REPORT
PROJECT: 121658-6.2.1

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
CLARIDGE HOMES (RIVER PHASE 2) LP
760 RIVER ROAD
RIVERSIDE SOUTH COMMUNITY
RIDEAU RIVER AREA

Prepared for CLARIDGE HOMES (River Phase 2) LP
by IBI GROUP

SEPTEMBER 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, including the deviation noted in section 3.3, located in River Road adjacent to the subject lands.

1.4 Subject Property

A location plan for the subject property is shown on **Figure 1.1**, the current draft plan of subdivision for the subject property is shown on **Figure 1.2,** which are included in **Appendix A**. The proposed subdivision is 3.83 Ha is size.

The proposed development comprises of 55 single family residential units.

1.5 Existing Infrastructure

Figure 1.3 shows the location of existing major municipal infrastructure in the vicinity of the proposed 760 River Road development.

The 2017 ISSU report recommended that the subject site be serviced via the 406 mm diameter watermain which is now existing along River Road. Additionally, a 150 mm and 50mm watermain was extended further within River Road to serve proposed lots 1 to 8.

Wastewater flows from the subject site are to be routed to the newly constructed sanitary sewers in River Road and flow eastwards through the River Road sub-trunk sewer.

All minor stormwater runoff from the site is proposed to be routed to Pond 5 which is located west of the subject site. 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 substantially complete.

1.6 Pre-Consultation

There was a pre-consultation meeting with the City of Ottawa on September 5, 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 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 87 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 following geotechnical investigation report has been prepared by Paterson Group in support of the subject lands.

- Report No. PG4728-1 dated December 17, 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 subject lands includes topsoil or fill consisting of brown silty clay with varying amounts of sand, gravel and organics underlain by a hard to stiff brown silty clay crust followed by a very stiff to firm grey silty clay deposit.

One of the recommendations from the Paterson Group study included grade raise restrictions for the development. A general grade raise restriction for the site of 3.0m has been provided.

1.9 Watercourses and Setbacks

There are no identified Municipal Drains in the 2017 ISSU report. It should be noted that the subject lands boarder an area of interest identified by the Rideau Valley Conservation Authority. This area has recently been improved, through the River Road reconstruction works to receive some surface drainage waters to maintain a base flow. It is not anticipated that works from the proposed development will impact this area, furthermore, the proposed development should provide the opportunity to provide additional surface water for the base flow.

2 WATER SUPPLY

2.1 Existing Conditions

As noted in Section 1.5 there is an existing 400 mm watermain on River Road adjacent to the site which is currently capped just south of Solarium Drive. A 150 mm and 50 mm watermain were extended to service lots 1 to 8. **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 single family lots. A watermain demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 0.77 l/s
- Maximum Day 1.90 l/s
- Peak Hour 4.17 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 single family homes 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 is one location where the rear of the single family home faces the side of an adjacent unit at lots 23, 24 and 25. At this location, 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, a two hour firewall may be required for lot 23 on the side facing lot 24 and 25. If the distance between the houses on lots 25 and 26 is greater than 3 meters, then the houses on lots 24 and 25 can be considered a single fire unit with a building separation less than 3 meters. An FUS calculation is included in **Appendix B** which gives a fire flow demand of 12,000 l/min (200 l/s) for lots 24 and 25. If the water model can support a 12,000 l/min fire flow at this location, then a 2 hour firewall is not required for lot 23.

2.3.4 Boundary Conditions

The City of Ottawa has provided boundary conditions at three locations in the Riverside South area for various projects. There are two locations on Borbridge Avenue, one at River Road and another at Brian Good Avenue. The other boundary condition is on Spratt Road at Cambie Road. There are values given for the current Zone Barrhaven pressure district and for the future Zone SUC district. As the configuration to the Zone SUC district is expected this fall 2019, the hydraulic analysis is constructed with the Zone SUC values as the project will be constructed after the

configuration. A copy of the boundary condition is included in Appendix B and summarized as follows:

	CONNECTION 1 RIVER ROAD & BORBRIDGE	CONNECTION 2 BORBIRDGE & BRIAN GOOD	CONNECTIN 3 SPRATT AND CAMBIE
Max HGL (Basic Day)	147.8 m	147.8 m	147.8 m
Peak Hour	142.1 m	142.1 m	142.6 m
Max Day + Fire (10,000 l/min Fire Flow) (15,000 l/min Fire Flow	 139.8 m 134.6 m	 140.4 m 135.8 m	 139.0 m 132.7 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 & 3 and the Rivers Edge Phase 1 and 2 developments including the River Road watermain. 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. The model was run under the Max Day of 15,000 l/min fire flow to evaluate lots 24 and 25 which have a fire flow demand of 2,000 l/min as per section 2.3.3. 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	561.5 to 581.0 kPa
Peak Hour Pressure Range	505.0 to 524.3 kPa
Max Day + 10,000 l/min minimum Fire Flow	152.8 l/s
Max Day + 15,000 l/min Fire Flow (Lots 24 & 25)	224.9 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 nodes exceed the fire flow demand at 10,000 l/min except for node k10 which represents the hydrant servicing lots 1 to 8 on River Road which is a dead end main. The furthest house on lot 1 has two AA rated hydrants within 150 meters (nodes k10 and k12) which gives a combined fire flow at 9,500 l/min which is 95% of the target flow rate of 10,000 l/min. The fire flow at node k06 which represents lots 24 and 25 exceeds the target flow rate of 12,000 l/min.

2.4.2 Watermain Layout

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

Lots 1 to 16 fronting River Road are serviced by existing water mains on River Road. The remaining lots are serviced by 200 mm watermains with a connection to the River Road watermains and the adjacent development to the north. 50 mm diameter watermains are proposed in the two dead end streets.

3 SANITARY SEWERS

3.1 Existing Conditions

As noted earlier in Section 1.5, sanitary flows from the subject site will be routed to the existing River Road/Summerhill Street sub-trunk sanitary sewer.

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 Deviation Report (2017 IBI)

Subsequent to completion of the 2017 ISSU Report, it was recommended to move the drainage limit between the River Road and Spratt road sanitary collector sewers. It proposed an adjustment to move about 33 ha from Drainage Area 2c and 8 ha from Drainage Area 2d from the Spratt Road sewer to Drainage Area 2a which is tributary to the River Road sewer. This drainage limit shift is supported by the impacted landowners including RSDC, Claridge and Cardel. A copy of the relevant July 20, 2017 e-mail string is included in **Appendix C**.

Therefore, it is proposed to increase the 2a sub-catchment area by about 41 ha and decrease the 2c and 2d areas by an equal amount. A Deviation Report Memorandum detailing these changes was completed by IBI Group July 25, 2017 and is included in **Appendix C**. Similarly, further analysis was conducted on the Spratt Road Collector and Shoreline Drive Collector sewers, the resulting design sheet and Figure A-3 has also been provided in **Appendix C**.

Figure 3.1 from the 2018 Assessment of Adequacy of Public Services is also included in **Appendix C** which shows the proposed sanitary sewer servicing for the 760 River Road lands.

3.4 River Road Reconstruction (2018 IBI)

In 2018, the portion of River Road fronting the subject property was reconstructed which included the installation of a sanitary sewer.

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 subject lands have been included in the design calculations for the sanitary sewer recently constructed; the subject lands are identified as drainage area 12A, 30A, 29A and 28A.

3.5 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 detail design for River Road, the following density rates are estimated for the subject site:

- Single units = 3.2
- Semi units = 2.4
- Townhouse and back to back units = 2.4
- Apartment units = 1.9

3.6 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 system. A preliminary sanitary plan is included in **Figure 3.1** 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 in its final stages of construction and is located west of the subject site.

The lands currently drain westward directly into the Rideau River and/or the newly constructed pond 5.

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 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. Some 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)

Similar to the sanitary sewer, 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 as part of the Pond 5 and River Road construction, the subject lands are identified as drainage areas 11 and 163.

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 or adjacent drainage feature.

4.4 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

4.5 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 system. A preliminary storm plan is included in **Figure 4.1** 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.

4.6 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.

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 under the supervision of our firm and the City of Ottawa representatives.

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 major 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 substantially complete and 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 Claridge Homes property known as 760 River Road 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

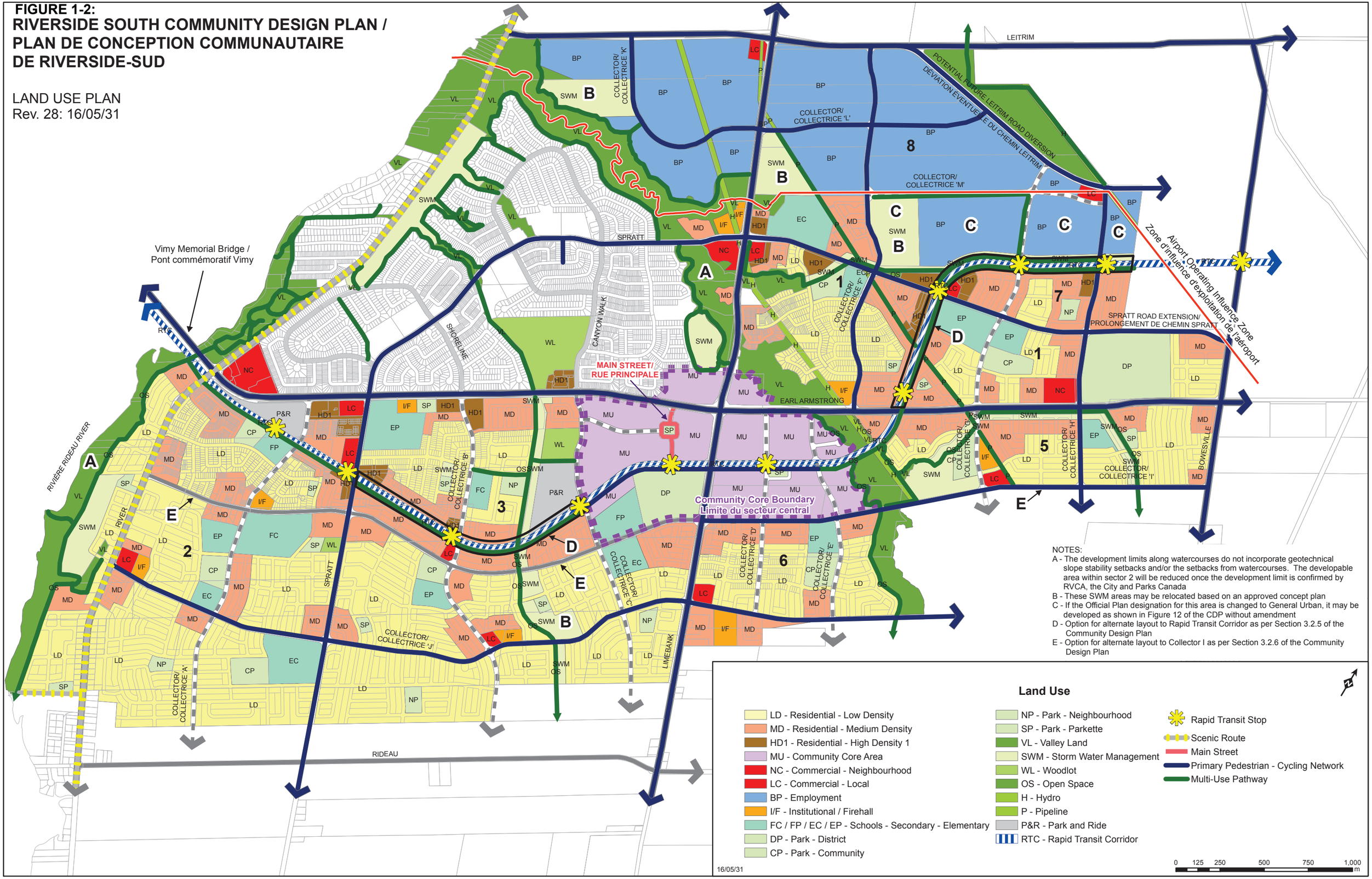
CONCLUSION CHECKLIST

	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

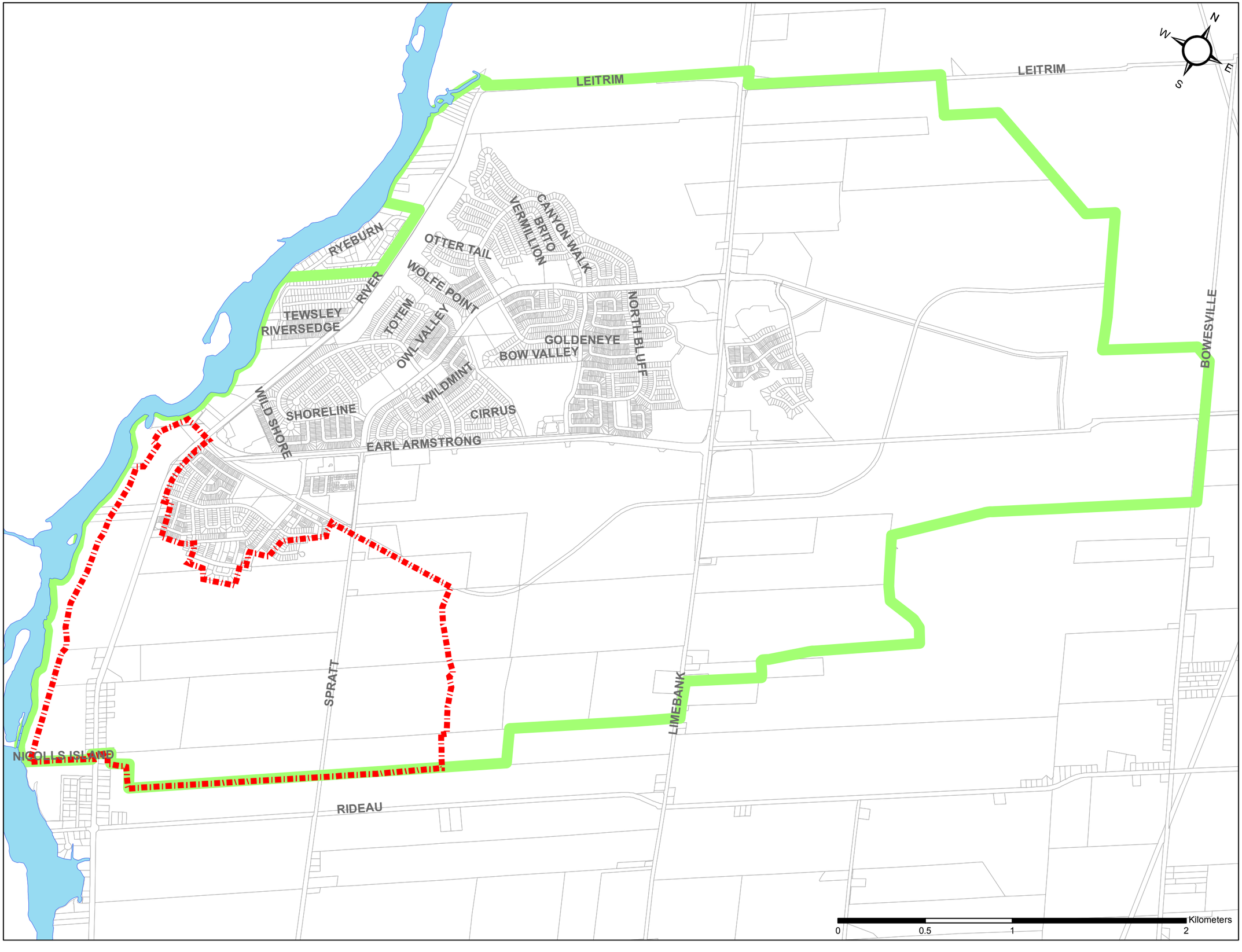
Land Use

- 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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OTTAWA, ON
TEL. 613.722.4420
WWW.STANTEC.COM

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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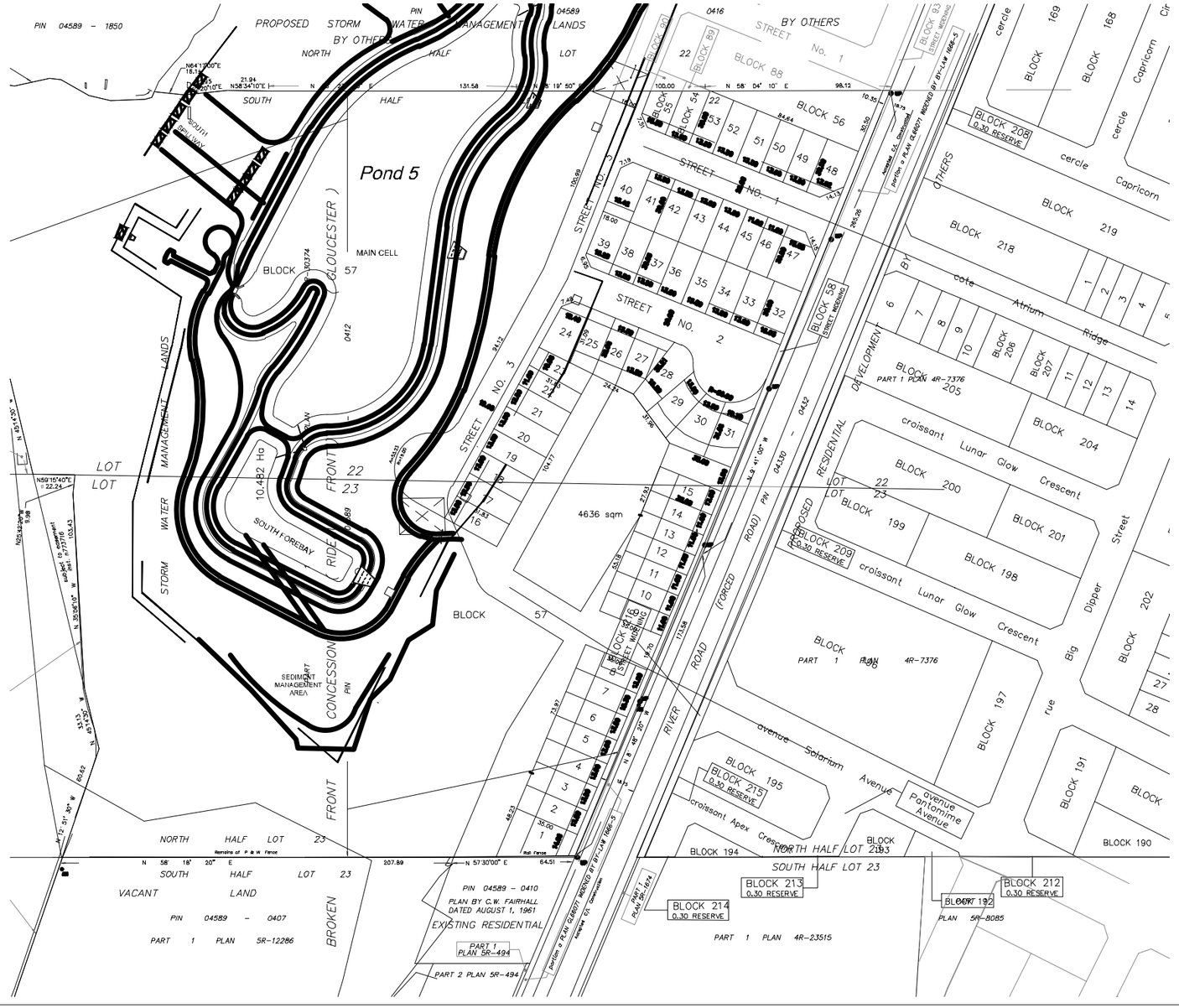
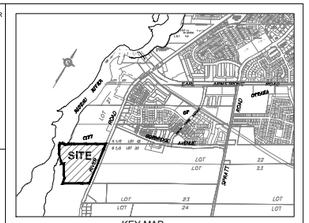
Scale	Project Title	Drawing Title	Sheet No.
1:2000	760 RIVER ROAD	LOCATION PLAN	FIGURE 1.1



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

DRAFT PLAN OF SUBDIVISION OF
PART OF LOTS 22 And 23
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 we are the owners of the lands to be subdivided and that this plan was prepared in accordance with our instructions.

_____ Date
_____ Jim Burghout, Authorized Signing Officer, Claridge Homes 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 family residential housing 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

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@annilt.com
Ontario Land Surveyors
Job No.18590-17 Claridge Pt Lts 22 23 BF GL DPS 02 N

Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	DRAFT PLAN	FIGURE 1.2

N

BORBRIDGE AVENUE

ATRIUM RIDGE

SOLARIUM AVENUE

RIVER ROAD

SUBJECT PROPERTY
760 RIVER ROAD

BLOCK 92

BLOCK 85

BLOCK 86

BLOCK 87

BLOCK 88

BLOCK 89

BLOCK 54

BLOCK 55

BLOCK 56

STREET NO. 1

STREET NO. 2

STREET NO. 3

BLOCK 57

SEDIMENT MANAGEMENT AREA

EX. SWM POND 5

POND BOTTOM = 80.00
PERMANENT POOL
INITIAL INTERIM = 81.50
INTERIM = 82.00
ULTIMATE = 82.60

NORTH FOREBAY

MAIN CELL

BLOCK 91

58

59

SO1

LEGEND:

- EXISTING WATERMAIN
- EXISTING STORM
- EXISTING SANITARY
- WATERMAIN (BY OTHERS)
- STORM (BY OTHERS)
- SANITARY (BY OTHERS)

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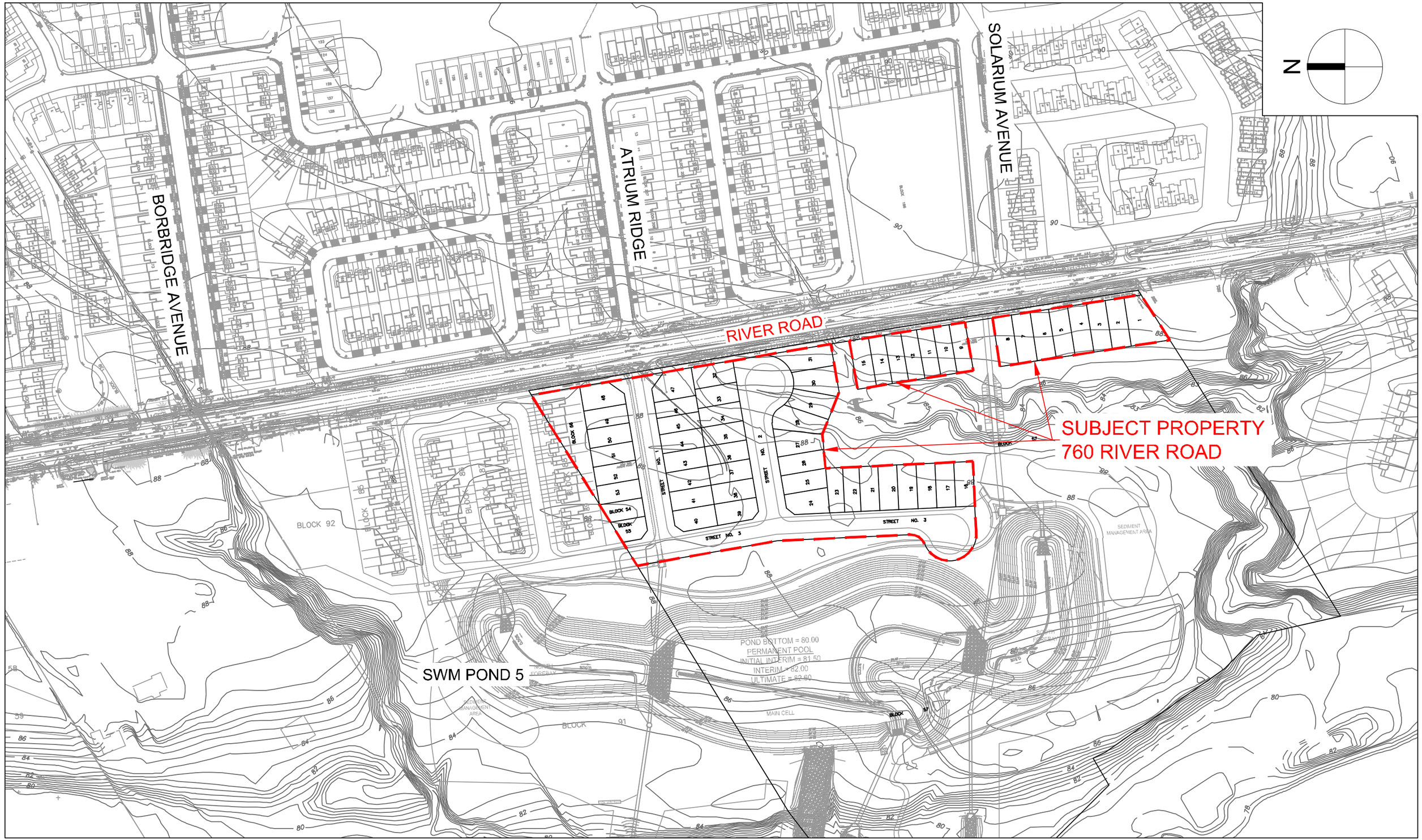
Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	LOCATION OF EXISTING MAJOR MUNICIPAL INFRASTRUCTURE	FIGURE 1.3



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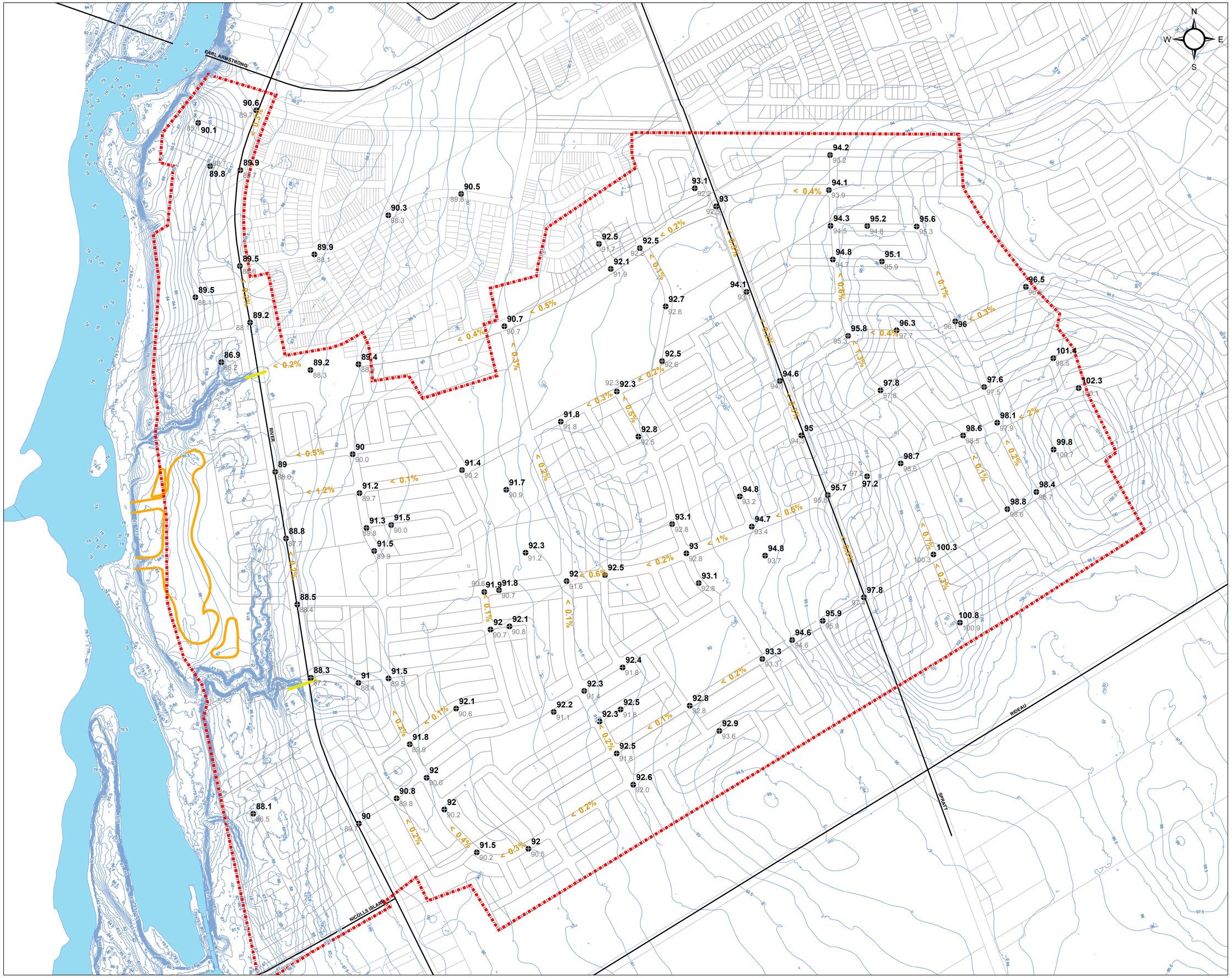
Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	SITE TOPOGRAPHY	FIGURE 1.4



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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

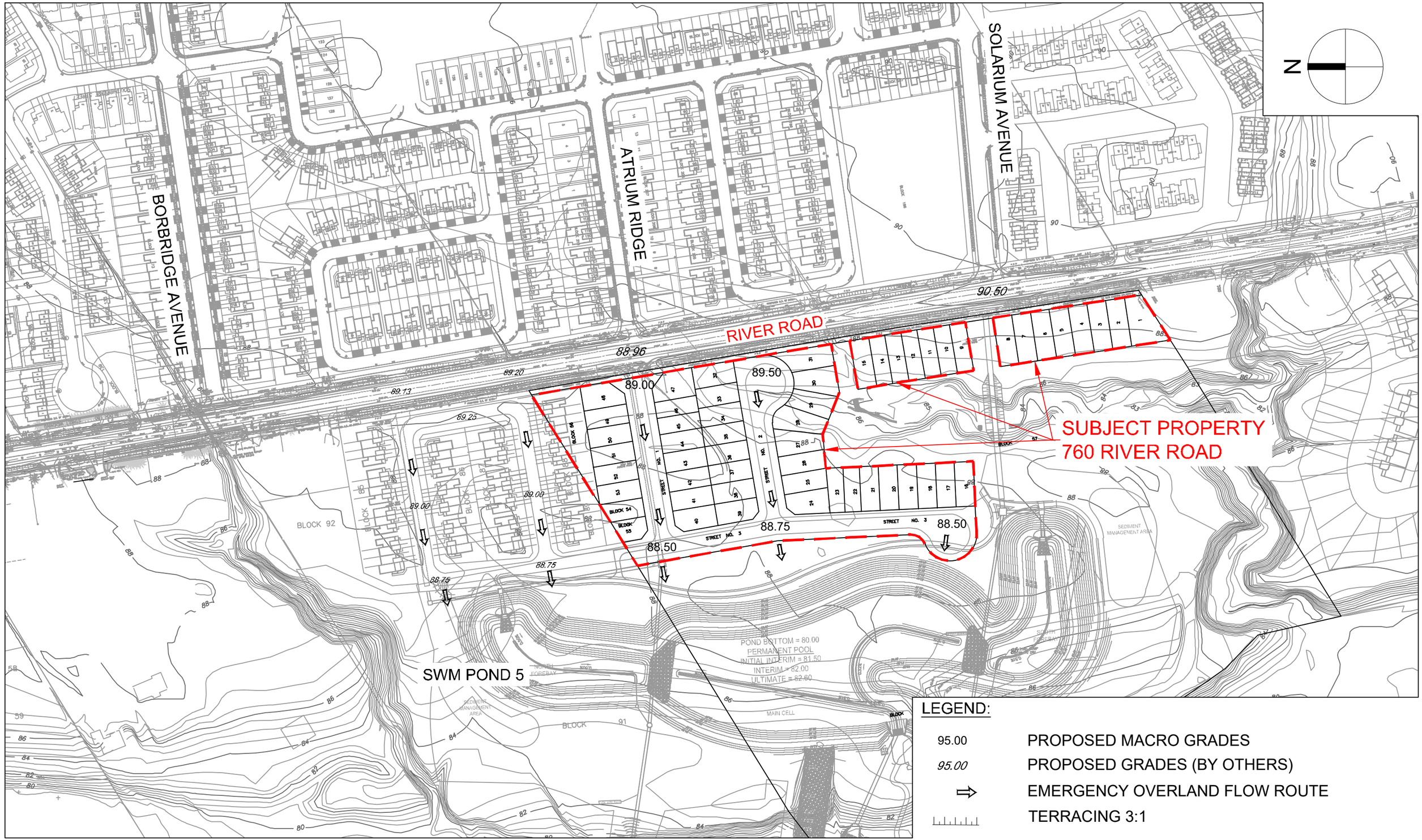
Project No.: **163401101**

Scale: 0 50 100 200 Meters

Drawing No.: **GCP-1**

Sheet: **1 of 7**

Revision: **0**



LEGEND:

95.00	PROPOSED MACRO GRADES
95.00	PROPOSED GRADES (BY OTHERS)
⇨	EMERGENCY OVERLAND FLOW ROUTE
	TERRACING 3:1

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Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	PROPOSED MACRO GRADING PLAN	FIGURE 5.1

760 River Road

Good afternoon Vince,

It was nice meeting you for a pre-application consultation (PC2018-0214) on September 5, 2018. The proposal discussed was a subdivision comprising of 55 development blocks intended for single family homes. The concept provided included one signalized access to the site via River Road, three public streets, and a future street connection to lands to the north owned by others (Urbandale).

Planning & Design Comments:

1. Official Plan: General Urban Area; Secondary Plan: N/A; Community Design Plan: Riverside South CDP; Zoning: Development Reserve, Subzone 1 (DR1)
2. Sidewalks on both sides of Street 1 are desirable.
3. A multi-use pathway is acceptable alternative to a street through the valley lands. We will determine the details of this pathway during detailed design.
4. Overall, we would like to see an effort to co-ordinate with the Urbandale lands to the north. Please advise us on any developments in this regard.
5. Please ensure to comply with the Terms of Reference when preparing the Planning Rationale.
6. Before proceeding I would suggest contacting Councillor Michael Qaqish to discuss this project.

Transportation:

7. Follow Traffic Impact Assessment Guidelines – Screening form to start, full Traffic Impact Assessment if any of the triggers on the screening form are satisfied.
    1. Start this process asap.
    2. Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
8. Noise Impact Studies required for road noise
9. TIA will determine the need of turning lane(s) along River road at street 1.
10. Noise study is required.
11. Paved shoulders along full frontage of River road should be provided.
12. For more information on this please contact Asad Yousfani (Asad.Yousfani@ottawa.ca / ext. 16571).

Engineering Comments:

Assessement of Adequacy of Public Services Study:

13. The report is to follow the City's Servicing Study guidelines which can be found at the following link: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications
14. Prior to submitting the servicing report, the consultant should contact me and request boundary conditions for the watermain design. The consultant will need to provide the type of development, fire flow required, average day demand, maximum day demand and maximum hour demand as well as a location plan showing the points of connection to the public system.
15. The Watermain, Storm and Sanitary Sewers are to follow the recently approved Infrastructure Servicing Study Update and the Master Drainage Plan update for the Rideau Drainage Area in Riverside South. If the consultant requires digital copies then they can email me directly for the documents.

Geotechnical Study:

16. Containing detailed information on geotechnical matters and recommendations (i.e. pavement, foundation, bedding construction etc.). The report is to follow the City's Geotechnical Reporting Guidelines which can be found at http://www.ottawa.ca/cs/groups/content/@webottawa/documents/pdf/mdaw/mtm4/~edisp/cap137602.pdf
17. Sensitive Marine Clay (SMC) is widely found across Ontario – geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane shear test results (at a minimum) with a discussion for proposals in areas containing SMC.

Slope Stability Analysis.

18. Containing detailed information on setback etc. for all potentially unstable slopes; the slope stability analysis is required to follow the City's slope stability reporting guidelines which can be found at http://documents.ottawa.ca/en/document/slope-stability-guidelines-development-applications

Hydrogeological Assessment:

19. Addressing the impacts to existing wells in the vicinity of the development.
20. This report shall include at a minimum the following items:
    - Basic hydrogeology for the area
    - Risk to existing wells during construction and from the long term development of the site (e.g. quantity/quality, recharge, water budget)
    - Monitoring program for existing wells.
21. Should you have any questions or require additional information, please contact Jeff Shillington directly at (613) 580-2424, x16960 or by email at Jeff.Shillington@ottawa.ca)

Rideau Valley Conservation Authority Comments:

22. The proposed subdivision is located adjacent to the Rideau River, as well as a tributary providing drainage through a ravine to the Rideau River. A 30 metre setback is required all watercourses. Specific to this project the lots are proposed on both sides of the tributary. The 30m setback is to be measured from the bank full condition of the existing watercourse.
23. A pathway crossing/buried pipe is proposed between proposed lots 8-9 for pedestrian and maintenance access purposes only. RVCA acknowledges this may be required and is willing to entertain the crossing. A vehicular access for day to day subdivision movement is not supported in this location.
24. A portion of the lot is located within the RVCA's Regulated area. This area is associated primarily due to concerns with slope stability. All works within this area may be subject to permits. Permits are specifically required from the RVCA for any alteration/interference with the watercourse, which include the proposed pathway. Contact us further regarding permit complete application requirements.
25. Geotechnical concerns will need to be detailed through a Geotechnical report, specficially the RVCA is looking for the identification of the limit of hazard lands.
26. Additional requirements may be implemented related to the geotechnical setbacks, (such as covenants related to development restrictions, limiting of sturcutres/pools etc.).
27. Winter maintenance is a concern from a salt perspective, through our discussion this was to be looked into as to the proposed application/or winter routes proposed.
28. Additional flows from the subdivision (such as overland flow routes) would be acceptable provided water quality/erosion of the watercourse are protected.

Environmental Planning:

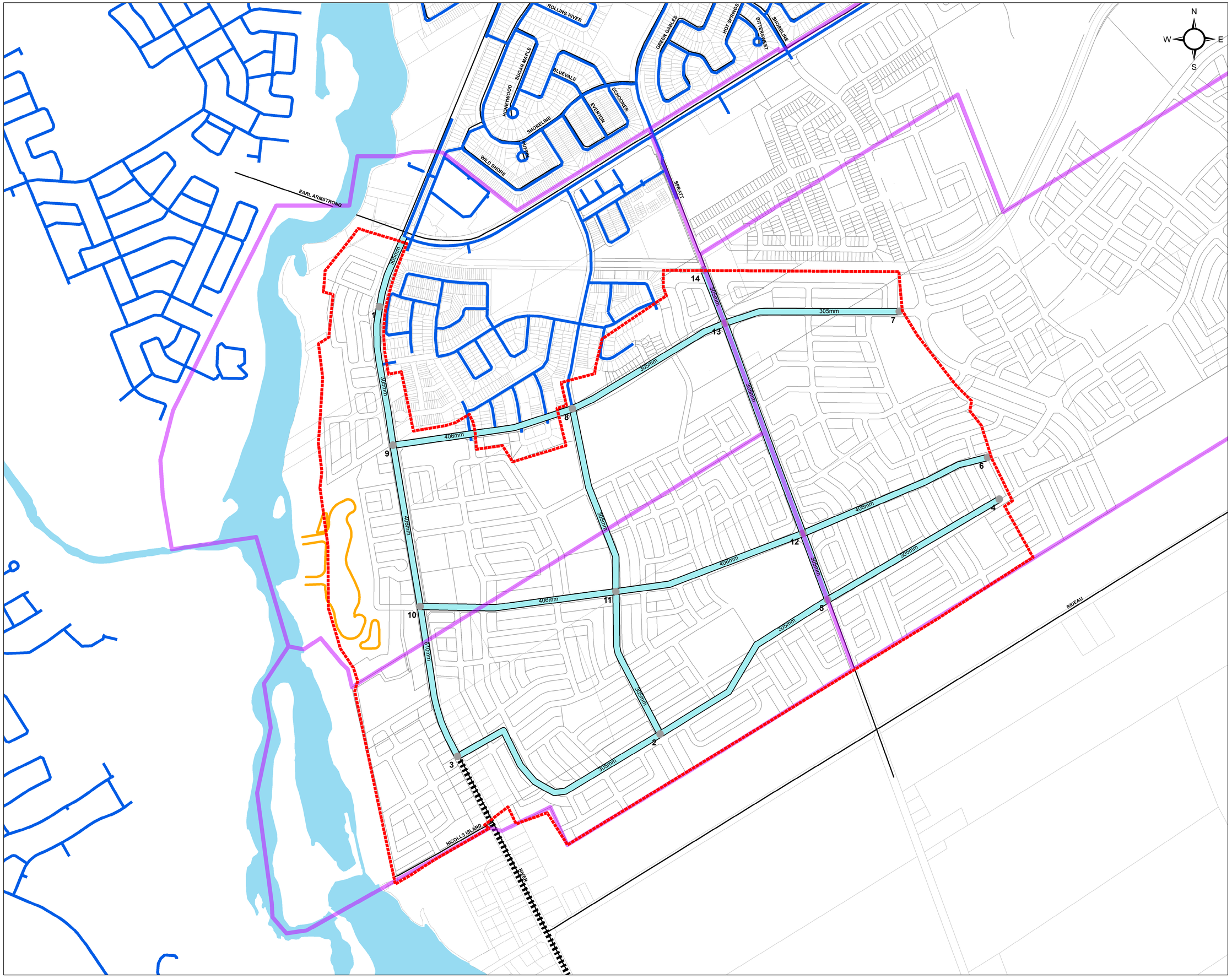
29. The subdivision will need to be supported with an EIS and TCR.

The proposed application will be a Plan of Subdivision Application, which costs **$61,329.56, plus design review and inspection fee, and Conservation Authority fee of $3,610** (detail regarding fees)

Major Zoning By-law Amendment, $16,545.30 , plus $360 Conservation Authority fee.

Best regards,

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.: **163401101**

Scale: 0 125 250 Meters

Drawing No.: **WAT-1**

Sheet: **7 of 7**

Revision: **0**

N

BORBRIDGE AVENUE

ATRIUM RIDGE

SOLARIUM AVENUE

RIVER ROAD

400mm Ø

150mm Ø

50mm Ø

CONNECT TO EXISTING WATERMAIN

WATERMAIN LAYOUT PER W37.1

MIN. 3m SEPARATION BETWEEN HOUSES

SUBJECT PROPERTY
760 RIVER ROAD

FUTURE CONNECTION

WATERMAIN LAYOUT PER W37.2

EX. SWM POND 5

POND BOTTOM = 80.00
PERMANENT POOL
INITIAL INTERIM = 81.50
INTERIM = 82.00
ULTIMATE = 82.60

NORTH FOREBAY

SOUTH FOREBAY

MAIN CELL

SEDIMENT MANAGEMENT AREA

BLOCK 92

BLOCK 91

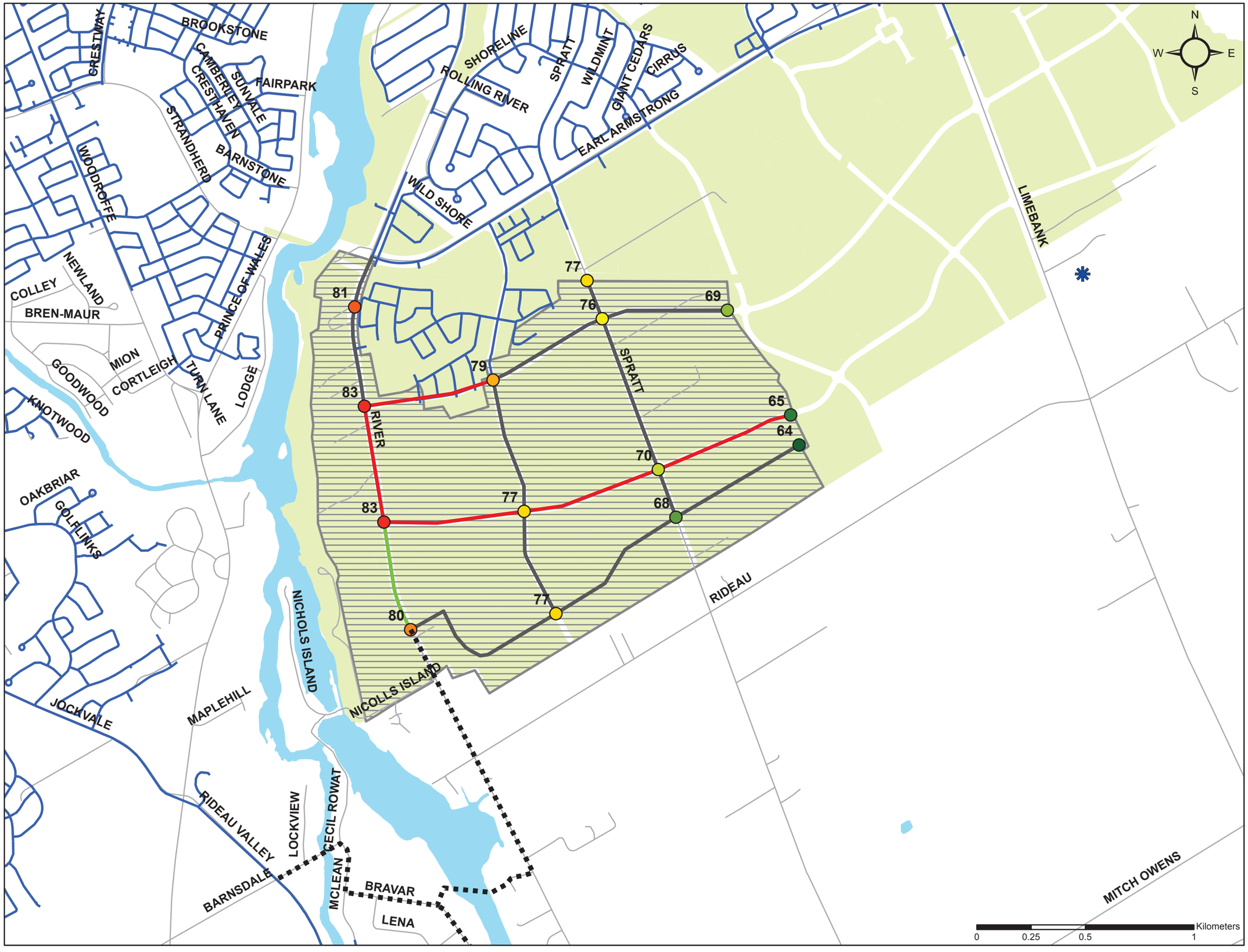
LEGEND:

EXISTING WATERMAIN

WATERMAIN (BY OTHERS)

PROPOSED WATERMAIN

Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	CONCEPTUAL WATER PLAN	FIGURE 2.1



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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

Boundary Conditions for Riverside South Phase 15-3

Information Provided:
Date provided: April 23, 2019

Scenario	Demand	
	L/min	L/s
Average Daily Demand	1986	33.1
Maximum Daily Demand	4494	74.9
Peak Hour	9606	160.1
Fire Flow Demand #1	10000	167
Fire Flow Demand #2	15000	250

Location:

Results

Connection 1 - River Road

Demand Scenario	Existing Zone Barrhaven		Future Zone SUC	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	132.4	62.7	147.8	84.5
Peak Hour	121.5	47.2	142.1	76.5
Max Day plus Fire (10,000l/min)	118.4	42.8	139.8	73.2
Max Day plus Fire (15,000l/min)	114.6	37.3	134.6	65.9

[1]Ground Elevation = 88.3 m

Connection 2 - Brian Good

Demand Scenario	Existing Zone Barrhaven		Future Zone SUC	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	132.4	58.9	147.8	80.7
Peak Hour	121.5	43.4	142.1	72.7
Max Day plus Fire (10,000l/min)	119.1	39.9	140.4	70.2
Max Day plus Fire (15,000l/min)	115.8	35.2	135.8	63.7

[1]Ground Elevation = 91.0 m

Connection 3 - Spratt

Demand Scenario	Existing Zone Barrhaven		Future Zone SUC	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	132.4	57.8	147.8	79.6
Peak Hour	122.0	43.0	142.6	72.2
Max Day plus Fire (10,000l/min)	117.6	36.7	139.0	67.1
Max Day plus Fire (15,000l/min)	112.4	29.3	132.7	58.2

[1] Ground Elevation = 91.8 m

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
   a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
   b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

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

IBI GROUP

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : RIVERSIDE SOUTH - 760 RIVER ROAD
LOCATION : CITY OF OTTAWA
DEVELOPER : CLARDIGE HOMES

FILE: 121658.5.7
DATE PRINTED: 13-Sep-19
DESIGN: LE
PAGE : 1 OF 1

NODE	RESIDENTIAL UNITS			POP'N	NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	SF	SD & TH	APT		INDTRL (ha.)	COMM. (ha.)	INST. (ha.)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
K02	8			27				0.11	0.00	0.11	0.28	0.00	0.28	0.61	0.00	0.61	10,000
K04	8			27				0.11	0.00	0.11	0.28	0.00	0.28	0.61	0.00	0.61	10,000
K06	5			17				0.07	0.00	0.07	0.17	0.00	0.17	0.38	0.00	0.38	12,000
K08	5			17				0.07	0.00	0.07	0.17	0.00	0.17	0.38	0.00	0.38	10,000
K10	6			20				0.08	0.00	0.08	0.21	0.00	0.21	0.45	0.00	0.45	
K12	4			14				0.06	0.00	0.06	0.14	0.00	0.14	0.30	0.00	0.30	10,000
K14	4			14				0.06	0.00	0.06	0.14	0.00	0.14	0.30	0.00	0.30	
K16	7			24				0.10	0.00	0.10	0.24	0.00	0.24	0.53	0.00	0.53	10,000
K18	5			17				0.07	0.00	0.07	0.17	0.00	0.17	0.38	0.00	0.38	10,000
K20	3			10				0.04	0.00	0.04	0.10	0.00	0.10	0.23	0.00	0.23	
Total	55	0	0	187						0.77			1.90			4.17	

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
- Lot 23 & 24 12,000 l / min
- ICI/MD 15,000 l / min

Fire Flow Requirement from Fire Underwriters Survey

760 River Road - Lot 24 and 25

Building Floor Area

Total width 2 buildings	24.0	m
depth	20.0	m
stories	2	
Area	960.0	m^2

$F = 220C\sqrt{A}$

C	1.5	
A	960	m^2
F	10,225	l/min
use	10,000	l/min

C =
- 1.5 wood frame
- 1.0 ordinary
- 0.8 non-combustile
- 0.6 fire-resistive

Occupancy Adjustment

Use	-15%	
Adjustment	-1500	l/min
Fire flow	8,500	l/min

- -25% non-combustile
- -15% limited combustile
- 0% combustile
- +15% free burning
- +25% rapid burning

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	32.0				5%
east	3.1	20.0	2	40	18%
south	7.5	20.0	2	40	18%
west	> 45				0%
Total					41%

Adjustment	3,485	l/min
Total adjustments	3,485	l/min
Fire flow	11,985	l/min
Use	**12,000**	**l/min**
	200.0	**l/s**

* Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)

OVERALL WATER MODEL

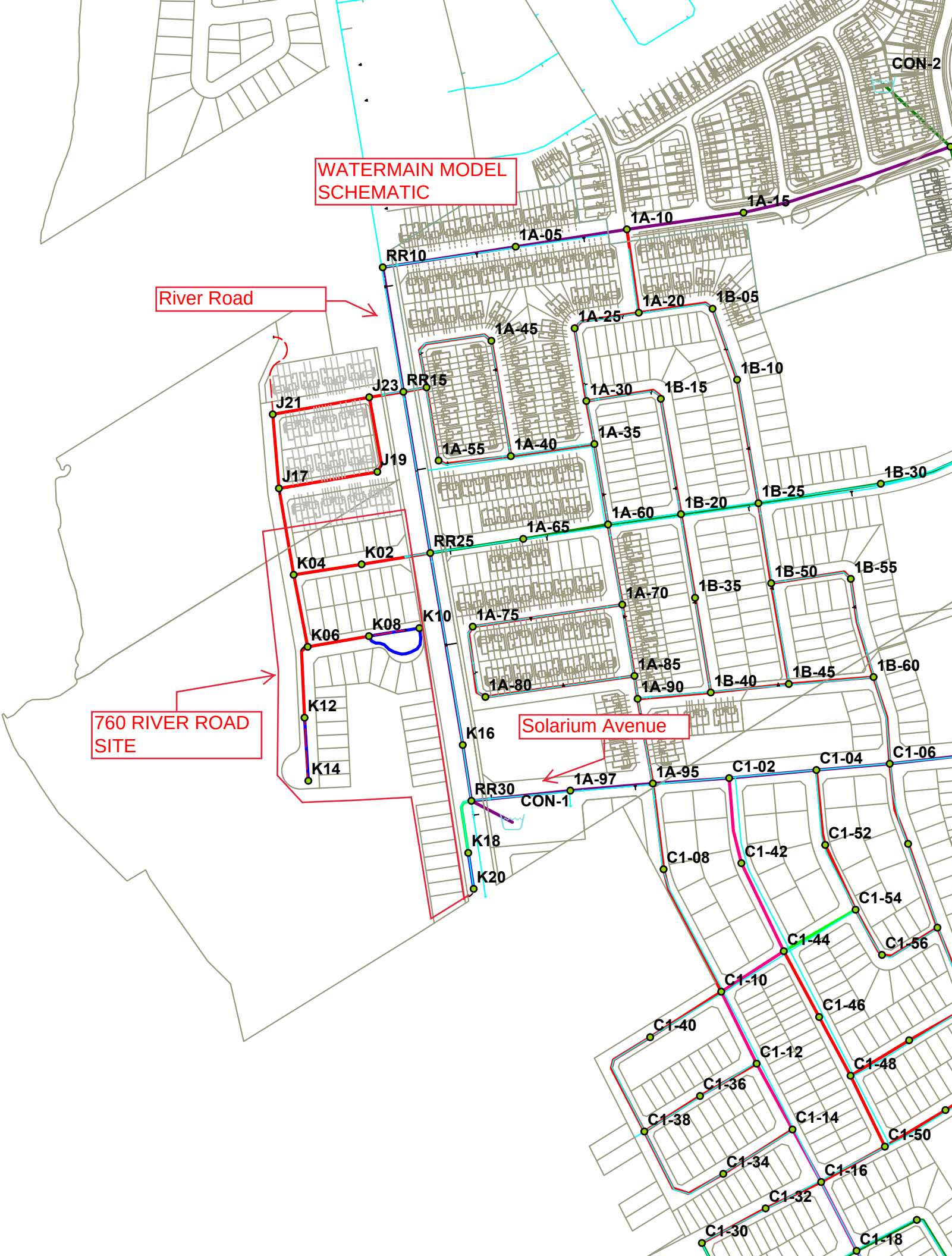
BORBRIDGE AVENUE

RIVER ROAD

SPRATT ROAD

760 RIVER ROAD SITE

CON-3
SP-01
4-50
4-60
4-20
4-80
4-40
SP-03
4-30
2-125
4-10
2-120
SP-04
2-115
2-85
CON-2
2-110
2-80
2-70
2-105
2-75
2-100
RR10
1A-05
1A-10
1A-15
2-48
2-62
2-65
2-40
1B-05
2-28
2-58
C2-32
1A-45
1A-25
2-25
2-38
2-50
C2-28
SP-08
J21
J23
1A-50
1B-15
2-15
C2-26
C2-34
C2-30
2-05
2-12
2-35
C2-24
C2-22
3-30
J17
J19
1A-40
1A-35
2-08
2-20
C2-16
3-20
3-28
3-26
1B-25
1B-30
2-10
C2-12
C2-20
3-24
SP-12
K04
K02
RR25
1A-65
1A-60
C2-10
C2-18
3-16
1B-50
1B-55
C2-14
3-12
3-22
1A-70
3-08
K10
1A-75
C2-08
3-18
K06
3-14
3-04
3-10
1B-45
1B-60
1A-80
1A-90
3-06
K12
3-02
C2-06
C2-04
3-88
K16
C1-02
C1-06
3-82
3-86
K14
CON-1
3-62
3-32
3-80
C1-42
C1-52
C1-60
3-60
3-76
3-84
K18
3-58
3-34
3-66
K20
C1-54
C1-62
3-56
C1-44
3-54
3-36
3-68
C1-10
C1-46
C1-64
3-50
C1-40
C1-66
3-52
3-38
3-74
C1-12
C1-48
3-48
C1-36
C1-78
3-40
C1-38
C1-14
3-46
C1-50
C1-70
3-42
C1-34
3-44
C1-32
C1-76
C1-72
C1-30
C1-74
C1-28
C1-20
C1-24


WATERMAIN MODEL SCHEMATIC
River Road
760 RIVER ROAD SITE
Solarium Avenue
CON-2
CON-1
1A-15
1A-10
1A-05
RR10
1A-20
1B-05
1A-25
1A-45
1B-10
J23
RR15
J21
1A-30
1B-15
1A-35
1A-55
1A-40
J19
J17
1B-30
1B-25
1B-20
1A-60
1A-65
RR25
K04
K02
1B-50
1B-55
1B-35
1A-70
K10
1A-75
K06
K08
1A-85
1B-45
1B-60
1A-80
1A-90
1B-40
K12
K16
C1-04
C1-06
C1-02
1A-95
1A-97
RR30
K14
K18
C1-08
C1-42
C1-52
K20
C1-54
C1-44
C1-56
C1-10
C1-46
C1-40
C1-12
C1-48
C1-36
C1-38
C1-14
C1-50
C1-34
C1-16
C1-32
C1-30
C1-18

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
151	☐	C2-02	0.11	91.75	147.78	549.09	8.87
152	☐	C2-04	0.04	92.05	147.78	546.14	9.87
153	☐	C2-06	1.63	92.50	147.78	541.73	10.75
154	☐	C2-08	0.10	92.70	147.78	539.78	9.57
155	☐	C2-10	0.14	93.70	147.78	529.98	8.55
156	☐	C2-12	0.20	95.25	147.78	514.78	9.55
157	☐	C2-14	0.37	96.50	147.78	502.53	10.66
158	☐	C2-16	0.19	93.40	147.78	532.90	11.12
159	☐	C2-18	0.28	93.60	147.78	530.94	13.36
160	☐	C2-20	0.25	93.80	147.78	528.98	14.83
161	☐	C2-22	0.25	93.90	147.78	528.00	15.96
162	☐	C2-24	0.17	93.50	147.78	531.92	12.60
163	☐	C2-26	0.19	93.60	147.78	530.94	13.42
164	☐	C2-28	0.25	93.70	147.78	529.96	11.89
165	☐	C2-30	0.22	93.80	147.78	528.98	14.26
166	☐	C2-32	0.20	95.00	147.78	517.23	9.25
167	☐	C2-34	0.22	94.20	147.78	525.06	10.52
168	☐	C2-36	0.20	95.20	147.78	515.26	7.64
169	☐	J17	0.13	88.50	147.79	581.04	18.51
170	☐	J19	0.16	88.00	147.79	585.94	10.94
171	☐	J21	0.13	88.50	147.79	581.04	12.02
172	☐	J23	0.16	88.00	147.79	585.94	8.33
173	☐	K02	0.11	89.20	147.79	574.18	6.43
174	☐	K04	0.11	88.50	147.79	581.04	12.39
175	☐	K06	0.07	88.75	147.79	578.59	14.40
176	☐	K08	0.07	89.00	147.79	576.14	18.27
177	☐	K10	0.08	89.50	147.79	571.22	19.37
178	☐	K12	0.06	88.60	147.79	580.06	20.17
179	☐	K14	0.06	88.50	147.79	580.99	21.17
180	☐	K16	0.10	90.40	147.80	562.43	2.00
181	☐	K18	0.07	90.50	147.80	561.46	3.91
182	☐	K20	0.04	90.10	147.79	565.37	4.91
183	☐	RR10	0.23	88.91	147.80	577.03	5.85
184	☐	RR15	0.00	89.15	147.79	574.67	7.33
185	☐	RR25	0.08	88.90	147.79	577.12	5.01
186	☐	RR30	0.00	90.50	147.80	561.46	1.00
187	☐	SP-01	0.00	92.55	147.80	541.41	1.00
188	☐	SP-02	0.07	93.20	147.79	534.97	2.00
189	☐	SP-03	0.09	93.00	147.79	536.89	3.00
190	☐	SP-04	0.00	93.95	147.79	527.56	4.00
191	☐	SP-06	0.00	94.80	147.78	519.20	5.43
192	☐	SP-08	0.00	95.30	147.78	514.28	6.64
193	☐	SP-10	0.00	96.20	147.78	505.46	8.01
194	☐	SP-12	0.00	97.30	147.78	494.68	9.67

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
151	☐	C2-02	0.61	91.75	141.85	490.95	0.00
152	☐	C2-04	0.23	92.05	141.85	487.96	0.00
153	☐	C2-06	4.52	92.50	141.84	483.50	0.00
154	☐	C2-08	0.54	92.70	141.86	481.69	0.00
155	☐	C2-10	0.75	93.70	141.86	471.98	0.00
156	☐	C2-12	1.10	95.25	141.85	456.64	0.00
157	☐	C2-14	2.05	96.50	141.84	444.30	0.00
158	☐	C2-16	1.04	93.40	141.84	474.71	0.00
159	☐	C2-18	1.55	93.60	141.83	472.66	0.00
160	☐	C2-20	1.36	93.80	141.83	470.69	0.00
161	☐	C2-22	1.36	93.90	141.83	469.72	0.00
162	☐	C2-24	0.91	93.50	141.84	473.71	0.00
163	☐	C2-26	1.06	93.60	141.84	472.73	0.00
164	☐	C2-28	1.37	93.70	141.84	471.76	0.00
165	☐	C2-30	1.20	93.80	141.84	470.76	0.00
166	☐	C2-32	1.10	95.00	141.86	459.17	0.00
167	☐	C2-34	1.20	94.20	141.84	466.86	0.00
168	☐	C2-36	1.08	95.20	141.85	457.11	0.00
169	☐	J17	0.72	88.50	142.00	524.28	0.00
170	☐	J19	0.90	88.00	142.00	529.18	0.00
171	☐	J21	0.72	88.50	142.00	524.28	0.00
172	☐	J23	0.90	88.00	142.00	529.20	0.00
173	☐	K02	0.61	89.20	142.00	517.44	0.00
174	☐	K04	0.61	88.50	142.00	524.28	0.00
175	☐	K06	0.38	88.75	142.00	521.80	0.00
176	☐	K08	0.38	89.00	142.00	519.35	0.00
177	☐	K10	0.45	89.50	141.95	513.94	0.00
178	☐	K12	0.30	88.60	142.00	523.27	0.00
179	☐	K14	0.30	88.50	141.91	523.38	0.00
180	☐	K16	0.53	90.40	142.03	505.94	0.00
181	☐	K18	0.38	90.50	142.04	505.02	0.00
182	☐	K20	0.23	90.10	142.01	508.63	0.00
183	☐	RR10	1.26	88.91	142.02	520.39	0.00
184	☐	RR15	0.00	89.15	142.01	517.98	0.00
185	☐	RR25	0.45	88.90	142.01	520.43	0.00
186	☐	RR30	0.00	90.50	142.04	505.03	0.00
187	☐	SP-01	0.00	92.55	142.60	490.42	0.00
188	☐	SP-02	0.36	93.20	142.27	480.86	0.00
189	☐	SP-03	0.48	93.00	142.09	481.05	0.00
190	☐	SP-04	0.00	93.95	142.03	471.10	0.00
191	☐	SP-06	0.00	94.80	141.90	461.52	0.00
192	☐	SP-08	0.00	95.30	141.85	456.20	0.00
193	☐	SP-10	0.00	96.20	141.84	447.26	0.00
194	☐	SP-12	0.00	97.30	141.84	436.43	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)
169	☐	K02	166.95	469.88	K02	139.96	103.48	469.88	139.96	139.97
170	☐	K04	166.95	413.55	K08	135.06	102.78	410.52	139.96	144.88
171	☐	K06	200.17	244.72	K08	137.51	103.03	243.82	139.96	142.41
172	☐	K08	166.84	194.17	K08	139.96	103.28	194.17	139.96	139.96
173	☐	K12	166.81	188.69	K12	139.96	102.88	188.69	139.96	139.96
174	☐	K16	166.91	2,293.53	K16	139.98	104.69	2,293.60	139.96	140.02
175	☐	K18	166.84	152.77	K18	139.96	104.78	152.77	139.96	139.94
176	☐	RR10	166.90	1,468.83	RR10	139.97	103.19	1,468.85	139.96	139.96
177	☐	RR15	166.67	1,586.18	RR15	139.97	103.43	1,586.21	139.96	139.96
178	☐	RR25	166.75	1,827.68	RR25	139.97	103.18	1,827.71	139.96	139.96
179	☐	RR30	166.67	3,429.88	K18	140.00	104.79	3,430.11	139.96	139.97
180	☐	SP-02	166.74	1,168.48	SP-02	139.97	107.48	1,168.49	139.96	139.97
181	☐	SP-03	166.76	1,068.31	SP-03	139.97	107.28	1,068.31	139.96	139.96
182	☐	SP-08	166.67	814.62	SP-08	139.96	109.58	814.62	139.96	139.96
183	☐	SP-10	166.67	803.49	SP-10	139.96	110.48	803.50	139.96	139.96
184	☐	SP-12	166.67	818.14	SP-12	139.96	111.58	818.14	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)
169	☐	K02	166.95	433.22	K02	139.96	103.48	433.22	139.96	139.96
170	☐	K04	166.95	381.97	K08	135.06	102.78	378.72	139.96	144.87
171	☐	K06	200.17	225.89	K08	137.51	103.03	224.93	139.96	142.41
172	☐	K08	166.84	179.08	K08	139.96	103.28	179.08	139.96	139.96
173	☐	K12	166.81	174.19	K12	139.96	102.88	174.19	139.96	139.96
174	☐	K16	166.91	2,106.71	K16	139.98	104.68	2,106.77	139.96	139.91
175	☐	K18	166.84	140.17	K18	139.96	104.78	140.17	139.96	139.92
176	☐	RR10	166.90	1,357.02	RR10	139.97	103.19	1,357.04	139.96	139.96
177	☐	RR15	166.67	1,463.80	RR15	139.97	103.43	1,463.82	139.96	139.96
178	☐	RR25	166.75	1,686.79	RR25	139.97	103.18	1,686.82	139.96	139.96
179	☐	RR30	166.67	3,147.90	K18	140.00	104.79	3,148.10	139.96	139.93
180	☐	SP-02	166.74	1,050.47	SP-02	139.97	107.48	1,050.48	139.96	139.96
181	☐	SP-03	166.76	964.68	SP-03	139.97	107.28	964.68	139.96	139.96
182	☐	SP-08	166.67	733.40	SP-08	139.96	109.58	733.40	139.96	139.96
183	☐	SP-10	166.67	721.00	SP-10	139.96	110.48	721.01	139.96	139.96
184	☐	SP-12	166.67	730.79	SP-12	139.96	111.58	730.79	139.96	139.96

Peak Hour Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count	Water Age (hrs)
211	☐	P183	C2-24	C2-16	86.42	204.00	110.00	-1.56	0.05	0.00	0.03	Open	0	0.00
212	☐	P185	C2-26	C2-24	70.56	204.00	110.00	-0.65	0.02	0.00	0.01	Open	0	0.00
213	☐	P187	C2-26	2-50	41.85	155.00	100.00	-2.28	0.12	0.01	0.24	Open	0	0.00
214	☐	P189	C2-26	C2-22	74.07	204.00	110.00	3.17	0.10	0.01	0.10	Open	0	0.00
215	☐	P193	C2-28	C2-30	73.67	204.00	110.00	1.62	0.05	0.00	0.03	Open	0	0.00
216	☐	P191	C2-28	C2-26	81.99	204.00	110.00	1.30	0.04	0.00	0.02	Open	0	0.00
217	☐	P195	C2-30	3-20	86.86	204.00	110.00	1.56	0.05	0.00	0.03	Open	0	0.00
218	☐	P201	C2-32	2-65	115.75	204.00	110.00	-5.39	0.16	0.03	0.26	Open	0	0.00
219	☐	P199	C2-32	C2-28	91.12	204.00	110.00	4.29	0.13	0.02	0.17	Open	0	0.00
220	☐	P203	C2-34	C2-30	86.30	204.00	110.00	1.14	0.04	0.00	0.01	Open	0	0.00
221	☐	P207	C2-36	3-30	116.29	204.00	110.00	2.70	0.08	0.01	0.07	Open	0	0.00
222	☐	P205	C2-36	C2-34	102.44	204.00	110.00	2.34	0.07	0.01	0.05	Open	0	0.00
223	☐	317	CON-2	2-105	1.00	297.00	120.00	72.85	1.05	0.00	4.35	Open	0	0.00
224	☐	319	CON-3	SP-01	1.00	297.00	120.00	56.83	0.82	0.00	2.75	Open	0	0.00
225	☐	P237	J17	K04	89.96	204.00	110.00	0.50	0.02	0.00	0.00	Open	0	0.00
226	☐	P235	J17	J19	102.68	204.00	110.00	-0.60	0.02	0.00	0.00	Open	0	0.00
227	☐	P233	J21	J17	76.24	204.00	110.00	0.62	0.02	0.00	0.00	Open	0	0.00
228	☐	P229	J23	RR15	35.60	204.00	110.00	-3.74	0.11	0.00	0.13	Open	0	0.00
229	☐	P227	J23	J21	100.65	204.00	110.00	1.34	0.04	0.00	0.02	Open	0	0.00
230	☐	P231	J23	J19	78.77	204.00	110.00	1.50	0.05	0.00	0.02	Open	0	0.00
231	☐	P241	K02	RR25	71.61	204.00	110.00	-2.53	0.08	0.00	0.06	Open	0	0.00
232	☐	P239	K04	K02	70.65	204.00	110.00	-1.92	0.06	0.00	0.04	Open	0	0.00
233	☐	P243	K04	K06	75.26	204.00	110.00	1.81	0.06	0.00	0.03	Open	0	0.00
234	☐	P251	K06	K12	76.27	204.00	110.00	0.60	0.02	0.00	0.00	Open	0	0.00
235	☐	P245	K06	K08	63.97	204.00	110.00	0.83	0.03	0.00	0.01	Open	0	0.00
236	☐	P249	K10	K08	52.50	50.00	100.00	-0.25	0.13	0.05	0.98	Open	0	0.00
237	☐	P247	K10	K08	79.68	50.00	100.00	-0.20	0.10	0.05	0.65	Open	0	0.00
238	☐	P253	K12	K14	64.85	50.00	100.00	0.30	0.15	0.09	1.37	Open	0	0.00
239	☐	P255	K16	RR30	57.94	393.00	120.00	-21.43	0.18	0.01	0.12	Open	0	0.00
240	☐	P259	K18	K20	37.30	50.00	100.00	0.23	0.12	0.03	0.84	Open	0	0.00
241	☐	P257	K18	RR30	61.03	155.00	100.00	-0.61	0.03	0.00	0.02	Open	0	0.00
242	☐	19	RR10	1A-05	138.19	393.00	120.00	-14.92	0.12	0.01	0.06	Open	0	0.00
243	☐	13	RR10	RR15	129.52	393.00	120.00	13.66	0.11	0.01	0.05	Open	0	0.00
244	☐	15	RR15	RR25	167.66	393.00	120.00	0.76	0.01	0.00	0.00	Open	0	0.00
245	☐	17	RR25	K16	199.80	393.00	120.00	-20.90	0.17	0.02	0.11	Open	0	0.00

APPENDIX C

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

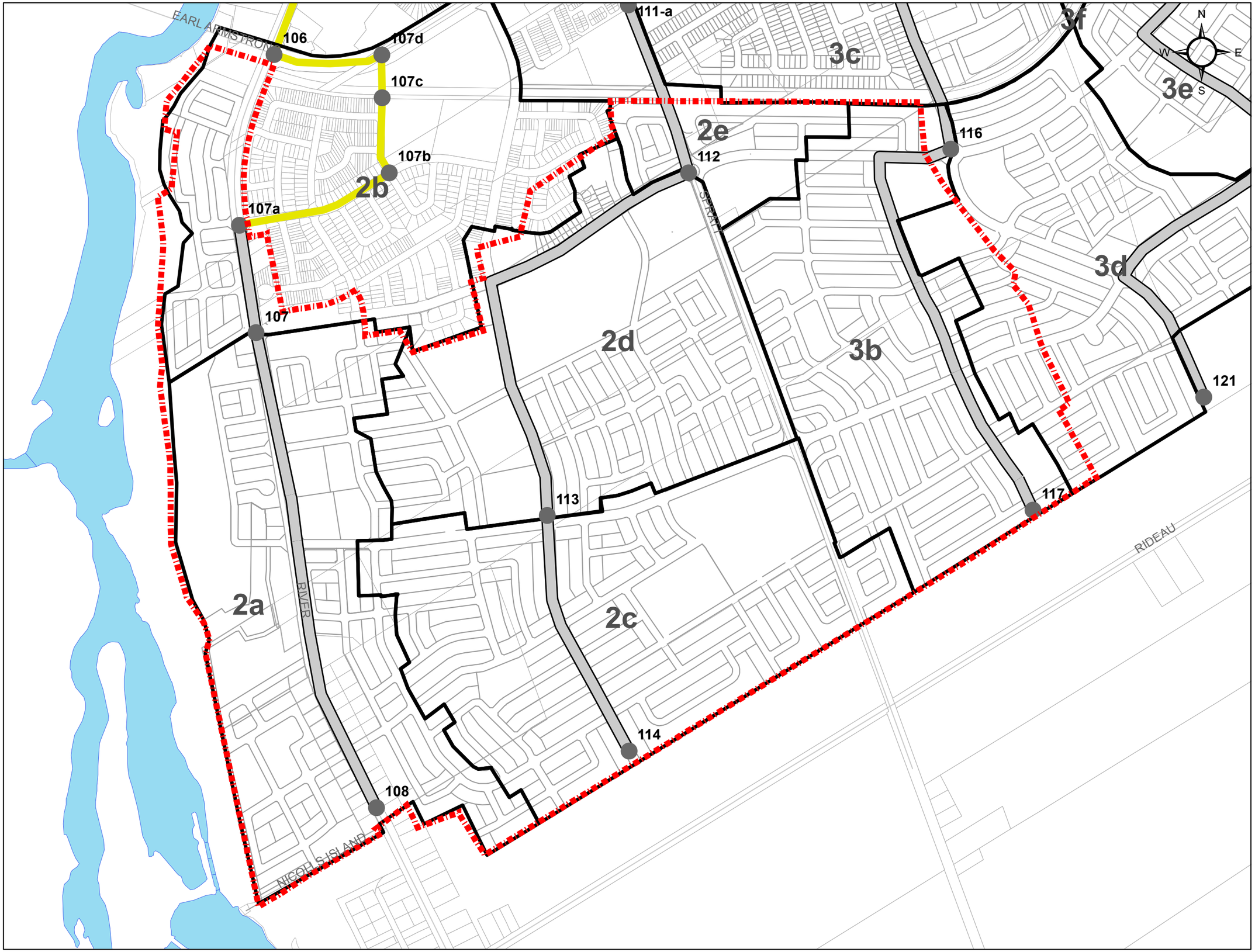
RIVERSIDE SOUTH ISSU UPDATE

OTTAWA, ON

Title:

SANITARY DRAINAGE PLAN

Project No.:	Scale:	
163401101	0 125 250 500 Meters	
Drawing No.:	Sheet:	Revision:
SAN-1	6 of 7	0



Stantec

STANTEC CONSULTING LTD.
400 1331 CLYDE AVENUE
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TEL. 613.722.4420
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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

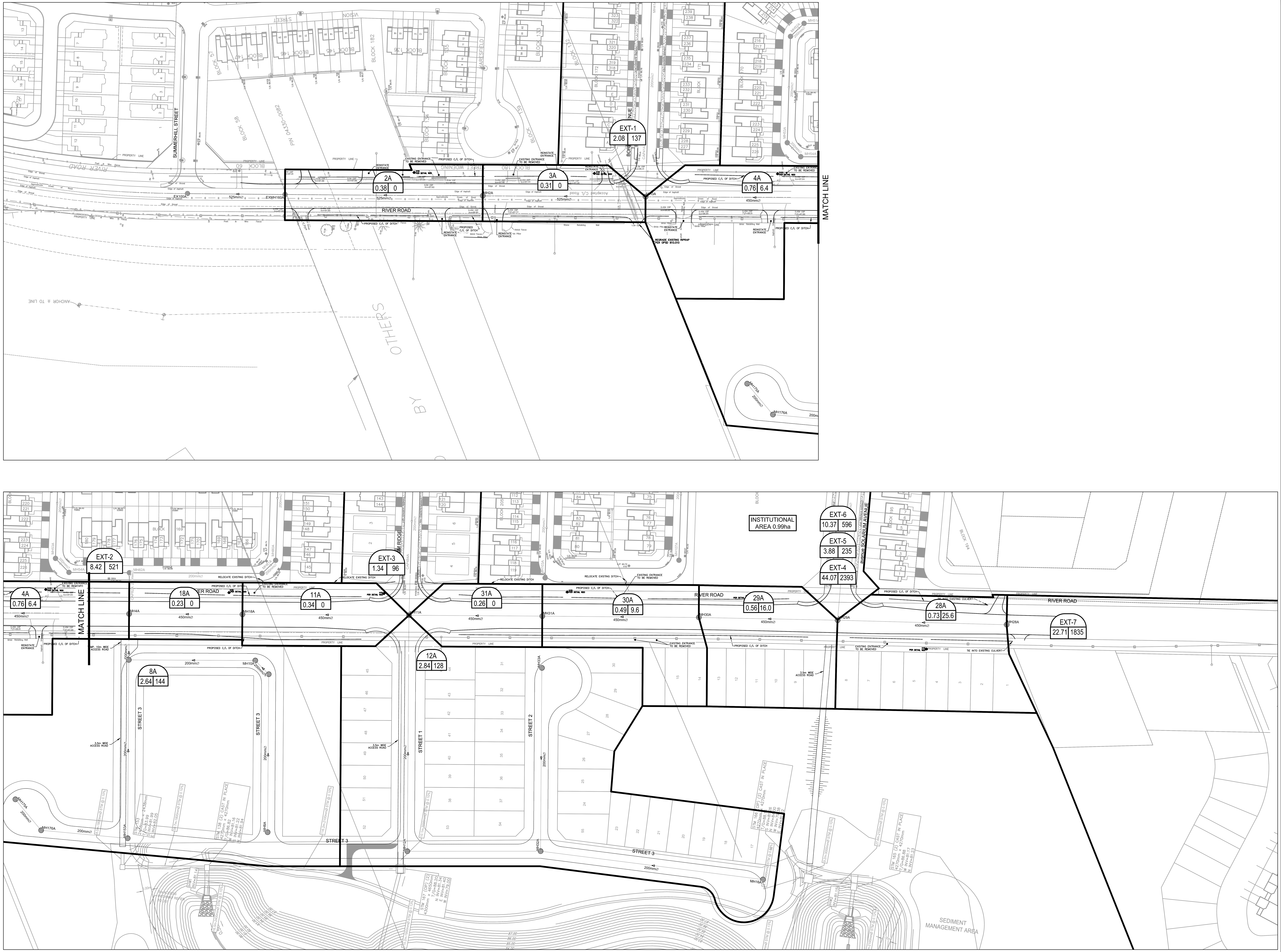
Average Daily Flow / Person:	350	l/p/day	Commercial:	0.579	l/s/ha
Minimum Velocity:	0.60	m/s	Employment	0.579	l/s/ha
n =	0.013		Institutional:	0.579	l/s/ha
Max Peaking Factor:	4.0		Infiltration:	0.280	l/s/ha
Min. Peaking Factor:	2.0				
Peaking Factor Industrial:	Based on Appendix 4-B		Low Density:	@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

D07-

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	
STREET	AREA ID	FROM MH	TO MH		SF	SD	TH	APT		IND	CUM				INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM	(L/s)	IND	CUM							
															IND	CUM	IND	CUM	IND	CUM													
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			
SF	3.2	p/p/u				Peak Factor
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

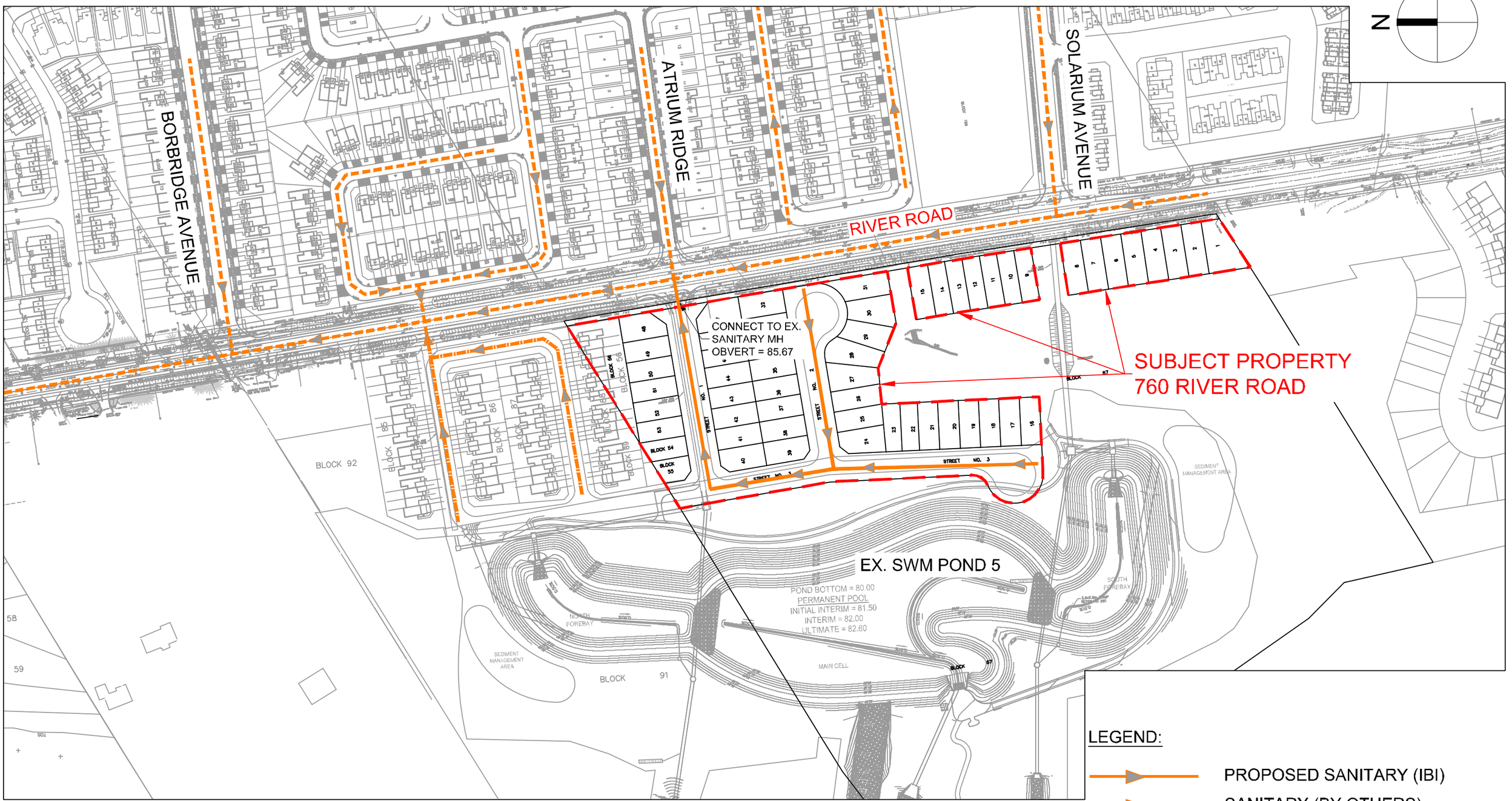
Designed: LME

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



J:\121658_760RiverRd\7.0_Production\7.3_Design\04_Civil_LAND_Assessment Report\121658-fig-3.1-CONCEPTUAL SANITARY PLAN.dwg Last Saved By: ddore Last Saved At: Sep. 12, 19

Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	CONCEPTUAL SANITARY PLAN	FIGURE 3.1

Jim Moffatt

From: Sevigny, John <John.Sevigny@ottawa.ca>
Sent: Thursday, July 20, 2017 10:18 AM
To: Bob Wingate
Cc: Terry Brule; Jim Moffatt
Subject: RE: Riverside South , Rideau River Drainage Area

Hi Bob.
Yes, this is satisfactory.
Regards,

*****Absence alert: Please note that I will be out of the office as of July 31, 2017 and will be returning to the office on August 8, 2017*****

John Sevigny, C.E.T.
Project Manager, Infrastructure Approvals
Development Review, Suburban Services | *Examen des projets d'aménagement, Services suburbains*
Planning, Infrastructure and Economic Development Department | Services de la planification, de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **14388**, fax/téléc:613-580-2576, john.sevigny@ottawa.ca

---

From: Bob Wingate [mailto:rwingate@IBIGroup.com]
Sent: Wednesday, July 19, 2017 10:18 AM
To: Sevigny, John <John.Sevigny@ottawa.ca>
Cc: Terry Brule <tbrule@IBIGroup.com>; Jim Moffatt <jmoffatt@IBIGroup.com>
Subject: Fw: Riverside South , Rideau River Drainage Area

Hi John
We assume this satisfies your requirement for acknowledgment from Cardel regarding concurrence with our proposed Revision to the sanitary drainage limit for the River Road trunk sewer.
Regards
Bob

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Matt Wingate <MWingate@dsel.ca>
Sent: Tuesday, July 18, 2017 10:37 PM
To: John Sevigny
Cc: Bob Wingate; Terry Brule
Subject: Fwd: Riverside South , Rideau River Drainage Area

Hi John,
Please find Lisa Dalla Rosa's agreement below to IBI's proposed sanitary drainage plan described below.
Please feel free to call if you have any questions or need further input from our end.
Thanks

Matt Wingate, P.Eng.
DSEL
david schaeffer engineering ltd.

Begin forwarded message:

From: Lisa Dalla Rosa <lisa.dallarosa@cardelhomes.com>
Date: July 18, 2017 at 12:36:59 PM EDT
To: Matt Wingate <MWingate@dsel.ca>
Subject: RE: Riverside South , Rideau River Drainage Area

Agreed.
LDR

From: Matt Wingate [mailto:MWingate@dsel.ca]
Sent: Thursday, July 13, 2017 11:43 AM
To: Lisa Dalla Rosa <lisa.dallarosa@cardelhomes.com>
Cc: Laura Maxwell <LMaxwell@dsel.ca>; 'Bob Wingate P.Eng. (rwingate@ibigroup.com)' <rwingate@ibigroup.com>
Subject: RE: Riverside South , Rideau River Drainage Area

Hi Lisa,

IBI has requested that acceptance of their sanitary proposal come directly from Cardel. Can you respond to this email with your agreement?

Thanks

Matt

From: Matt Wingate
Sent: July 12, 2017 1:38 PM
To: 'Lisa Dalla Rosa (lisa.dallarosa@cardelhomes.com)' <lisa.dallarosa@cardelhomes.com>
Cc: Laura Maxwell <LMaxwell@dsel.ca>
Subject: FW: Riverside South , Rideau River Drainage Area

Hi Lisa,
Please see below related to the Urbandale/Claridge/Cardel coordinated sanitary servicing plan for Riverside south, as discussed two weeks ago.
Let me know if you have any questions.
We will forward the final draft of our functional servicing report to you shortly for your review.

Matt

From: Matt Wingate
Sent: July 12, 2017 1:35 PM
To: 'Bob Wingate' <rwingate@IBIGroup.com>
Cc: Steve Pichette <SPichette@dsel.ca>; Terry Brule <tbrule@IBIGroup.com>; Sevigny, John <John.Sevigny@ottawa.ca>
Subject: RE: Riverside South , Rideau River Drainage Area

Ref Fig S-1

Hi Bob;
Thanks for including us in this circulation.
I can confirm that we are in agreement with your proposal to include Cardel's developable property area west of the Brian Good collector road within the River Road trunk sanitary sewer catchment, as illustrated in your Figure S-1.

We are currently finalizing our functional servicing report to be submitted in support of Cardel's application for plan of subdivision approval, and we will present a preferred alternative wastewater servicing plan for Cardel's subdvision that will match the drainage boundaries presented in IBI's proposal.
If there are any further questions or you require additional info related to our proposed servicing plan, please do not hesitate to call.

regards

Matt Wingate, P.Eng.
Manager of Design Administration

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext 522
direct: (613) 836-1522
cell: (613) 858-4975
e-mail: mwingate@DSEL.ca

From: Bob Wingate [mailto:rwingate@IBIGroup.com]
Sent: July 12, 2017 11:46 AM
To: Matt Wingate <MWingate@dsel.ca>
Cc: Steve Pichette <SPichette@dsel.ca>; Terry Brule <tbrule@IBIGroup.com>; Sevigny, John <John.Sevigny@ottawa.ca>
Subject: FW: Riverside South , Rideau River Drainage Area

Hi Matt
We have submitted our sanitary analysis for Riverside South to the City of Ottawa(John Sevigny) for their review and approval , as per our previous discussion. This morning John called to advise that he has circulated this request to expand the tributary area to the River Road trunk sanitary sewer and use the revised sanitary design parameters currently being considered by the City internally at the City . To support this submission he would appreciate it if we could get confirmation from Cardel / DSEL that you have seen this proposal and that you are in general agreement with the proposed drainage expansion through Cardel's lands as an initial servicing scenario. The e-mail below and supporting attachments included is a complete copy of the submission to reconfirm it is consistent with our discussions .
If you would provide us with the confirmation John is requesting that would be appreciated so we can ensure that this request maintains momentum at the City .

Bob Wingate

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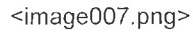
400-333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 fax +1 613 225 9868



From: Bob Wingate
Sent: Thursday, June 29, 2017 2:20 PM
To: Sevigny, John <John.Sevigny@ottawa.ca>
Cc: Terry Brule (tbrule@ibigroup.com) <tbrule@ibigroup.com>; Marcel Denomme (mdenomme@urbandale.com) <mdenomme@urbandale.com>; Jim Burghout (jim.burghout@claridgehomes.com) <jim.burghout@claridgehomes.com>; Matt Wingate <mwingate@dsel.ca>
Subject: Riverside South , Rideau River Drainage Area

Get Plan + Spreadsheet

Hi John
Further to our previous discussions , attached is a figure which illustrates a proposed expansion of the River Road trunk sanitary sewer tributary area , easterly from the existing developed area to the north to the south limit of the urban boundary . This figure shows the drainage divide between the River Road sanitary collector sewer and the Spratt Road collector as currently proposed in the recently updated MSS , overlaid on the latest draft plans as proposed by the three major developers in the area (RSDC , Claridge , and Cardel) . also shown on this figure is a proposed expansion of the River Road collector drainage area easterly based on the use of monitored parameters from the current City design guidelines , as suggested by John Bougadis , and the use of revised design parameters currently being considered by the City for the undeveloped portion of the proposed tributary area to the River Road trunk sewer . To support the proposed expanded drainage area to the River Road trunk sewer we have recreated the sanitary spread sheet from the MSS and attached a copy of the unaltered version of this spread sheet for your use in confirming that the analysis prepared by IBI is based on exactly the same assumptions regarding land use , density , etc. as the final MSS document . The second spread sheet attached has only the design parameters for the areas tributary to the River Road trunk sewer adjusted to reflect the use of monitored parameters for the built out areas , and revised design parameters for the undeveloped areas tributary to the River Road trunk sewer . This last spread sheet demonstrates that the proposed expanded drainage area can be accommodated in the existing River Road collector sewer without surcharging the system . Given that this expanded drainage area significantly reduces the potential for grade raise issues , maximizes the use of parallel sewers in the local road network , and improves phasing potential for all three major developers involved , we request that the City confirm acceptance of this proposal as a minor adjustment to the MSS , so that all three developers can finalize their individual serviceability reports based on this revision to the drainage areas.
It should be noted that IBI represents both Claridge and RSDC for this development area and that we have met with DSEL who represents Cardel , the other major developer in the area , and all three developers are in agreement with the proposed new drainage limit , and support the implementation of this change .
If you have any questions regarding this submission please do not hesitate to contact me directly .

Regards

Bob Wingate

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400-333 Preston Street
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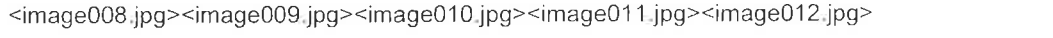
tel +1 613 225 1311 fax +1 613 225 9868



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tel 613 225 1311 fax 613 225 9868
ibigroup.com

Memorandum

To/Attention:	John Sevigny, City of Ottawa Marcel Denomme, Urbandale (RSDC) Jim Burghout, Claridge Homes	**Date:**	July 25, 2017
From:	Robert W. Wingate	**Project No:**	38269-5.3.1
cc:			
Subject:	**DEVIATION REPORT MEMORANDUM RIVERSIDE SOUTH, RIDEAU RIVER DRAINAGE AREA SANITARY SEWER DESIGN PARAMETERS**		

INTRODUCTION:

Urbandale Corporation (RSDC), Claridge Homes and Cardel Homes are in the process of advancing the development of their lands in Riverside South located in the area known as the Rideau River Drainage Area (Figure A-1 illustrates the ownership limits).

As part of the draft plan approval process, IBI Group has been retained to prepare "Adequacy of Services Reports" to support the proposed development of the RSDC lands and the Claridge lands. In reviewing the Final Master Servicing Study (MSS) IBI Group has determined that an alternative method of calculating the design flow for the trunk sanitary sewer in River Road will be beneficial to the design of the internal sanitary sewer system for the subject area, and will ultimately benefit development of the overall development area.

PURPOSE:

The purpose of this memorandum is to present the alternative method of design for the River Road Sanitary Collector Sewer, identify the benefits of implementing the proposed deviation, and request approval to proceed with the implementation of the proposed deviation in design procedure.

JUSTIFICATION:

In advancing the detailed local sanitary sewer system layout for the development lands in the Rideau River Drainage Area west of Spratt Road, it became apparent that the drainage divide between the River Road Sanitary Collector Sewer and the Spratt Road Collector Sewer was problematic as presented in the recent update to the MSS for this area. The combination of the Spratt Road Collector Sewer being significantly higher than the River Road Collector, and the fact that the existing ground surface drops off significantly between the Spratt Road Collector and the current drainage divide is problematic as proposed in the updated MSS. It is problematic because these facts combine to produce a high risk of grade raise issues along the corridor between the Spratt Road sewer and the drainage divide. This grade raise risk is further compounded by the fact that the MSS drainage proposal results in reverse flowing sewers between the sanitary sewer and storm sewer on most streets in that area.

John Sevigny, City of Ottawa
Marcel Denomme, Urbandale (RSDC)
Jim Burghout, Claridge Homes
July 25, 2017

The simple solution to resolve all these issues is to expand the drainage limit of the deeper River Road Collector sewer easterly. Figure A-2 illustrates the proposed expansion of the River Road Collector Sewer Drainage Area. This adjustment to the drainage area reduces the potential for grade raise issues, maximizes the use of parallel sewers in the local road network, and improves the phasing potential for all three developers.

The problem with implementing the proposed expansion of the River Road Collector Sewer drainage area is that the free flow design capacity of the existing River Road Collector Sewer is exceeded using the City of Ottawa's current design guideline design parameter for sanitary sewers. To alleviate this theoretical issue we have evaluated the River Road Sanitary Collector Sewer using monitored parameters for the existing development area tributary to the River Road Collector Sewer, and the City's proposed revised sanitary sewer design parameters, as presented in Table 1, for the remainder of the development area tributary to the River Road Collector Sewer. The attached spreadsheet was created to replicate the sanitary spreadsheet in the current MSS. The City's proposed revised design parameters were then applied to the un-built area tributary to the River Road Collector Sewer using the proposed expanded drainage area (see pink highlighted section of spreadsheet). The modified spreadsheet demonstrates that the River Road Collector Sewer's capacity under free flow conditions is not exceeded at build-out under this design scenario.

CONCLUSION:

Given the significance of the benefits to expanding the River Road Sanitary Collector Sewers drainage area easterly, including reducing the risk of grade raise issues, maximizing the use of parallel sanitary and storm sewers, and enhancing construction phasing potential for all three developers involved, it is recommended that the City approve the use of the revised sanitary sewer design parameters for use in the Riverside South Rideau River Drainage Area in advance of formal approval of these revised parameters. In considering this recommendation, it should also be noted that shifting the drainage areas as proposed will provide additional residual capacity in the more easterly Spratt Road Sanitary Collector Sewer. This will help support more intensification beyond that currently proposed in the existing CDP for the eastern portion of the development area. This is consistent with the City's Building Better Smarter Suburbs (BBSS) initiative and the recent decision to extend the next phase of the LRT to Riverside South. Given these recent facts the City may want to approve the use of the proposed revised sanitary sewer design parameters for all of Riverside South at this time, to maximize the implementation of the BBSS initiative and further support the imminent extension of the LRT to Riverside South by facilitating additional intensification of development.

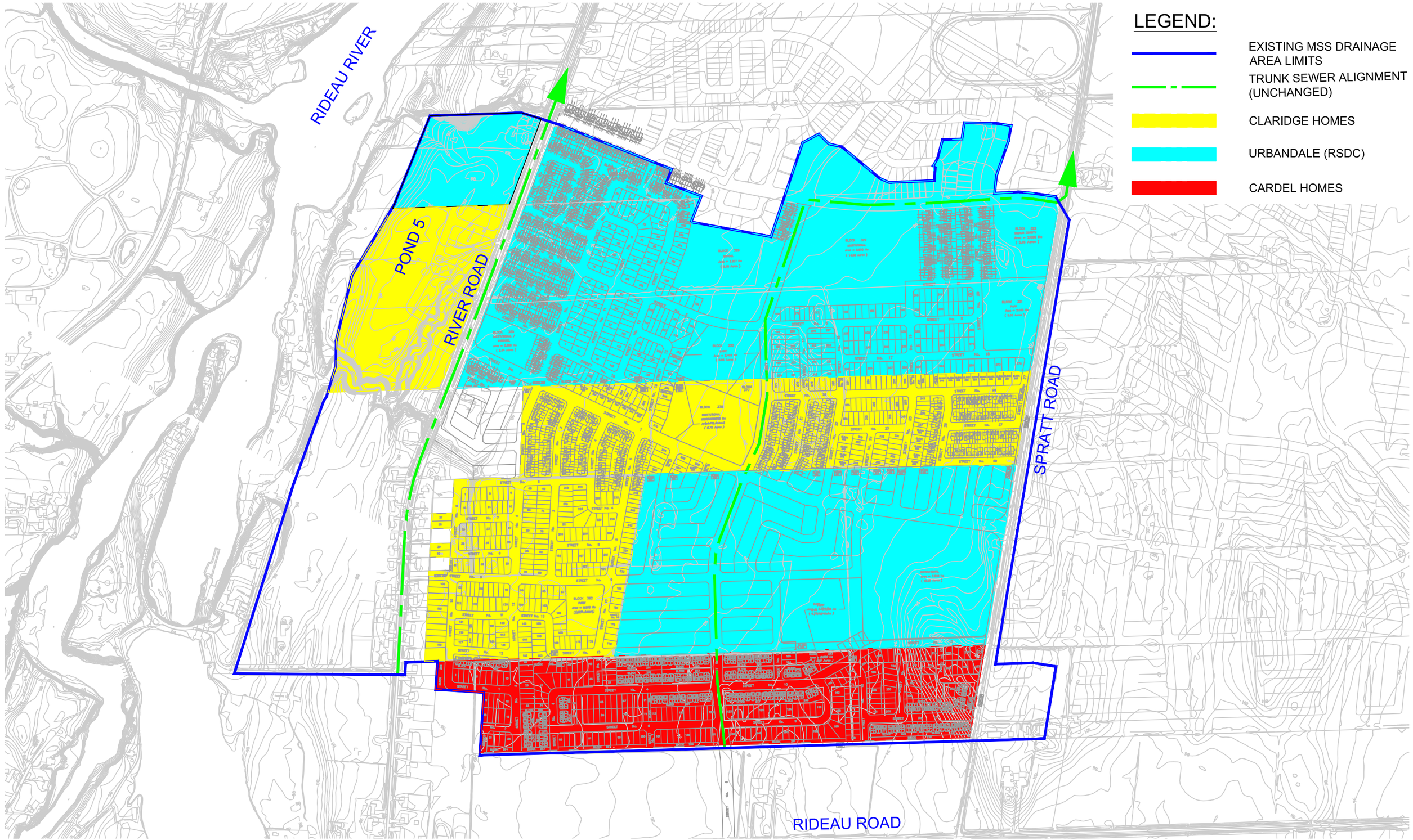
Yours truly,

IBI GROUP

Robert W. Wingate, P. Eng.
Associate

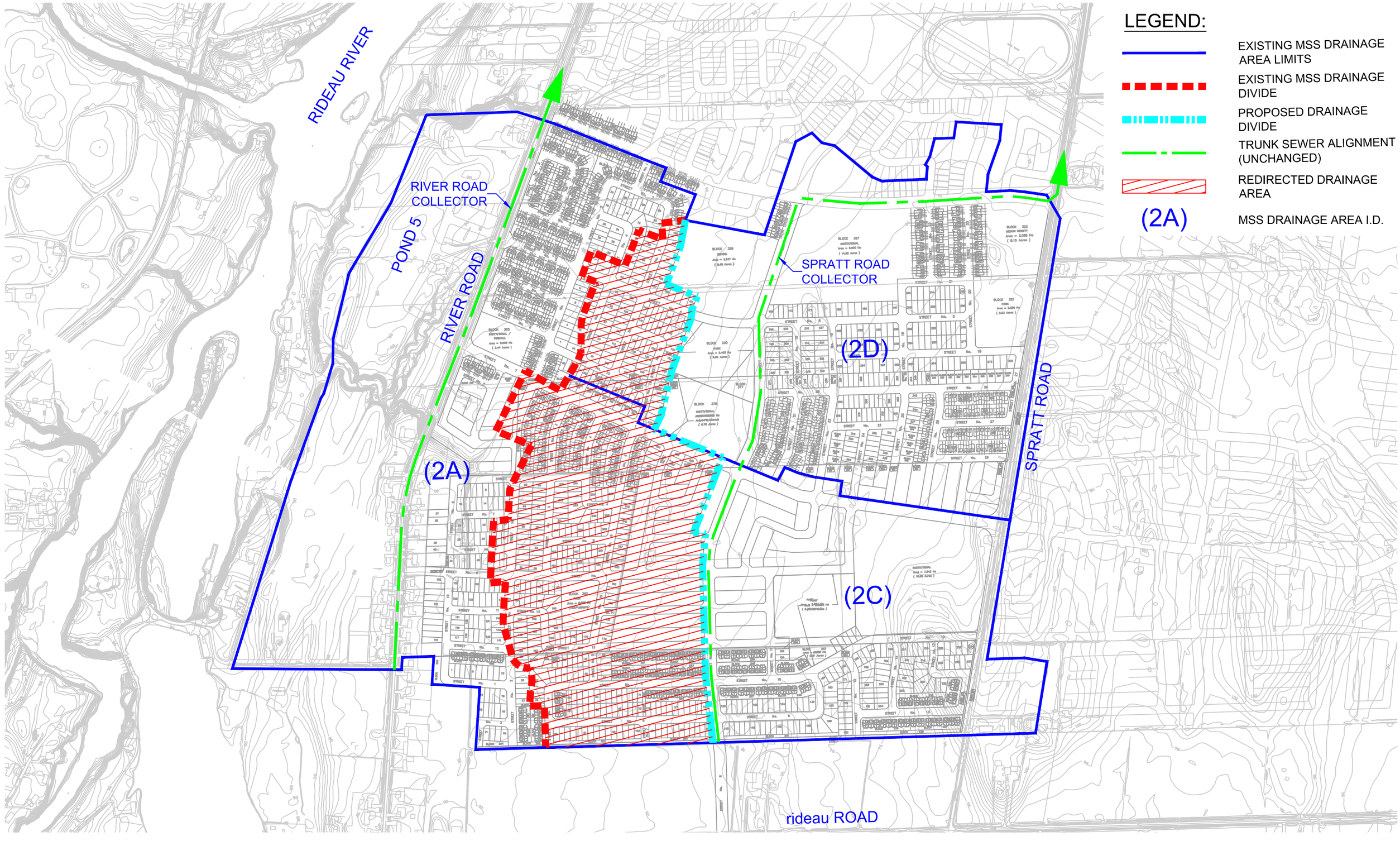
RWW/ks
Encl.

J:\38269-RiversideSthPh15\5.3 Approvals\5.3.1 Municipal\CTB_sevigny_2017-07-24.docx\2017-07-25\KS



J:\38269-RiversideSthPh15\5.9 Drawings\59civil\current\Deviation Report figures\FIGURE A-1.dwg Layout Name: FIGURE A-1 Plot Scale: 1:5.13 Plotted At: 7/25/2017 Last Saved By: chris.cormier Last Saved At:

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	RIVERSIDE SOUTH RIDEAU RIVER POND 5 DRAINAGE AREA	OWNERSHIP	FIGURE A-1



J:\38269-RiversideSthPh15\5.9 Drawings\59civil\current\Deviation Report figures\FIGURE A-2.dwg Layout Name: FIGURE S-1 Plot Scale: 1:5.13 Plotted At: 7/25/2017 Last Saved By: chris.cormier Last Saved At:

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	RIVERSIDE SOUTH RIDEAU RIVER POND 5 DRAINAGE AREA	ALTERNATIVE SANITARY DRAINAGE LIMIT	FIGURE A-2

APPENDIX D

![Stantec]

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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

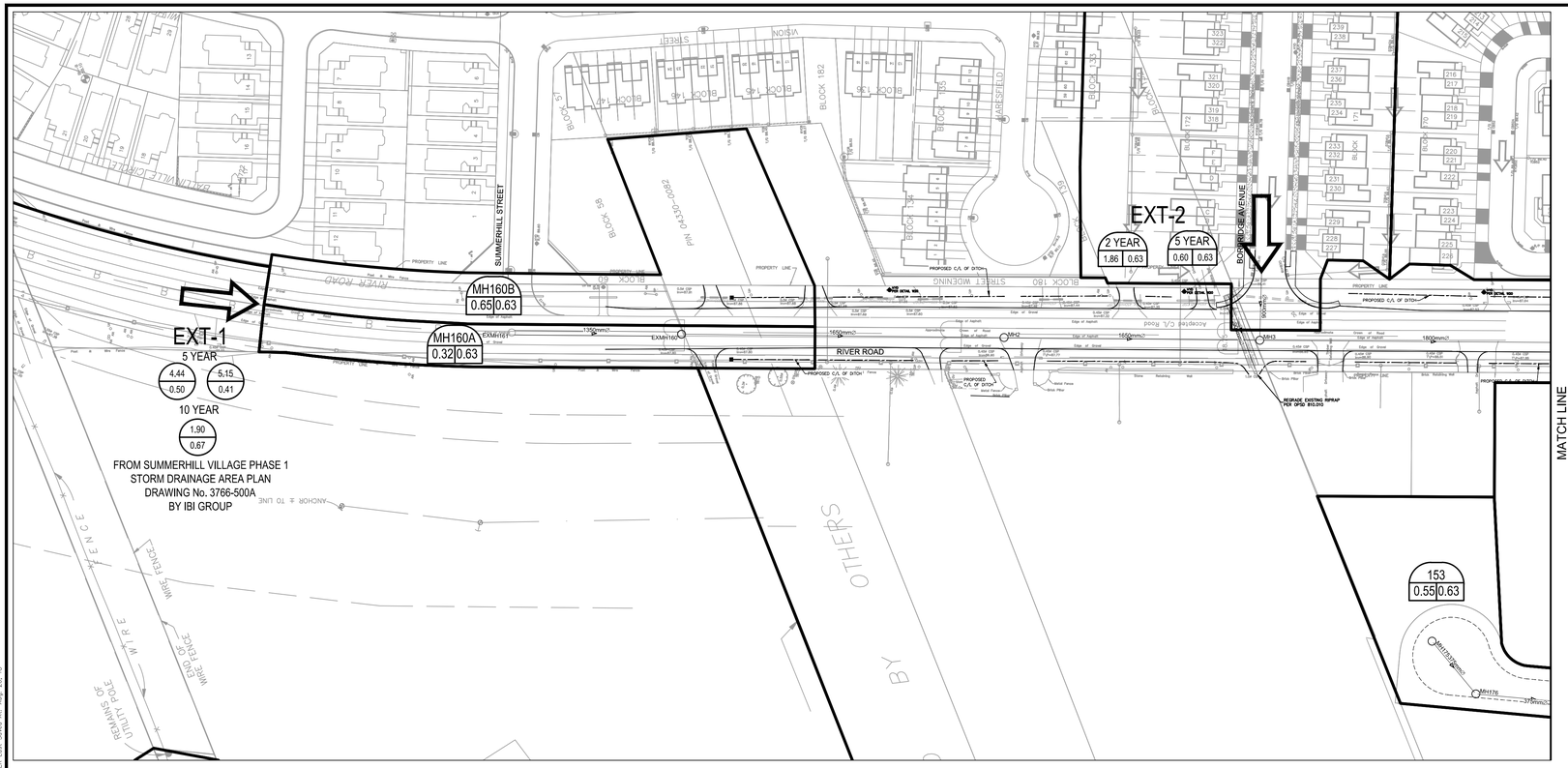
OTTAWA, ON

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
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Project Title

RIVER ROAD RECONSTRUCTION

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

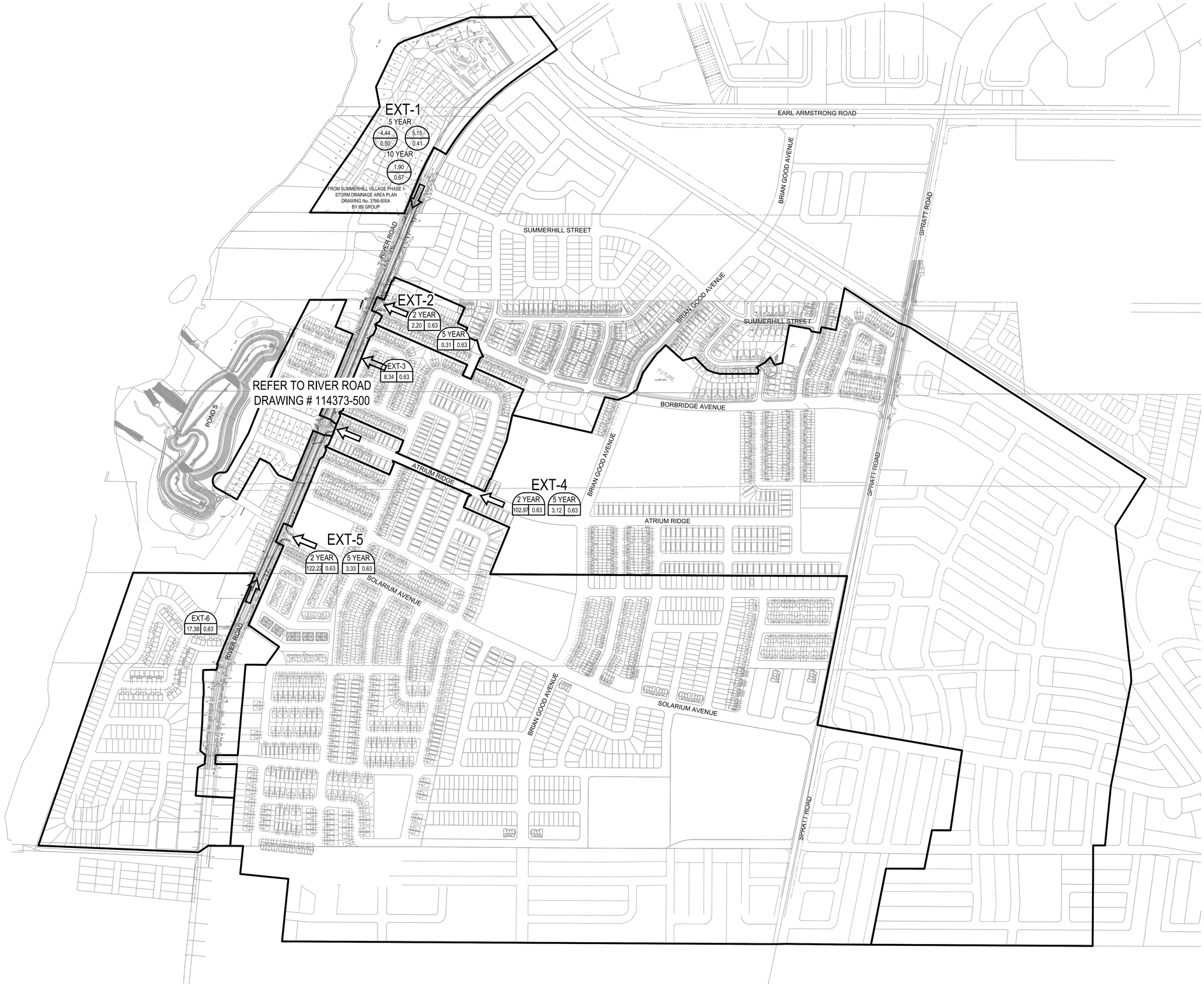
N

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

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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

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Ottawa, Ontario K1S 5N4 Canada
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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

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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

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

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

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

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

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

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

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	-	-				

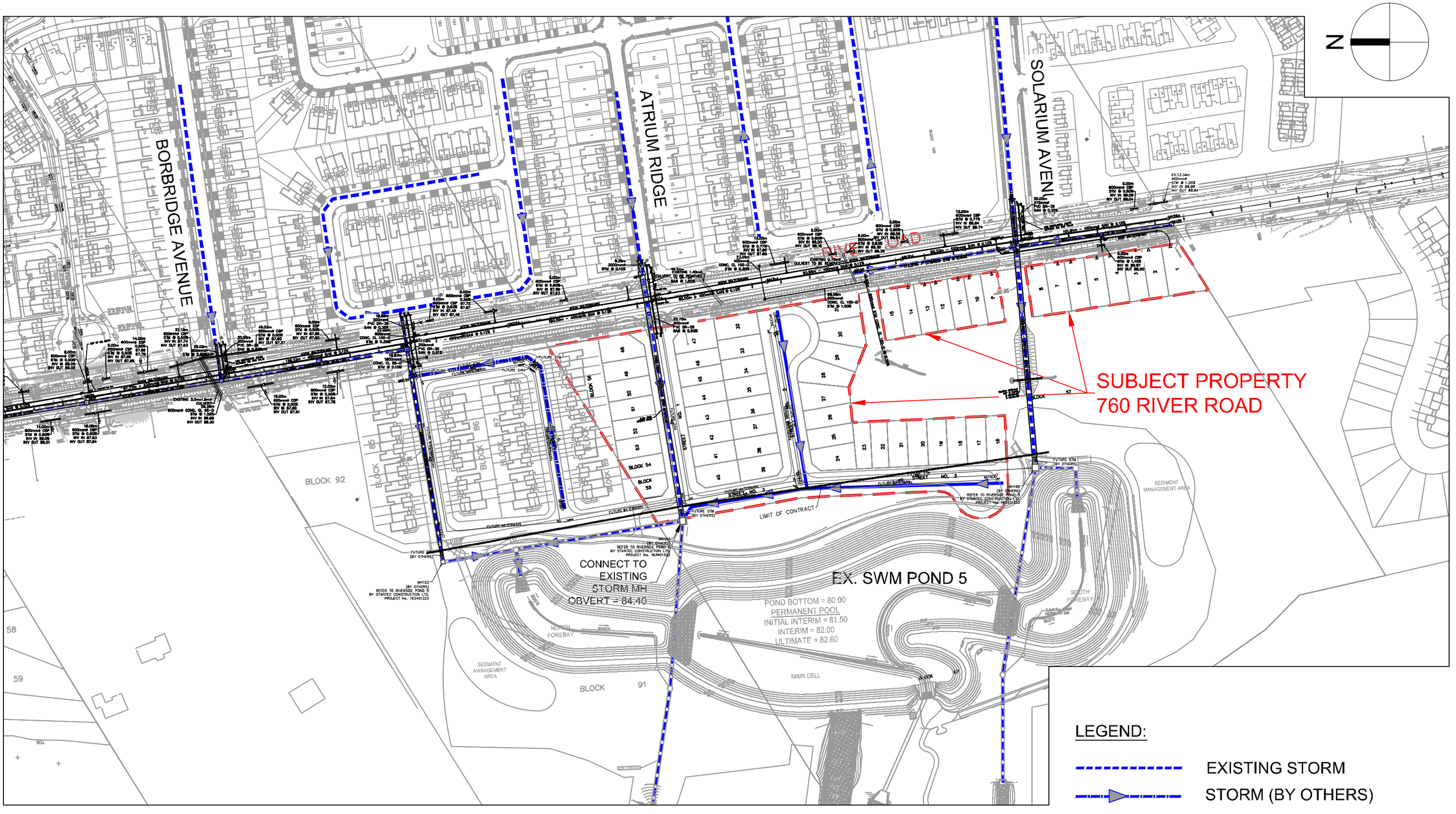
Table F-2: Storm Water Sewers - South

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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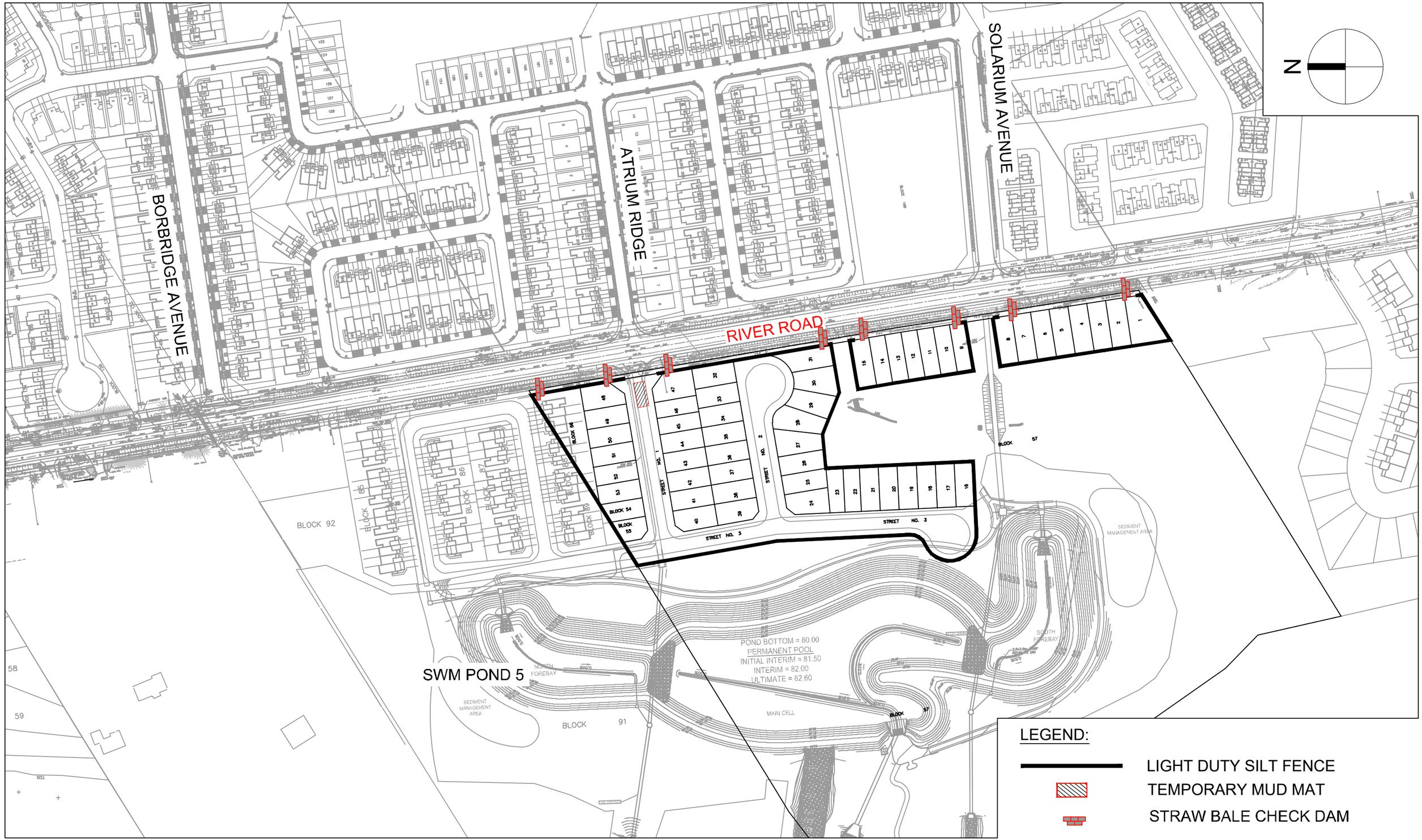
Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	CONCEPTUAL STORM PLAN	FIGURE 4.1

APPENDIX E



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Scale	Project Title	Drawing Title	Sheet No.
NTS	760 RIVER ROAD	EROSION & SEDIMENTATION CONTROL PLAN	FIGURE 6.1