



**MINTO / CANDEREL**

**CONCEPTUAL SITE SERVICING STUDY  
STORMWATER SITE MANAGEMENT PLAN  
EROSION AND SEDIMENTATION CONTROL PLAN  
485 RICHMOND ROAD, OTTAWA**

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**Project: 32385-5.2.2**

**JULY 2012**

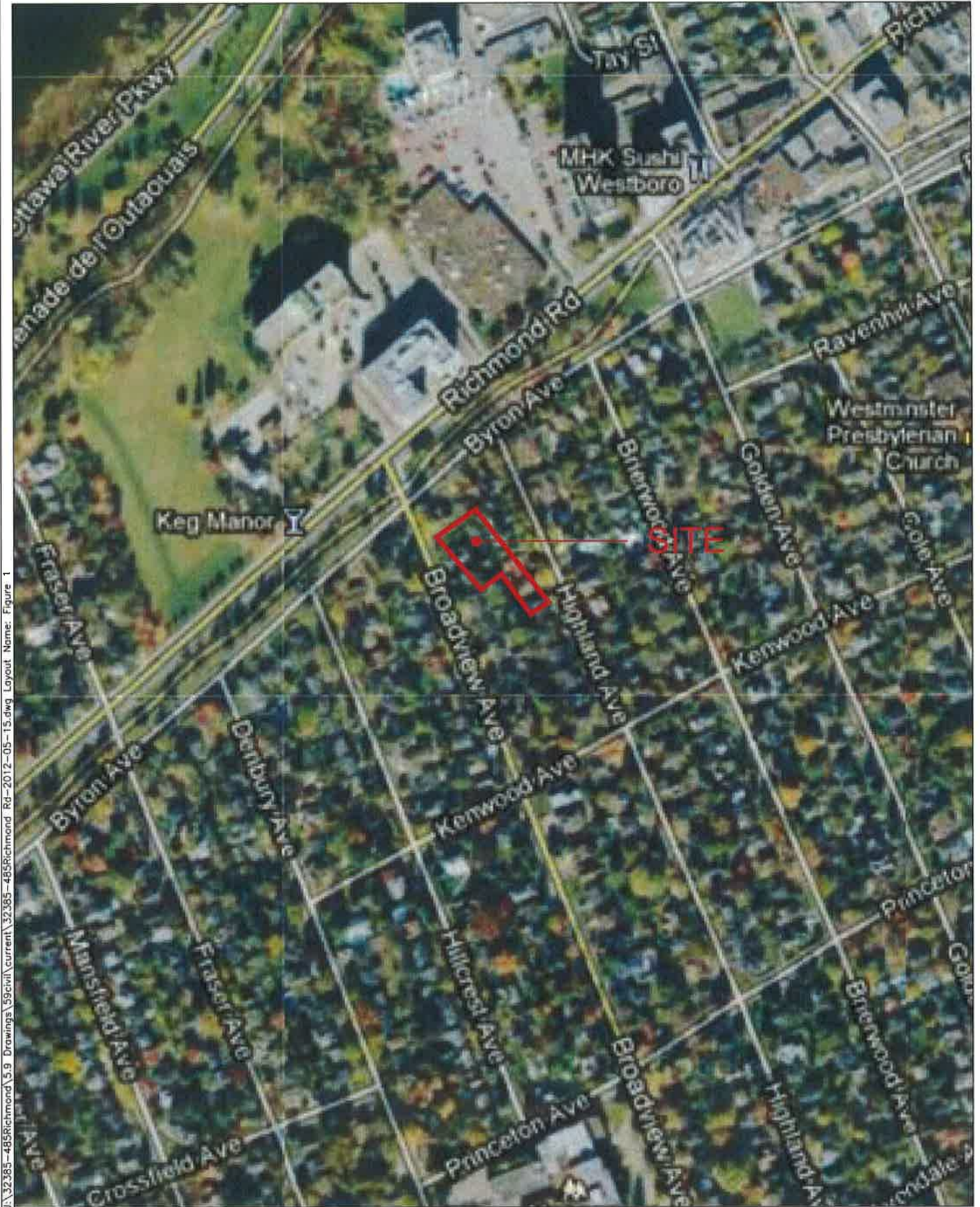


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485 RICHMOND ROAD

LOCATION PLAN

FIGURE 1

## 1. INTRODUCTION

### 1.1 Development Servicing Study Checklist

The servicing Study Guideline Checklist is included in **Appendix A** for reference. The list identifies where elements in this report can be found. Some elements are not applicable and are identified accordingly. Otherwise, the checklist items are address in this report.

### 1.2 Purpose

The purpose of this report is to outline the required municipal services, including water supply, stormwater management and wastewater disposal, needed to support the redevelopment of the subject property. The total property is approximately 0.34 hectares in area and is located at 485 Richmond Road. See **Figure 1** for the site location

As requested by the City of Ottawa, this Conceptual Site Servicing Study, which also includes the Stormwater Site Management Plan, Watermain Analysis and Erosion and Sedimentation Control Plans, is being completed as a requirement of the Site Plan Application. The Conceptual Site Servicing Study is one of the documents required to support a site plan application and this document will fulfil that requirement.

### 1.3 Subject Site

Minto Communities Inc., in conjunction with Canderel, propose to develop the remaining parcel of a mixed use development located at 485-495 Richmond Road as a high-rise apartment building. The mixed use development includes the Amica at Westboro Park senior's residence at 491 Richmond Road, and the Denis Coolican office building located at 495 Richmond Road. **Figure 2** shows the site plan. The address of the remaining parcel to be developed is 485 Richmond Road. The site survey and legal plan is included in **Appendix B**.

In the City of Ottawa Official Plan, the entire property is designated General Urban Area. The entire property is also located on a portion of Richmond Road that is designated Traditional Mainstreet in the Official Plan. The entire property is regulated by the City of Ottawa Zoning By-Law 2008-250, and is currently zoned TM [157] F(2.3) S149 – Traditional Mainstreet, Exception 157, Floor Space index 2.3, Schedule 149. The parcel to be developed comprises Area D on Schedule 149, with a maximum height limit of 77 meters.

The parcel to be developed is currently used as overflow parking for the neighbouring office building located at 495 Richmond Road. The proposed development comprises a 24-storey tower that includes 194 residential units, associated amenity space, three levels of above-grade podium parking, and one level of underground parking. Parking for 150 vehicles would be provided. Access to the parcel from Richmond Road would be from the existing driveways on the east and west sides of the Amica Building.

## 1.4 Pre-Consultation

In July 2012, The City of Ottawa was advised that IBI Group was retained to provide civil engineering services for the proposed development. **Appendix C** includes reposed e-mails providing some design criteria for sewer outlets and water supply analysis.

## 1.5 Geotechnical Investigation

A geotechnical investigative report entitled 'Geotechnical Investigation Proposed Residential Building, 485 Richmond Road, Ottawa, Ontario' by Houle Chevrier Engineering Ltd., dated July 2012, was prepared for the subject site.

The objectives of the investigation report include:

- Determination of the subsoil and groundwater conditions;
- Provision of geotechnical recommendations pertaining to the design and development of the subject site including construction considerations.

Among other items, the reports will comment on the following:

- Site grading;
- Foundation design;
- Pavement Structure;
- Infrastructure construction
- Groundwater control;
- Contamination/corrosive environment.

The report noted that the concentration of sulphate in the overburden can be classified as low and moderate in the bedrock. Accordingly, any concrete that will be in contact with the native soil, bedrock or groundwater should be batched with moderate sulphate-resistant hydraulic cement (MS).

## 2. WATER SUPPLY

### 2.1 Existing Conditions

A 305 mm diameter watermain runs along the south side of Richmond road across the frontage of the subject site. Previously, a 203 mm diameter watermain was extended north from Richmond Road to service the existing 7-storey Denis Coolican office building at 495 Richmond Road located west of the subject site. Subsequently, the Amica Seniors Residence was constructed immediately south of the subject site at 491 Richmond Road. During its construction, the existing 203 mm diameter water service to the office building was relocated slightly to the west as part of the site works. Additionally, a dedicated 152 mm diameter water service for the senior’s residence was also extended from the 305 mm diameter main on Richmond Road.

The preferred location for connection to the existing municipal water supply is via the existing 203 mm diameter main that currently serves the adjacent office building. This eliminates the requirement to disturb Richmond Road with excavation and connection to an existing main on the opposite side of the roadway.

### 2.2 Design Criteria

In an e-mail provided by City of Ottawa staff, and included in **Appendix C**, a boundary condition for the existing 305 mm diameter main on Richmond Road has been provided. The exact location of the boundary condition is also included in an attached sketch, also in **Appendix C**. The following is a summary of the boundary conditions:

- Minimum HGI = 106.7 m
- Maximum HGL = 114.1 m
- Max Day Fire Flow HGL = 106.2m

The above noted fire flow boundary condition is based on an available fire flow demand of 170 l/s, which is appropriate for the proposed type of high-density residential development, as discussed in the Fire Underwriters Survey (F.U.S.) 1999, and discussed in detail in Section 2.2.1.

In accordance with both MOE and City of Ottawa requirements, the watermain system for the subject site has been designed with following objectives in mind:

- (i) Minimum pressure of 276 kPa under maximum hourly demand conditions.
- (ii) Minimum pressure of 140 kPa during periods of maximum day and fire flow demands.
- (iii) Maximum pressure of 552 kPa at all points within the system.

The predicted water demands for the subject site are determined using the following City of Ottawa criteria:

- (iv) Average Day 350 L/c/d
- (v) Maximum Day Demand 875 L/c/d
- (vi) Peak Hour Demand 1,925 L/c/d

Based on a population of 334 (191 units x 1.8 p/p/u) within the proposed residential development, the following demands are expected:

(vii)	Average Day Demand	1.39 L/s
(viii)	Maximum day Demand	3.48 L/s
(ix)	Peak Hour Demand	7.66 L/s

If any existing water services are encountered during construction, the City will be notified and a decision regarding decommissioning of any existing laterals can be discussed.

### 2.2.1 FIRE FLOW CALCULATION

The necessary fire flow, as determined by the F.U.S 1999, for the proposed 24 storey residential building can be determined as follows:

- $F = 220C \sqrt{A}$   
 Where,  
 F = Fire flow rate in L/min  
 C = coefficient related to type of construction (C = 0.8 for non-combustible construction)  
 A = Floor area of largest unit in the building

Therefore, for the proposed building, the required fire flow becomes:  
 $F = 220 (0.8) (2015)^{0.5} = 7,900 \text{ L/min}$ , assume 8,000 L/min

- Apply a reduction of 25% for a low hazard occupancy type;  
 Therefore,  $8,000 \times 0.25 = -2,000 \text{ L/min}$
- Apply a reduction of 30% for the building being sprinklered  
 Therefore,  $8,000 \times 0.30 = -2,400 \text{ L/min}$
- Apply a 20% increase due to the west face of the building being exposed to adjacent structure within 3.1 m to 10 m;  
 Therefore,  $8,000 \times 0.20 = +1,600 \text{ L/min}$

Apply a 10% increase due to the south face of the building being exposed to adjacent structures within 20.1 m to 30 m;  
 Therefore,  $8,000 \times 0.10 = +800 \text{ L/min}$

Apply a 20% increase due to the east face of the building being exposed to adjacent structures within 3.1 m to 10 m;  
 Therefore,  $8,000 \times 0.20 = +1,600 \text{ L/min}$

Thus, the total increase for exposure to adjacent structures is  $1,600 \text{ L/min} + 800 \text{ L/min} + 1,600 \text{ L/min} = 4,000 \text{ L/min}$

- The fire flow requirement can then be calculated as:  
 $8,000 \text{ L/min} - 2,000 \text{ L/min} - 2,400 \text{ L/min} + 4,000 \text{ L/min} = 7,600 \text{ L/min} (127 \text{ L/s})$

## 2.3 Hydraulic Analysis

The water distribution system for the proposed development was modeled us H<sub>2</sub>O MAP software and existing boundary conditions. Repeated iterations were run in order to determine adequacy of the proposed system based on the pressure criteria noted in Section 2.2.



The following results were obtained;

- Minimum pressure during max hour conditions = 427.42 kPa
- Maximum pressure during average day conditions = 499.98 Kpa
- Fire flow of 204.93 L/s during max day and fire flow conditions (minimum pressure of 140 kPa maintained)

A complete list of the results from the model during different demand conditions is included in **Appendix C**. The results indicate that the proposed 203 mm diameter extension from the existing infrastructure will provide the new building with a reliable water supply.

Because of the height of the proposed building, an internal booster pump will be required to maintain pressure at higher levels of the 24-storey building.

## 2.4 Proposed Water Plan

In order to supply the proposed development with a reliable water supply, it is recommended that the existing 203 mm diameter watermain be extended eastward from the adjacent office building property at 495 Richmond Road. A hydrant is proposed just south of the building and will provide adequate flow for fire protection. The 203 mm diameter pipe will also be extended to service the proposed building.

Details of the proposed water plan are shown on drawing 32385-C-01, a copy of which is included in **Appendix F**.

### 3. WASTEWATER DISPOSAL

#### 3.1 Existing Conditions

The site is currently improved with an asphalt parking lot and related access road. The parking lot will be removed to accommodate the new building. There is an existing 150 mm diameter sanitary sewer located along the west side of the site. The sewer is currently not in use but was originally designed for a building which was removed in 2006 as part of the redevelopment of the adjacent site including the Amica building. The Amica building is serviced from a sanitary sewer located to the west of that building. The unused sanitary sewer connects to an existing 150 mm diameter sanitary sewer immediately north of the Denis Coolican building which in turn connects to the 1500 mm diameter West Nepean Collector sewer. The existing 150 mm diameter sanitary sewer, which was constructed at a slope of 3.5%, has a capacity of 28.8 l/s.

#### 3.2 Sewer Capacity Analysis

The City of Ottawa’s Servicing Study Guideline Checklist recommends that the proponent confirm that there is available capacity in receiving sewers. IBI has determined there is a total capacity of 28 l/s in the 150 mm diameter sanitary sewer

The current proposal is to replace the existing parking lot with a 24 storey residential high rise with both above ground and underground parking. IBI estimates that the peaked wastewater flow from the proposed development will be 5.7 l/s. This is based on the following criteria:

Total # of units	191
Population density	1.8 ppu
Average Residential Flow	350 l/p/d
Peaking Factor	Harmon Formula [max = 4.0, min. = 2.0]
Infiltration Allowance	0.28 l/s/ha
Site Area	0.34 ha

There is only one other building using the existing sanitary sewer which is located immediately east of the subject property. The Rogers Communication building is a single storey commercial building covering 1.29 ha. Peak wastewater flows from that site are expected to be in the 1.5 l/s range. Therefore, there is ample available capacity in the existing 150 mm diameter sanitary sewer for the proposed development.

The detailed sewer calculations, together with **Figure 3**, the Sanitary Drainage Area Plan, are included in **Appendix E**.

#### 3.3 Proposed Wastewater Plan

A new 150 mm diameter service connection is proposed to be connected to the existing 150 mm diameter sanitary. The connection is proposed to the existing manhole where the existing 150 mm site sewer is presently connected. The existing site sewer is proposed to be replaced. The service will enter the building near the northwest corner close to the storm service pipe. The Site Servicing Plan as well as the Site Grading and Drainage Plan are included in **Appendix F**.

## 4. STORMWATER MANAGEMENT

### 4.1 Existing Conditions

As stated in Section 3.1, the 0.34 ha subject site presently is improved with an asphalt parking lot and some landscaped areas. The entire existing site surface will be replaced. Runoff from the existing site presently outlets in three directions. A small area of 239 m<sup>2</sup> adjacent to Richmond Road drains southward towards an existing 675 mm storm sewer in that street. Another small area of 673 m<sup>2</sup>, east and south of the Amica building, drains to an existing 1500 mm storm sewer and the balance of the site of about 2500 m<sup>2</sup> drains to the north where it is captured in a catchbasin and outlets to a 250 mm storm sewer. The existing catchbasin lead pipe is 250 mm diameter at a slope of 1.7% which has a full flow capacity of 78 l/s.

### 4.2 Proposed Stormwater Outlet Plan

The existing post development flow to the existing 250 mm diameter sewer located to the north of the property is 33.54 l/s. The detailed calculations are included in the Stormwater Management Report. A copy of these calculations is included in **Appendix E**. A 250 mm diameter storm sewer is proposed to collect runoff from the site and connect to the existing sewer. At a slope of 1.00%, the new sewer will have a capacity of 62 l/s. The details of the proposed sewer are indicated on drawing C-01 Site Servicing Plan. The proposed sewer lateral will enter the building about 7 m from the northwest corner.

The balance of the site is proposed to sheet drain mirroring existing conditions.

For further stormwater information pertaining to the site refer to the report titled 'Stormwater Management Servicing Report, 485 Richmond Road, Ottawa' completed by IBI Group and dated July 2012. That report concludes that runoff from the post development of the site will have no additional impact on the performance of existing storm sewers.

## 5. STORMWATER SITE MANAGEMENT

During construction, existing conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- In trench groundwater will be pumped into a filter mechanism prior to release to the environment. Pumping in excess of 50,000 l/day will require a Permit To Take Water from the provincial Ministry of Environment. The geotechnical report will review this issue.
- Filter cloths will be placed on open structures such as catchbasins and manhole covers, and will remain in place until the project is completed. Regular monitoring will be required to ensure proper function of the cloth including replacement as required.
- Existing catchbasins on the streets adjacent to the streets are to be monitored to ensure that their sumps remain clean (cleaned as required).
- Silt fence on the perimeter of the site as per OPSD Standard 219.110 will be erected.
- Another method the contractor should try to utilize on the site during construction is to maintain the ground sloping to an artificial low spot which would include a settling bay to collect silt material. This could reduce the amount of silt material being pumped to the filter mechanism.

## **6. APPROVALS AND PERMIT REQUIREMENTS**

### **6.1 City of Ottawa**

The City of Ottawa reviews all development documents including this report. Upon completion, the City will approve the service connections and eventually issue a Commence Work Notification.

### **6.2 Province of Ontario**

There may be no need to obtain an MOE Environmental Compliance Approval since proposed sewer discharge from the site will be directed to separate sewers. Those sewers do not appear to contribute to a downstream combined sewer but rather have separate outlets.

### **6.3 Conservation Authority**

There are no approvals required from any Conservation Authority for this project.

### **6.4 Federal Government**

There will be a requirement to obtain a Land Use Permit from the National Capital Commission which owns the property immediately north of the subject site. The existing storm sewer, to which it is proposed to connect the building service pipe, is located on NCC property.

## 7. CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Conclusions

The existing municipal services, including the 200 mm diameter watermain, 150 mmØ diameter sanitary sewer and 2500 mm diameter storm sewer provide the site with the necessary capacity to support the proposed development. Appropriate connections to the existing infrastructure are needed to properly service the subject development.

### 7.2 Recommendations

Based on the findings and conclusions of our investigation, IBI recommends that the proposed high rise development at 485 Richmond Road be serviced with a water supply, wastewater and stormwater outlet to existing infrastructure adjacent to the site.



# **APPENDIX A**

## **Servicing Study Guideline Checklist**

*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 and 2
√	Plan showing the site and location of all existing services.	Drawing C-01
√	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 1.3, 2.2, 3.2
√	Summary of Pre-consultation Meeting with City and other approval agencies.	Appendix B
	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 defensible design criteria.	N/A
	Statement of objectives and servicing criteria	N/A
√	Identification of existing and proposed infrastructure available in the immediate area.	Section 2.1, 3.1, 4.1
	Identification of Environmentally Significant Areas, Watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
	<u>Concept level master grading plan</u> 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.	N/A
	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 1.5
√	All preliminary and formal site plan submissions should have the following information: <ul style="list-style-type: none"> <li>• Metric scale</li> <li>• North arrow (including construction North)</li> <li>• Key plan</li> <li>• Name and contact information of applicant and property owner</li> <li>• Property limits including bearings and dimensions</li> <li>• Existing and proposed structures and parking areas</li> <li>• Easements, road widening and rights-of-way</li> <li>• Adjacent street names</li> </ul>	Report Drawings



*Development Servicing Report: Water*

ITEM DESCRIPTION		LOCATION
	Confirm consistency with Master Servicing Study, if available	N/A
√	Availability of public infrastructure to service proposed development	Section 2.4.
	Identification of system constraints – external water needed	N/A
√	Identify boundary conditions	Section 2.2
√	Confirmation of adequate domestic supply and pressure	Section 2.4
√	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 2.3
	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defining phases of the project including the ultimate design.	N/A
	Address reliability requirements such as appropriate location of shut-off valves.	N/A
	Check on the necessity of a pressure zone boundary modification.	N/A
√	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Section 2.3
	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
	Description of off-site required feeder mains, 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 2.2
	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

*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 3.2 and Appendix C
Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
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.	N/A
√ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 3.1
√ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 3.2
√ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix "C") format.	Appendix C
√ Description of proposed sewer network including sewers, pumping stations and forcemains.	Section 3.3
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
√ Special considerations such as contamination, corrosive environment, check soils, etc.	Section 1.5

*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)	N/A
√	Analysis of available capacity in existing public infrastructure.	Section 2.2, 3.2, 4.2
	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	N/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.	N/A
	Water quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	N/A
	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	N/A
	Set-back from private sewage disposal systems.	N/A
	Watercourse and hazard lands setbacks.	N/A
	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
√	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 4.2, SWM Report, Drawing C-01
	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
√	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 4.2 SWM Report, Drawing C-01
	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
	Identification of potential impacts to receiving watercourses	N/A
	Identification of municipal drains and related approval requirements.	N/A

√	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 4.2 SWM Report
	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Drawing 27399-200
	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
√	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.	N/A

***Approval and Permit Requirements: Checklist***

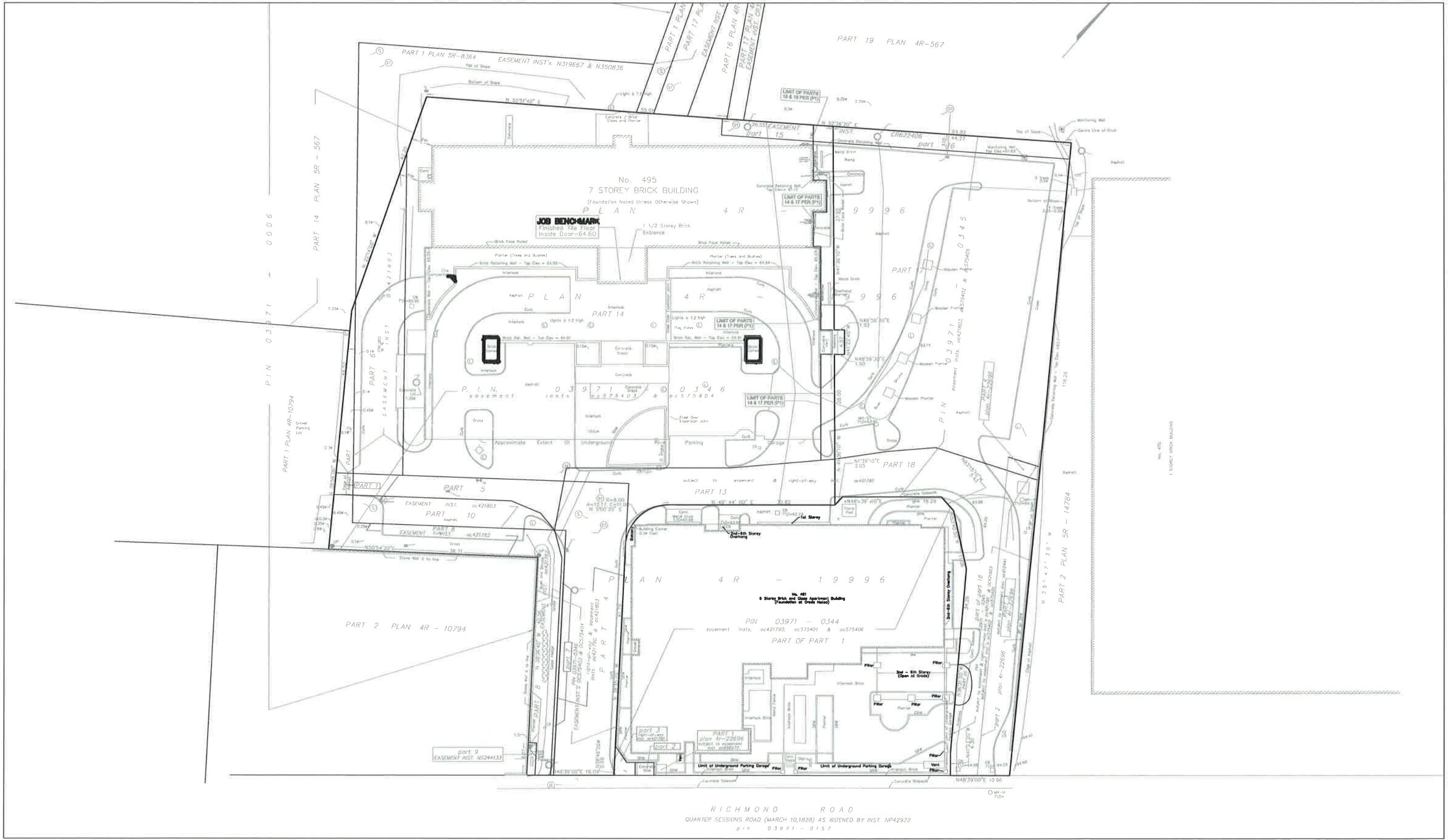
ITEM DESCRIPTION		LOCATION
	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not 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.	N/A
√	Application for Certification of Approval (CofA) under the Ontario Water resources Act.	Section 6.2
	Changes to Municipal Drains	N/A
	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 6.4

***Conclusion Checklist***

ITEM DESCRIPTION		LOCATION
√	Clearly stated conclusions and recommendations	Section 7
	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A
√	All draft and final reports shall be signed and stamped by professional Engineer registered in Ontario.	Done

**APPENDIX B**  
**Annis O'Sullivan Vollebekk Ltd.**  
**Ref. Job 11127-10**

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Scale

N.T.S.



Project Title

CANDEREL

485 RICHMOND ROAD

Drawing Title

SITE PLAN

Sheet No.

FIGURE 2

# **APPENDIX C**

## **Pre-Consultation Records**

**From:** Wu, John [mailto:John.Wu@ottawa.ca]  
**Sent:** July 13, 2012 10:02  
**To:** Ryan Kennedy  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

The result with 170L/s fire flow demand:

Max Day + FF = 98.9 m assuming a fire flow of 320 L/s  
Max Day + FF = 106.2 m assuming a fire flow of 170 L/s  
Minimum HGL = 106.7 m  
Maximum HGL = 114.1 m

**From:** Ryan Kennedy [mailto:rkennedy@IBIGroup.com]  
**Sent:** July 13, 2012 9:40 AM  
**To:** Wu, John  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

Thanks John,

Can you also request a boundary condition for a 170 L/s fireflow, as we discussed?

**Ryan Kennedy P.Eng.**

**IBI Group**  
400-333 Preston Street  
Ottawa ON K1S 5N4 Canada

tel 613 225 1311 ext 526  
fax 613 225 9868  
cell 613 255 3850  
email [rkennedy@ibigroup.com](mailto:rkennedy@ibigroup.com)  
web [www.ibigroup.com](http://www.ibigroup.com)

**From:** Wu, John [mailto:John.Wu@ottawa.ca]  
**Sent:** July 13, 2012 9:36  
**To:** Ryan Kennedy  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

The result:

**\*\*\*\*The following information may be passed on to the consultant, but do NOT forward this e-mail directly.\*\*\*\***

The following are boundary conditions, HGL, for hydraulic analysis at 485 Richmond Road assumed to be connected to the 305mm on Richmond Road (see attached PDF for location).

Max Day + FF = 98.9 m assuming a fire flow of 320 L/s  
Minimum HGL = 106.7 m  
Maximum HGL = 114.1 m

These are for current conditions and are based on computer model simulation.

John



**From:** Wu, John [mailto:John.Wu@ottawa.ca]  
**Sent:** July 10, 2012 15:32  
**To:** Ryan Kennedy  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

Thanks, I will forward that to IMD too, this is a reasonable fire demand.

John

**From:** Ryan Kennedy [mailto:rkennedy@IBIGroup.com]  
**Sent:** July 10, 2012 3:31 PM  
**To:** Wu, John  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

John, if we are to follow the Building Code method with a 2-hour fire separation we can reduce the needed fire flow to 170 L/s (10,200 L/min) based on the largest unit.

Thanks,

**Ryan Kennedy P.Eng.**

**IBI Group**  
400-333 Preston Street  
Ottawa ON K1S 5N4 Canada

**tel** 613 225 1311 **ext** 526  
**fax** 613 225 9868  
**cell** 613 255 3850  
**email** [rkennedy@ibigroup.com](mailto:rkennedy@ibigroup.com)  
**web** [www.ibigroup.com](http://www.ibigroup.com)

**From:** Wu, John [mailto:John.Wu@ottawa.ca]  
**Sent:** July 10, 2012 14:16  
**To:** Ryan Kennedy  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

Hi, Ryan:

I don't think City's can provide the fire flow like that big, I do not know what happens last time, DME has some mistake when it use the modelling, I am familiar with that model, the assumption is totally wrong. I am not the project manager at that time. The fire flow should use the largest unit in the building with fire separation of 2 hours to determine the fire flow, not the total area of the building( that is for small buildings with no fire separation more than 2 hours).

If you wish to continue using fire flow of 320 L/s as request. Just let you know the answer maybe no.

Thanks.

John

**From:** Ryan Kennedy [mailto:rkennedy@IBIGroup.com]  
**Sent:** July 10, 2012 2:00 PM  
**To:** Wu, John  
**Cc:** Jim Moffatt  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

John,

Here is a summary of the revised demands for the proposed 24-storey residential building:

1. Fire Flow = 320 L/s (19,200 L/min) based on a total floor area of 22,356 sq.m.
2. Daily demand = 1.39 L/s
3. Max day demand = 3.48 L/s
4. Peak hour demand = 7.66 L/s

Please have your IMD group provide a boundary condition based on these numbers.

Thanks,

**Ryan Kennedy P.Eng.**

**IBI Group**  
400-333 Preston Street  
Ottawa ON K1S 5N4 Canada

**tel** 613 225 1311 **ext** 526  
**fax** 613 225 9868  
**cell** 613 255 3850  
**email** [rkennedy@ibigroup.com](mailto:rkennedy@ibigroup.com)  
**web** [www.ibigroup.com](http://www.ibigroup.com)

**From:** Wu, John [mailto:John.Wu@ottawa.ca]  
**Sent:** July 10, 2012 11:42  
**To:** Ryan Kennedy  
**Subject:** RE: 485 Richmond Road - Watermain Boundary Condition

Hi, Ryan:

I need the updated fire flow request and daily water (including peak ) demand, I can forward to our IMD group, please note the original fire flow maybe not right by DME. It is too high(the calculation is wrong).

Thanks.

John

**From:** Ryan Kennedy [mailto:rkennedy@IBIGroup.com]  
**Sent:** July 10, 2012 11:36 AM  
**To:** Wu, John  
**Cc:** Jim Moffatt  
**Subject:** 485 Richmond Road - Watermain Boundary Condition

Hi John,

As you know, we are working on a project at 485 Richmond Road. Part of the requirement involves updating a watermain hydraulic analysis previously prepared by DME in July 2006.

Can you please provide us with a current boundary condition at that location so that we can ensure we are using the latest data.

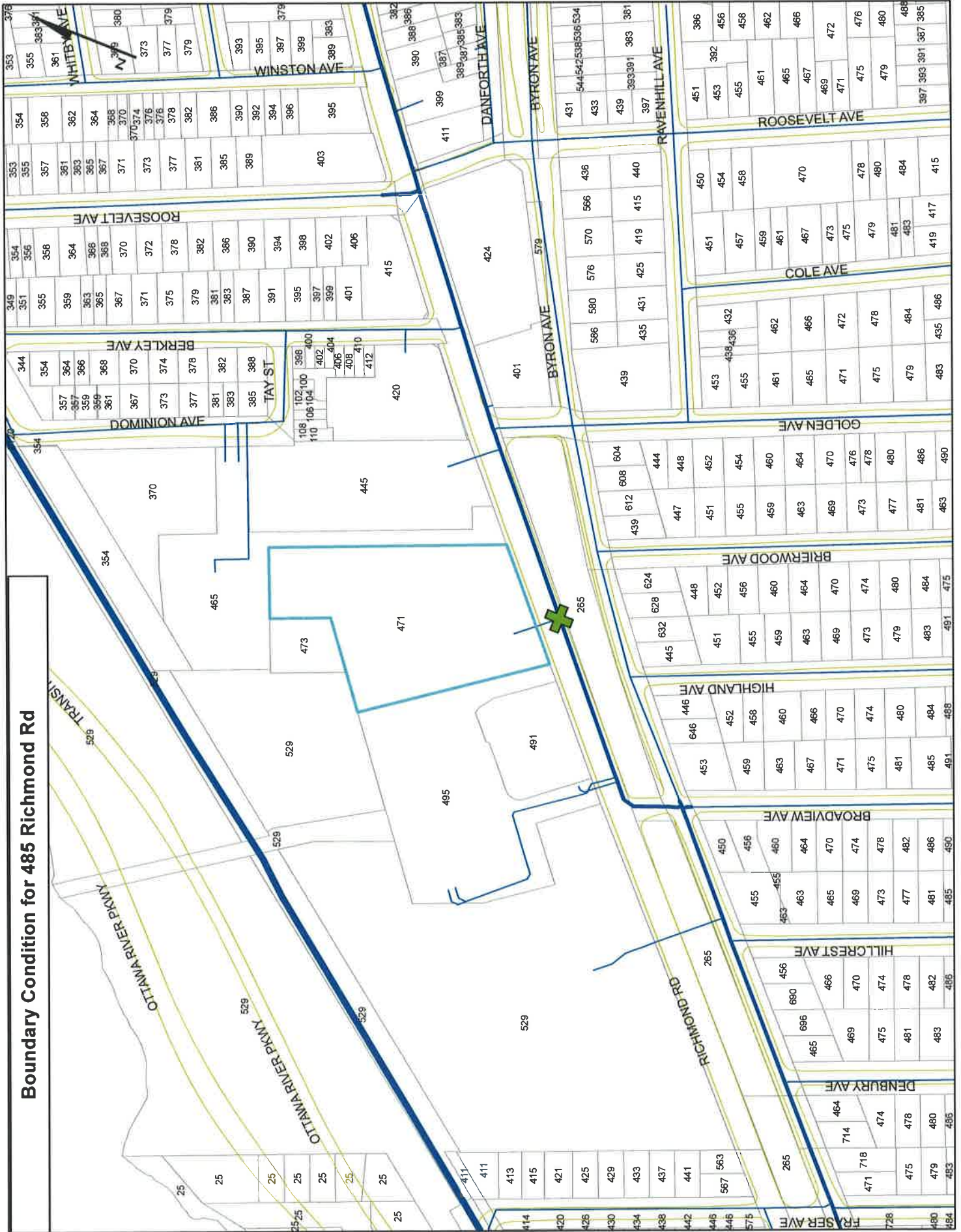
I have attached the previous report with boundary conditions for reference.

**Ryan Kennedy** P.Eng.

**IBI Group**  
400-333 Preston Street  
Ottawa ON K1S 5N4 Canada

**tel** 613 225 1311 ext 526  
**fax** 613 225 9868  
**cell** 613 255 3850  
**email** [rkennedy@ibigroup.com](mailto:rkennedy@ibigroup.com)  
**web** [www.ibigroup.com](http://www.ibigroup.com)

# Boundary Condition for 485 Richmond Rd



# **APPENDIX D**

## **Watermain Analysis Outputs**



IBI GROUP  
333 PRESTON STREET  
OTTAWA, ON  
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

FILE: 32385 5.7  
DATE: 2012-07-25  
DESIGN: RK  
PAGE: 1 OF 1

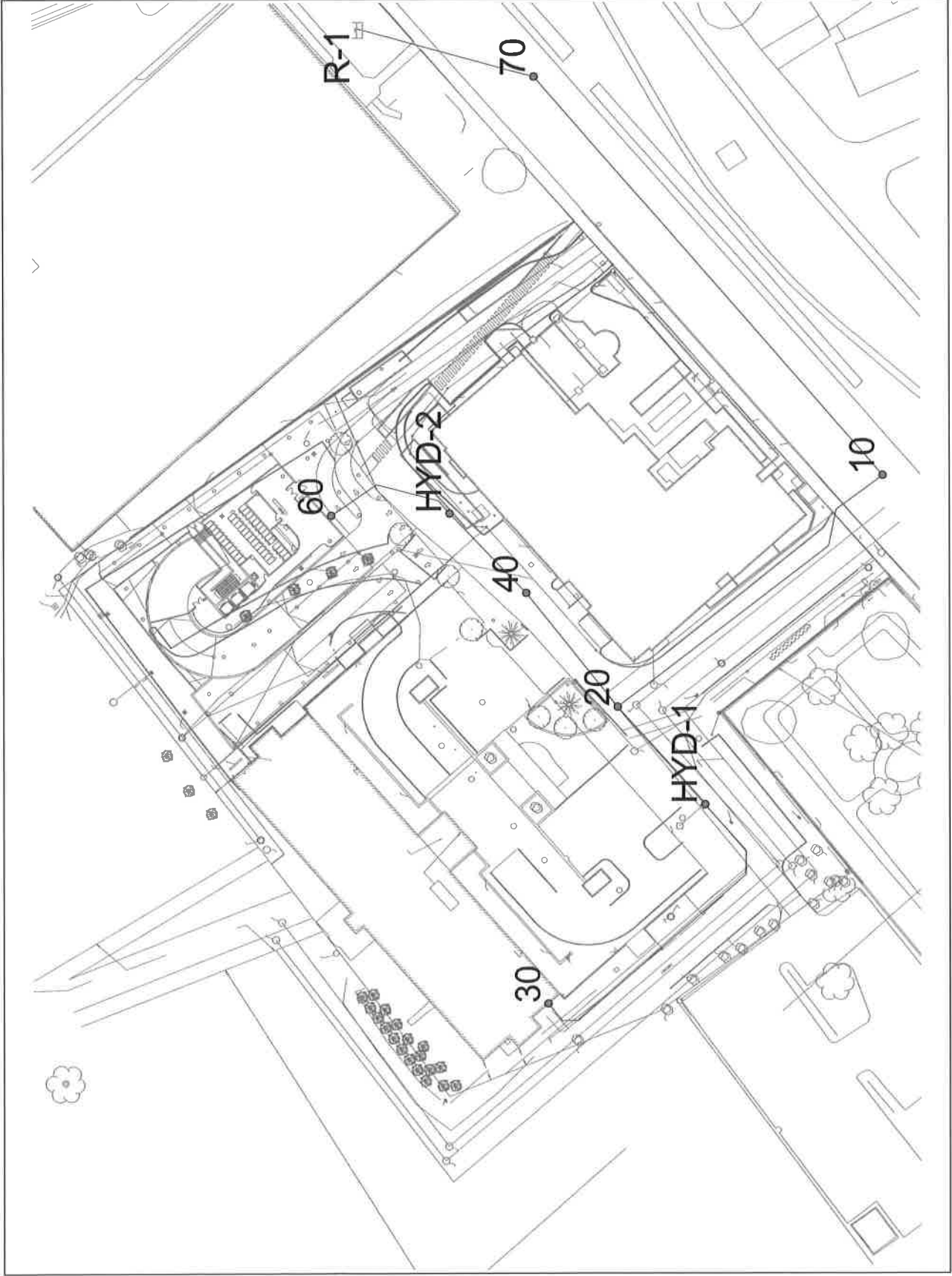
PROJECT : 485 RICHMOND ROAD  
LOCATION : CITY OF OTTAWA  
DEVELOPER : MINTO COMMUNITIES INC.

NODE	RESIDENTIAL				NON-RESIDENTIAL		AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/s)						
	UNITS				COM (Ha)	IND (Ha)	INS (Ha)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.		Total					
	SF	SD	TH	APT	GROSS RES. (Ha)	POP'N																
30							0.15					0.00	0.05	0.05	0.00	0.07	0.07	0.00	0.13	0.13	250	
60				191		344						1.39	0.00	1.39	3.48	0.00	3.48	7.66	0.00	7.66	170	

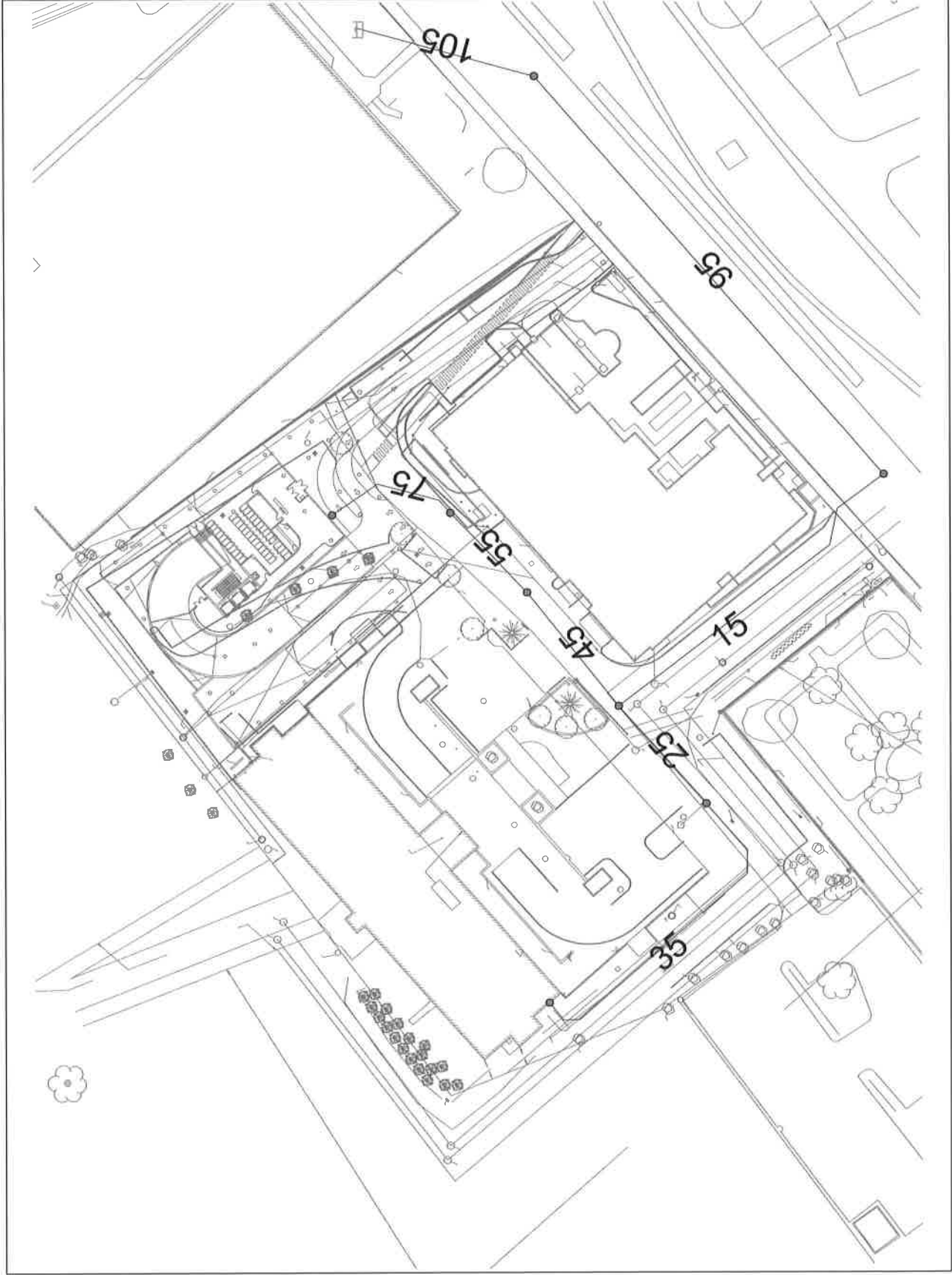
ASSUMPTIONS

RESIDENTIAL DENSITIES	AVERAGE DAILY DEMAND	MAXIMUM DAILY DEMAND	MAXIMUM HOURLY DEMAND	FIRE DEMANDS
- Single Family (SF)	3.4 p/p/u	350 l/cap/day	875 l/cap/day	- SF 100 l/s
- Semi Detached (SD)	2.7 p/p/u	28,000 l/ha/day	42,000 l/ha/day	- SD 125 l/s
- Townhouse (TH)	2.7 p/p/u	35,000 l/ha/day	52,500 l/ha/day	- TH 125 l/s
- Apartment (APT)	1.8 p/p/u	15,000 l/ha/day	22,500 l/ha/day	- APT 170 l/s
				- ICI 250 l/s

**485 RICHMOND ROAD - NODE ID's**

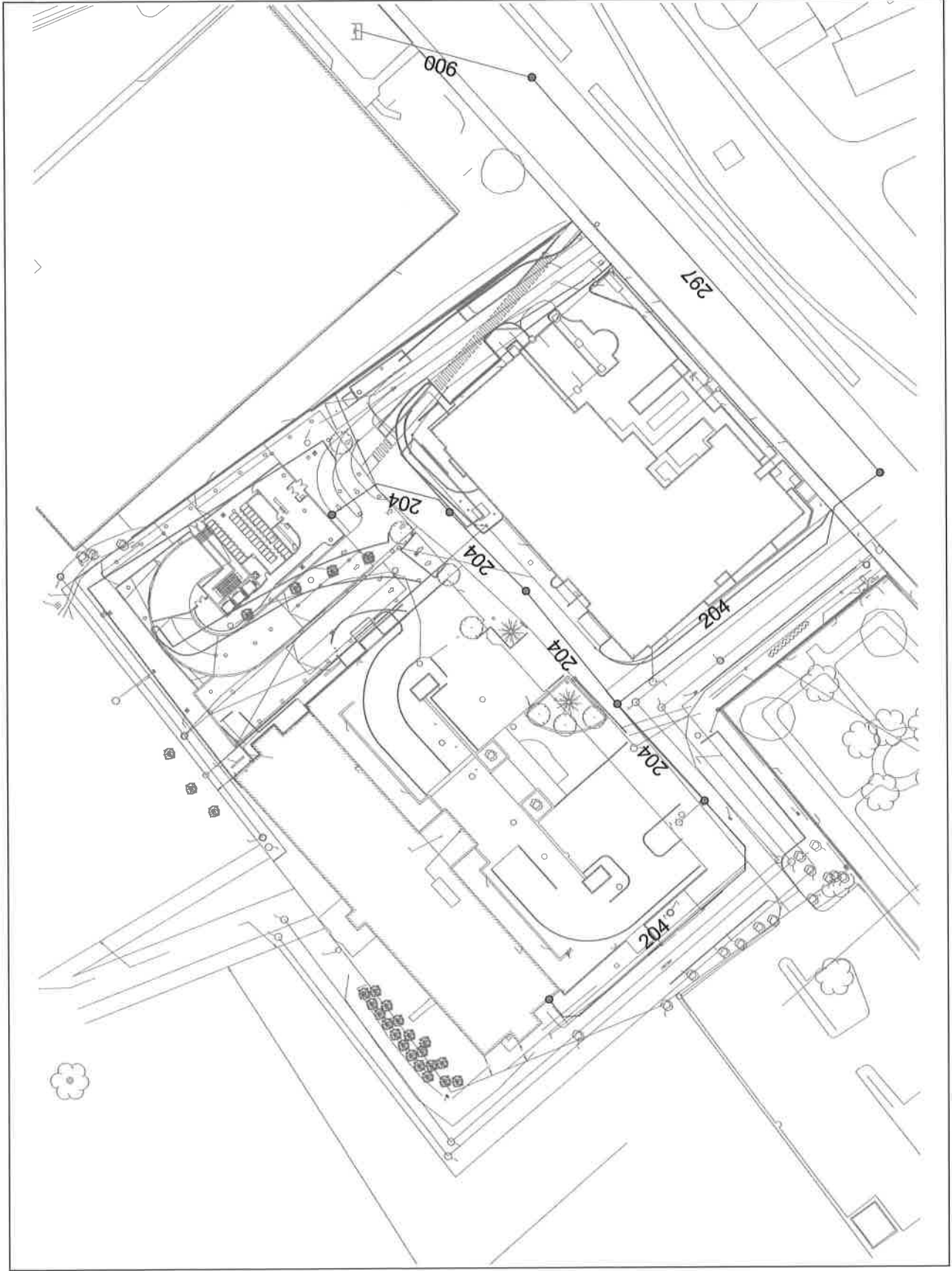


**485 RICHMOND ROAD - PIPE ID'S**













**485 RICHMOND ROAD - PIPE SIZES**



Average Day - Junction Report (HGL = 106.7m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	64.15	106.69	416.89
2		20	0.00	62.40	106.66	433.70
3		30	0.13	61.30	106.66	444.48
4		40	0.00	62.90	106.65	428.67
5		60	7.66	63.00	106.62	427.47
6		70	0.00	64.30	106.70	415.49
7		HYD-1	0.00	62.30	106.66	434.68
8		HYD-2	0.00	63.10	106.64	426.61

Average Day - Junction Report - High Pressure Check (HGL = 114.1m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	64.15	114.09	489.40
2		20	0.00	62.40	114.06	506.22
3		30	0.13	61.30	114.06	517.00
4		40	0.00	62.90	114.05	501.18
5		60	7.66	63.00	114.02	499.98
6		70	0.00	64.30	114.10	488.00
7		HYD-1	0.00	62.30	114.06	507.20
8		HYD-2	0.00	63.10	114.04	499.13

Average Day - Pipe Report (HGL = 106.7m)

	ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)
1	105	R-1	70	0.10	900.00	130.00	7.79	0.01	0.00
2	15	10	20	67.52	204.00	110.00	7.79	0.24	0.03
3	25	20	HYD-1	24.95	204.00	110.00	0.13	0.00	0.00000
4	35	HYD-1	30	64.79	204.00	110.00	0.13	0.00	0.00000
5	45	20	40	27.32	204.00	110.00	7.66	0.23	0.01
6	55	40	HYD-2	20.62	204.00	110.00	7.66	0.23	0.01
7	75	HYD-2	60	25.31	204.00	110.00	7.66	0.23	0.01
8	95	10	70	99.30	297.00	120.00	-7.79	0.11	0.01

Average Day - Pipe Report (HGL = 106.7m)

	ID	HL/1000 (m/km)
1	105	0.00
2	15	0.51
3	25	0.000
4	35	0.000
5	45	0.49
6	55	0.49
7	75	0.49
8	95	0.07

Max Day + Fireflow Report (HGL = 106.2m)

	ID	Total Demand (L/s)	Critical Node 1 ID	Critical Node 1 Pressure (kPa)	Critical Node 1 Head (m)	Adjusted Fire-Flow (L/s)
1	HYD-1	250.00	HYD-1	98.65	72.37	232.47
2	HYD-2	170.00	HYD-2	221.29	85.68	204.93

Max Day + Fireflow Report (HGL = 106.2m)

		ID	Available Flow @Hydrant (L/s)	Critical Node 2 ID	Critical Node 2 Pressure (kPa)	Critical Node 2 Head (m)	Adjusted Available Flow (L/s)
1	<input type="checkbox"/>	HYD-1	232.47	HYD-1	139.96	76.58	232.47
2	<input type="checkbox"/>	HYD-2	204.93	HYD-2	139.96	77.38	204.93

**Max Day + Fireflow Report (HGL = 106.2m)**

		<b>ID</b>	<b>Design Flow (L/s)</b>
<b>1</b>	<input type="checkbox"/>	<b>HYD-1</b>	<b>232.47</b>
<b>2</b>	<input type="checkbox"/>	<b>HYD-2</b>	<b>204.93</b>



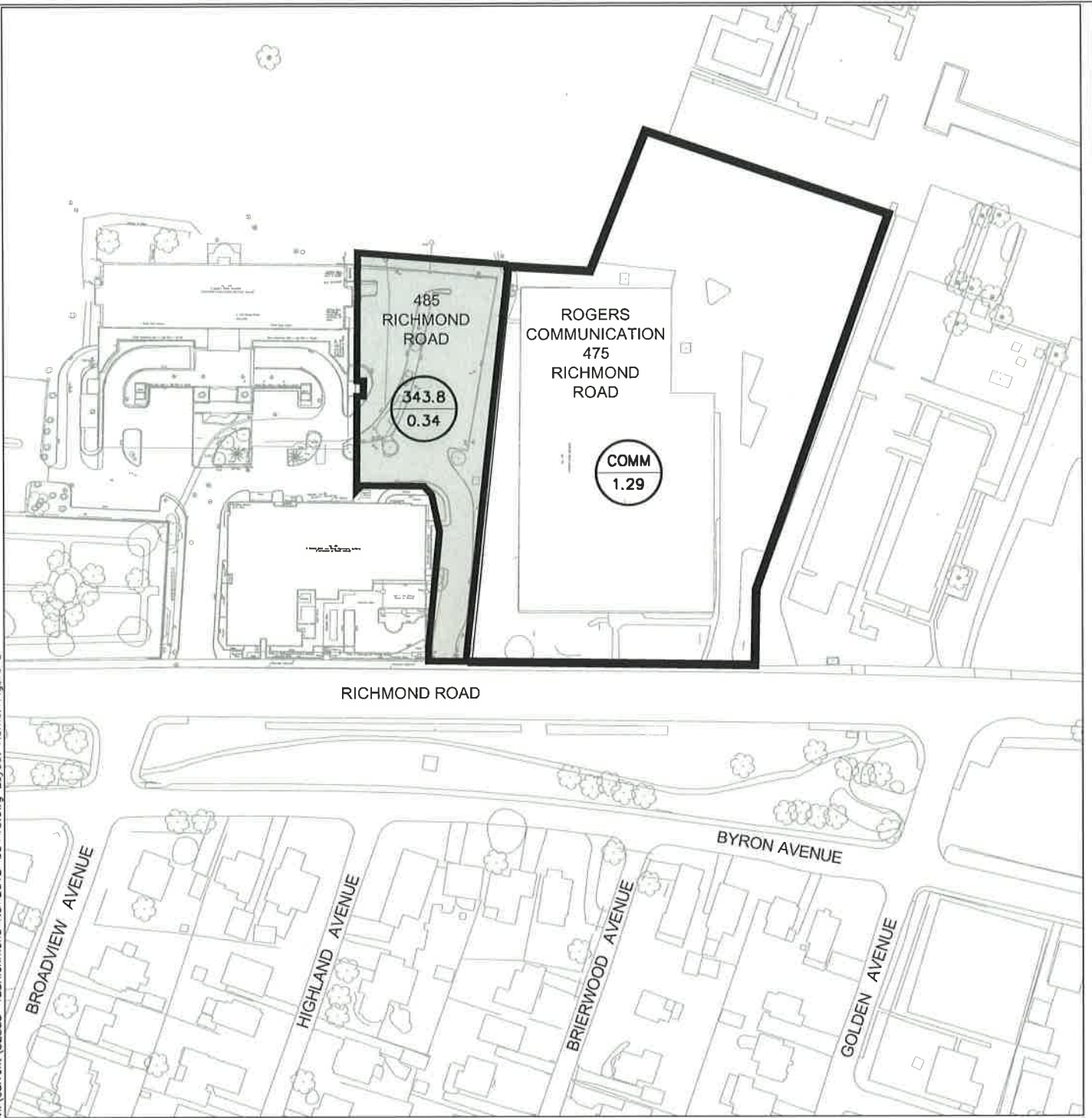
**Max Hour - Junction Report - (HGL = 106.7m)**

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	64.15	106.69	416.88
2		20	0.00	62.40	106.65	433.65
3		30	0.66	61.30	106.65	444.42
4		40	0.00	62.90	106.64	428.62
5		60	7.66	63.00	106.62	427.42
6		70	0.00	64.30	106.70	415.49
7		HYD-1	0.00	62.30	106.65	434.63
8		HYD-2	0.00	63.10	106.63	426.56




**APPENDIX E**  
**Sewer Calculation Sheet**  
**Sanitary Drainage Area Plan (Figure 3)**  
**Area C Maximum Allowable Flow – Storm**



J:\32385-485Richmond\5.9 Drawings\59civil\current\32385-485Richmond Rd-2012-05-15.dwg Layout Name: Figure 3



**LEGEND:**

-  POPULATION
-  AREA IN HECTARES
-  COMMERCIAL SITE

Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 1:1 Plotted At: Jul. 26, 12 11:48 AM Printed By: DON SIURNA Last Saved By: DSIURNA Last Saved At: Jul. 26, 12



CANDEREL

485 RICHMOND ROAD

SANITARY DRAINAGE  
AREA PLAN

FIGURE 3

### Maximum Allowable Flow - Flow Restricted to Existing Conditions Area C

Time of concentration = 20 minutes

Area = 2491 m<sup>2</sup>

Runoff Coefficient (C) = Asphalt (1788 m<sup>2</sup>) 0.9  
Grass (703 m<sup>2</sup>) 0.2  
$$\frac{[(1788 \times 0.9) + (703 \times 0.2)]}{2491}$$

Runoff Coefficient (C) = 0.7

Intensity - 5 year event storm

20 min Tc  $i_{5yr} = 998.071 / (T + 6.053)^{0.814} = 70.25$  mm/hr

**Restricted Flowrate (Q<sub>C5yr</sub>)**

Q<sub>max allowable 5yr</sub> = 2.78 \* A \* C \* i = 34.05 l/s

Intensity - 100 year event storm

20 min Tc  $i_{100yr} = 1735.688 / (T + 6.014)^{0.82} = 119.95$  mm/hr

**Restricted Flowrate (Q<sub>C100yr</sub>)**

Q<sub>max allowable 100yr</sub> = 2.78 \* A \* C \* i = 58.15 l/s

### Stormwater Management - Total Site Post-development Uncontrolled 100 Year Flow Area A

Time of concentration = 20 minutes

Area = 2429 m<sup>2</sup>

Runoff Coefficient (C) = Asphalt (1585 m<sup>2</sup>) 0.9  
Grass (330 m<sup>2</sup>) 0.2  
Shrubs (514 m<sup>2</sup>) 0.4  
$$\frac{[(1585 \times 0.9) + (330 \times 0.2) + (514 \times 0.4)]}{2429}$$

Runoff Coefficient (C) = 0.707

Intensity - 5 Year event storm

20 min Tc  $i_{5yr} = 998.071 / (T + 6.053)^{0.814} = 70.25$  mm/hr

**Maximum Flowrate (Q<sub>C5yr</sub>)**

Q<sub>max allowable</sub> = 2.78 \* A \* C \* i = 33.54 l/s

Intensity - 100 year event storm

20 min Tc  $i_{100yr} = 1735.688 / (T + 6.014)^{0.82} = 119.95$  mm/hr

**Maximum Flowrate (Q<sub>C100yr</sub>)**

Q<sub>max allowable 100yr</sub> = 2.78 \* A \* C \* i = 57.27 l/s

# **APPENDIX F**

**Site Servicing Plan – Drawing C-01**

**Site Grading and Drainage Plan – Drawing C-02**

**NOTES:**

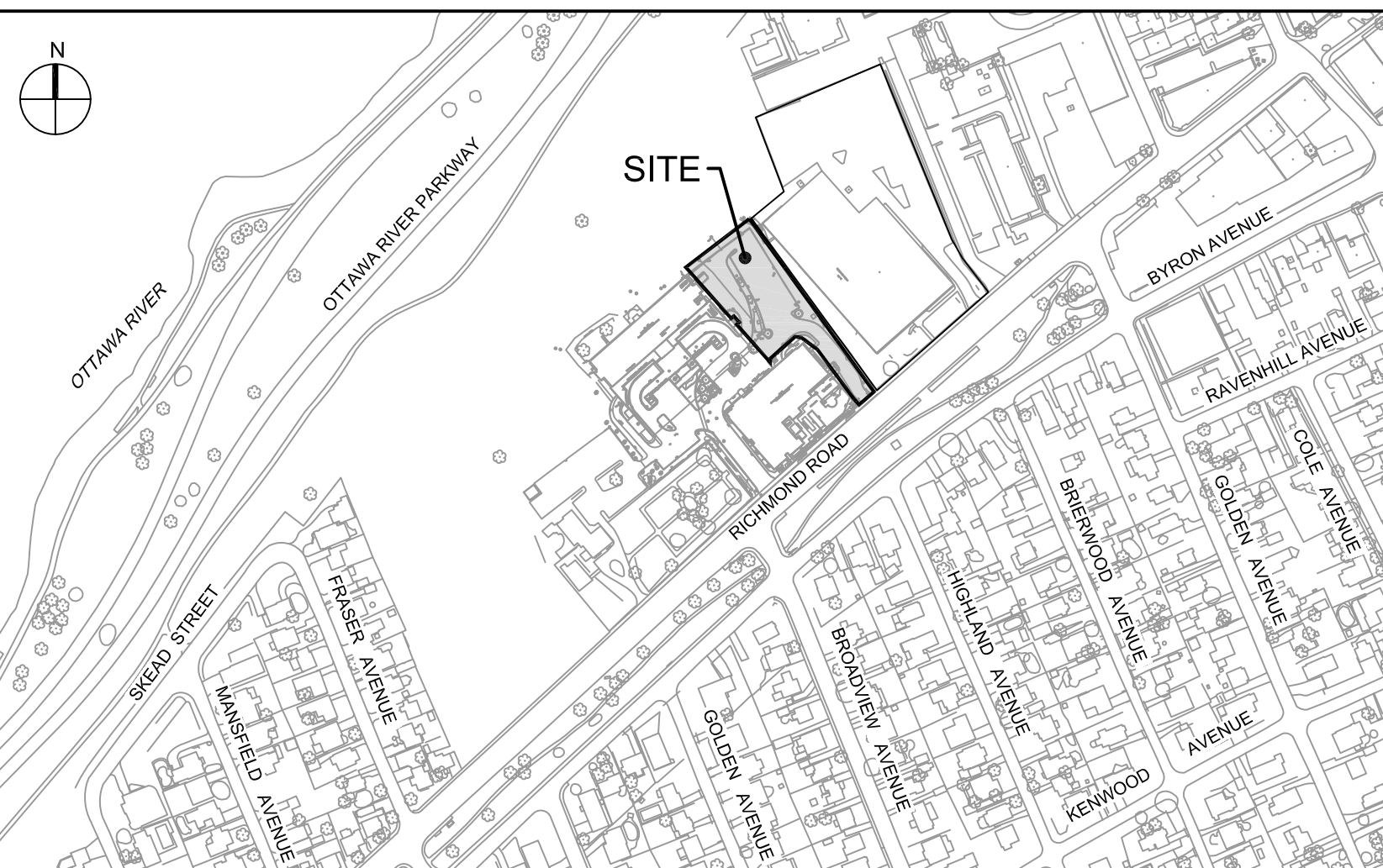
- ALL WORKS TO BE COMPLETED AS PER CITY OF OTTAWA STANDARDS AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
- SEWER LATERALS TO BE PVC DR 35.
- WATER SERVICES TO BE PVC DR 18 CL150 MINIMUM COVER OF 2.4m FOR WATER SERVICE AS REQUIRED, USE THERMAL INSULATION AS PER CITY STANDARDS WHEN COVER IS LESS THAN 2.4m.
- ALL SERVICE LATERAL AND SURFACE RESTORATION WORK IN ACCORDANCE WITH CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
- FULL PORT BACKWATER VALVE IS REQUIRED ON THE SANITARY SERVICE AND A CHECK VALVE IS REQUIRED ON THE STORM SERVICE.
- WATER SERVICE CHLORINATION AND TESTING TO BE COMPLETED BY CITY FORCES.
- PROPOSED BUILDING INFORMATION TAKEN FROM WALLMAN ARCHITECTS DRAWINGS.
- AN EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED ON THIS SITE. AS A MINIMUM THAT PLAN WILL INCLUDE A LIGHT DUTY SILT FENCE BARRIER TO OPSD STANDARD 219.110 SURROUNDING THE SITE WHERE PRACTICAL AND FILTER CLOTHS FITTED UNDER EXISTING STREET CATCH BASINS.
- ALL SHOWN UTILITIES ARE APPROXIMATE AND ARE TO BE FIELD VERIFIED BY CONTRACTOR, ANY DISCREPANCIES ARE TO BE REPORTED TO IBI GROUP PRIOR TO CONTRACTOR MOBILIZING TO SITE.
- CONTRACTOR RESPONSIBLE TO SUPPORT EXISTING UTILITIES THAT MAY BE AFFECTED DURING CONSTRUCTION
- A) MOST EXISTING CURBS ARE TO BE REPLACED, ALL NEW CURBS TO BE AS PER CITY STANDARD SC1.1 TIEING INTO TOP/BOTTOM OF CURB ELEVATIONS.
- CONCRETE SIDEWALK TO BE IN ACCORDANCE WITH CITY STD. DRAWING SC4 AND SC5.
- SURFACE RESTORATION OVER NEW WATERMAIN TO BE IN ACCORDANCE WITH CITY STD. DRAWING R-10.
- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATER COURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY APPLICABLE REGULATORY AGENCIES.
- BOUNDARY INFORMATION COMPILED FROM PLAN 4R-19996. ELEVATIONS HEREON ARE REFERRED TO GEODETIC DATUM. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION ON THIS DRAWING.
- FOR GEOTECHNICAL INFORMATION SEE "GEOTECHNICAL INVESTIGATION PROPOSED
- FOR STORMWATER MANAGEMENT INFORMATION SEE STORMWATER MANAGEMENT REPORT BY IBI GROUP TITLED STORMWATER MANAGEMENT .....
- CLAY SEAL TO BE INSTALLED IN SERVICE TRENCHES BETWEEN CONNECTION POINT AND CAP.
- CONTRACTOR TO REFER TO LANDSCAPE PLANS AND SPECIFICATIONS FOR SOME FINISHES, TEXTURES, COLORS AND REMAINING LANDSCAPE FEATURES.
- NEW PAVEMENT/CONCRETE STRUCTURES ARE INCLUDED ON THIS DRAWING. THE HEAVY DUTY PAVEMENT/CONCRETE AREA IS SHADED. ALL OTHER AREAS TO BE PAVED/CONCRETE WITH LIGHT DUTY.
- 1200mm# MANHOLES TO BE AS PER OPSD-701.010 WITH COVER AND FRAME AS PER CITY STANDARD S24 AND S25.

RESIDENTIAL BUILDING 485 RICHMOND ROAD  
OTTAWA ONTARIO BY HOULE CHEVRIER  
ENGINEER DATED JULY 2012

SEWER SCHEDULE						
LOCATION	INVERT ELEVATIONS (m)				OPSD	FRAME COVER **
	NORTH	SOUTH	EAST	WEST		
CB-1	60.03				705.010	S19
CBMH-1			59.93	59.96	701.010*	S25/S28.1
MH1	59.80	59.83		59.86	701.012	S24.1/S25
MH2	59.26		59.32		701.012	S24.1/S25
EX STM MH		59.75			61.29	-
EX SAN MH		59.18	59.13EX	59.12EX	61.02	-

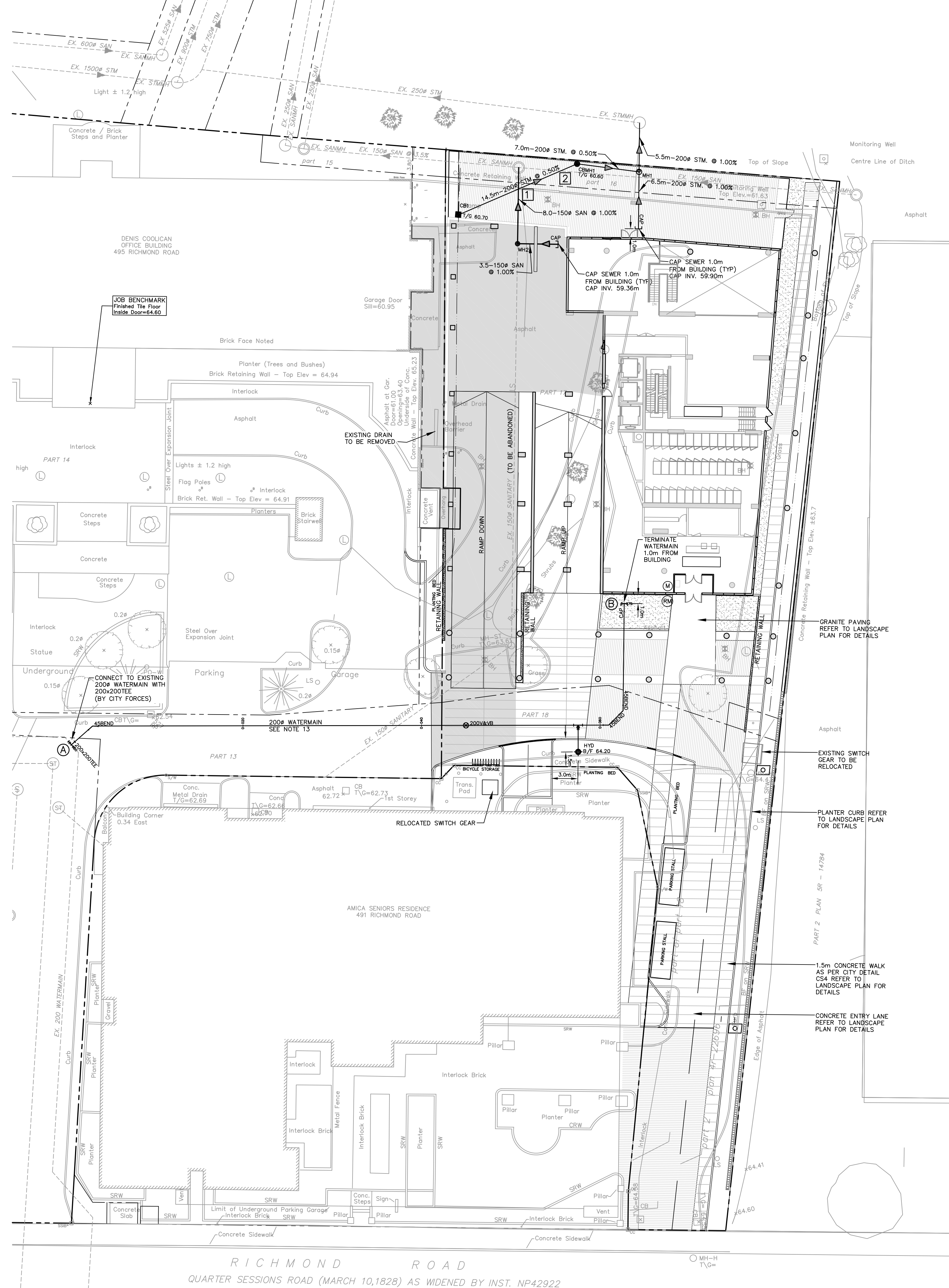
WATERMAIN SCHEDULE-BOTH PIPES					
LOCATION	DESCRIPTION	FINISHED GRADE(m)	TOP OF WATERMAIN(m)		AS-BUILT
			PROPOSED	AS-BUILT	
A+0+00	200x200TEE	±62.45	60.05		
0+003	45° BEND	±62.50	60.10		
0+015	-	±62.70	60.30		
0+030	-	±62.91	60.51		
0+045	VALVE & BOX	63.05	60.65		
0+057.5	200x200TEE	63.95	61.55		
0+061	45° BEND	64.20	61.80		
0+063	45° BEND	64.30	61.90		
B+0+75.5	CAP	64.70	62.30		

PIPE CROSSING CONFLICT TABLE	
1	PROPOSED 200# STORM SEWER 0.67m CLEARANCE OVER PROPOSED 150# SAN SEWER
2	PROPOSED 200# STORM SEWER 0.53m CLEARANCE OVER EX. 150# SAN SEWER



LEGEND	
---	PROPERTY LINE
FF 70.50	FINISHED FLOOR ELEVATION
DC	DEPRESSED CURB
—	CURB TAPER
M	WATER METER (SEE MECH. DRWG. FOR EXACT LOCATION)
RM	REMOTE WATER METER (SEE MECH. DRWG. FOR EXACT LOCATION)
⌋	SIAMESE CONNECTIONS (SEE MECH. DRWG. FOR EXACT LOCATION)
—	PROPOSED CURB
—	EXISTING CURB
—	DEPRESSED CURB
[Pattern]	UNIT PAVERS
[Pattern]	PEA GRAVEL
[Pattern]	LIGHT DUTY CONCRETE DRIVEWAY
[Pattern]	HEAVY DUTY CONCRETE DRIVEWAY
⊕	EXISTING TRAFFIC SIGN
□ CB	EXISTING CATCH BASIN
○ STMH	EXISTING STORM MANHOLE
○ SMH	EXISTING COMBINED MANHOLE
— 200# STORM	PROPOSED STORM SEWER
— 200# SANITARY	PROPOSED SANITARY SEWER
— 127# WATERMAIN	EXISTING WATERMAIN
— 200# WATERMAIN	PROPOSED WATERMAIN
⊕ 200x4x4	PROPOSED VALVE AND VALVE BOX
— 200x150REDUCER	PROPOSED REDUCER
⊕ HYD	EXISTING FIRE HYDRANT
— SN	EXISTING SIGN
⊕ WV	EXISTING WATER VALVE
○ SP	EXISTING WATER SERVICE STANDPOST
⊕ B-3	EXISTING BOREHOLE
[Pattern]	LIGHT DUTY PAVEMENT
[Pattern]	HEAVY DUTY PAVEMENT

ROAD STRUCTURES ASPHALT:
<b>LIGHT DUTY PAVEMENT</b> 50mm SUPER PAVE 12.5mm 150mm GRANULAR 'A' 300mm GRANULAR 'B'
<b>HEAVY DUTY PAVEMENT</b> 40mm SUPER PAVE 12.5mm 40mm SUPER PAVE 19mm 150mm GRANULAR 'A' 450mm GRANULAR 'B' TYPE II SEE NOTE 18.
ROAD STRUCTURES CONCRETE:
<b>LIGHT DUTY CONCRETE</b> 120mm CONCRETE 150mm GRANULAR 'A' 300mm GRANULAR 'B'
<b>HEAVY DUTY CONCRETE</b> 160mm CONCRETE 150mm GRANULAR 'A' 450mm GRANULAR 'B' TYPE II SEE NOTE 18.

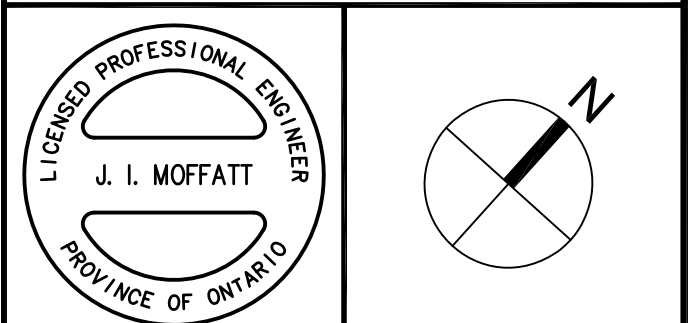


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1	ISSUED FOR SPA	JIM	12:07:27
No.	REVISIONS	By	Date



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

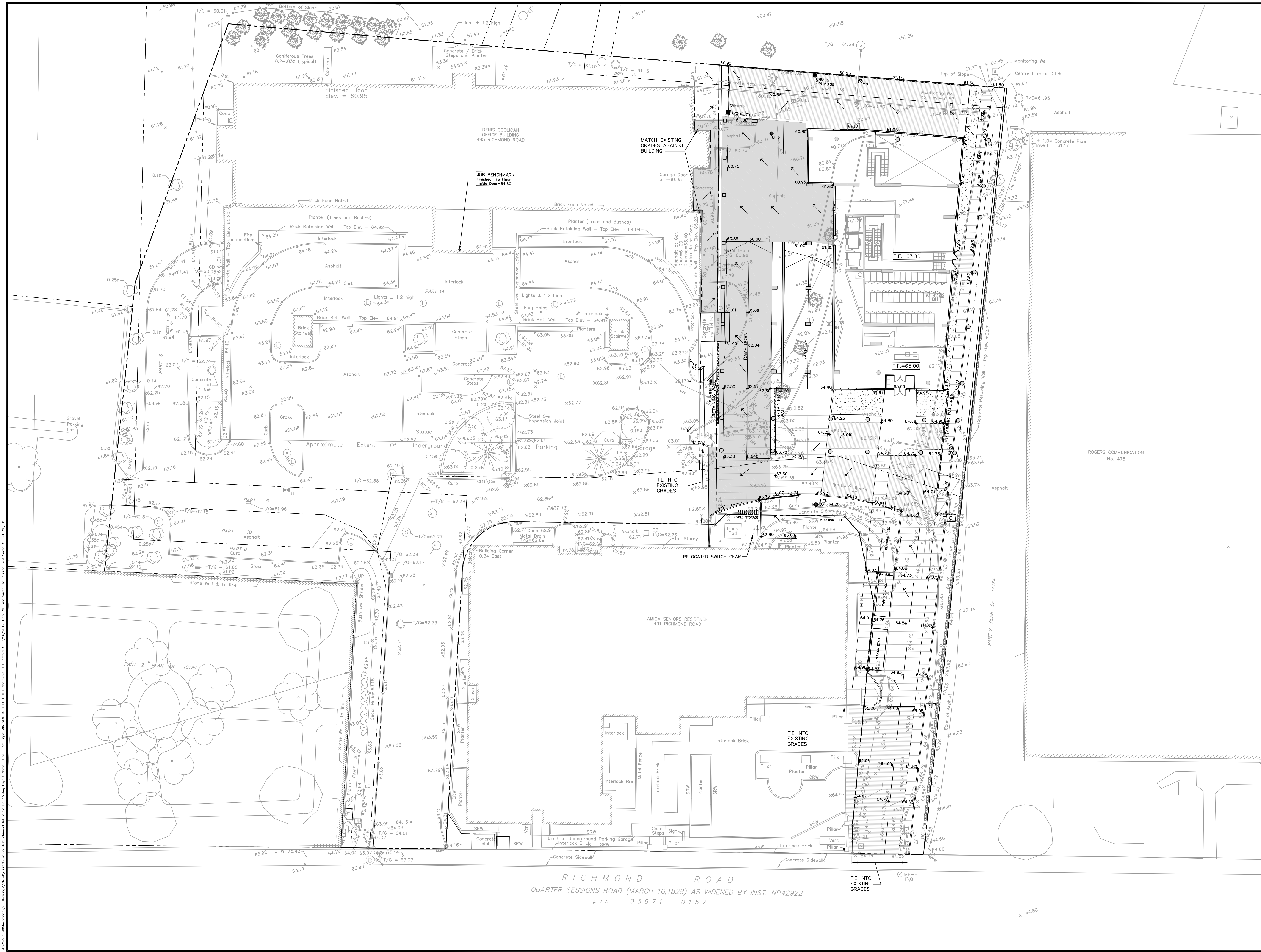
Project Title  
**485 RICHMOND ROAD**



**SITE SERVICING PLAN**



Design	J.I.M.	Date	MAY 2012
Drawn	D.P.S.	Checked	J.I.M.
Project No.	32385	Drawing No.	C-100



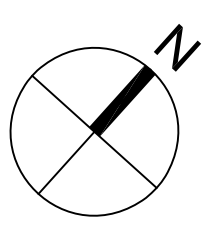
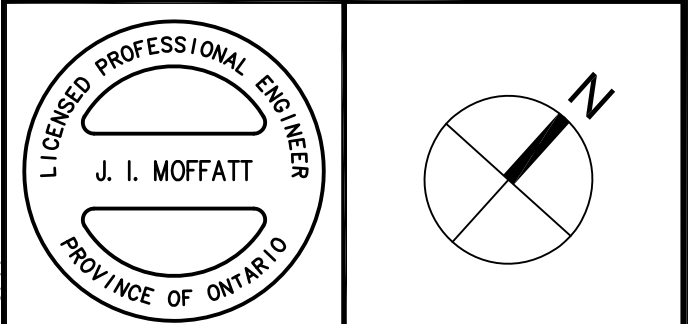
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 User: J.Moffatt  
 Scale: 1:1  
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 Plot User: J.Moffatt  
 Plot Scale: 1:1  
 Plot Size: 11.33 x 17.75  
 Plot Date: 11/26/2013 11:53 PM  
 Plot User: J.Moffatt  
 Plot Scale: 1:1

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1	ISSUED FOR SPA	JIM 12:07:27
No.	REVISIONS	By Date



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Project Title  
**485 RICHMOND ROAD**



Drawing Title  
**SITE GRADING PLAN**

Scale  
 1 : 250

Design	J.I.M.	Date	MAY 2012
Drawn	D.P.S.	Checked	J.I.M.
Project No.	32385	Drawing No.	C-200