REPORT
PROJECT: 122012-6.2.3

DESIGN BRIEF
3636 INNES ROAD
C/O AMERCO REAL ESTATE COMPANY
CITY OF OTTAWA

Prepared for AMERCO REAL ESTATE COMPANY
by IBI GROUP

FEBRUARY 18, 2020

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1 INTRODUCTION

1.1 Purpose

IBI has been retained by the Amerco Real Estate Company (U-Haul) to prepare detail design of private services to support the Site Plan Approval for 3636 Innes Road. The development is located in Orléans, a community in the east end of the City of Ottawa, formerly located in the City of Gloucester. The subject site is approximately 3.31 ha and consists of an existing two storey metal building, formerly a hardware store, three metal storage sheds and a large parking lot. The site is currently owned and maintained by U-Haul for its multi service offerings.

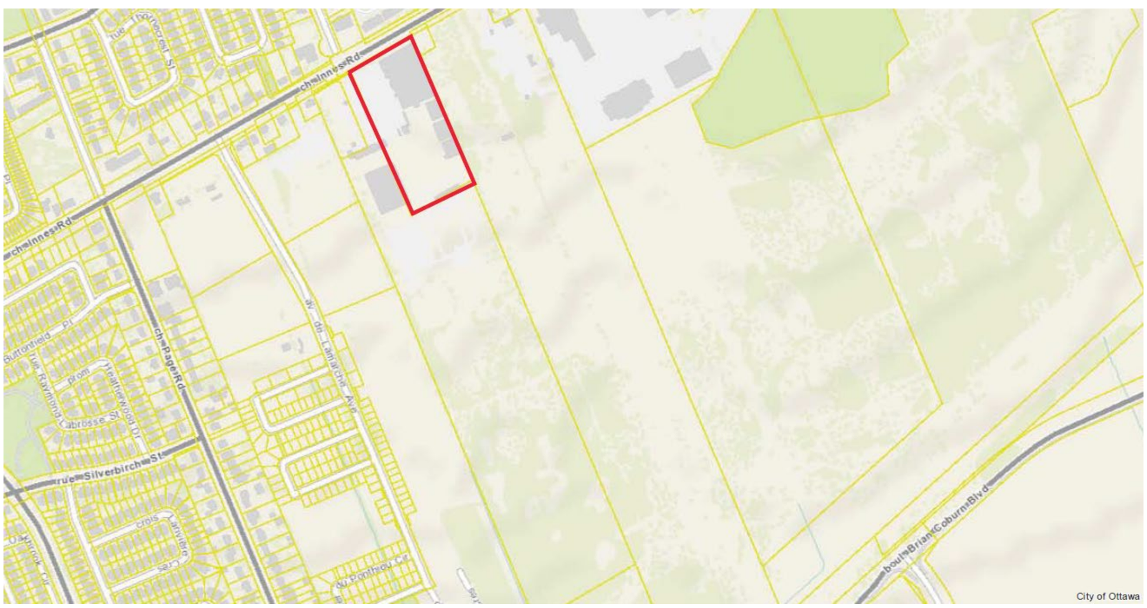
The site is bounded by Innes Road to the north, vacant future development lands to the south, and east, and an existing private road with access to Innes to the West.

U-Haul is proposing to construct a three-storey concrete and steel building for self-storage purposes on the 3.31 hectare site.

Refer to key plan on Figure 1.1 for property location.

A copy of the site plan is provided in **Appendix A**.

Figure 1.1 Site Location



1.2 Pre-consultation meeting

A pre-consultation meeting was held with the City of Ottawa on January 6, 2020. No major servicing constraints were noted in the meeting. City staff did reiterate that as a single parcel of land, they would only accept a single service to the site, unless substantial technical reasoning prohibited a single service. City noted that an ECA is probable given the industrial zoning of the site, regardless of whether industrial uses were being used.

2 WATER DISTRIBUTION

2.1 Existing Conditions

The subject property is located on Innes Road, where an existing 406mm diameter watermain runs along the north frontage of the site. An existing 200 mm diameter watermain runs from Innes Road to the site with an existing hydrant located within 20 meters of the proposed building. See General Plan of Services in **Appendix A** for details.

2.2 Design Criteria

2.2.1 Water Demands

Water demands have been calculated based on Table 4.2 – Ottawa Design Guidelines – Water Distribution. A consumption rate of 25,000 l/hectare/day is used for the commercial lands in the subject site.

A watermain demand calculation sheet is included in **Appendix A** and the total water demands are summarized as follows:

Average Daily	0.30 l/s
Maximum Daily	0.46 l/s
Peak Hourly	0.55 l/s

2.2.2 System Pressure

The 2010 City of Ottawa Water Distribution Guidelines 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 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 may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rate

As per the Ottawa Design Guidelines, fire flow requirements are to be calculated using the Fire Underwriters Survey (FUS) method. The FUS method requires the building area, type of construction, type of occupancy, use of sprinklers and exposures to adjacent buildings. The calculations result in a fire flow of 8,000 l/min for the site; a copy of the FUS calculation is included in **Appendix A**.

2.2.4 Boundary Conditions

A hydraulic boundary condition for the analysis was obtained from the City on Innes Road where the existing 200 mm watermain servicing the site connects to the existing 406 mm watermain on Innes Road.

A copy of the boundary condition is included in **Appendix A**, and they are summarized as follows:

SCENARIO	HGL (M) INNES ROAD	PRESSURE (PSI)
Maximum HGL (Basic Day)	130.5	56.3
Minimum HGL (Peak Hour)	127.5	51.9
Max Day + Fire Flow (8,000 L/m)	126.2	50.1

2.2.5 Hydraulic Model

A computer model for the subdivision has been developed using the InfoWater 12.4 program produced by Innovyze. The boundary conditions has been incorporated into the model at Node J10 which represents the connection between the 400 mm main on Innes Road and the existing 200 mm main servicing the site. Node J16 is at the end of the 200 mm watermain where there is an existing hydrant, fire flow analysis is carried out at this node. Node J14 is where the 50 mm water service enters the building, minimum and maximum pressures for the building are recorded at this node. The location of the nodes is shown on the water model schematic in **Appendix A.**

2.3 Proposed Water Plan

2.3.1 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Results of the hydraulic model are included in **Appendix A** and summarized as follows:

Results of the hydraulic analysis are summarized as follows:

SCENARIO	
Basic Day (Max HGL) Pressure (kPa)	387.8
Peak Hour Pressure (kPa)	356.0
Minimum Design Fire Flow @140 kPa Residual Pressure (l/s)	153.5

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

Maximum Pressure:	The pressure at the building for the basic day analysis is less than 552 kPa therefore pressure reducing control is not required for this building.
Minimum Pressure:	In the peak hour analysis the pressure at the building is greater than the required 276 kPa pressure.
Fire Flow:	Under the fire flow analysis the node adjacent to the existing hydrant has a design fire flow greater than the required 133 l/s (8,000 l/min) flow.

General Plan of Service in Appendix A illustrate the extension of a 50mm diameter water service to the proposed building. The existing fire hydrant is able to provide adequate fire flow for the site.

3 WASTEWATER

3.1 Existing Conditions and Studies

The existing building on the subject lands is serviced with a shallow 150mm diameter sanitary service. The service discharges into a private sewer on running parallel with the north property line. The private sewer outlets to the west, prior to discharging into a manhole on Innes Road. The sewer outlets north into a 300mm sanitary sewer in Boyer Street. The trunk sewer in Boyer continues north until it intersects with the St. Joseph Blvd trunk sewer. Eventually, sewage from the site reaches the R.O. Pickard Wastewater treatment plant. See General Plan of Service in **Appendix A** for details.

3.2 Capacity in Existing Sanitary Sewer

The existing private sewers were designed using an assumed criteria of 50,000 L/Ha/day with a Peaking factor of 1.5 for the commercial lands, which is based on the previous design capacities used by the City of Ottawa. The total existing peak flow from that site, including extraneous flow @ 0.28L/s/Ha is 3.97 L/s. The existing 150mm sewer, at 1.0% slope has a capacity of 15.89 L/s.

3.3 Design Criteria

All on-site sewers have been designed to City of Ottawa and MOE design criteria which include but are not limited to the below listed criteria.

Institutional/Commercial:	28,000 l/d/Ha
Institutional/Commercial Peak Factor:	1.5
Extraneous Flow:	0.33 l/s/Ha
Minimum Pipe Size:	200 mm diameter
Forcemain Pipe Size:	50 mm diameter
Maximum Velocity	3.0 m/s
Minimum Velocity	0.6 m/s

3.4 Design Flows Based on Updated Sewer Design Guidelines

The peak flow from the subject lands, based on the updated City of Ottawa Sewer Design Guidelines is 2.70 L/s. The updated design flow is less than the existing design flow, and less than the capacity of the existing service.

Notwithstanding the aforementioned calculations, the building specific flows are limited to 1 bathroom for visitors to the storage facility. The facility is intended to be un-manned, with the exception of daily cleaning staff. The City of Ottawa's Daily Sewage Flow for Various Types of Establishments Table, in Appendix A4-A does not have a reasonable comparable use for a large unmanned storage facility, however the waste water discharge from the new building is expected to be minimal and have a negligible impact on existing sewers.

3.5 Proposed Sanitary Service

As previously mentioned, the existing sewer is shallow, with approximately 1.8m of cover. The existing, and proposed grades of the subject lands generally fall from north to south. A 150mm diameter gravity sewer to the new building would have required the proposed building slab to be raised by a minimum of 1.5m and insulation provided. This would have resulted in a significant increase in site grading expense, would have subjected the existing metal storage buildings to flooding risks, and would have required grading transitions in order to connect with future road grades for the adjacent land owner (Glenview homes). As a result, an in-building sewage pump and a 50mm forcemain is proposed. The duplex sanitary sewage pump system and private forcemain is to be designed in accordance with City of Ottawa criteria. The pump, forcemain, check valve and pit are to be designed by a Mechanical Engineer licensed in the province of Ontario prior to Site Plan Approval. See General Plan of Service in **Appendix A** for the proposed location of the forcemain and connection to the existing sewer and the proposed building.

4 STORMWATER MANAGEMENT

4.1 Background

There is an existing 375mm diameter storm service connection to the site, which eventually drains to the existing 1475mm x 2310mm storm sewer trunk along Innes Road, and outlets north along Boyer Road. As a result of the East Urban Community Phase 3 CDP Master Servicing Study, prepared by DSEL, dated October 2019, the subject lands are to be entirely tributary to EUC SWM Pond #1. As a result, the existing 375mm storm connection will be abandoned. See General Plan of Service in **Appendix A** for details of the existing storm sewers.

The lands immediately downstream of the subject site, owned by Glenview Homes are to construct storm sewers suitably sized for the upstream lands, as per the MSS. Amerco Real Estate Company will enter into a cost sharing agreement with Glenview Homes for its share of the downstream storm sewers. Amerco will also be responsible for its fair share of the EUC SWM facility Pond #1.

The Glenview Homes subdivision, has provided the U-Haul site with a stormwater boundary condition of a restricted flow rate of 786.60 l/s, based on the 5-year storm event with a time of concentration of 12 minutes and a runoff coefficient of 0.90.

4.2 Objective

The purpose of this evaluation is to prepare the dual drainage design, including the minor and major system, for 3636 Innes Road development. The design includes the assignment of inlet control devices, on-site storage, maximum depth of surface ponding and hydraulic grade line analysis. The evaluation takes into consideration the design requirement of the existing stormwater management pond, City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01 and the June 2018 Technical Bulletin ISTB-2018-04.

4.3 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

• Design Storm	1:2 year return (Ottawa)
• Rational Method Sewer Sizing	
• Initial Time of Concentration	10 minutes
• Runoff Coefficients	
- Landscaped Areas	C = 0.25
- Building and Roof Area	C = 0.90
- Parking Area and Driveway	C = 0.90
• Pipe Velocities	0.80 m/s to 3.0 m/s
• Minimum Pipe Size	250 mm diameter (200 mm CB Leads)

4.4 System Concept

According to the current detail design report for the Glenview subdivision prepared by Novatech, the development of the downstream system omitted MSS requirement to provide an outlet for the subject property. Subsequently, Novatech has confirmed that capacity will be provided as per the MSS, at the aforementioned 5 year event, C=0.90 and a Tc=12min, see e-mail from Novatech dated February 10, 2020 in Appendix C. The existing storm sewers constructed adjacent to the site will be oversized to provide the needed capacity for minor storm runoff from the subject site. Minor storm runoff from the subject site will connect to the proposed 975mm storm sewer in Street 9 along the west side of the site. Copies of the storm design sheet and the conceptual storm sewer layout and tributary areas for 3636 Innes Road are provided in the **Appendix C**.

The downstream sewers are not sized for major flow from the site, therefore flows generated in excess of the 5 year up to 100 year event will be retained onsite. Flows in excess of 100 year will discharges onto the adjacent subdivision Street 9.

4.4.1 Dual Drainage Design

The dual drainage system proposed for the subject site will accommodate both major and minor stormwater runoff. Minor flow from the subject site will be conveyed through the storm sewer network and discharge into the proposed 975mmØ storm sewer in Street 9.

The balance of the surface flow not captured by the minor system will be conveyed via the major system. Where possible, storage will be provided in surface sags or low points within the parking lot and landscaped areas. Once the maximum storage is utilized, the excess flow from the catchment will cascade to the next downstream sag. Major flow up to 100-year storm event will be restricted and detained on-site. Emergency overflow will be directed towards Street 9.

4.4.2 Proposed Minor System

Using the criteria identified in Section 4.3, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in **Appendix C**. The general plan of services, depicting all on-site storm sewers can be found in **Appendix A**.

The owner of the site will be responsible for regular maintenance of the on-site sewers, catch basins and inlet control devices (ICDs). Maintenance includes but is not limited to the cost of regular cleaning of the structures and ICDs as necessary. The site owner will also be responsible for replacement of damaged or missing catch basin structures, grates or ICDs as needed.

In the absence of the Glenview storm trunk system, an improvement to the existing drainage ditch, or a new ditch will be required to be constructed to the south. This ditch will be located on Glenview lands. The ditch will be required to have a minimum cross section which is based on a minimum level of service of 786.60 l/s. Using the Manning's Formula from City of Ottawa sewer design guidelines 6.4.1., the ditch required will have a minimum depth of 0.8m, with 3:1 side slope and a longitudinal gradient of 0.1%. A ditch with these properties has a maximum flow rate of 1031.10 l/s. Refer to calculations in **Appendix C.**

4.5 Stormwater Management – Quality Control

Quality control will be provided by the EUC SWM Pond #1 previously constructed for the subject lands. No additional quality control measures are required on the site. It should be noted that the proposed building has a sloped roof, hence no roof top storage is available for the building.

4.6 Stormwater Management – Quantity Control (On-Site)

The subject site will be limited to a maximum minor system release rate of 786.60 l/s according to the design report being prepared by Novatech. This will be achieved through a combination of inlet control devices (ICD's) at inlet locations, surface storage where possible and underground storage tanks where required.

Surface flows in excess of the site's allowable release rate will be stored on site in strategic surface storage areas or underground storage tanks and gradually released into the minor system to respect the site's allowable release rate. The maximum surface retention depth located within the developed areas will be limited to 300mm during a 1:100 year event as show on the ponding plan located in **Appendix C** and grading plans located in **Appendix D.** There is one maximum ponding depth of 0.35m in the existing parking lot, which is still in line with current City of Ottawa guidelines for residential streets. 2 year, 5 year, 100 year and maximum ponding elevations are show on the ponding plan. Overland flow routes will be provided in the grading to permit emergency overland flow.

Along the north property line, due to the existing conditions adjacent to Innes Road, the opportunity to capture and store runoff is limited due to grading constraints and existing building geometry. These areas will discharge to Innes Road uncontrolled. The southwest portion of the existing parking lot will also be uncontrolled release with the current grading pattern. Additionally, the depressed loading bay of the new building will also require uncontrolled release.

Based on the proposed site plan, the total uncontrolled area has been calculated to be (0.09+0.01 +0.21) 0.31 ha. Refer to Drawing 500 in **Appendix D** for the detailed storm drainage area plan for the site.

Based on a 1:100 year event, the flow from the 0.31 Ha uncontrolled area can be determined as:

$\mathbf{Q_{uncontrolled}}$ = $\mathbf{2.78} \times \mathbf{C} \times \mathbf{i_{100yr}} \times \mathbf{A}$ where:

$\mathbf{C}$ = Average runoff coefficient = 0.9 (increased by 20%, use 1.0 max)

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= $1735.688 \times (T_c + 6.014)^{0.820}$ =178.56 mm/hr; where T_c = 10 minutes

$\mathbf{A}$ = Uncontrolled Area = 0.31 Ha

Therefore, the uncontrolled release rate can be determined as:

$\mathbf{Q_{uncontrolled}}$ = $\mathbf{2.78} \times \mathbf{C} \times \mathbf{i_{100yr}} \times \mathbf{A}$

= $2.78 \times 1.0 \times 178.56 \times 0.31$

= **153.88 L/s**

The maximum allowable release rate from the remainder of the site can then be determined as:

$\mathbf{Q_{max\ allowable}}$ = $\mathbf{Q_{restricted} - Q_{uncontrolled}}$

= 786.60 L/s – 153.88 L/s

= **632.72 L/s**

Based on the previously noted factors, the rest of the site will be limited to 632.72 l/s discharging rate with inlet control devices.

4.6.1 Parking Areas

The following table identifies the ICD type for each drainage area and corresponding storage requirements as noted in the modified rational method calculation included in **Appendix D**. The total restricted flow through the ICDs is 491.64 l/s. A detailed calculation of the underground storage volume is also included in **Appendix D**.

DRAINAGE AREA	ICD TYPE	RESTRICTED FLOW (L/s)	100yr STORAGE REQUIRED (m^3)	STORAGE PROVIDED (m^3)
CB 9 & 10	Custom 168mm Dia. Orifice	100.64	58.70	63.25
CB 1 & 2	Tempest HMF 152mm	75.20	26.10	27.25
MH 6	Custom 207mm Dia. Orifice	174.57	239.55	245.24
CB 7	Tempest HMF 83mm	22.94	15.72	39.15
CB 6	Custom 187mm Dia. Orifice	118.29	70.93	71.09
TOTAL	**-**	**491.64**	**507.72**	**540.98**

4.6.2 Roof Areas

The existing building has a flat roof, and for the purposed of this report, it has been assumed that the structure of the existing building is adequately designed and constructed to support the snow load in additional to the live load of the required rooftop storage. A letter from a structural engineer will be required prior to site plan approval. At the time of writing this report, winter 2020, the roof of the existing building was snow covered and counting roof drains would have been challenging. Prior to site plan approval, a review of the number of inlets, and their associated roof areas will need to be further analyzed. It is anticipated that the existing roof is currently draining uncontrolled, as it was constructed in the early 1980's.

Based on these assumptions, a very generous release rate has been applied to the existing building of 140 L/s. This would require a total 100year retention volume of 94.65m3.

Typically, the available storage on a flat roof building can be determined using 75% of the total roof area, with a maximum depth of 150mm. For the existing building, the roof area is approximately 6,000m2. This would provide an approximate storage volume of 225m3 [(6,000 x 0.15m x 75%) / 3].

The proposed building has a low slope flat roof, which drains from east to west, into a gutter and downspout system. The system discharges to surface onto the asphalt perimeter drive aisle. For stormwater management purposes, the area of the proposed building is included in the **CB6** drainage area.

4.6.3 Total Release

As previously mentioned, the total release rate from all on-site parking areas is 491.64 L/s and the total release rate for the existing building is 140 L/s. The total controlled release from the site is **631.64 L/s**, which is less than the aforementioned maximum allowable release rate of 632.72 L/s.

4.7 Low Impact Development

As per the discussions in the pre-consult with City Staff Will Curry, although the subject lands are tributary to Mud Creek, which is undergoing a Cumulative Impact Statement in regards to the impact on its reach from upstream development, it was agreed that the since the majority of the existing asphalt site area was left to discharge uncontrolled towards the south, that the redevelopment would not alter the existing conditions enough to warrant implementation of LIDs on this site.

5 SOURCE CONTROLS

5.1 General

Since an end of pipe treatment facility is provided for Glenview subdivision development, stormwater site management for the subject lands will focus on site level or source control management of runoff. Such controls or mitigative measures are proposed for this site not only for final development but also during construction. Some of these measures are:

- flat site grading;
- vegetation planting; and
- groundwater recharge in landscaped areas.

5.2 Site Grading

In accordance with local municipal standards, all grading will be between 1.0 and 6.0 percent for hard surfaces and 1.0 and 7.0 percent for all landscaped areas, or terracing and/or retaining walls will be implemented. A copy of the grading plan has been included in **Appendix D.**

5.3 Vegetation

As with most site plan agreements, the developer will be required to complete a vegetation and planting program. Vegetation will be provided where opportunities exist to re-create lost vegetation.

6 CONVEYANCE CONTROLS

6.1 General

Besides source controls, the site plan also proposes to use several conveyance control measures to improve runoff quality. These will include:

- flat vegetated swales; and
- catchbasin sumps.

6.2 Flat Vegetated Swales

The site plan will make use of relatively flat vegetated swales where possible to encourage infiltration and runoff treatment.

6.3 Catchbasins and Maintenance Hole Sumps

All catchbasins within the development will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Catchbasins will be to OPSD 705.02. All storm sewer maintenance holes on site shall be constructed with a 300 mm sump as per City standards.

6.4 Pervious Landscaped Area Drainage

Some of the landscaped area swales make use of a filter wrapped perforated drainage pipe constructed below the swales. This perforated system is designed to provide some ground water recharge and generally reduce both volumetric and pollutant loadings that enter the minor pipe system.

7 SEDIMENT AND EROSION CONTROL PLAN

7.1 General

During construction, existing stream and 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:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed in the existing manholes which connect to the existing downstream sewers;
- seepage barriers will be constructed in any temporary drainage ditches;
- filter cloths will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use; and
- Silt fence on the site perimeter.

7.2 Trench Dewatering

Although little groundwater is expected during construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

7.3 Bulkhead Barriers

Temporary ½ diameter bulkhead barriers will be constructed for the existing manholes at the property limits. This bulkhead will trap any sediment carrying flows thus preventing any construction-related contamination of the existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed and removed prior to top course asphalt being laid.

7.4 Seepage Barriers

The presence of road side ditches along Innes Road and the proximity of the proposed temporary ditch necessitate the installation of seepage barriers. These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with Drawing 900 in Appendix G. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

7.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures should be covered in some fashion to prevent sediment from entering the minor storm sewer system. Until landscaped areas are sodded or until parking lot is asphalted and curbed, all catchbasins and manholes will be constructed with a geotextile filter fabric located between the structure frame and cover. These will stay in place and be maintained during construction and build until it is appropriate to remove same.

7.6 Stockpile Management

During construction of any development similar to that proposed by the Owner, both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems or natural stream systems is needed.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern provided the previous noted seepage barriers are installed.

The parking lot granular materials are not stockpiled on site. They are immediately placed in the parking lot and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

8 GEOTECHNICAL RECOMMENDATION

At this time of preparing this report, the geotechnical engineer has not completed their investigation report. When available, this report and drawings will be updated to include the geotechnical recommendations.

9 CONCLUSIONS

Water, wastewater and stormwater systems required to develop 3636 Innes Road will be designed in accordance with MOE and City of Ottawa's current level of service requirements.

The use of lot level control outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- Site Plan Approval: City of Ottawa
- Water Data Card: City of Ottawa

Report Prepared By:

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PROVINCE OF ONTARIO

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APPENDIX A

American National

Commercial Real Estate
Due Diligence Management
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www.amnational.net

ALTA/NSPS Land Title Survey

U-HAUL CO. (CANADA) LTD. U-HAUL CO. (CANADA) LTEE
3636 INNES ROAD
OTTAWA, ONTARIO

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2046609

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

Surveyor's Certificate :

I CERTIFY THAT :
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH *THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT* AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 21th DAY OF FEBRUARY, 2018.

MACKAY, MACKAY & PETERS LIMITED

MARCH 27, 2018
DATE

PER: ROSS A. CLARKE
ONTARIO LAND SURVEYOR

TO: U-HAUL CO. (CANADA) LTD.; U-HAUL CO. (CANADA) LTEE; DS LAWYERS CANADA LLL; AMERCO REAL ESTATE COMPANY, A NEVADA CORPORATION.

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 1, 2, 3, 5, 4, 6a, 6b, 7a, 7b1, 7c, 8, 9, 10a, 11, 13, 14, 16, 17, 18, 19, 20 AND 21 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON 21th DAY OF FEBRUARY, 2018.

ROSS A. CLARKE — MARCH 27, 2018

DATE OF PLAT OR MAP:
REGISTERED SURVEYOR:
ONTARIO LAND SURVEYOR No.: 1201
PROVINCE OF ONTARIO
DATE OF LAST REVISION: MARCH 27, 2018
DATE PRINTED: MARCH 27, 2018
PROJECT NO.: 18-018

MACKAY MACKAY & PETERS LIMITED
Established 1906

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Records of Sewell & Sewell and Yates & Yates LTD.

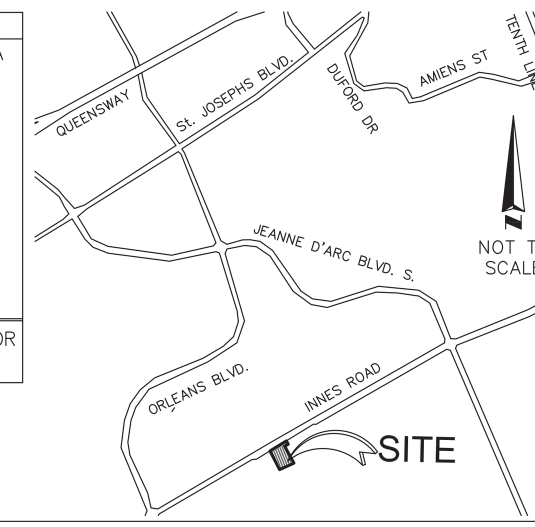
amec foster wheeler

Zoning Notes

NOTES: CITY OF OTTAWA ZONING BY-LAW 2008-250 - IL2 H(14)

ITEM	REQUIRED	OBSERVED	STATUS
PERMITTED USE	PUBLIC STORAGE FACILITY		SOURCE: CITY OF OTTAWA
MINIMUM LOT AREA	0.49 Acres	8.47 Acres	
MINIMUM LOT FRONTAGE	N/A	504.26'	
MAX LOT COVERAGE	65%	23.9%	
MAX BUILDING HEIGHT	45.93'	see plan	
MINIMUM SETBACKS			
FRONT	24.61'	33.50'	
SIDE ONE	24.61'	5.07'	
OTHER	24.61'	177.29'	
REAR (ABUTTING HYDRO)	11.48'	171.66'	
PARKING REQUIREMENTS	ONE PARKING SPACE PER 1076.3 sq.ft. GROSS FLOOR AREA		

Vicinity Map



INTEGRATION DATA			
OBSERVED REFERENCE POINTS (ORB's): UTM ZONE 17, NAD83 (CSRS) (2010.0). COORDINATES ARE TO AN URBAN ACCURACY PER SECTION 14(2) OF O.REG. 216/10			
POINT ID	**NORTHING**	**EASTING**	**ELEVATION**
A	16512228.27'	1506548.25'	299.50'
B	16511602.70'	1507242.70'	295.36'
CAUTION: COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.			

"IMPERIAL" DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN FEET AND CAN BE CONVERTED TO METRES BY MULTIPLYING BY 0.3048

Legal Description

SURVEYOR'S REAL PROPERTY REPORT
WITH TOPOGRAPHIC FEATURES
PLAN OF
PART OF LOT 4
CONCESSION 3 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
BEING IN THE
CITY OF OTTAWA
MacKAY, MacKAY & PETERS LIMITED – ONTARIO LAND SURVEYORS
SCALE 1":50'

0 50 100 150 200 250 FEET

REPORT SUMMARY BEING PART 2 (to be read in conjunction with Plan being Part 1)
LAND REGISTRY OFFICE TITLE INFORMATION ON SUBJECT PROPERTY INCLUDING BOUNDARIES, EASEMENTS AND RIGHT OF WAYS – DATE MARCH 06, 2018.

REGISTERED EASEMENTS AND/OR RIGHT-OF-WAY:
SUBJECT TO EASEMENTS AS SET OUT IN INSTRUMENT OC1970226
TOGETHER WITH EASEMENT AS SET OUT IN INSTRUMENT OC1970226

REGISTERED OWNER: U-HAUL CO. (CANADA) LTD. U-HAUL CO. (CANADA) LTEE (TRANSFERRED BY INST. No. OC1970226)

CERTIFICATE OF TITLE: PARCEL REGISTRY PIN 04404-1581 FOR THE LAND TITLES DIVISION OF THE REGISTRY OFFICE OF OTTAWA-CARLETON (4)

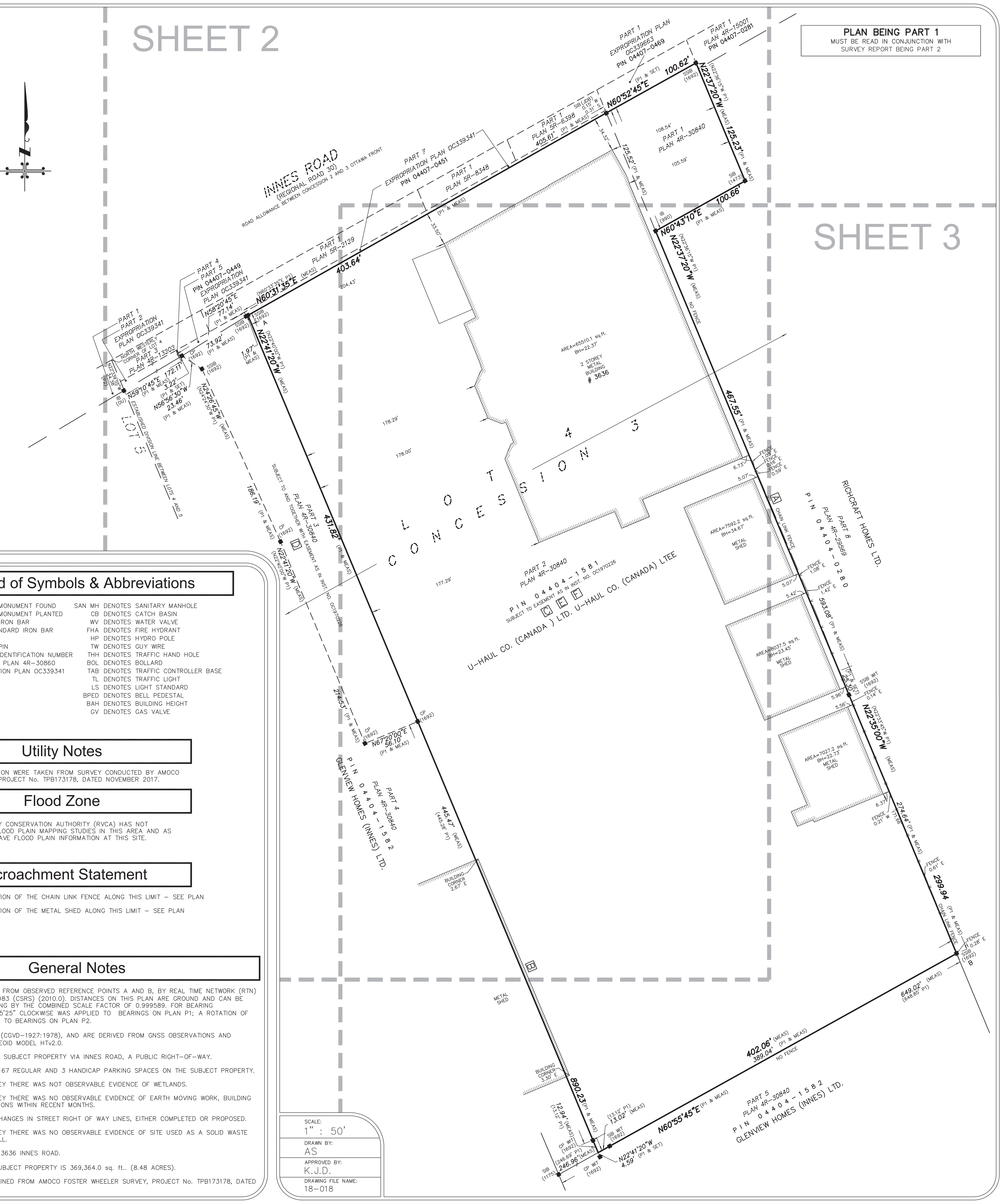
LEGAL DESCRIPTION: PART OF LOT 4, CONCESSION 3 (OTTAWA FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER; BEING PARTS 1 AND 2 ON PLAN 4R-30840

ENCUMBRANCES:
- C SUBJECT TO AN EASEMENT AS SET OUT IN INST. No. OC1970226 DESIGNATED AS PARTS 1 AND 2, PLAN 4R-30840 IN FAVOUR OF THE GLENVIEW HOMES (INNES) LTD. FOR THE PURPOSE OF WATER AND UTILITY LINES.
- D TOGETHER WITH AN EASEMENT AS SET OUT IN INST. No. OC1970226 DESIGNATED AS PART 3, PLAN 4R-30840 FOR THE PURPOSE OF ACCESS AND STORM AND SANITARY LINES.
- E SUBJECT TO A NOTICE OF OPTION TO PURCHASE AS IN INST. No. OC1970233 (EXPIRES FEBRUARY 1, 2028)
- F SUBJECT TO A NOTICE OF LEASE AS IN INST. No. OC1970234 (EXPIRES FEBRUARY 1, 2028)

Surveyor's As-Surveyed Written Description

COMMENCING AT THE NORTHWEST CORNER OF PART 2, PLAN 4R-30840,
-THENCE NORTHEASTERLY N60°31'35"E, 403.64',
-THENCE NORTHEASTERLY N60°52'45"E, 100.62',
-THENCE SOUTHEASTERLY S22°37'20"E, 125.23',
-THENCE SOUTHWESTERLY S60°43'10"W, 100.66',
-THENCE SOUTHEASTERLY S22°37'20"E, 467.55',
-THENCE SOUTHEASTERLY S22°35'00"E, 299.94,
-THENCE SOUTHWESTERLY S60°55'45"W, 402.06'
-THENCE NORTHWESTERLY N22°41'20"W, 890.23' TO THE POINT OF COMMENCEMENT.

PLAN BEING PART 1
MUST BE READ IN CONJUNCTION WITH SURVEY REPORT BEING PART 2



SCALE: 1" : 50'
DRAWN BY: AS
APPROVED BY: K.J.D.
DRAWING FILE NAME: 18-018

Legend of Symbols & Abbreviations

■ DENOTES A SURVEY MONUMENT FOUND	SAN MH DENOTES SANITARY MANHOLE
□ DENOTES A SURVEY MONUMENT PLANTED	CB DENOTES CATCH BASIN
SIB DENOTES STANDARD IRON BAR	WV DENOTES WATER VALVE
SSIB DENOTES SHORT STANDARD IRON BAR	FHA DENOTES FIRE HYDRANT
IB DENOTES IRON BAR	HP DENOTES HYDRO POLE
CP DENOTES CONCRETE PIN	TW DENOTES GUY WIRE
PIN DENOTES PROPERTY IDENTIFICATION NUMBER	THH DENOTES TRAFFIC HAND HOLE
P1 DENOTES REGISTERED PLAN 4R-30860	BOL DENOTES BOLLARD
P2 DENOTES EXPROPRIATION PLAN OC339341	TAB DENOTES TRAFFIC CONTROLLER BASE
	TL DENOTES TRAFFIC LIGHT
	LS DENOTES LIGHT STANDARD
	BPED DENOTES BELL PEDESTAL
	BAH DENOTES BUILDING HEIGHT
	GV DENOTES GAS VALVE

Utility Notes

UTILITIES INFORMATION WERE TAKEN FROM SURVEY CONDUCTED BY AMOCO FOSTER WHEELER, PROJECT No. TPB173178, DATED NOVEMBER 2017.

Flood Zone

THE RIDEAU VALLEY CONSERVATION AUTHORITY (RVCA) HAS NOT CONDUCTED ANY FLOOD PLAIN MAPPING STUDIES IN THIS AREA AND AS SUCH DOES NOT HAVE FLOOD PLAIN INFORMATION AT THIS SITE.

Encroachment Statement

- A NOTE THE LOCATION OF THE CHAIN LINK FENCE ALONG THIS LIMIT – SEE PLAN
- B NOTE THE LOCATION OF THE METAL SHED ALONG THIS LIMIT – SEE PLAN

General Notes

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0). DISTANCES ON THIS PLAN ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999589. FOR BEARING COMPARISONS, A ROTATION OF 1°05'25" CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN P1; A ROTATION OF 1°04'25"E CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN P2.

ELEVATIONS ARE GEODETIC ORIGIN (CGVD-1927:1978), AND ARE DERIVED FROM GNSS OBSERVATIONS AND NATURAL RESOURCES CANADA'S GEOID MODEL HTv2.0.

THERE IS DIRECT ACCESS TO THE SUBJECT PROPERTY VIA INNES ROAD, A PUBLIC RIGHT-OF-WAY.

THERE ARE A TOTAL NUMBER OF 167 REGULAR AND 3 HANDICAP PARKING SPACES ON THE SUBJECT PROPERTY.

ON THE DATE OF THE FIELD SURVEY THERE WAS NOT OBSERVABLE EVIDENCE OF WETLANDS.

ON THE DATE OF THE FIELD SURVEY THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS WITHIN RECENT MONTHS.

SURVEYOR IS UNAWARE OF ANY CHANGES IN STREET RIGHT OF WAY LINES, EITHER COMPLETED OR PROPOSED.

ON THE DATE OF THE FIELD SURVEY THERE WAS NO OBSERVABLE EVIDENCE OF SITE USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.

THE POSTED ADDRESS ON SITE IS 3636 INNES ROAD.

THE GROSS LAND AREA OF THE SUBJECT PROPERTY IS 369,364.0 sq. ft.. (8.48 ACRES).

ALL TOPOGRAPHY DATA WAS OBTAINED FROM AMOCO FOSTER WHEELER SURVEY, PROJECT No. TPB173178, DATED NOVEMBER 2017.

LEGAL DESCRIPTION

PLAN OF
PART OF LOT 4
CONCESSION 3 (OTTAWA FRONT)

GEOGRAPHIC TOWNSHIP OF GLOUCESTER
BEING IN THE BEING PARTS 1 AND 2 ON PLAN 4R-30840

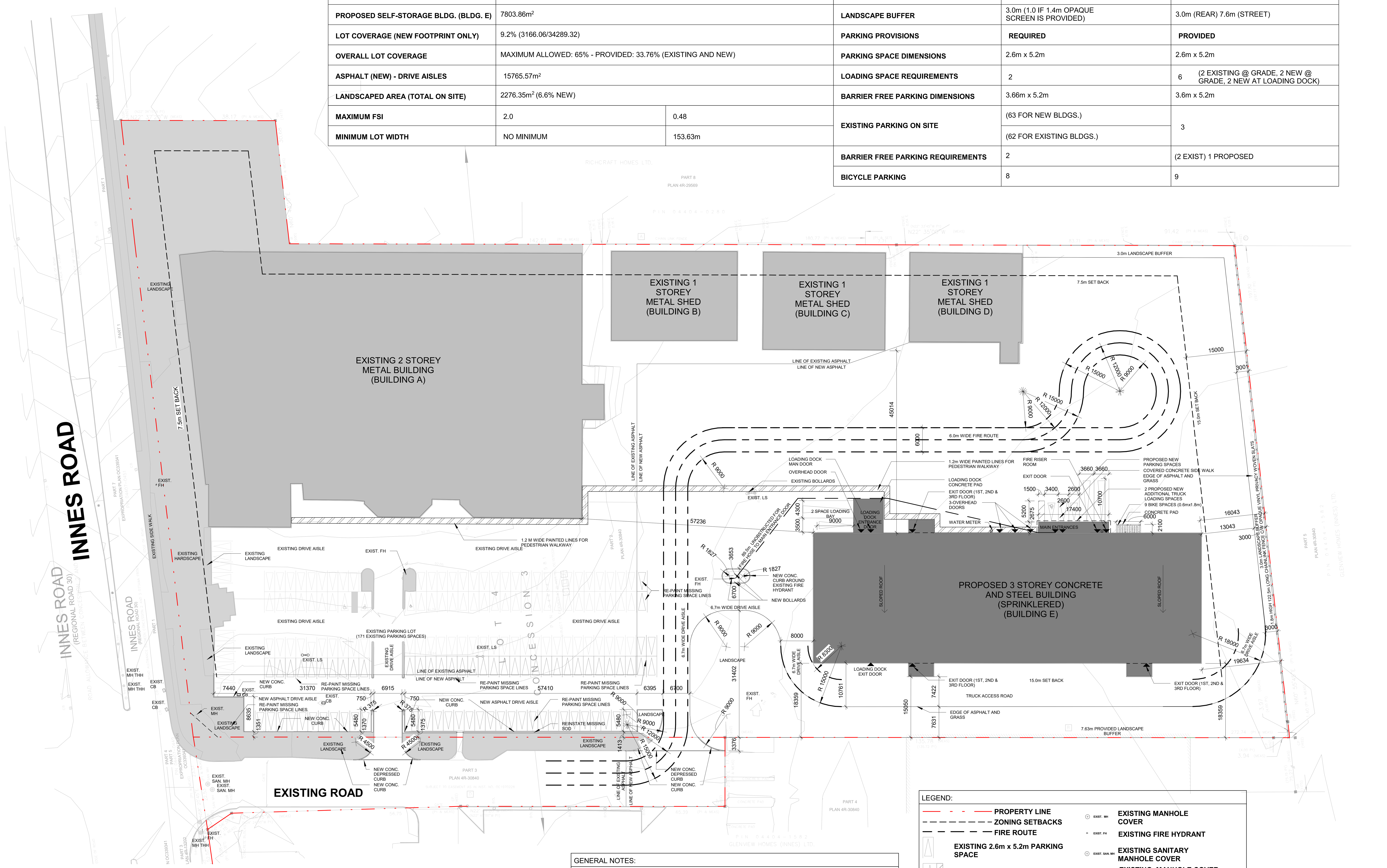
CITY OF OTTAWA

MacKAY, MacKAY & PETERS LIMITED - ONTARIO LAND SURVEYORS

SITE STATISTICS: 3636 INNES ROAD

CURRENT ZONING	IL2	
SITE AREA (AS PER SURVEY)	34289.32m²	
EXISTING GFA TYPES	AREA IN SQUARE METRES	
EXISTING SELF-STORAGE BLDG. (BLDG. A)	6576.93m²	
EXISTING SELF-STORAGE BLDG. (BLDG. B)	683.95m²	
EXISTING SELF-STORAGE BLDG. (BLDG. C)	725m²	
EXISTING SELF-STORAGE BLDG. (BLDG. D)	630.75m²	
NEW GFA TYPE	AREA IN SQUARE METRES	
PROPOSED SELF-STORAGE BLDG. (BLDG. E)	7803.86m²	
LOT COVERAGE (NEW FOOTPRINT ONLY)	9.2% (3166.06/34289.32)	
OVERALL LOT COVERAGE	MAXIMUM ALLOWED: 65% - PROVIDED: 33.76% (EXISTING AND NEW)	
ASPHALT (NEW) - DRIVE AISLES	15765.57m²	
LANDSCAPED AREA (TOTAL ON SITE)	2276.35m² (6.6% NEW)	
MAXIMUM FSI	2.0	0.48
MINIMUM LOT WIDTH	NO MINIMUM	153.63m

ZONING PROVISIONS		
SETBACK REQUIREMENTS	REQUIRED	PROVIDED
FRONT YARD	7.5m	7.5m
REAR YARD	7.5m (15.0m ABUTTING RESIDENTIAL)	15.0m
INTERIOR SIDE YARD	7.5m(15.0m ABUTTING RESIDENTIAL)	15.0m
EXTERIOR YARD	7.5m (15.0m ABUTTING RESIDENTIAL)	15.0m
MAXIMUM HEIGHT	14.0m	10.26m
AMENITY SPACE REQUIREMENT	N/A	N/A
LANDSCAPE BUFFER	3.0m (1.0 IF 1.4m OPAQUE SCREEN IS PROVIDED)	3.0m (REAR) 7.6m (STREET)
PARKING PROVISIONS	REQUIRED	PROVIDED
PARKING SPACE DIMENSIONS	2.6m x 5.2m	2.6m x 5.2m
LOADING SPACE REQUIREMENTS	2	6 (2 EXISTING @ GRADE, 2 NEW @ GRADE, 2 NEW AT LOADING DOCK)
BARRIER FREE PARKING DIMENSIONS	3.66m x 5.2m	3.6m x 5.2m
EXISTING PARKING ON SITE	(63 FOR NEW BLDGS.) (62 FOR EXISTING BLDGS.)	3
BARRIER FREE PARKING REQUIREMENTS	2	(2 EXIST) 1 PROPOSED
BICYCLE PARKING	8	9



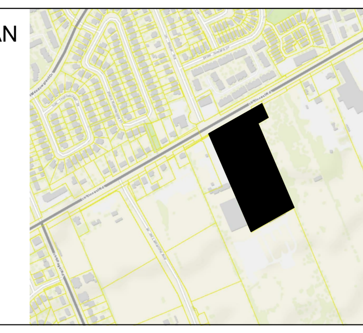
CLIENT
U-Haul CO. (Canada) LTD.

526 Grays Road, Hamilton, ON.
L8E 2Z4

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR SITE PLAN CONTROL APPLICATION	2020-02-05

KEYPLAN



CONSULTANTS

ARCHITECTURE: IBI GROUP - OTTAWA
333 PRESTON STREET UNIT 400,
OTTAWA, ON K1S 5N4

CIVIL: IBI GROUP - OTTAWA
333 PRESTON STREET UNIT 400,
OTTAWA, ON K1S 5N4

PLANNING : IBI GROUP - KINGSTON
650 DALTON AVENUE
KINGSTON, ON K7M 8N7

LANDSCAPE: IBI GROUP - TORONTO
7TH FL - 55 ST. CLAIR AVENUE WEST
TORONTO, ON M4V 2Y7

SEAL

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

PROJECT
U-Haul Storage
3636 Innes Road,
Ottawa, ON
K1C

PROJECT NO: 122637	
DRAWN BY: S.K.	CHECKED BY: Y. Bilbeisi
PROJECT MGR: S.K.	APPROVED BY: Heather Semple

SHEET TITLE
Site Plan

SHEET NUMBER AS-001
ISSUE 1

GENERAL NOTES:

1. FOR NEW TIE-IN SERVICES ON THE NORTH PART OF THESITE, REFER TO CIVIL FOR EXTENT OF CUT LINE LOCATIONS. EXISTING CURBS IN THIS AREA ARE TO BE DEMOLISHED AND REINSTATED IN THE APPROX. LOCATION ON THE SITE PLAN.
2. FOR EXISTING PARKING SPACES ON THE SITE THAT ARE BEING TEMPORARILY REMOVED, SITE MEASURE SPOTS, AND REINSTATE WITH PAINTED LINES WHEN NEW ASPHALT IS INSTALLED.
3. FOR EXACT POSITIONING OF EXISTING BUILDINGS TO THE PROPERTY LINES, REFER TO THE LEGAL SURVEY.

LEGEND:

- PROPERTY LINE
- ZONING SETBACKS
- FIRE ROUTE
- EXISTING 2.6m x 5.2m PARKING SPACE
- EXISTING 3.4m + 1.5m x 5.2m BARRIER FREE PARKING SPACE
- EXISTING LIGHT STANDARD
- EXIT OR ENTRANCE (REFER TO SITE PLAN FOR ADDITIONAL NOTES
- 0.6mx1.8m BICYCLE PARKING SPACE
- EXISTING MANHOLE COVER
- EXISTING FIRE HYDRANT
- EXISTING SANITARY MANHOLE COVER
- EXISTING MANHOLE COVER THH
- EXISTING CATCH BASIN
- PAINTED LINES FOR PEDESTRIAN WALK WAY
- PROPOSED SIAMESE CONNECTION
- PROPOSED WATER METER

0 10 25 50 m
Scale 1:500

True North Project North

2020-02-07 3:46:13 PM

C:\Users\scott.kipp\Documents\REVIT2018\UHU-07-NewBldg_scott.kipp.rvt

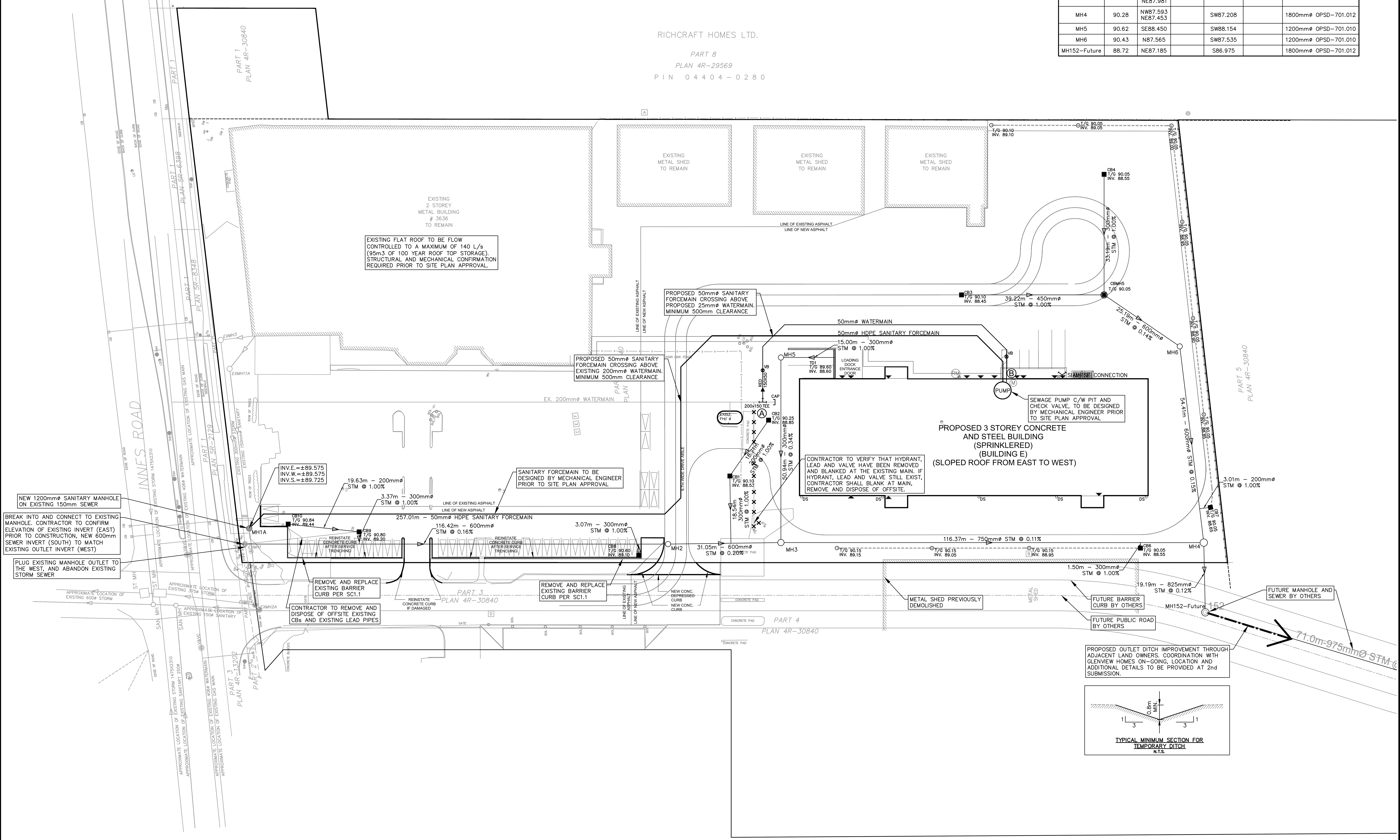
WATERMAIN SCHEDULE

	Station	Description	Finished Grade	Top of Watermain	As Built Watermain
A	0+000.00	200X150 TEE	90.380m	87.980m	
	0+003.93	RED 150X50	90.472m	88.072m	
	0+008.75	VB	90.584m	88.184m	
	0+015.28	BEND	90.719m	88.319m	
	0+023.77	BEND	90.632m	88.232m	
	0+043.77		90.428m	88.028m	
	0+063.77		90.394m	87.994m	
	0+078.00	BEND	90.399m	87.999m	
	0+087.70	BEND	90.679m	88.279m	
	0+089.64	VB	90.724m	88.324m	
B	0+096.54	BUILDING CONNECTION	90.775m	88.375m	

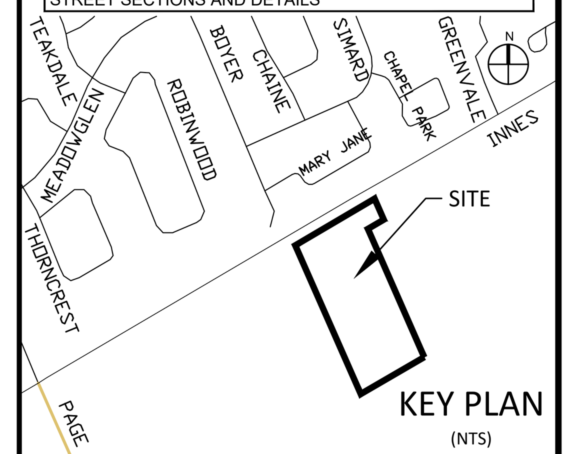
DRAINAGE AREA	ICD TYPE	RESTRICTED FLOW (L/s)	100yr STORAGE REQUIRED (m^3)	STORAGE PROVIDED (m^3)
CB 9 & 10	Custom 168mm Dia. Orifice	100.64	58.7	63.25
CB 1 & 2	Tempest HMF 152mm	75.2	26.1	27.25
MH 6	Custom 207mm Dia. Orifice	174.57	239.55	245.24
CB 7	Tempest HMF 83mm	22.94	15.72	39.15
CB 6	Custom 187mm Dia. Orifice	118.29	70.93	71.09
TOTAL	-	**491.64**	**507.72**	**540.98**

STM STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
CBMH5	90.05	NW88.058 NE88.218		S87.600		1200mmø OPSD-701.010
EXMH1	91.96	NE89.379		SE87.909 SW89.359		1200mmø OPSD-701.010
EXMH3	92.04	SE90.005		SW89.945		1200mmø OPSD-701.010
EXMH4	90.77	NE89.190				1200mmø OPSD-701.010
MH2	90.71	NW87.723		SE87.703		1200mmø OPSD-701.010
MH3	90.33	NW87.641 NE87.981		SE87.721		1500mmø OPSD-701.011
MH4	90.28	NW87.593 NE87.453		SW87.208		1800mmø OPSD-701.012
MH5	90.62	SE88.450		SW88.154		1200mmø OPSD-701.010
MH6	90.43	N87.565		SW87.535		1200mmø OPSD-701.010
MH152-Future	88.72	NE87.185		S86.975		1800mmø OPSD-701.012



SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
(NTS)

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	ISSUED FOR SPA	DGY	2020.02.18

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

Project Title

U-HAUL

3636 INNES ROAD

LICENSED PROFESSIONAL ENGINEER D. G. Yannoulopoulos 2020/02/18 PROVINCE OF ONTARIO

Drawing Title

GENERAL PLAN

OF SERVICES

Scale: 1 : 500

####

Design	Date
R.M./W.Z.	JANUARY 2020
Drawn	**Checked**
E.H.	DGY
Project No.	**Drawing No.**
122012	001

CITY PLAN No. ####

CITY FILE No. ####

WATERMAIN DEMAND CALCULATION SHEET

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

PROJECT : U-Haul Ottawa, 3636 Innes Road
CLIENT :

FILE:
DATE PRINTED: 18-Feb-20
DESIGN: W.Z.

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	TOWN HOUSE UNITS	MEDIUM DENSITY (ha)	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
Site						1.02			0.30	0.30		0.44	0.44		0.53	0.53	8,000

POPULATION DENSITY

Single Family	3.4 persons/unit
Semi Detached & Townhouse	2.7 persons/unit
Medium Density	1.8 persons/unit

WATER DEMAND RATES

Residential	350 l/cap/day
Commercial Shopping Center	2,500 L/(1000m2)/day

PEAKING FACTORS

Maximum Daily	
Residential	2.5 x avg. day
Commercial	1.5 x avg. day
Maximum Hourly	
Residential	2.2 x avg. day
Commercial	1.8 x avg. day

FIRE DEMANDS

Single Family	10,000 l/min (166.7 l/s)
Semi Detached & Townhouse	10,000 l/min (166.7 l/s)
Medium Density	15,000 l/min (250 l/s)

Fire Flow Requirement from Fire Underwriters Survey - U-Haul Ottawa, 3636 Innes Road

Building

Floor Area of Largest building	3,104	m^2
Storey	3	m^2
Total Floor Area	9,311	m^2

$F = 220C\sqrt{A}$

C	1.0		C =	1.5	wood frame
A	9,311	m^2		1.0	ordinary
				0.8	non-combustible
F	21,229	l/min		0.6	fire-resistive
use	21,000	l/min			

Occupancy Adjustment

			-25%	non-combustible
			-15%	limited combustible
Use	-25%		0%	combustible
			+15%	free burning
Adjustment	-5250	l/min	+25%	rapid burning
Fire flow	15,750	l/min		

Sprinkler Adjustment

			-30%	system conforming to NFPA 13
			-50%	complete automatic system
Use	-50%			
Adjustment	-7875	l/min		

Exposure Adjustment

Separation	Charge
0 to 3m	+25%
3.1 to 10m	+20%
10.1 to 20m	+15%
20.1 to 30m	+10%
30.1 to 45m	+5%

Building Face	Separation	Charge
north	Greater than 45	0%
east	Greater than 45	0%
south	Greater than 45	0%
west	Greater than 45	0%
Total		0%

Adjustment	-	l/min
Fire flow	7,875	l/min
Use	**8,000**	**l/min**
	133	**l/s**

BOUNDARY CONDITIONS

Boundary Conditions For: 3636 Innes Road

Date of Boundary Conditions: 2019-Aug-19

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	18	0.3
Maximum Daily Demand	28	0.5
Peak Hour	33	0.6
Fire Flow #1 Demand	8,000	133.3

Number Of Connections: 1

Location:

BOUNDARY CONDITIONS

Results:

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.5	56.3
Peak Hour	127.5	51.9
Max Day Plus Fire (8,000) L/min	126.2	50.1

[1]Elevation: **90.94 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:

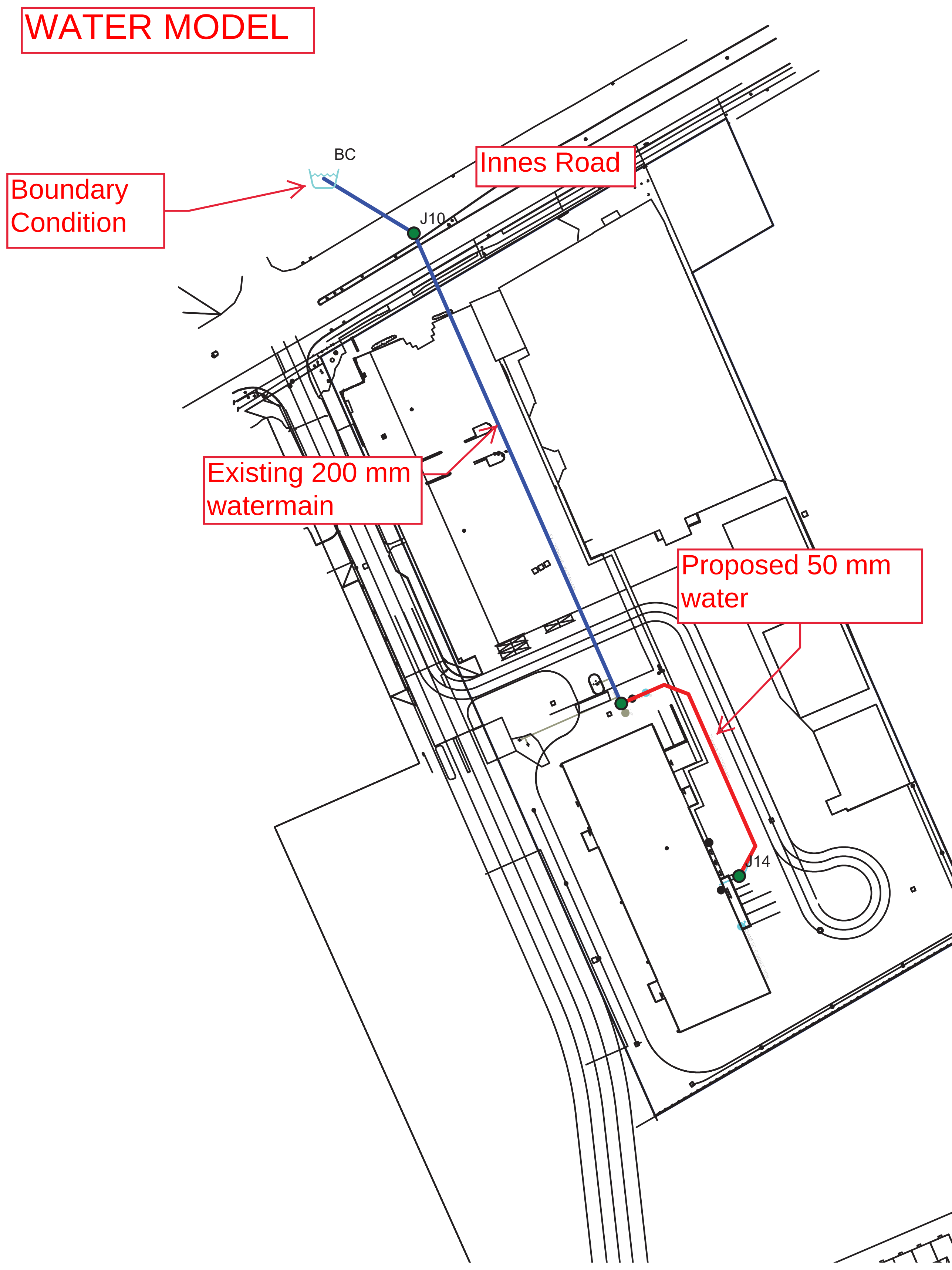
a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building,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

2) Click or tap here to enter text.

3) Click or tap here to enter text.

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.


WATER MODEL
BC
Boundary Condition
Innes Road
J10
Existing 200 mm watermain
Proposed 50 mm water
J14

Basic Day (Max HGL) HGL 130.5 m - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.00	91.50	130.50	382.17
2	☐	J14	0.30	90.80	130.38	387.83
3	☐	J16	0.00	90.40	130.50	392.95

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.00	91.50	127.50	352.77
2	☐	J14	0.55	90.80	127.12	355.95
3	☐	J16	0.00	90.40	127.50	363.54

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	J16	133.30	153.47	J16	139.96	104.68	153.47	139.96	140.14

Peak Hour HGL 127.5 m - 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
1	☐	P11	J10	BC	1.00	204.00	110.00	-0.55	0.02	0.00	0.01	Open	0
2	☐	P19	J16	J14	89.15	50.00	100.00	0.55	0.28	0.38	4.21	Open	0
3	☐	P21	J16	J10	167.93	204.00	110.00	-0.55	0.02	0.00	0.00	Open	0

APPENDIX B

APPENDIX C

DSEL
david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
CONCEPTUAL STORM SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	JUNE 2019
DRAWING No.	4

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

Manning 0.013

Ottawa

LOCATION			AREA (Ha) 2 YEAR				5 YEAR				10 YEAR				100 YEAR				FLOW						SEWER DATA								
Location	From Node	To Node	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Time of Conc. (min)	Intensity 2 Year (mm/h)	Intensity 5 Year (mm/h)	Intensity 10 Year (mm/h)	Intensity 100 Year (mm/h)	Peak Flow Q (l/s)	DIA. (mm) (actual)	DIA. (mm) (nominal)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min)	RATIO Q/Q full
	2085	2116	0.70	0.70	1.36	68.69			0.00	14.26			0.00	5.35			0.00	12.43	26.63	43.35	58.42	0.00	99.58	5049	3000	3000	CONC	0.10	119.5	14194	2.01	0.99	0.36
PARK			0.56	0.40	0.62	69.32			0.00	14.26			0.00	5.35			0.00	12.43															
			1.16	0.70	2.26	71.57			0.00	14.26			0.00	5.35	1.13	0.80	2.51	14.95															
			2.62	0.70	5.10	76.67			0.00	14.26			0.00	5.35			0.00	14.95															
FUTURE EXT. COMM.			2.77	0.90	6.93	83.60			0.00	14.26			0.00	5.35			0.00	14.95															
			0.00	0.00	0.00	83.60			0.00	14.26			0.00	5.35	2.94	0.80	6.54	21.48															
FUTURE EXT. COMM.			3.12	0.90	7.81	91.41			0.00	14.26			0.00	5.35			0.00	21.48															
			7.72	0.70	15.02	106.43			0.00	14.26			0.00	5.35			0.00	21.48															
			0.23	0.80	0.51	106.94			0.00	14.26			0.00	5.35			0.00	21.48															
			0.72	0.90	1.80	108.75			0.00	14.26			0.00	5.35			0.00	21.48															
			9.47	0.90	0.00	108.75			0.00	14.26			0.00	5.35	2.18	0.40	2.42	23.91					85L/s/Ha	805									
FUTURE E	2116	2117	0.24	0.80	0.53	109.28	0.89	0.90	2.23	16.49			0.00	5.35			0.00	23.91	27.62	42.31	57.01	0.00	97.17	8692	3000	3000	CONC	0.13	75.0	16183	2.29	0.55	0.54
	2117	2118	0.53	0.70	1.03	110.31			0.00	16.49			0.00	5.35			0.00	23.91	28.16	41.77	56.27	0.00	95.89	8633	3000	3000	CONC	0.13	85.0	16183	2.29	0.62	0.53
			0.30	0.70	0.58	110.89			0.00	16.49			0.00	5.35			0.00	23.91															
			0.64	0.70	1.25	112.14			0.00	16.49			0.00	5.35			0.00	23.91															
	2118	2119	1.26	0.70	2.45	114.59			0.00	16.49			0.00	5.35			0.00	23.91	28.78	41.17	55.46	0.00	94.49	8696	3000	3000	CONC	0.10	80.5	14194	2.01	0.67	0.61
FUTURE EXT. COMM.			5.63	0.90	14.09	128.68			0.00	16.49			0.00	5.35			0.00	23.91															
FUTURE EXT. MED.			0.00	0.00	0.00	128.68			0.00	16.49			0.00	5.35	0.95	0.80	2.11	26.02															
PARK			1.16	0.40	1.29	129.97			0.00	16.49			0.00	5.35			0.00	26.02															
			2.86	0.70	5.57	135.53			0.00	16.49			0.00	5.35			0.00	26.02															
			0.00	0.00	0.00	135.53			0.00	16.49			0.00	5.35	0.95	0.80	2.11	28.13															
	2119	2120	7.33	0.70	14.26	149.80	0.49	0.90	1.23	17.71			0.00	5.35			0.00	28.13	29.45	40.54	54.60	0.00	93.03	10463	3000	3000	CONC	0.10	47.0	14194	2.01	0.39	0.74
	2120	2121	0.41	0.70	0.80	150.60			0.00	17.71			0.00	5.35			0.00	28.13	29.84	40.19	54.12	0.00	92.20	10409	3000	3000	CONC	0.10	84.5	14194	2.01	0.70	0.73
	2121	2142	1.13	0.70	2.20	152.79			0.00	17.71			0.00	5.35			0.00	28.13	29.84	40.19	54.12	0.00	92.20	10498	3000	3000	CONC	0.10	76.0	14194	2.01	0.63	0.74
To TRUNK 2						152.79				17.71				5.35				28.13	30.54														
TRUNK 2																																	
	2201	2202	6.77	0.80	15.06	15.06			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	0.00	178.56	1156	1350	1350	CONC	0.10	110.0	1688	1.18	1.55	0.69
	2202	2203	0.00	0.00	0.00	15.06			0.00	0.00			0.00	0.00			0.00	0.00	11.55	71.31	96.64	0.00	165.49	1074	1350	1350	CONC	0.10	110.0	1688	1.18	1.55	0.64
			0.40	0.80	0.89	15.95			0.00	0.00			0.00	0.00			0.00	0.00															
	2203	2204	4.64	0.40	5.16	21.11			0.00	0.00			0.00	0.00			0.00	0.00	13.11	66.62	90.21	0.00	154.38	1406	1350	1350	CONC	0.10	110.0	1688	1.18	1.55	0.83
	2204	2205	0.89	0.80	1.98	23.09			0.00	0.00			0.00	0.00			0.00	0.00	14.66	62.57	84.66	0.00	144.79	1444	1350	1350	CONC	0.12	110.0	1849	1.29	1.42	0.78
	2205	2206	0.83	0.80	1.85	24.93			0.00	0.00			0.00	0.00			0.00	0.00	16.08	59.32	80.21	0.00	137.12	1479	1350	1350	CONC	0.12	110.0	1849	1.29	1.42	0.80
	2206	2207	1.03	0.80	2.29	27.22			0.00	0.00			0.00	0.00			0.00	0.00	17.50	56.43	76.26	0.00	130.30	1536	1500	1500	CONC	0.10	109.5	2235	1.26	1.44	0.69
	2207	2208	0.00	0.00	0.00	27.22			0.00	0.00			0.00	0.00			0.00	0.00	18.95	53.79	72.65	0.00	124.09	1464	1500	1500	CONC	0.10	92.0	2235	1.26	1.21	0.66
	2208	2209	1.48	0.80	3.29	30.51			0.00	0.00			0.00	0.00			0.00	0.00	20.16	51.78	69.91	0.00	119.36	1580	1500	1500	CONC	0.10	91.5	2235	1.26	1.21	0.71
	2209	2210			0.00	30.51	0.39	0.90	0.98	0.98			0.00	0.00			0.00	0.00	21.36	49.94	67.39	0.00	115.03	1589	1500	1500	CONC	0.10	91.5	2235	1.26	1.21	0.71
	2210	2211	0.00	0.00	0.00	30.51			0.00	0.98			0.00	0.00			0.00	0.00	22.57	48.23	65.07	0.00	111.04	1535	1500	1500	CONC	0.10	35.0	2235	1.26	0.46	0.69
	2211	2212	3.97	0.80	8.83	39.34			0.00	0.98			0.00	0.00			0.00	0.00	23.03	47.62	64.23	0.00	109.59	1936	1650	1650	CONC	0.10	35.0	2882	1.35	0.43	0.67
	2212	2136	0.10	0.70	0.19	39.54			0.00	0.98			0.00	0.00			0.00	0.00	23.46	47.05	63.47	0.00	108.27	1922	1650	1650	CONC	0.10	35.0	2882	1.35	0.43	0.67
			0.35	0.70	0.68	40.22			0.00	0.98			0.00	0.00			0.00	0.00															
	2136	2138	1.21	0.70	2.35	42.57			0.00	0.98			0.00	0.00			0.00	0.00	23.03	47.62	64.23	0.00	109.59	2090	1800	1800	CONC	0.10	90.5	3635	1.43	1.06	0.57
			0.37	0.70	0.72	43.29			0.00	0.98			0.00	0.00			0.00	0.00															
	2138	2139	0.67	0.70	1.30	44.60			0.00	0.98			0.00	0.00			0.00	0.00	24.09	46.27	62.40	0.00	106.43	2124	1800	1800	CONC	0.10	77.0	3635	1.43	0.90	0.58
	2139	2140	0.37	0.70	0.72	45.32			0.00	0.98			0.00	0.00			0.00	0.00	24.98	45.19	60.92	0.00	103.89	2107	1800	1800	CONC	0.10	73.5	3635	1.43	0.86	0.58
	2140	2141	0.12	0.70	0.23	45.55			0.00	0.98			0.00	0.00			0.00	0.00	25.84	44.20	59.58	0.00	101.59	2072	1800	1800	CONC	0.10	17.0	3635	1.43	0.20	0.57
	2141	2142	0.37	0.70	0.72	46.27			0.00	0.98			0.00	0.00			0.00	0.00	26.04	43.98	59.28	0.00	101.08	2093	1800	1800	CONC	0.10	95.0	3635	1.43	1.11	0.58
Contribution From TRUNK 1, Pipe 2121-2143						152.79				17.71				5.35				28.13	30.54														
	2142	2143			0.00	199.06			0.00	18.69			0.00	5.35			0.00	28.13	30.54	39.56	53.28	0.00	90.75	12229	3000	3000	CONC	0.10	32.5	14194	2.01	0.27	0.86
	2143	HW			0.00	199.06			0.00	18.69			0.00	5.35			0.00	28.13	30.81	39.33	52.96	0.00	90.20	12162	3000	3000	CONC	0.10	39.0	14194	2.01	0.32	0.86
TO POND 1						199.06				18.69				5.35				28.13	30.81														

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

Designed: R.B.	PROJECT: Orleans EUC MUC	
Checked: V.C.	LOCATION: City of Ottawa	
Dwg. Reference:	File Ref: 14-733	Date: October 2018	Sheet No. 2

733_STM3_Opt1.xlsx

From: Ryan Magladry
Sent: Monday, February 10, 2020 3:23 PM
To: Ryan Magladry
Subject: FW: UHO - Glenview servicing

From: Sam Bahia <s.bahia@novatech-eng.com>
Sent: Thursday, February 6, 2020 4:35 PM
To: Ryan Magladry <rmagladry@IBIGroup.com>
Cc: Amy Zhuang <Amy.Zhuang@ibigroup.com>; Ben Sweet <b.sweet@novatech-eng.com>
Subject: RE: UHO - Glenview servicing

Hi Ryan
Based on discussion with Ben, we can likely accommodate the 87.95 obvert during detailed design stage or earlier, if we can.
We can discuss timing next Wed.
Thanks

Sam Bahia, P.Eng., Project Manager | Land Development
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 285 | Fax: 613.254.5867

From: Ryan Magladry <rmagladry@IBIGroup.com>
Sent: Tuesday, February 4, 2020 3:16 PM
To: Sam Bahia <s.bahia@novatech-eng.com>
Cc: Amy Zhuang <Amy.Zhuang@ibigroup.com>; Ben Sweet <b.sweet@novatech-eng.com>
Subject: RE: UHO - Glenview servicing

Hey Sam,
I tried calling you, and rather than a voicemail decided to email…
Given that the spill elevation of the ROW is confirmed to be lowered to 90.32. We have many on-site CB's around the 90.10-90.15 mark. With an obvert of 88.20 at the connection, we are barely making minimum cover throughout our site.

Is this obvert elevation you provided based on my original request of an obvert 88.25 – which was based on a ROW spill elevation of 90.65? Or is it based on a flat pipe design? The cad file we have on file has an invert elevation of 86.46, which would be an obvert of +/- 87.44. Is it possible for the connecting obvert to be lowered by 300mm to **87.95**? This would still be above your current design (CAD file we received), and the additional foot would keep us from insulating most of our pipes.

Thanks,

Ryan Magladry CET

Project Manager

IBI GROUP
400-333 Preston Street

Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64061 fax +1 613 225 9868

From: Sam Bahia <s.bahia@novatech-eng.com>
Sent: Friday, January 31, 2020 4:38 PM
To: Ryan Magladry <rmagladry@IBIGroup.com>
Cc: Amy Zhuang <Amy.Zhuang@ibigroup.com>; Ben Sweet <b.sweet@novatech-eng.com>
Subject: RE: UHO - Glenview servicing

Hi Ryan
There may be a revision to our Draft Plan's Street 9 / 2 layout, which will change sewer inverts/road grades. But I think the current layout is as long and high as it would get, so it may improve. Notwithstanding, you can use the following information as the basis of your design:

- **STMMH 152** Storm obvert of the **975mm** diameter storm (assuming a pipe size to accommodate UHO/cost sharing) will be **88.20m**

- The roadway spill overelevation point at the edge of pavement within Street 9 near the STMMH 152 can be lowered to provide a **spill over elevation of 90.32 at UHO's south-west property corner/ROW.**

I trust this meets your needs for the time being, and we'll coordinate cost sharing/detailed design in due course. Is you client willing to meet over the next 2 weeks to discuss those outstanding issues?

Regards
Sam Bahia, P.Eng., Project Manager | Land Development
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 285 | Fax: 613.254.5867

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STORM SEWER DESIGN SHEET

3636 Innes Road
City of Ottawa
U-Haul Ottawa

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW				
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.65	C= 0.70	C= 0.75	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)
	ROOF	EXMH11	EXMH1										0.60	1.50	1.50	10.00	0.44	10.44
	CB10, CB9, CB8	EXMH1	MH2										0.61	1.53	3.03	10.44	2.21	12.65
	CB2	CB2	CB1										0.15	0.38	0.38	10.00	0.30	10.30
	CB1	CB1	MAIN				0.12							0.17	0.54	10.00	0.22	10.22
		MH2	MH3											0.00	3.57	12.65	0.53	13.17
	TD1	TD1	MH5										0.01	0.03	0.03	10.00	0.18	10.18
		MH5	MH3											0.00	0.03	10.18	1.05	11.23
	CB6	CB6	MAIN									0.53		1.11	1.11	10.00	0.02	10.02
		MH3	MH4											0.00	4.70	13.17	2.30	15.47
	CB3	CB3	CBMH5										0.74	1.85	1.85	10.00	0.36	10.36
	CB4	CB4	CBMH5										0.18	0.45	0.45	10.00	0.40	10.40
	CBMH5	CBMH5	MH6										0.18	0.45	2.75	10.40	0.51	10.91
	CB7	CB7	MAIN										0.11	0.28	0.28	10.00	0.05	10.05
		MH6	MH4											0.00	3.03	10.91	1.07	11.98
		MH4	MH152											0.00	7.73	15.47	0.34	15.81
			Ditch											7.73	TRUE			

LOCATION		RATIONAL DESIGN FLOW										SEWER DATA								
FROM	TO	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	(%)
EXMH11	EXMH1	76.81	104.19	122.14	178.56	115.30	156.41	183.36	268.05		115.30	123.55	44.27	300			1.50	1.693	8.25	6.68%
EXMH1	MH2	75.17	101.95	119.50	174.67	227.58	308.63	361.76	528.80		227.58	256.22	116.42	600			0.16	0.878	28.65	11.18%
CB2	CB1	76.81	104.19	122.14	178.56	28.82	39.10	45.84	67.01		28.82	34.22	18.71	200			1.00	1.055	5.39	15.76%
CB1	MAIN	76.81	104.19	122.14	178.56	41.64	56.48	66.21	96.80		41.64	100.88	18.54	300			1.00	1.383	59.25	58.73%
MH2	MH3	67.95	92.02	107.81	157.52	242.54	328.48	384.84	562.26		242.54	286.47	31.05	600			0.20	0.982	43.93	15.34%
TD1	MH5	76.81	104.19	122.14	178.56	1.92	2.61	3.06	4.47		1.92	100.88	15.00	300			1.00	1.383	98.96	98.10%
MH5	MH3	76.12	103.25	121.03	176.92	1.90	2.58	3.03	4.43		1.90	58.82	50.94	300			0.34	0.806	56.92	96.76%
CB6	MAIN	76.81	104.19	122.14	178.56	84.87	115.14	134.97	197.32		84.87	100.88	1.50	300			1.00	1.383	16.01	15.87%
MH3	MH4	66.44	89.96	105.39	153.96	312.26	422.80	495.29	723.54		312.26	385.20	116.37	750			0.11	0.845	72.93	18.93%
CB3	CBMH5	76.81	104.19	122.14	178.56	142.20	192.91	226.14	330.60		142.20	297.43	39.22	450			1.00	1.812	155.23	52.19%
CB4	CBMH5	76.81	104.19	122.14	178.56	34.59	46.92	55.01	80.42		34.59	100.88	33.19	300			1.00	1.383	66.29	65.71%
CBMH5	MH6	75.30	102.13	119.71	174.98	207.25	281.07	329.46	481.59		207.25	239.68	25.19	600			0.14	0.821	32.43	13.53%
CB7	MAIN	76.81	104.19	122.14	178.56	21.14	28.68	33.62	49.14		21.14	34.22	3.01	200			1.00	1.055	13.08	38.22%
MH6	MH4	73.47	99.61	116.75	170.64	222.44	301.57	353.44	516.59		222.44	248.09	54.41	600			0.15	0.850	25.65	10.34%
MH4	MH152	60.68	82.07	96.10	140.33	468.89	634.16	742.59	1,084.32		468.89	518.75	19.19	825			0.12	0.940	49.86	9.61%
	Ditch																			

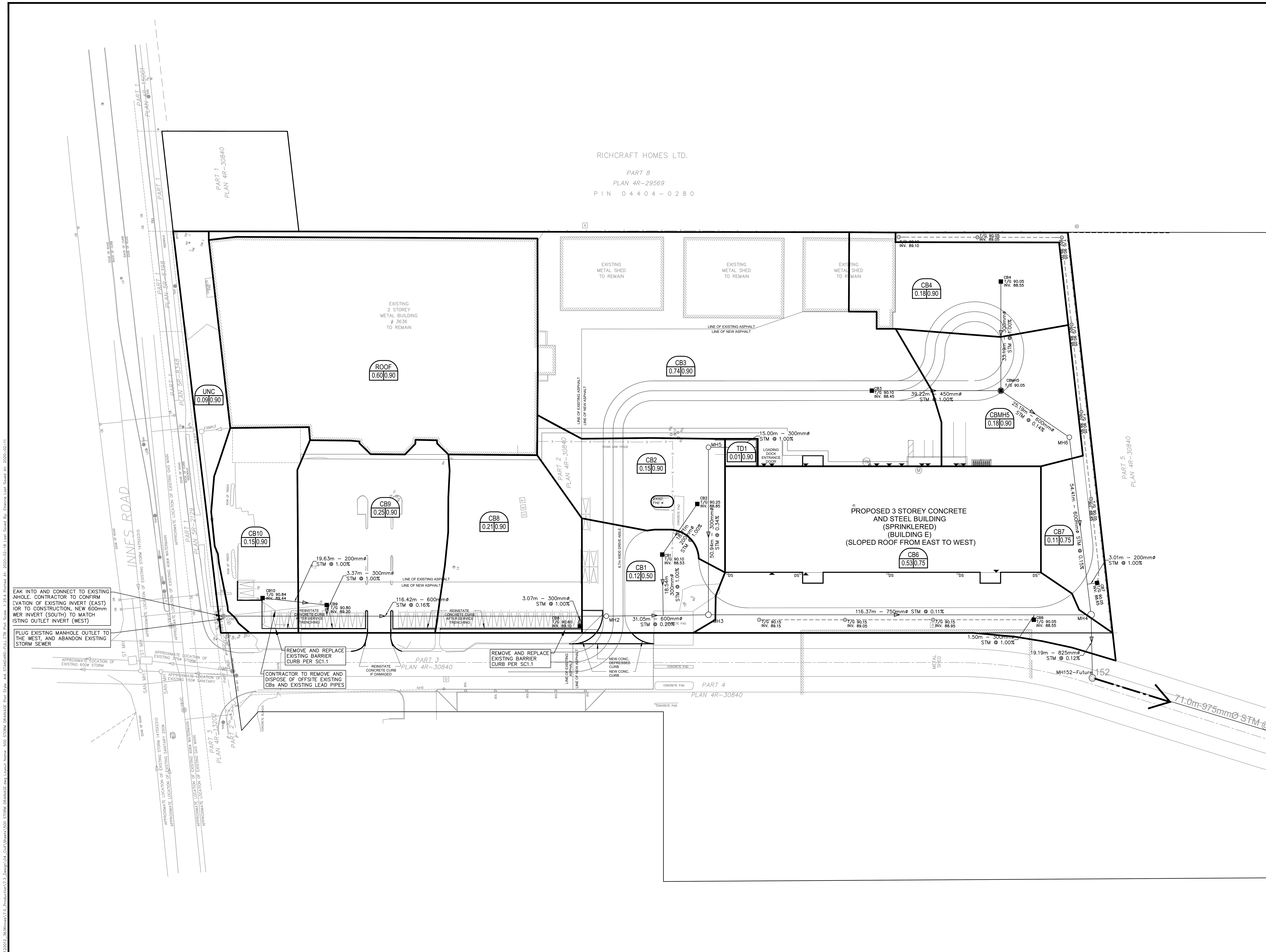
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: W.Z.
R.M.
Checked: D.G.Y.
Dwg. Reference: 122012-500

No.	Revision	Date
1.	Servicing Brief - Submission No. 1	2020-02-18

File Reference:	Date:	Sheet No:
122012-6.2.4	2020-02-18	1 of 1



LEGEND

STORM TRIBUTARY OUTLINE

500 — AREA NUMBER

0.81 | 0.75 — COEFFICIENT / AREA (ha)

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN (NTS)

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	ISSUED FOR SPA	DGY	2020.02.18

IBI GROUP
400 – 333 Preston Street
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Project Title

U-HAUL

3636 INNES ROAD

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2020/02/18
PROVINCE OF ONTARIO

Drawing Title

STORM DRAINAGE AREA PLAN

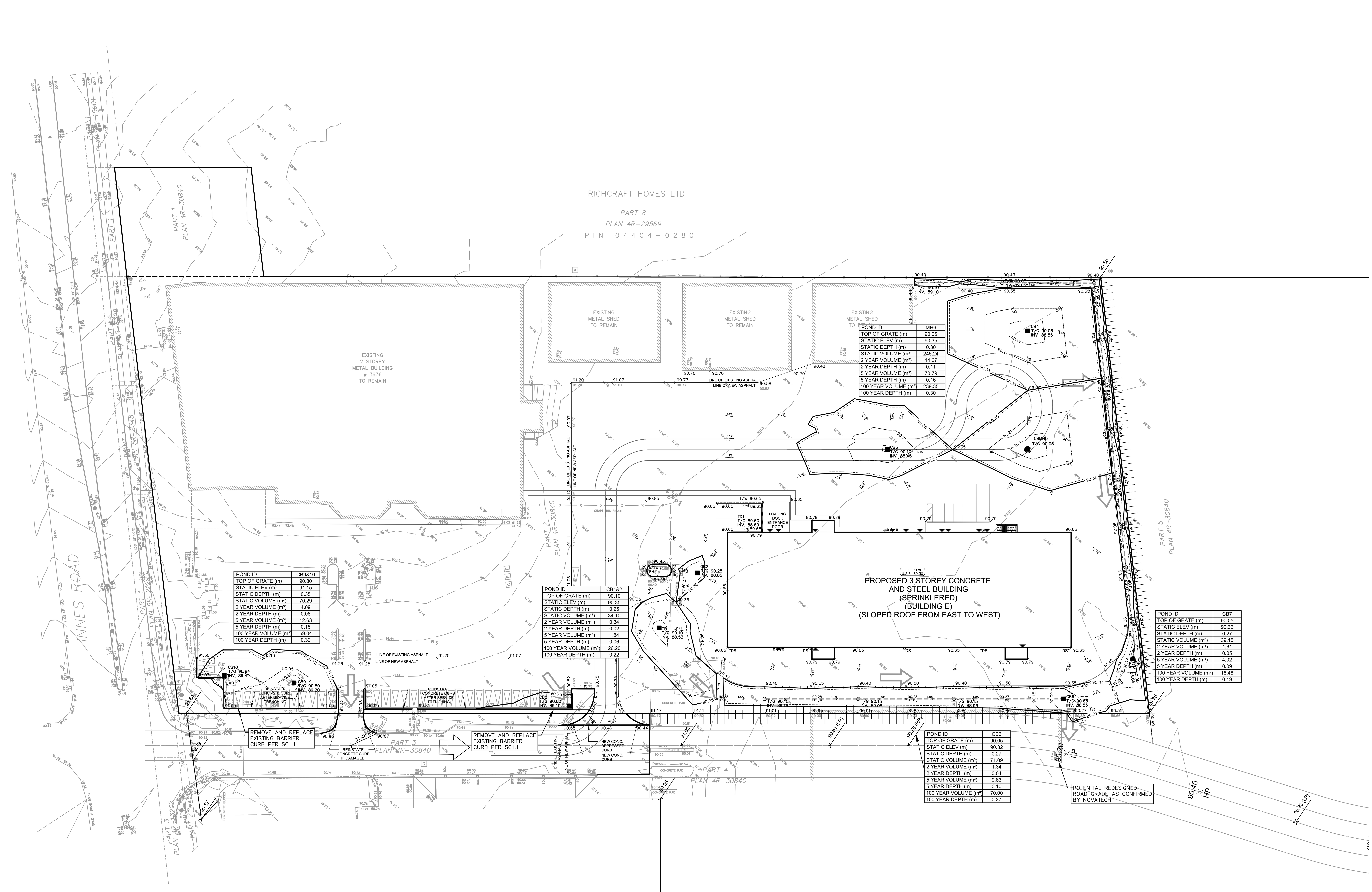
Scale 1 : 500

####

Design	Date
R.M./W.Z.	JANUARY 2020
Drawn	Checked
E.H.	DGY
Project No.	Drawing No.
122012	500

CITY PLAN No. ####

CITY FILE No. ####



POND ID	MH6
TOP OF GRATE (m)	90.05
STATIC ELEV (m)	90.35
STATIC DEPTH (m)	0.30
STATIC VOLUME (m³)	245.24
2 YEAR VOLUME (m³)	14.67
2 YEAR DEPTH (m)	0.11
5 YEAR VOLUME (m³)	70.79
5 YEAR DEPTH (m)	0.16
100 YEAR VOLUME (m³)	239.35
100 YEAR DEPTH (m)	0.30

POND ID	CB9&10
TOP OF GRATE (m)	90.80
STATIC ELEV (m)	91.15
STATIC DEPTH (m)	0.35
STATIC VOLUME (m³)	70.29
2 YEAR VOLUME (m³)	4.09
2 YEAR DEPTH (m)	0.08
5 YEAR VOLUME (m³)	12.63
5 YEAR DEPTH (m)	0.15
100 YEAR VOLUME (m³)	59.04
100 YEAR DEPTH (m)	0.32

POND ID	CB1&2
TOP OF GRATE (m)	90.10
STATIC ELEV (m)	90.35
STATIC DEPTH (m)	0.25
STATIC VOLUME (m³)	34.10
2 YEAR VOLUME (m³)	0.34
2 YEAR DEPTH (m)	0.02
5 YEAR VOLUME (m³)	1.84
5 YEAR DEPTH (m)	0.06
100 YEAR VOLUME (m³)	26.20
100 YEAR DEPTH (m)	0.22

POND ID	CB7
TOP OF GRATE (m)	90.05
STATIC ELEV (m)	90.32
STATIC DEPTH (m)	0.27
STATIC VOLUME (m³)	39.15
2 YEAR VOLUME (m³)	1.61
2 YEAR DEPTH (m)	0.05
5 YEAR VOLUME (m³)	4.02
5 YEAR DEPTH (m)	0.09
100 YEAR VOLUME (m³)	18.48
100 YEAR DEPTH (m)	0.19

POND ID	CB6
TOP OF GRATE (m)	90.05
STATIC ELEV (m)	90.32
STATIC DEPTH (m)	0.27
STATIC VOLUME (m³)	71.09
2 YEAR VOLUME (m³)	1.34
2 YEAR DEPTH (m)	0.04
5 YEAR VOLUME (m³)	9.83
5 YEAR DEPTH (m)	0.10
100 YEAR VOLUME (m³)	70.00
100 YEAR DEPTH (m)	0.27

LEGEND :

- STATIC MAXIMUM PONDING LIMIT
- 100 YEAR PONDING LIMIT
- 5 YEAR PONDING LIMIT
- 2 YEAR PONDING LIMIT
- PONDING ELEVATION
- EMERGENCY OVERLAND FLOW ROUTE

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN (NTS)

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	ISSUED FOR SPA	DGY	2020:02:18

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Project Title
U-HAUL
3636 INNES ROAD

LICENSED PROFESSIONAL ENGINEER D. G. Yannoulopoulos 2020/02/18 PROVINCE OF ONTARIO

Drawing Title
PONDING PLAN

Scale 1 : 500
####

Design R.M./W.Z.
Date JANUARY 2020
Drawn E.H.
Checked DGY
Project No. 122012
Drawing No. 600

CITY PLAN No. ####
CITY FILE No. ####

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PROJECT: 3636 Innes Rd
DATE: 2020-02-18
FILE: 122012-6.2.4
REV #: -
DESIGNED BY: W.Z. & R.M.
CHECKED BY: D.G.Y.

STORMWATER MANAGEMENT

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = 732.951 / $(T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = 998.071 / $(T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = 1735.688 / $(T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Restricted Flowrate (5yr C=0.9 tc =12min)

A_{site} =	3.32	Ha	Area Received from Novatech
T_c =	12.00	min	
C=	0.90		
I_{5yr} =	94.70	mm/hr	
$Q_{restricted}$ =	786.60	L/s	

Uncontrolled Release ($Q_{uncontrolled}$ = 2.78*C*i_{100yr}*$A_{uncontrolled}$)

C =	1.0	(C=0.9 increase by 20% for 100year storm, max C=1.0)	
T_c =	10	min	
i_{100yr} =	178.56	mm/hr	
$A_{uncontrolled}$ =	0.31	Ha	
$Q_{uncontrolled}$ =	153.88	L/s	

Maximum Allowable Release Rate ($Q_{max\ allowable}$ = $Q_{restricted}$ - $Q_{uncontrolled}$)

$Q_{max\ allowable}$ = 632.72 L/s

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area: EX Roof
Area (Ha): 0.600
C = 1.00
Restricted Flow Q_r (L/s)= 140.00

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
7	211.67	353.06	140.00	213.06	89.49
9	188.25	314.01	140.00	174.01	93.96
11	169.91	283.40	140.00	143.40	**94.65**
13	155.11	258.72	140.00	118.72	92.60
15	142.89	238.35	140.00	98.35	88.51

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	94.65	0.00	95	0.00

overflows to: CB9&10

Drainage Area: EX Roof
Area (Ha): 0.600
C = 0.90
Restricted Flow Q_r (L/s)= 140.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
3	166.09	249.33	140.00	109.33	19.68
4	152.51	228.95	140.00	88.95	21.35
5	141.18	211.94	140.00	71.94	**21.58**
6	131.57	197.51	140.00	57.51	20.70
7	123.30	185.10	140.00	45.10	18.94

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	21.58	0.00	95	0.00

overflows to: CB9&10

Drainage Area: EX Roof
Area (Ha): 0.600
C = 0.90
Restricted Flow Q_r (L/s)= 140.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
5.0	103.57	155.48	140.00	15.48	4.64
5.2	102.10	153.27	140.00	13.27	4.14
5.4	100.67	151.12	140.00	11.12	**3.60**
5.6	99.28	149.05	140.00	9.05	3.04
5.8	97.94	147.03	140.00	7.03	2.45

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	3.60	0.00	95	0.00

overflows to: CB9&10

Drainage Area	CB9&10		
Area (Ha)	0.400		
C =	1.00	Restricted Flow Q_r (L/s)=	100.64

100

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
5	242.70	269.89	100.64	169.25	50.77
7	211.67	235.37	100.64	134.73	56.59
9	188.25	209.34	100.64	108.70	**58.70**
11	169.91	188.94	100.64	88.30	58.28
13	155.11	172.48	100.64	71.84	56.03

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	58.70	70.29	0	0.00

overflows to: Future Street

Drainage Area	CB9&10		
Area (Ha)	0.400		
C =	0.90	Restricted Flow Q_r (L/s)=	100.64

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
2	182.69	182.83	100.64	82.19	9.86
3	166.09	166.22	100.64	65.58	11.80
4	152.51	152.63	100.64	51.99	**12.48**
5	141.18	141.29	100.64	40.65	12.20
6	131.57	131.67	100.64	31.03	11.17

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	12.48	70.29	0	0.00

overflows to: Future Street

Drainage Area	CB9&10		
Area (Ha)	0.400		
C =	0.90	Restricted Flow Q_r (L/s)=	100.64

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
1.9	134.66	134.77	100.64	34.13	3.89
2.1	132.03	132.13	100.64	31.49	3.97
2.3	129.51	129.61	100.64	28.97	**4.00**
2.5	127.09	127.19	100.64	26.55	3.98
2.7	124.77	124.87	100.64	24.23	3.93

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	4.00	70.29	0	0.00

overflows to: Future Street

Drainage Area	CB1-2		
Area (Ha)	0.270		
C =	0.87	Restricted Flow Q_r (L/s)=	75.20

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
4	262.41	170.70	75.20	95.50	22.92
6	226.01	147.02	75.20	71.82	25.86
8	199.20	129.58	75.20	54.38	**26.10**
10	178.56	116.16	75.20	40.96	24.57
12	162.13	105.47	75.20	30.27	21.79

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	26.10	34.10	0	0.00

overflows to: CB6

Drainage Area	CB1-2		
Area (Ha)	0.270		
C =	0.72	Restricted Flow Q_r (L/s)=	75.20

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
0	230.48	124.94	75.20	49.74	0.00
1	203.51	110.32	75.20	35.12	2.11
2	182.69	99.04	75.20	23.84	**2.86**
3	166.09	90.04	75.20	14.84	2.67
4	152.51	82.67	75.20	7.47	1.79

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	2.86	34.10	0	0.00

overflows to: CB6

Drainage Area	CB1-2		
Area (Ha)	0.270		
C =	0.72	Restricted Flow Q_r (L/s)=	75.20

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
0.4	158.96	86.17	75.20	10.97	0.26
0.6	155.17	84.12	75.20	8.92	0.32
0.8	151.56	82.16	75.20	6.96	**0.33**
1.0	148.14	80.31	75.20	5.11	0.31
1.2	144.89	78.55	75.20	3.35	0.24

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.33	34.10	0	0.00

overflows to: CB6

Drainage Area	MH6		
Area (Ha)	1.110		
C =	1.00	Restricted Flow Q_r (L/s)=	174.78

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
11	169.91	524.30	174.78	349.52	230.68
13	155.11	478.63	174.78	303.85	237.00
15	142.89	440.94	174.78	266.16	**239.55**
17	132.63	409.27	174.78	234.49	239.18
19	123.87	382.23	174.78	207.45	236.50

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	239.55	245.24	0	0.00

overflows to: CB7

Drainage Area	MH6		
Area (Ha)	1.110		
C =	0.90	Restricted Flow Q_r (L/s)=	174.78

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{5yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
6	131.57	365.39	174.78	190.61	68.62
7	123.30	342.44	174.78	167.66	70.42
8	116.11	322.47	174.78	147.69	**70.89**
9	109.79	304.92	174.78	130.14	70.28
10	104.19	289.37	174.78	114.59	68.75

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	70.89	245.24	0	0.00

overflows to: CB7

Drainage Area	MH6		
Area (Ha)	1.110		
C =	0.90	Restricted Flow Q_r (L/s)=	174.78

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr}A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
5.0	103.57	287.64	174.78	112.86	33.86
5.2	102.10	283.55	174.78	108.77	33.93
5.4	100.67	279.58	174.78	104.80	**33.95**
5.6	99.28	275.73	174.78	100.95	33.92
5.8	97.94	272.01	174.78	97.23	33.83

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	33.95	245.24	0	0.00

overflows to: CB7

NOTE: 19.28m3 of storage within pipes upstream if MH6 ICD. Given a 2 year required volume if 33.95 The balance on the surface is 14.67m3. There are 3 low points within this area, thus each would have an average minor 2 year ponding volume of 4.9m3 each. Given the nature of the sites use, and the spacing between catchbasins, the 2 year ponding on the surface is considered neglible.

Drainage Area	CB7				
Area (Ha)	0.110				
C =	0.90	Restricted Flow Q_r (L/s)=	22.94		
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi$_{100yr}$A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
7	211.67	58.26	22.94	35.32	14.83
9	188.25	51.81	22.94	28.87	15.59
11	169.91	46.76	22.94	23.82	**15.72**
13	155.11	42.69	22.94	19.75	15.40
15	142.89	39.33	22.94	16.39	14.75

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	15.72	39.15	0	0.00

overflows to: CB6

Drainage Area	CB7				
Area (Ha)	0.110				
C =	0.75	Restricted Flow Q_r (L/s)=	22.94		
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi$_{5yr}$A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
2	182.69	41.90	22.94	18.96	2.28
3	166.09	38.09	22.94	15.15	2.73
4	152.51	34.98	22.94	12.04	**2.89**
5	141.18	32.38	22.94	9.44	2.83
6	131.57	30.18	22.94	7.24	2.60

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	2.89	39.15	0	0.00

overflows to: CB6

Drainage Area	CB7				
Area (Ha)	0.110				
C =	0.75	Restricted Flow Q_r (L/s)=	22.94		
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi$_{2yr}$A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
3.3	118.35	27.14	22.94	4.20	0.83
3.4	117.35	26.91	22.94	3.97	0.81
3.5	116.37	26.69	22.94	3.75	**0.79**
3.6	115.40	26.47	22.94	3.53	0.76
3.7	114.46	26.25	22.94	3.31	0.74

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.79	39.15	0	0.00

overflows to: CB6

Drainage Area	CB6				
Area (Ha)	0.530				
C =	0.90	Restricted Flow Q_r (L/s)=	118.29		
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi$_{100yr}$A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
5	242.70	321.84	118.29	203.55	61.06
7	211.67	280.68	118.29	162.39	68.21
9	188.25	249.64	118.29	131.35	**70.93**
11	169.91	225.31	118.29	107.02	70.63
13	155.11	205.68	118.29	87.39	68.17

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	70.93	71.09	0.00	0.00

overflows to: Future Street

Drainage Area	CB6				
Area (Ha)	0.530				
C =	0.75	Restricted Flow Q_r (L/s)=	118.29		
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78xCi$_{5yr}$A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
2	182.69	201.88	118.29	83.59	10.03
3	166.09	183.53	118.29	65.24	11.74
4	152.51	168.53	118.29	50.24	**12.06**
5	141.18	156.01	118.29	37.72	11.32
6	131.57	145.39	118.29	27.10	9.76

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	12.06	71.09	0	0.00

overflows to: Future Street

Drainage Area	CB6				
Area (Ha)	0.530				
C =	0.75	Restricted Flow Q_r (L/s)=	118.29		
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi$_{2yr}$A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
1.5	140.30	155.04	118.29	36.75	3.31
1.7	137.42	151.85	118.29	33.56	3.42
1.9	134.66	148.81	118.29	30.52	**3.48**
2.1	132.03	145.90	118.29	27.61	3.48
2.3	129.51	143.11	118.29	24.82	3.43

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	3.48	298.13	0	0.00

overflows to: Future Street

	Area	Flow	
CB's	2.42	491.85	
Building	0.60	140.00	
Uncontrolled	0.31	153.88	
	3.33	**785.73**	0.87
Allowable		**786.60**	

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PROJECT:	3636 Innes Road
DATE:	2020-02-18
FILE:	122012-6.2.4
REV #:	-
DESIGNED BY:	W.Z. & R.M.
CHECKED BY:	D.G.Y.

UNDERGROUND STORAGE CALCULATIONS - 3636 Innes Road

Pipe Storage	***MH6***				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB3	CBMH5	39.22	450	0.159	6.24
Subdrain	CB3	3.00	250	0.049	0.15
Subdrain	CB3	3.00	250	0.049	0.15
Subdrain	CB3	3.00	250	0.049	0.15
Subdrain	CB3	3.00	250	0.049	0.15
Subdrain	CB4	3.00	250	0.049	0.15
Subdrain	CB4	3.00	250	0.049	0.15
Subdrain	CB4	3.00	250	0.049	0.15
Subdrain	CB4	3.00	250	0.049	0.15
Subdrain	CB5	3.00	250	0.049	0.15
Subdrain	CB5	3.00	250	0.049	0.15
Subdrain	CB5	3.00	250	0.049	0.15
Subdrain	CB5	3.00	250	0.049	0.15
CB4	CBMH5	33.19	300	0.071	2.35
CBMH5	MH6	25.19	450	0.159	4.01
				Total	14.36

Structure Storage			***MH6***			
	Base	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB3	88.700	90.10	1.40	600	0.360	0.50
CB4	88.800	90.05	1.25	600	0.360	0.45
MH6	88.800	90.35	1.55	1200	1.440	2.23
CBMH5	88.510	90.05	1.54	1200	1.131	1.74
					Total	4.93

MH6	**TOTAL**	**19.28**

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PROJECT: 3636 Innes Road (UHO)
DATE: 2020-02-18
FILE: 122012-6.2.4
REV #: -
DESIGNED BY: RM
CHECKED BY: RM

ORIFICE SIZING

Orifice coefficients	
Cv =	0.60
Cv =	0.65

	Invert	Diameter	Centre ICD	Max. Pond Elevation	Hydraulic Slope	Target Flow	Theoretical		Recommended		
							Orifice	Actual Flow	Orifice	Actual Flow	
	(m)	(mm)	(m)	(m)	(m)	(l/s)	(m)	(l/s)	(m)	(l/s)	
CB 9	89.200	300	89.350	91.15	1.800	100.64	0.1680	100.64	0.168	100.64	Custom
CB 1	88.700	300	88.850	90.35	1.500	75.20	0.1520	75.20	0.152	75.20	Standard
MH6	87.700	600	88.000	90.35	2.350	174.57	0.2070	174.57	0.207	174.57	Custom
CB7	88.650	200	88.750	90.32	1.570	22.94	0.0830	22.94	0.083	22.94	Standard
CB6	88.550	300	88.700	90.32	1.620	118.29	0.1870	118.29	0.187	118.29	Custom
						491.64				**491.64**	

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Ottawa, Ontario
K1S 5N4

Flow Calculations:

Depth	**0.8**	**m**
Grade	**0.1**	**%**
Roughness:	0.02	low vegetation
Properties		
Area	1.920	sq.m
Wetted Per.	9.860	m
Hydr. Radius	0.195	

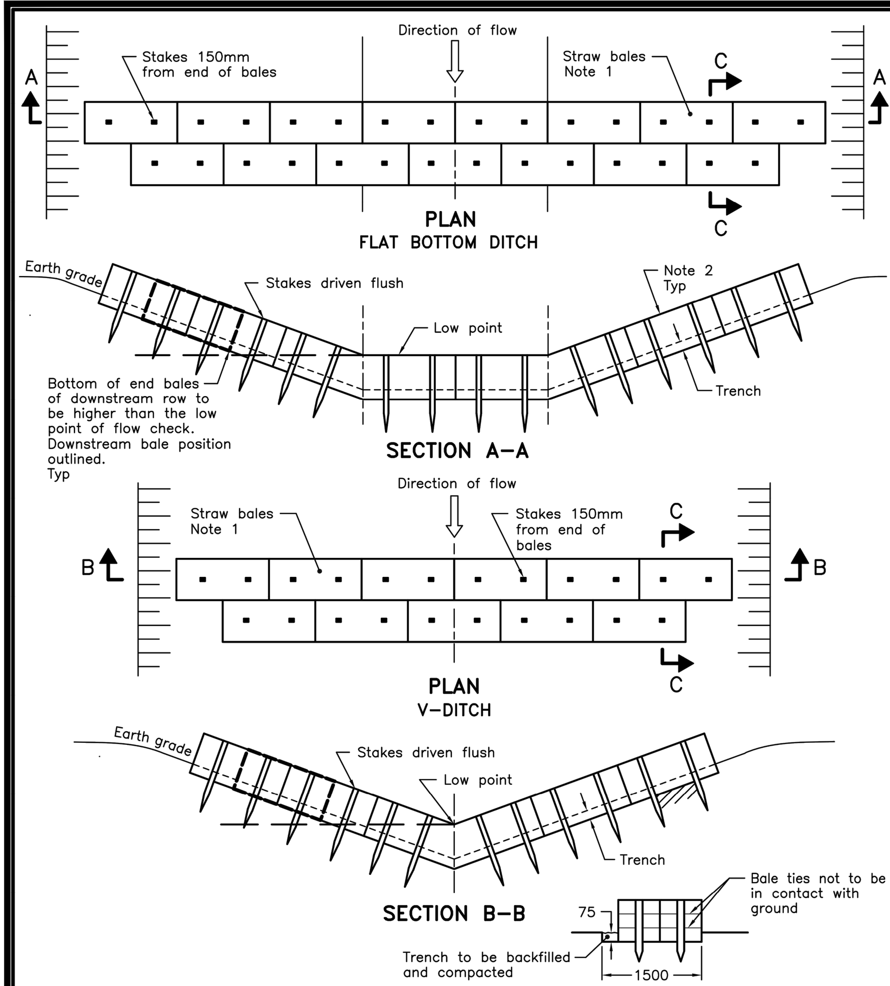
Q = (1/N)(A)(R^0.66)(S^0.5)

$Q_{CAPACITY}$ = 1031.10 l/s

Target Release rate= 786.60 l/s
refer to on-site swm calcs

Dimensions Used for Area		
Width	4.8	m
Depth	0.8	m

APPENDIX D

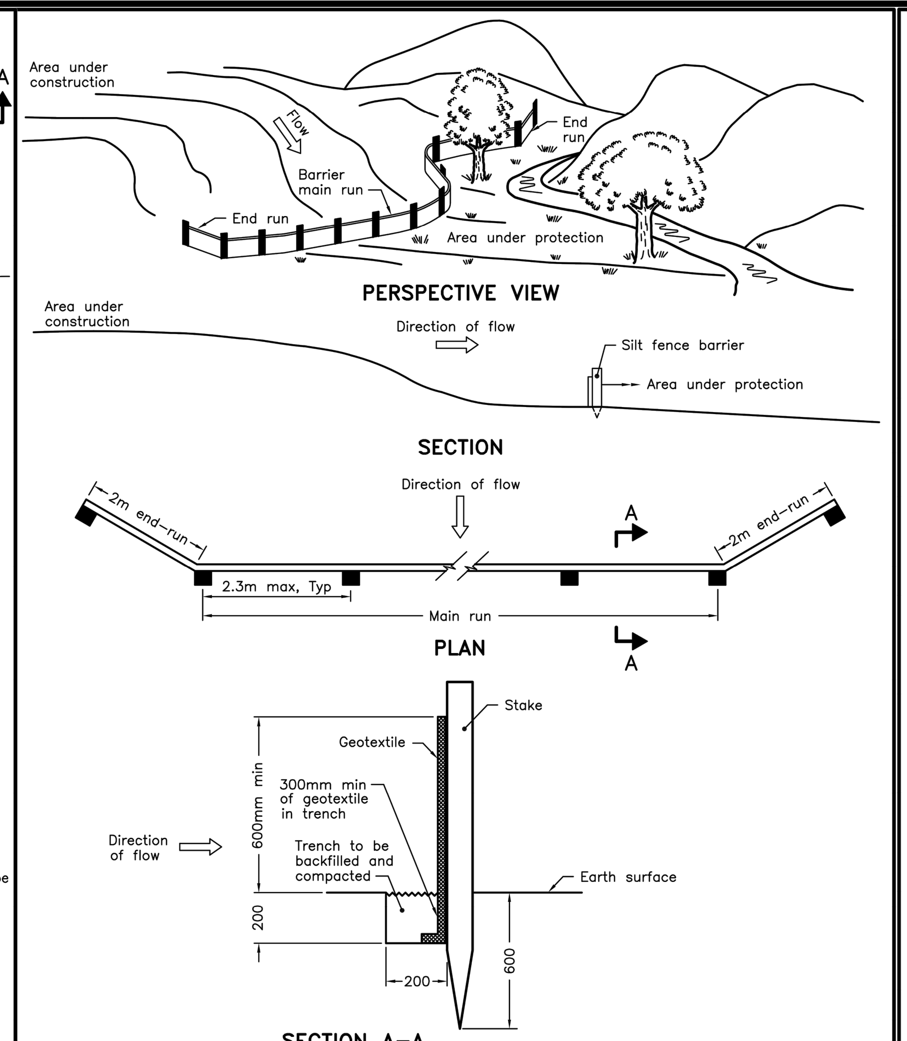


NOTES:
1 Number of bales varies to suit ditch.
2 Straw bales to be butted tightly against adjoining bales and shaped to conform to the sides of the ditch to prevent water flow through barrier.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

STRAW BALE FLOW CHECK DAM

OPSD 219.180

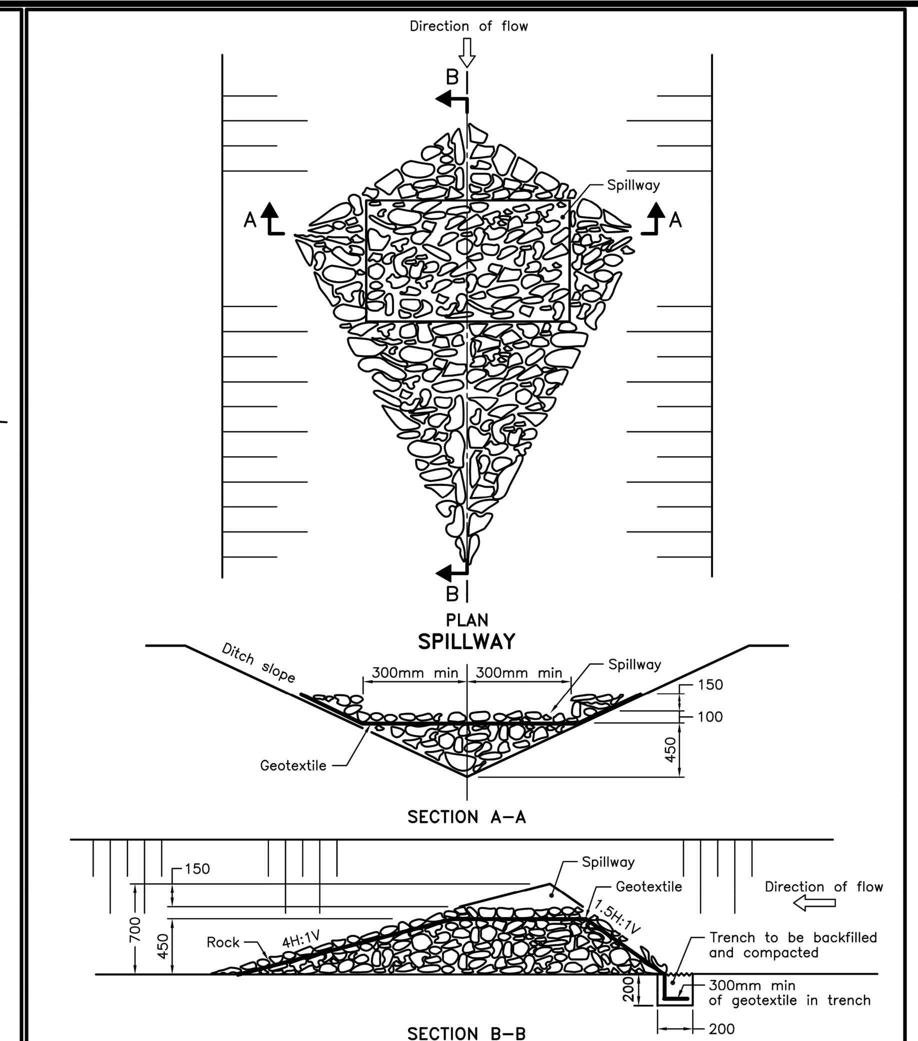


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

LIGHT–DUTY SILT FENCE BARRIER

OPSD 219.110



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

ROCK FLOW CHECK DAM
V–DITCH

OPSD 219.210

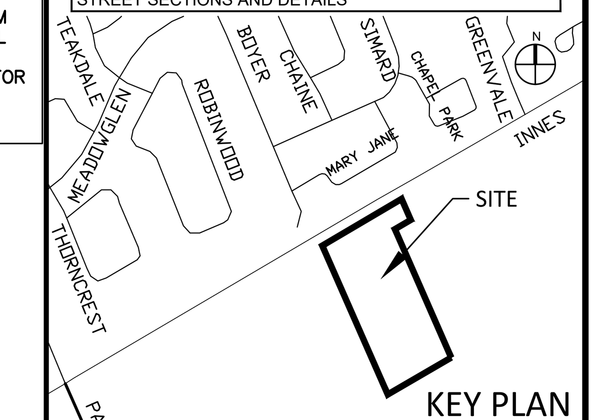
NOTES:

1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
5. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
6. ALL DISTURBED AREA TO BE REVEGETATED AS SOON AS POSSIBLE.
7. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED WEEKLY OR IMMEDIATELY FOLLOWING A STORM EVENT. ANY DAMAGED CONTROL MEASURE SHALL BE REPAIRED IMMEDIATELY. CONTRACTOR TO BE RESPONSIBLE FOR PROTECTING EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION.
8. ALL SEDIMENT DEPOSITS SHALL BE REMOVED FROM SITE AND DISPOSED OF AT APPROPRIATE DISPOSAL FACILITY, OR SHALL BE TESTED BY GEOTECHNICAL ENGINEER WHO MAY PROVIDE RECOMMENDATIONS FOR MATERIALS TO BE USED ONSITE PRIOR TO LANDSCAPING.

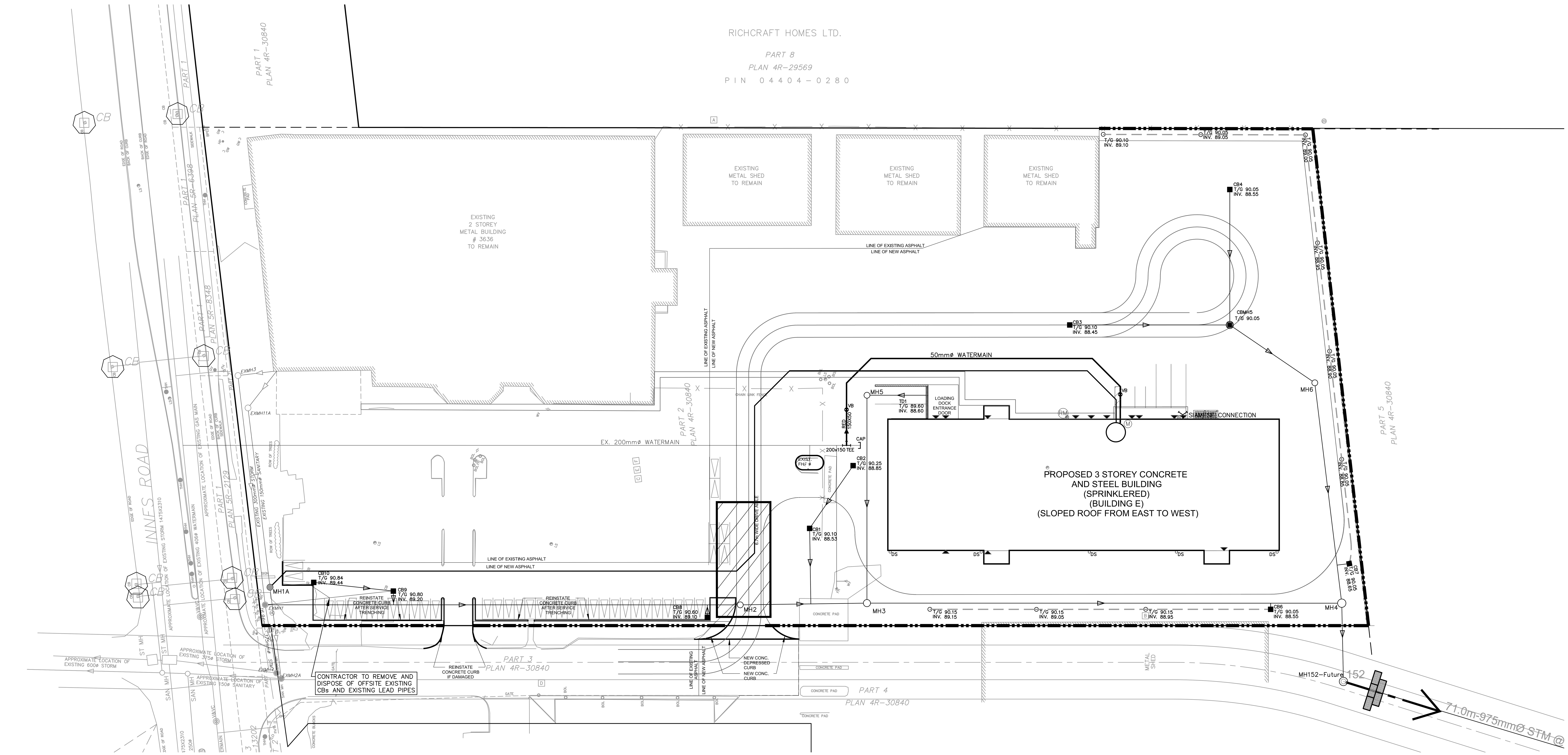
LEGEND :

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (15.0 × 7.0)

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
(NTS)



No.	REVISIONS	By	Date
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1	ISSUED FOR SPA	DGY	2020.02.18

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Project Title

U-HAUL

3636 INNES ROAD

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2020/02/18
PROVINCE OF ONTARIO

Drawing Title

EROSION AND SEDEMENTATION CONTROL PLAN

Scale

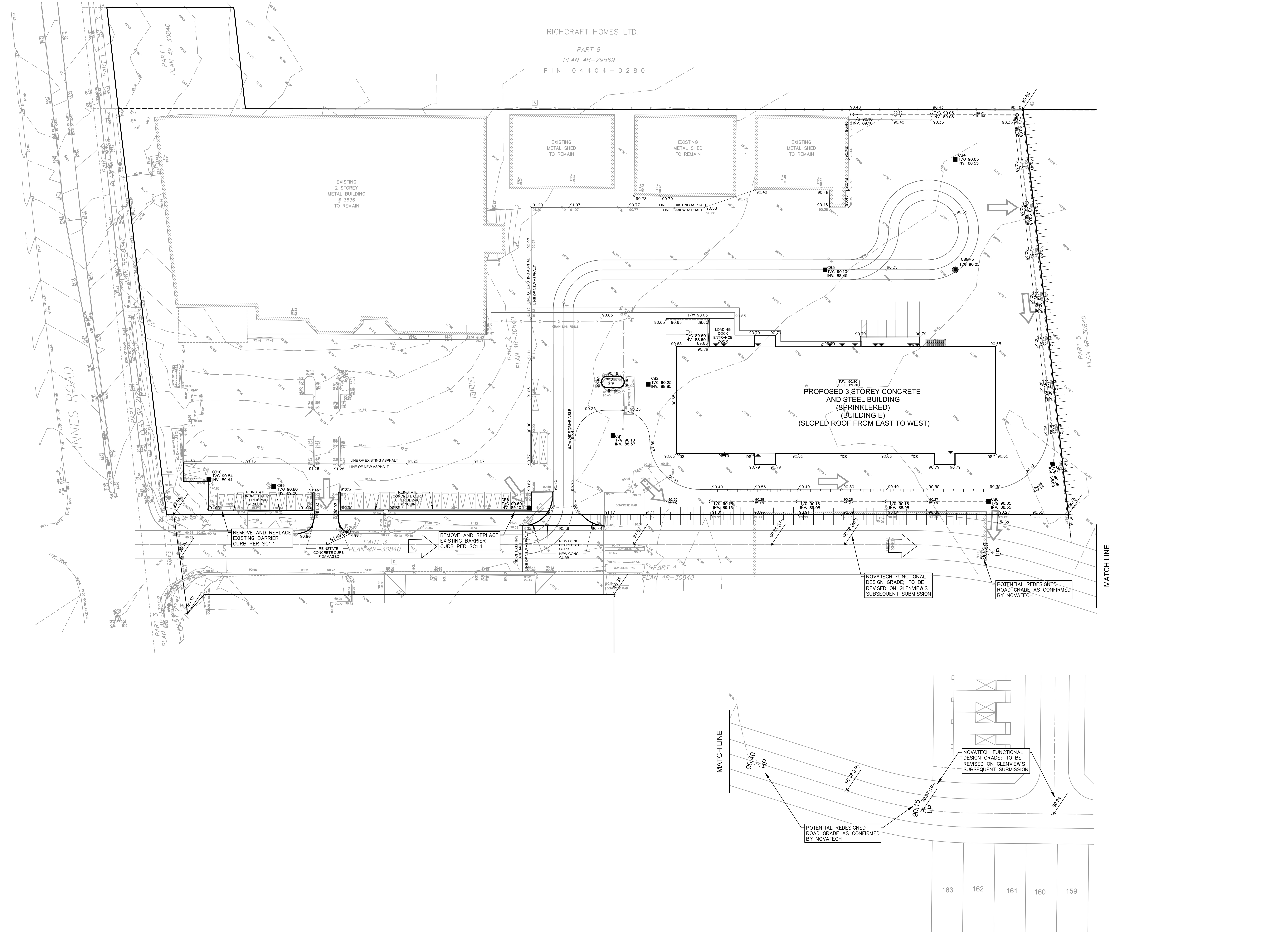
1 : 500

####

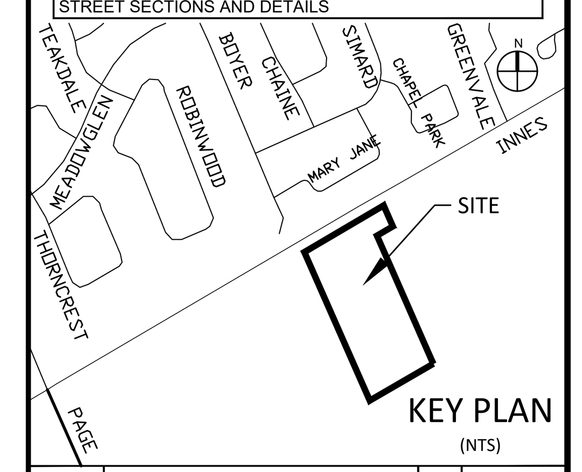
Design	Date
R.M./W.Z.	JANUARY 2020
Drawn	Checked
E.H.	DGY
Project No.	Drawing No.
122012	900

CITY PLAN No.####

CITY FILE No. ####



SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
(NTS)

No.	REVISIONS	By	Date
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1	ISSUED FOR SPA	DGY	2020:02:18

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Project Title

U-HAUL

3636 INNES ROAD

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2020/02/18
PROVINCE OF ONTARIO

Drawing Title

GRADING PLAN

Scale
1 : 500

Design	Date
R.M./W.Z.	JANUARY 2020
Drawn	**Checked**
E.H.	DGY
Project No.	**Drawing No.**
122012	200

CITY PLAN No. ####

CITY FILE No. ####