
	Riverside South Infrastructure Servicing Study Update 2008		N5-7	N5-8	1950	651	Green	2025	$ 988	$ 643,119				
	Riverside South Infrastructure Servicing Study Update 2008		N5-8	N5-9	1950	654	Green	2025	$ 988	$ 646,083				
	Riverside South Infrastructure Servicing Study Update 2008		N5-9	N5-13	1950	181	Green	2020	$ 988	$ 178,809				
	Riverside South Infrastructure Servicing Study Update 2008		N5-12	N5-13	1800	1098	Green	2020	$ 501	$ 550,235				
	Riverside South Infrastructure Servicing Study Update 2008		N5-14f	N5-13	1800	590	Green	2017	$ 501	$ 295,663				
	Riverside South Infrastructure Servicing Study Update 2008		N5-13	Pond #5	2700	218	Green	2017	$ 4,225	$ 921,066				
	Riverside South Infrastructure Servicing Study Update 2008		N5-17	N5-18	1800	465	Green	2015	$ 501	$ 233,023				
	Riverside South Infrastructure Servicing Study Update 2008		N5-18	N5-19	1800	392	Green	2015	$ 501	$ 196,441				
	Riverside South Infrastructure Servicing Study Update 2008		N5-19	N5-22	1950	970	Green	2015	$ 988	$ 958,258				
	Riverside South Infrastructure Servicing Study Update 2008		N5-22	Pond #5	2400	250	Green	2015	$ 2,820	$ 704,996				
2E	***Subtotal Pond 5 Storm Sewers***									**$ 6,500,826**			**$ 6,500,826**	
			8	Int. Pond 6a	1950	50	Green	Post 2031	$ 988	$ 49,395				
2F	***Subtotal Pond 6A Storm Sewers***									**$ 49,395**				Post 2031 cost. **Not included in total 2013 outstanding cost.**
2	***Subtotal Gloucester SUC (S-1)***									**$ 19,473,298**	**$ 4,032,000**		**$ 28,073,115**	2005-Council approved 10.65M for Pond 2 (2008)
	South Nepean (North of Jock River)													
	Foster SWM Pond Storm Sewers (STM 3)													
			111	110	2550	425	Green	Pre 2013	$ 3,514	$ 1,493,409				
			110	109	2550	273	Green	Pre 2013	$ 3,514	$ 957,539				
			109	108B	2700	240	Green	Pre 2013	$ 4,225	$ 1,014,018				
			108B	OUTLET	3000	99	Green	Pre 2013	$ 5,546	$ 547,378				
			106	108A	2250	927	Green	Pre 2013	$ 2,079	$ 1,927,047				
3	***Subtotal Foster Pond Storm Sewers***									**$ 5,939,390**			**$ 5,939,390**	
	Kennedy Burnett Pond Storm Sewers (STM 3)	**Kennedy Burrnet Pond Storm Sewers**												
	South Nepean Urban Area Master Servicing Study Environmental Study Report	3000x1200 Box Culvert Equivalent Size ϕ	1600	1590	2100	200	Green	2015	$ 1,509	$ 301,793				
	South Nepean Urban Area Master Servicing Study Environmental Study Report	2400x1200 Box Culvert Equivalent Size ϕ	1570	1560	1950	250	Green	2016	$ 988	$ 246,974				
	South Nepean Urban Area Master Servicing Study Environmental Study Report	4200x1800 Box Culvert Equivalent Size ϕ	1560	1520 (Pond)	3000	450	Green	2017	$ 5,546	$ 2,495,643				
	South Nepean Urban Area Master Servicing Study Environmental Study Report	3600x1500 Box Culvert Equivalent Size ϕ	1510	1500	2700	70	Green	2018	$ 4,225	$ 295,755				
4	***Subtotal Kennedy Burnett Storm Sewers***									**$ 3,340,165**			**$ 3,340,165**	
5	***Subtotal for North of Jock (S-3)***									**$ 9,279,555**			**$ 9,279,555**	

CONSTRUCTED

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RIVERSIDE SOUTH SWM POND 4 (Post 2031)
REFER TO TABLE F-1: SWMF - SOUTH
LINE ID #6

RIVERSIDE SOUTH SWM POND 3
REFER TO TABLE F-1: SWMF - SOUTH
LINE ID #5

SWM STORMCEPTOR SITE SPECIFIC TREATMENT UNITS 2, 3, 8
REFER TO TABLE F-1: SWMF - SOUTH
LINE ID #8

RIVERSIDE SOUTH SWM POND 2
REFER TO TABLE F-1: SWMF - SOUTH
LINE ID #4

RIVERSIDE SWM POND 5
REFER TO TABLE F-1: SWMF - SOUTH
LINE ID #7

RIVERSIDE SOUTH STORM SEWERS
REFER TO TABLE F-2: STORM WATER SEWERS - SOUTH
LINE ID #2

RIVERSIDE SWM POND 6A (Post 2031)
REFER TO TABLE F-1: SWMF - SOUTH
LINE ID #9

RIVERSIDE SOUTH TRIBUTARIES

TRIB.	REFER TO TABLE F-1: SWMF - SOUTH
2	LINE ID #10
3	LINE ID #11
4	LINE ID #12
7A	LINE ID #13
7B	LINE ID #14
8	LINE ID #15
10	LINE ID #16
Reach2	LINE ID #17

NOTES:
1. TOTAL COSTS SHOWN IN TABLES INCLUDE CONSTRUCTION, LAND (WHERE APPLICABLE),10% ENGINEERING, 15% CONTINGENCY.
2. PIPE SIZES MAY BE REDUCED AT DETAILED DESIGN STAGE.
3. ROAD PATTERNS BASED ON BEST AVAILABLE.

DEVELOPMENT CHARGE AREA
PROPOSED STORMWATER POND
EXISTING STORMWATER POND
PROPOSED STORM SEWERS
EXISTING STORM SEWERS
NODE NUMBER
PROPOSED TRIBUTARY
EXISTING TRIBUTARY
PROPOSESD STORMCEPTOR (AREA EXCLUDED)
EXISTING STORMCEPTOR (AREA EXCLUDED)
STREAMS
ROADS
RAILWAYS

CITY OF OTTAWA
DEVELOPMENT CHARGES STUDY
PLANNING AND GROWTH MANAGEMENT DEPARTMENT
DEVELOPMENT REVIEW SERVICES

Scale 1:10,000 (0, 100, 300, 500m) | Dwn No. STM4
Dwn By V.H. | Date April, 2014 | Revision 1

6.0 INFRASTRUCTURE PHASING

The total study area encompasses 300ha of development lands. It is recognized that this development will take several decades to reach full build-out and as such phasing of infrastructure planning and construction was considered to the extent possible in developing the servicing plans. This study has assumed that the interim condition will consist of all development west of Spratt Road except for the Cardel Lands located north of the urban boundary between River Road and Spratt Road. Areas east of Spratt Road to the limit of the study area and the Cardel Lands are assumed to be developed as part of the ultimate scenario. Phasing boundaries are illustrated in **Figure 6-1**. Phasing considerations related to natural features and proposed infrastructure are summarized in this section.

6.1 HEADWATER DRAINAGE FEATURES

A headwater drainage features assessment (HDFA) was completed by Stantec and identified recommendations for each reach of the ravines adjacent to Pond 5. Based on the recommendations of the HDFA, base flow to these ravines will need to be maintained throughout both in the interim and ultimate condition of development.

The construction of Phase 15 will cut off much of the source of base flow for downstream ravines North and South of the Pond 5 block, specifically reaches 1A, 2A and 2B as shown in **Figure 6-1** below. Subdivision designs for areas within the existing tributary areas to the ravines will need to provide measures to ensure baseflows are maintained per the HDFA recommendations.

Observations noted in the HDFA indicate that the watercourses to be preserved and or mitigated, experience seasonally intermittent flow with groundwater inferred to be a significant contributing source of flow. As such, the RVCA has indicated that the use of pond flows or OGS discharge will not provide sufficient replication of the existing flow regime since the temperature of the water from these sources would be too warm. A solution that utilizes foundation drains, or rear-yard drainage or LIDs and conveys flows subsurface for cooling is preferred.

The combined base flow and storm runoff from this system would need to remain below the existing conditions peak flow for each storm event to ensure the erosion thresholds are not exceeded. The approximate pre-development flow rates for each of these reaches is summarized in **Table 6-1** below:

Table 6-1: Pre-Development Tributary Ravine Flows for Varying Storm Events

Reach	Flow (L/s)			
	2-yr 12hr SCS	5-yr 12hr SCS	10-yr 12hr SCS	100-yr 12hr SCS
North Ravine				
1A	310	580	840	1690
South Ravine				
2A	640	1210	1730	3500
2B	240	450	640	1290

APPENDIX E

RAPID TRANSIT CORRIDOR

SUMMERHILL STREET

BORBRIDGE AVENUE

RIVER ROAD

PHASE 9

BLOCK 80

BLOCK 81

BLOCK 82

BLOCK 86

BLOCK 87

BLOCK 88

BLOCK 89

BLOCK 92

BLOCK 94

BLOCK 91

SWM POND 5

SEDIMENT MANAGEMENT AREA

RIDEAU RIVER

N

LEGEND:

LIGHT DUTY SILT FENCE

TEMPORARY MUD MAT

STRAW BALE CHECK DAM

Scale	Project Title	Drawing Title	Sheet No.
NTS	RIVERSIDE SOUTH PHASE 12	EROSION & SEDIMENTATION CONTROL PLAN	FIGURE 6.1