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Site Servicing Report

Dymon Self Storage, 1000 McGarry Terrace

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

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1.0 INTRODUCTION

1.1 General

Dymon Group of Companies (Dymon) has retained the services of J.L. Richards & Associates Limited (JLR) to proceed with the detailed design of municipal infrastructure for the development of their vacant land located at 1000 McGarry Terrace in the City of Ottawa. The legal description of the subject property is Part of Lot 15 Concession 2 (Rideau Front) Nepean, City of Ottawa.

This Site Servicing Report outlines the design objectives and criteria, servicing constraints and strategies for developing the subject property with water, wastewater, storm and stormwater management services in accordance with the November 2009 Servicing Study Guidelines for Development Applications in the City of Ottawa (City) as well as the Ottawa Sewer Design Guidelines (2012) and associated Technical Bulletins. This report also includes strategies and solutions for implementing erosion and sedimentation control measures throughout construction.

1.2 Site Description and Zoning

The subject property, currently vacant, has a gross area of approximately 0.6 ha and is located at the southeast corner of the Strandherd Drive and McGarry Terrace intersection (refer to Figure 1). The site is bounded by a retirement home to the east, vacant land to the south, Strandherd Drive to the north and McGarry Terrace to the west. The property is located within the urban limits of the Township of Nepean, City of Ottawa. As depicted on Figure 1, the site consists mainly of undeveloped grass with small clusters of trees and an abandoned asphalt access road bisecting the site. The current topography of the site generally slopes from west to east with an elevation difference of approximately ±3.0m however, due to the existing asphalt pathway, the majority of the western half of the site would sheet flow east and north towards Strandherd Drive. The remaining site drains toward the existing retirement home immediately to the east. All stormwater flows generated from the site will eventually outlet to the Jock or Rideau Rivers.

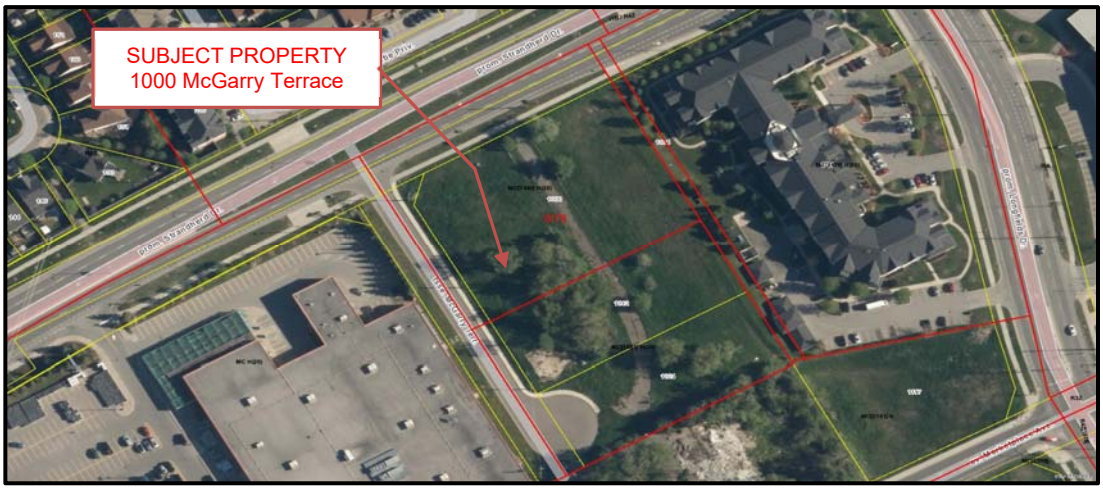


Figure 1: Site Location

1.3 Proposed Development and Building Configuration

Dymon wishes to redevelop the above-described property, totaling 0.603 ha in size, into a five (5) storey storage facility building (no basement) with two (2) retail spaces fronting Strandherd Drive. The development is inclusive of a covered drive-through garage for Dymon customers, access routes and parking areas, as depicted on the attached Site Plan (refer to Appendix 'H').

1.4 Existing Conditions and Infrastructure

This Site Servicing Report has been prepared to present the proposed onsite servicing and demonstrate that the existing municipal infrastructure fronting the subject property along McGarry Terrace can accommodate the proposed development. The following describes the existing municipal infrastructure located on Strandherd Drive and McGarry Terrace (refer to Appendix 'B' for a copy of the Background Drawings):

Watermain

- Existing 203 mm diameter PVC watermain located along McGarry Terrace
- Existing 406 mm diameter PVC watermain located along Strandherd Drive

Sanitary

- Existing 200 mm diameter PVC sanitary sewer along McGarry Terrace

.

Storm

- Existing 450 mm diameter concrete storm sewer flowing southerly to a 525 mm diameter concrete storm sewer along McGarry Terrace

1.5 Pre-Consultation, Permits and Approvals

A pre-consultation meeting was held between the Owner's representatives and staff from the City on November 14, 2017. A copy of the pre-consultation meeting notes has been provided in Appendix 'C'. The following summarizes the expected site servicing requirements:

- The site must be designed to adequately meet the City of Ottawa's design criteria and applicable standards
- The stormwater management criterion is to be based on the Master Servicing Study (MSS) for Barrhaven Town Center. The 1:100-year storm event must be detained on-site and the minor system capture rate must be restricted to 85 L/s/ha

As a condition of Site Plan Approval, the City will require the approval of the engineering documentation (Drawings and Report) prepared for this site. The City of Ottawa Development Servicing Study Checklist; which provides all the details associated with this development and the approval and permit requirements, has therefore been included in this document (refer to Appendix 'D').

1.6 Engineering Drawings

The following Engineering Drawings have been prepared in support of the development of the 1000 McGarry Terrace property (refer to Appendix 'H'):

- Site Servicing Grading Plan (Drawing SSG);
- Ponding Plan (Drawing SWM); and
- Erosion and Sediment Control Plan (Drawing ESC).

2.0 WATER SERVICING

2.1 Design Criteria

A Hydraulic Network Analysis (HNA) was conducted for the proposed Dymon site to confirm that the existing watermain and proposed water service can provide adequate supply while complying with both the City of Ottawa Design Guidelines for Water Distribution (July 2010) and Technical Bulletins ISDTB-2014-02 and ISTB-2018-02. These documents have been referred to in this section as the Design Guidelines, TB-2014-02, and TB-2018-02, respectively. The Design Guidelines require that a water supply system be designed to satisfy the following demand criteria:

- maximum day demand plus fire flow; and
- maximum hourly demand (peak hour demand).

To satisfy the design criteria and water demand, water supply to the proposed site will be achieved from the existing 203 mm diameter watermain on McGarry Terrace via a proposed 150 mm diameter water service lateral. The HNA was completed to satisfy the above demand criteria.

2.2 System Pressures

Section 4.2.2 of the Design Guidelines requires that new development additions to the public water distribution system be designed such that the minimum and maximum water pressures, as well as flow rates, conform to the following:

i. Under maximum hourly demand conditions (peak hour), the pressures shall not fall below 276 kPa (40 psi).

ii. During periods of simultaneous maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi).

iii. In accordance with the Ontario Code & Guide for Plumbing, the static pressure at any fixture shall not exceed 552 kPa (80 psi) in areas that may be occupied.

iv. The maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi) in unoccupied areas.

v. Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand. This criterion is irrelevant to this HNA as there are no feedermains proposed.

The HNA was carried out to fulfill the above watermain pressure and demand objectives.

2.3 Water Demands

The theoretical domestic demand for this development was obtained from the Owner's mechanical engineer (Goodkey, Weedmark & Associates Limited (GWAL)). Based on an anticipated fixture count of 32.2 x 3 (Dymon Storage and two (2) retail spaces), a total peak hour demand of 4.73 L/s (75 GPM) was estimated by the mechanical engineer (refer to Appendix 'E1' for a copy of the e-mail correspondence). Using the prescribed peaking factors of 1.8 and 1.5 (refer to Table 4.2 of the Design Guidelines), maximum day and average day demands of 2.63 L/s and 1.75 L/s were calculated, respectively. Table 2.1 summarizes the overall water demands used in the HNA.

Table 2.1: Calculated Water Demands

Average Day Demand	Maximum Day Demand	Peak Hourly Demand
1.75 L/s	2.63 L/s	4.73 L/s

To assess the performance of the existing water distribution system (refer to Drawing SSG in Appendix 'H'), the above-noted water demand scenarios were developed and evaluated against the pressure criteria listed in Section 2.2 using the WaterCAD® software platform.

2.4 Simulation of Fire Flows

Various guidelines are used throughout North America to establish fire flow requirements for different types of buildings. The Guidelines entitled "Water Supply for Public Fire Protection (1999)" developed by the Fire Underwriters Survey (FUS) were initially used to calculate the fire flow requirements for the site as this is the standard normally enforced by the City of Ottawa. As this calculation method resulted in a fire flow requirement beyond what the existing municipal water distribution system was able to supply, the City indicated that the Ontario Building Code (OBC) could be used instead to calculate the required fire flow. For sprinklered buildings, the OBC requires that the fire flow satisfy the sprinkler and hose stream water requirements per NFPA 13 (Standard for the Installation of Sprinkler Systems). Since the proposed building will incorporate a sprinkler system, the Owner's mechanical engineer (GWAL) indicated that the building's sprinkler system would require a supply of 31.55 L/s (500 GPM). Refer to Appendix 'E1' for a copy of the e-mail correspondence.

2.5 Watermain Sizing and Roughness Coefficients

The existing and proposed watermain layout for the Dymon Self Storage facility is shown on the Site Servicing Grading Plan (Drawing SSG included in Appendix 'H'). The proposed water servicing consists of the following components:

- Domestic supply to the proposed facility will be provided by a 150 mm diameter water service lateral that is connected to the existing 203 mm diameter watermain on McGarry Terrace. The proposed 150 mm diameter water service lateral will also supply the facility's

sprinkler system, which has been estimated by the mechanical engineer to require 31.55 L/s (500 GPM). Refer to Appendix 'E1' for a copy of the e-mail correspondence.

- The sprinkler system will be supplemented by the relocated municipal hydrant located west of the building that will connect to the existing 203 mm diameter watermain on McGarry Terrace. This hydrant will have a 150 mm diameter lead. The relocated hydrant will be located approximately 20 m from the proposed siamese connection located on the western face of the facility beside the proposed building entrance.

- The existing 200 mm diameter PVC watermain on McGarry Terrace will be relocated along a ±3 m length to provide adequate vertical clearance from the proposed storm sewer outlet. Per direction from the City in an email dated February 21, 2019 (see Appendix 'E3'), the existing watermain will be raised locally to cross over the sewer in accordance with City Detail W25.2. Thermal Insulation will be installed as per City Detail W22 and W23. Design details for the watermain relocation can be found on Drawing SSG.

The WaterCAD® overall schematic has been included in Appendix 'E2' for reference. The watermain roughness coefficients for the existing and proposed watermains were input as per Section 4.2.12 of the Design Guidelines.

2.6 Hydraulic Boundary Conditions

At the onset of this project, the City provided hydraulic boundary conditions based on the FUS required fire flow (RFF). Given that the existing system could not provide this RFF, the City generated hydraulic boundary conditions based on the OBC fire flow requirements. The HNA was carried out based on these updated boundary conditions provided by the City under various water demand conditions, as described in Section 2.3 (refer to Appendix 'E3' for a copy of the e-mail correspondence). Boundary conditions were requested based on a single feed connection to the existing 203 mm diameter watermain on McGarry Terrace.

The updated boundary conditions received from the City are summarized in Table 2.2 below.

Table 2.2: Hydraulic Boundary Conditions

Water Demands	McGarry Terrace HGL (m)
Peak Hour	142.9
Maximum Day + Fire Flow	139.8
High Pressure Check	156.7

The overall fire flow requirement for the proposed building is 31.55 L/s. The peak hour, maximum day plus fire flow, and high pressure scenarios were simulated using a single supply reservoir at McGarry Terrace with the supply characteristics shown in Table 2.2. For the maximum day plus fire flow scenario, the maximum day and sprinkler system demands were applied at one junction (Junction J-2), fed from the proposed 150 mm diameter water service.

2.7 Simulation Results

2.7.1 Peak Hour Demand

The proposed servicing as depicted on Drawing SSG was simulated under the peak hour demand based on the water demand summarized in Table 2.1 and the hydraulic boundary condition presented in Table 2.2. It should be noted that Junction J-2 was set to an elevation of 101.30 m, the finished floor elevation of the building at ground level, and that all proposed fixtures are located on the ground floor.

The simulation results show a residual pressure of 407 kPa (59.0 psi) at Junction J-2 (i.e., the finished floor) under the peak hour demand, exceeding the minimum operating pressure of 276 kPa (40 psi) as recommended in the Design Guidelines (refer to Appendix 'E4' for WaterCAD® simulation schematic and results).

2.7.2 Maximum Day Demand plus Fire Flow

Section 4.2.2.3 of the Design Guidelines requires that the water distribution system satisfy the maximum day demand combined with the fire flow requirement, as presented in Appendix 'E1'. The fire flow simulation was carried out by applying the maximum day demand of 2.63 L/s (per the fixture count) combined with the sprinkler system requirement of 31.55 L/s (500 GPM) for a total demand at Junction J-2 of 34.18 L/s, and observing the anticipated residual pressures in the system. The simulation results show a minimum pressure of 363 kPa (52.6 psi) at Junction J-2 (i.e., the finished floor) and the pressures observed at all junctions in the system are greater than 140 kPa (20 psi), as recommended in the Design Guidelines (refer to Appendix 'E5' for WaterCAD® simulation schematic and results).

2.7.3 High Pressure Check

The Design Guidelines require that a high pressure check (maximum hydraulic grade elevation) be performed on the proposed system to ensure that the maximum pressure constraint of 552 kPa (80 psi) of the Ontario Code & Guide for Plumbing is not exceeded. To generate the highest pressure, the demand at Junction J-2 was set to zero (0).

Simulation results for this scenario indicate that a residual pressure of 542 kPa (78.6 psi) is expected at Junction J-2 (i.e., the finished floor) (refer to Appendix 'E6' for WaterCAD® simulation schematic and results). Hence, the simulated pressure is below the maximum pressure constraint of 552 kPa (80 psi). Consequently, there is no need to incorporate a pressure reducing valve (PRV) as part of the building plumbing.

2.8 Internal Pumping

Simulation results have shown that there is no requirement to provide internal pumping during domestic usage as the minimum pressure of 276 kPa (40 psi) is exceeded for all of the proposed fixtures at ground level. Confirmation has been provided by Dymon's architectural consultant

(Nicholas Caragianis Architect Inc.) that all proposed fixtures are to be located on the ground floor of the building (refer to Appendix 'E1' for a copy of the e-mail correspondence). In terms of pumping requirements for the sprinkler system, it will be the responsibility of the certified fire protection specialist to recommend whether a pumping system will be required for the sprinkler system.

2.9 Summary and Conclusions

Based on the HNA presented above, it is recommended that the water servicing shown on the Site Servicing Grading Plan (Drawing SSG) be implemented to provide potable water for domestic and sprinkler system usages for the proposed development.

3.0 WASTEWATER SERVICING

3.1 Design Criteria

The proposed sanitary service for the Dymon Self Storage facility was designed based on the City of Ottawa Sewer Design Guidelines (2012) and associated Technical Bulletins. Key design parameters have been summarized in Table 3.1:

Table 3.1: Wastewater Servicing Design Criteria

Design Criteria	Design Value	Reference
Commercial/institutional average flow	28,000 L/gross ha/day	Tech Bulletin ISTB-2018-01
Industrial average flow	35,000 L/gross ha/day	City Section 4.4.1
Residential peaking factor	Harmon Formula	City Section 4.4.1
Commercial/institutional peaking factor	1.5	City Section 4.4.1
Industrial peaking factor	Varies (by area)	City Section 4.4.1, Appendix 4-B
Infiltration flow	0.33 L/s/effective gross ha	Tech Bulletin ISTB-2018-01
Minimum velocity	0.6 m/s	City Section 6.1.2.2
Maximum velocity	3.0 m/s	City Section 6.1.2.2
Manning Roughness Coefficient (for smooth wall pipes)	0.013	City Section 6.1.8.2
Minimum allowable slopes	Varies	City Table 6.2, Section 6.1.2.2

3.2 Proposed Sanitary Servicing and Calculations

Wastewater flows generated from the proposed facility will discharge to the existing 200 mm diameter sanitary sewer on McGarry Terrace via a proposed 150 mm diameter sanitary service lateral as depicted on the Site Servicing Grading Plan (Drawing SSG). Based on the proposed site development, the peak wastewater flows were evaluated using the following two (2) approaches (wastewater flow calculations provided in Appendix 'F'):

- Peak flow calculation based on the design value of 28,000 L/ha/day (or 56,000 L/ha/day assuming a 12-hour day of operation) for commercial development and an infiltration flow of 0.33 L/s/ha, as per the design parameters listed in Table 3.1;

- Peak flow calculation based on the mechanical fixture count (provided by GWAL).

Based on the above two (2) approaches, the most conservative peak flow estimate was used, which was based on the anticipated fixture count obtained from the Owner's mechanical engineer (refer to Appendix 'F' for a copy of the e-mail correspondence). As such, a peak flow of 5.36 L/s was used as the design requirement for the sizing of the proposed sanitary service. To fulfill the above design requirement of 5.36 L/s, the proposed 150 mm diameter sanitary service at a slope of 0.5% is adequate. The proposed sanitary sewer lateral has a capacity of 11.2 L/s and a velocity of 0.62 m/s (refer to Sanitary Sewer Design Sheet in Appendix 'F' and Drawing SSG for proposed sanitary sewer layout).

Based on the approved McGarry Terrace Plan and Profile Drawing No. 2641-P1 (Rev. 7 dated March 23, 2009), the existing sanitary sewer on McGarry Terrace has adequate capacity to accommodate the proposed development. As shown in the Sanitary Sewer Design Sheet in Appendix 'F', the existing 200 mm diameter sewer has a flow capacity of 27.6 L/s at 0.65% slope, which exceeds the design flow of 5.36 L/s. It is noted that while the available information is not 'as-constructed' information, the proposed connection is located at the most upstream section of the existing sanitary sewer and it is expected that the design flow can be accommodated.

3.3 Summary and Conclusions

Based on the above wastewater servicing details, it is recommended that the wastewater servicing shown on the Site Servicing Grading Plan (Drawing SSG) be implemented to provide wastewater servicing for the proposed development.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Design Criteria

Storm servicing for the subject property has been designed in accordance with the City of Ottawa Sewer Design Guidelines (2012) and Technical Bulletins. The minor system has been designed to capture and convey runoff during frequent storm events up to the 1:2 year recurrence, while the major system has been designed to capture and retain runoff onsite for storm events up to the 1:100 year reoccurrence.

In addition to the general City of Ottawa design criteria, storm servicing for the proposed development has been designed to comply with the storm servicing requirements specified by the City during the pre-consultation meeting held on November 14, 2017 (Appendix 'C'), as summarized below:

- Based on the MSS for Barrhaven Town Center, the 1:100 year storm event runoff must be detained on site and restricted to an allowable minor capture rate of 85 L/s/ha;

- Except for a small uncontrolled area of the site that drains to Strandherd Drive, runoff generated by the subject site shall be collected by the existing McGarry Terrace 525 mm diameter storm sewer which travels south and ultimately conveys stormwater to the Jock River.

In terms of water quality requirements, the subject site is tributary to the following end-of-pipe stormwater management facilities (SWMF): Nepean South-Chapman Mills SWMF located at the north-east corner of Longfields Drive and the Jock River, and the SWMF located north of Strandherd Drive and adjacent to the west side of Prince of Wales Drive. Details of the Nepean South-Chapman Mills SWMF, where the majority of the site drains, are presented in the "Nepean South-Chapman Mills Stormwater Management Design Brief" (IBI Group, May 2007) and four subsequent addenda to the overall SWM servicing in November 2009, September 2010, June 2012, and July 2017. Refer to Appendix 'B' for the Overall Drainage Area Plan which delineates the lands tributary to the Nepean South-Chapman Mills SWMF, inclusive of the 1000 McGarry Terrace Site.

4.2 Proposed Storm Servicing

Storm runoff generated by the 0.603 ha site will be collected by proposed on-site storm sewers that will discharge to the existing 525 mm diameter storm sewer on McGarry Terrace (refer to Drawing SSG in Appendix 'H'). Note that in order to provide adequate vertical clearance from the storm sewer outlet, the existing watermain on McGarry Terrace is proposed to be relocated per direction from the City (refer to Section 2.5). The 100 year storm event from the controlled areas of the property will be detained on site and the total of the controlled flows and uncontrolled flows will be restricted to the total allowable release rate of 51.26 L/s (allowable 85 L/s/ha x 0.603ha = 51.26 L/s).

As the site generally drops in ground elevation to the east, and the minor storm sewer system drains to the west, managing the stormwater for the site created certain elevation constraints. As a result, there is a small 0.059 ha area at the northern corner and along the northwestern landscaped portion of the site which is designed to flow uncontrolled to the street catch basins on Strandherd Drive.

Although having the uncontrolled flow drain to Strandherd is not ideal, a number of design options based on the grading limitations were considered to minimize the uncontrolled area which are summarized as follows:

- The storm sewer service outlet is located at the south-west corner of the site. The elevation of the pipe rises while the site drops to the north-east corner. A storm sewer extended to this area would have a minimal (±0.6 m) depth of cover;

- The controlled ponding areas on the site have a surface elevation of approximately 1.0 m higher than the uncontrolled north entrance to Strandherd Drive. Therefore, the placement of a catch basin in the north-east corner would have to be hydraulically disconnected from the downstream system;

- Installing a catch basin in the north-east corner with a direct connection to the catch basin or storm system on Strandherd Drive did not seem practical given the slight benefit of controlling the flow;

- A CB lead would likely conflict with other utilities in the boulevard;

- The on-site grading needed to create a low point would require steep transitions and undesirably high cross-slopes; and

- The ponding area available would be limited to approximately 2 m^3.

Based on these considerations, allowing the 0.059 ha area to flow uncontrolled to Strandherd Drive is the preferred option. The 1:5 year uncontrolled release rate is 10.92 L/s and the 1:100 year uncontrolled release rate is 21.10 L/s.

The following calculations and design demonstrate that the proposed servicing concept and development will have a total release rate of 50.76 L/s (controlled + uncontrolled), which is less than the total allowable release rate of 51.26 L/s (refer to SWM calculations in Appendix 'G').

4.3 Proposed Stormwater Management Solution and Calculations

4.3.1 Water Quantity

Storm servicing and stormwater management was developed to limit the 1:100 year post-development flows to 51.26 L/s. In order to achieve this criterion, on-site restrictions (i.e., inlet control devices (ICDs) in paved areas and rooftop restrictors) were utilized for the controlled conveyance of site runoff. Consequently, the storm servicing includes the provision of on-site storage which is achieved via rooftop storage and parking lot depressions. For the stormwater management calculations, the site was divided into six (6) drainage areas based on the proposed grading of the site (refer to Drawing SWM in Appendix 'H'). The site was divided as follows:

Roof – Five (5) storey storage facility
Area 0 – Uncontrolled (to Strandherd Drive)
Area 1 – CB 1 – ICD 1
Area 2 – CB 2 – ICD 2
Area 3 – CB 3 – ICD 3
Area 4 – Unrestricted – CB 4

For each of these drainage areas, the 1:5 year and 1:100 peak flows were calculated using the Rational Method. The minimum storage volume requirement was then calculated based on specified ICDs using the Modified Rational Method

(refer to SWM calculations in Appendix 'G'). The storage volume provided by each ponding area (shown as Max. Ponding Volume on Drawing SWM) was designed to accommodate the minimum storage volume requirement as calculated by the Modified Rational Method for the 100 year storm event. The stormwater management concept for major storm flows was designed such that storm runoff in excess of the 100 year storm event will overflow away from the building and ultimately outlet off-site to the Strandherd Drive right-of-way. Additional storage volume of approximately 25 m^3 above the 100 year storm event is provided in the ponding areas. This represents approximately 129% of the required storage.

For the minor storm sewer design, the sewers were sized to capture the 1:2 year peak flows, as per the City criterion. Refer to Appendix 'G' for the storm sewer design sheet. It is important to note that since rooftop restrictors are permanent, the storm lateral conveying the rooftop flow from the proposed building has been sized based on the restricted rooftop flow.

Roof: Prior to the rooftop design being completed by the structural/mechanical engineers, levels of restrictions were assessed as part of the overall stormwater management servicing solution. It was assumed that 75% of the rooftop could be dedicated as rooftop storage and that a ponding depth of 0.150 m could be used given that the roof needed to be designed as per the snow load described in the Ontario Building Code (OBC) and Section 7.4.10.4. Based on the above assumptions, an overall storage volume of 277 m^3 could be provided. Based on e-mail correspondence from the mechanical engineer (Appendix 'G'), rooftop runoff will be restricted using six (6) drains which will have their wier ¼ open, restricting to 0.95 L/s per drain. Consequently, the overall release rate for the building roof will be limited to 5.70 L/s (0.95 L/s x 6 drains) (refer to Appendix 'G' for SWM calculations).

Based on the Modified Rational Method calculations, the rooftop requires a minimum of 121.34 m^3 to fully detain the 1:100 year storm event, given a release rate of 5.70 L/s. Based on the assumption made (ponding depth of 0.150 m and 75% of roof dedicated to storage), 277 m^3 is available by the design. Hence, it is anticipated that the roof can accommodate the level of restriction that was specified.

Area 0 - Uncontrolled: Due to grading constraints, the northerly edge of the property between the building and the property line, as well as the northeast corner of the parking lot near the Strandherd Drive entrance, is proposed to sheet flow uncontrolled to Strandherd Drive (refer to Drawing SWM in Appendix 'H'). The uncontrolled area comprises 0.022 ha of grassed area and 0.037 ha of paved area (total of 0.059 ha). Considering a 1:100 year storm event, a peak flow of 21.10 L/s was calculated for the uncontrolled area based on an overall C-Factor of 0.720, total area of 0.059 ha, time of concentration of 10 minutes, and a 100-year rainfall intensity of 178.56 mm/hr using the Rational Method. This 1:100 year uncontrolled peak flow (21.10 L/s) was subtracted from the allowable release rate of 51.26 L/s to determine the remaining allowable release rate for the controlled areas.

Area 1 – ICD 1 (CB 1): Drainage Area 1 consists of the parking area west of the building totalling 0.101 ha. The overall AxC (100 year) for Area 1 was calculated to be 0.083. Based on the calculated 1:100 year peak flow of 41.20 L/s, storm runoff from Area 1 is proposed to be controlled by a Hydrovex Model 75 VHV-1 delivering a maximum of 6.0 L/s under 2.12 m of head. In light of the above, there is a need for 27.41 m^3 of storage in order to detain the 1:100 year peak flows on-site. Based on the ponding plan, Ponding Area 1 provides a total of 38.16 m^3 of storage at a ponding depth of 0.30 m; therefore sufficient storage has been provided by the design.

Area 2 – ICD 2 (CB 2): Drainage Area 2 consists of the parking area north of the building totalling 0.071 ha. The overall AxC (100 year) for Area 2 was calculated to be 0.071. Based on the calculated 1:100 year peak flow of 35.24 L/s, storm runoff from Area 2 is proposed to be controlled by a Hydrovex Model 75 VHV-1 delivering a maximum of 7.0 L/s under 1.83 m of head. In light of the above, there is a need for 20.25 m^3 of storage in order to detain the 1:100 year peak flows on-site. Based on the ponding plan, Ponding Area 2 provides a total of 23.20 m^3 of storage at a ponding depth of 0.25 m; therefore sufficient storage has been provided by the design.

Area 3 – ICD 3 (CB 3): Drainage Area 3 is located at the south-east corner of the property totalling 0.116 ha. The overall AxC (100 year) for Area 3 was calculated to be 0.103. Based on the calculated 1:100 year peak flow of 50.88 L/s, storm runoff from Area 3 is proposed to be controlled by a Hydrovex Model 75 VHV-1 delivering a maximum of 6.0 L/s under 1.82 m of head. In light of the above, there is a need for 36.99 m^3 of storage in order to detain the 1:100 year peak flows on-site. Based on the ponding plan, Ponding Area 3 provides a total of 49.37 m^3 of storage at a ponding depth of 0.30 m; therefore sufficient storage has been provided by the design.

Area 4 - Unrestricted – (CB 4): Drainage Area 4 consists of the area associated with the loading dock at the south-east corner of the building totalling 0.010 ha. To prevent inconveniences from ponding, this area was provided with a 1:100 year level of service (unrestricted flow). Based on an area of 0.010 ha, a 1:100 year peak flow of 4.96 L/s was estimated for the loading dock. This flow was subtracted from the allowable release rate of 51.26 L/s to determine the remaining allowable release rate for controlled areas.

Based on the above uncontrolled and controlled areas, the total 1:100 year peak flows have been restricted to a total release rate of 50.76 L/s, which is below the allowable release rate of 51.26 L/s. Consequently, the water quantity criteria provided by the City has been fulfilled.

4.3.2 Water Quality

Storm runoff generated by the majority of the 1000 McGarry Terrace development will be conveyed by the proposed on-site storm sewers which ultimately outlet to the Nepean South-Chapman Mills SWMF (refer to Appendix 'B' for Overall

Drainage Area Plan). The downstream SWM system diverts the most frequent and polluted flow (first flush) to the stormwater management facility via an interceptor sewer and interceptor manholes. Flows in excess of the first flush bypasses the stormwater management facility and are discharged directly to the Jock River via three overflow outlets. Details of the stormwater management facility are presented in the "Nepean South-Chapman Mills Stormwater Management Design Brief" (IBI Group, May 2007) and four subsequent addenda to the overall SWM servicing in November 2009, September 2010, June 2012, and July 2017.

Due to grading and storm sewer service depth constraints, a small portion of the parking lot at the northeast corner of the site will flow uncontrolled onto Strandherd Drive. The uncontrolled area is illustrated on the accompanying Ponding Plan (SWM).

4.4 Summary and Conclusions

The storm servicing and stormwater management solution presented in this Site Servicing Report has been designed to satisfy the criteria specified by the City of Ottawa. In terms of quantity control, the proposed total release rate of 50.76 L/s for the 100 year peak flow is found to be below the allowable release rate of 51.26 L/s. For quality control, stormwater runoff will be treated by the end-of-pipe Nepean South-Chapman Mills SWMF.

5.0 EROSION AND SEDIMENTATION CONTROL

Prior to initiating construction of the proposed development, erosion and sedimentation control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, are to be implemented to trap sediment on site.

The following erosion and sedimentation control measures are proposed, as shown on Drawing ESC:

- Supply and installation of a silt fence barrier, as per OPSD 219.110;
- Supply and installation of filter fabric between the frame and cover of existing catch basins adjacent to the proposed development, including regular inspection and maintenance as required;
- Stockpiles of material during construction is to be located along flat areas away from drainage paths and are to be enclosed with additional silt fence;
- Proposed catch basins are to be equipped with sumps, inspected frequently, and cleaned as required;
- Sandbags are to be placed blocking part of the sewer pipe in the connecting storm maintenance holes to eliminate construction debris from entering the existing storm sewer system. The sandbags are to be removed after the proposed storm sewers have been fully cleaned;
- Mud mats are proposed at both site entrances to keep the adjacent streets clean.

The proposed erosion control measures shall conform to the following documents:

- "Guidelines on Erosion and Sediment Control for Urban Construction Sites" published by Ontario Ministries of Natural Resources, Environment, Municipal Affairs, and Transportation & Communication, Association of Construction Authorities of Ontario and Urban Development Institute, Ontario, May 1987.
- "MTO Drainage Manual", Chapter F: "Erosion of Materials and Sediment Control", Ministry of Transportation & Communications, 1985.
- "Erosion and Sediment Control" Training Manual by Ministry of Environment, Spring 1998.
- Applicable Regulations and Guidelines of the Ministry of Natural Resources.

This report has been prepared for the exclusive use of Dymon Self Storage, for the stated purpose, for the named development. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of Dymon Self Storage and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Annie Williams, P.Eng.

Reviewed by:

Sheldon Dattenberger, P.Eng., PMP

Appendix A

Surveyor Area Certificate

PLAN OF SURVEY OF

BLOCK 1
REGISTERED PLAN 4M-1303
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

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 27th day of September, 2017.

October 19 2017
Date

A.J. Broxham
Andrew J. Broxham
Ontario Land Surveyor

Notes & Legend

		Denotes
—□—	-	Survey Monument Planted
—■—	-	Survey Monument Found
SIB	-	Standard Iron Bar
SSIB	-	Short Standard Iron Bar
IB	-	Iron Bar
CP	-	Concrete Pin
(WIT)	-	Witness
Meas.	-	Measured
(AOG)	-	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	-	Registered Plan 4M-1303
(P2)	-	(857) Plan March 3, 2017
(P3)	-	Plan 4R-23360
□ CB	-	Catch Basin
□ CBI	-	Catch Basin Inlet
—— OHW ——	-	Overhead Wires
○ UP	-	Utility Pole
⌖ AN	-	Anchor
	-	Deciduous Tree
	-	Coniferous Tree
○ FH	-	Fire Hydrant
○ MH-ST	-	Maintenance Hole (Storm Sewer)
○ MH-S	-	Maintenance Hole (Sanitary)
⊖ WV	-	Water Valve
△ S	-	Sign
Ø	-	Diameter
+65.00	-	Location of Elevations
+65.00	-	Top of Concrete Curb Elevation
T/G	-	Top of Grate
	-	Property Line
○ PO-W	-	Wood Pole

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2029573

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

Bearings are grid, derived from the wetserly limit of Block 1 Registered Plan 4M-1303 shown to be N29°34'50"W thereon and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

SITE AREA =6027 m²

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

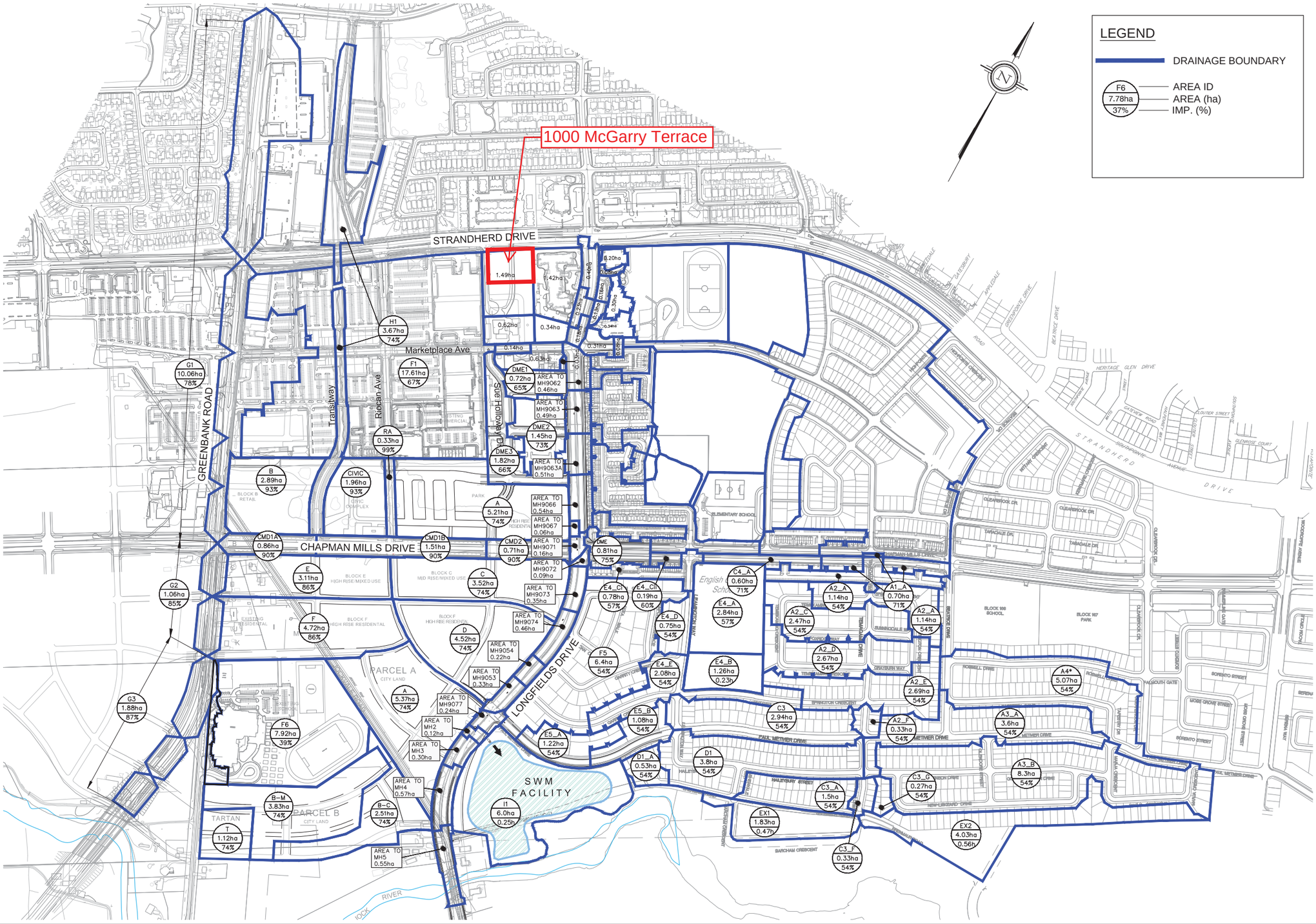
Ontario Land Surveyors

Job No. I8402-17 Dymon Blk 1 4M-1303 T F ig

LOT 15 CONCESSION 2 (RIDEAU FRONT) (NEPEAN)

Appendix B

Abutting Municipal Services
and Overall Drainage Area Plan



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

Drawing name: \\Autocad_srv\AUTOCAD\Projects\2600\2641 - Minto Area C-3\Cul-De-Sac Design\2641-P1-Westook Drive.dwg x-refs: cul-de-sac master [W:\Projects\2600\2641 - Minto Area C-3\Cul-De-Sac Design\cul-de-sac master.dwg]

Date of plot: Mar 23, 2007 - 11:42am

NOTE
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Ottawa

No.	REVISION	DATE	BY
7.	ISSUED FOR WATER PERMIT	MAR 23/07	SMC
6.	ISSUED FOR TENDER	MAR 20/07	SMC
5.	ISSUED FOR MOE APPROVAL	DEC 11/06	SMC
4.	REVISED SEWER OUTLETS	OCT 20/06	SMC
3.	REVISED AS PER CITY COMMENTS	JUNE 16/06	SMC
2.	REVISED AS PER CITY COMMENTS	JUNE 9/06	SMC
1.	ISSUED FOR REVIEW	JUNE 6/06	SMC

LICENSED PROFESSIONAL ENGINEER
M. CZAHARYNSKI
PROVINCE OF ONTARIO

minto
CANADA'S MOST HONOURED BUILDER

DME Ltd.
David McManus Engineering Ltd.
400 - 30 Camelot Drive
Ottawa Ontario, K2G 5X8
E-mail: mcmanus@dmel.on.ca
Ph. 225-1929 Fax 225-7330

BASEPLAN	DME
DESIGN	MSB
CHECKED	JHB
CAD	MSB
PROJ. MGR.	SMC
APPROVED	SMC

SCALE 1:500
0 5 10 15 20

MINTO DEVELOPMENTS INC.
MCGARRY TERRACE
CITY OF OTTAWA

PLAN AND PROFILE
MCGARRY TERRACE
STA. 0+000 TO 0+350

PROJECT No. 2641
SURVEY BY D.M.E.
DATE JUNE 2006
DRAWING No. 2641-P1

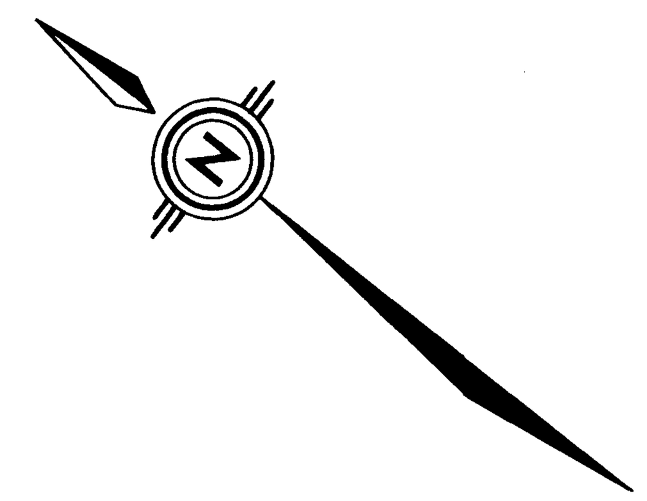
13968

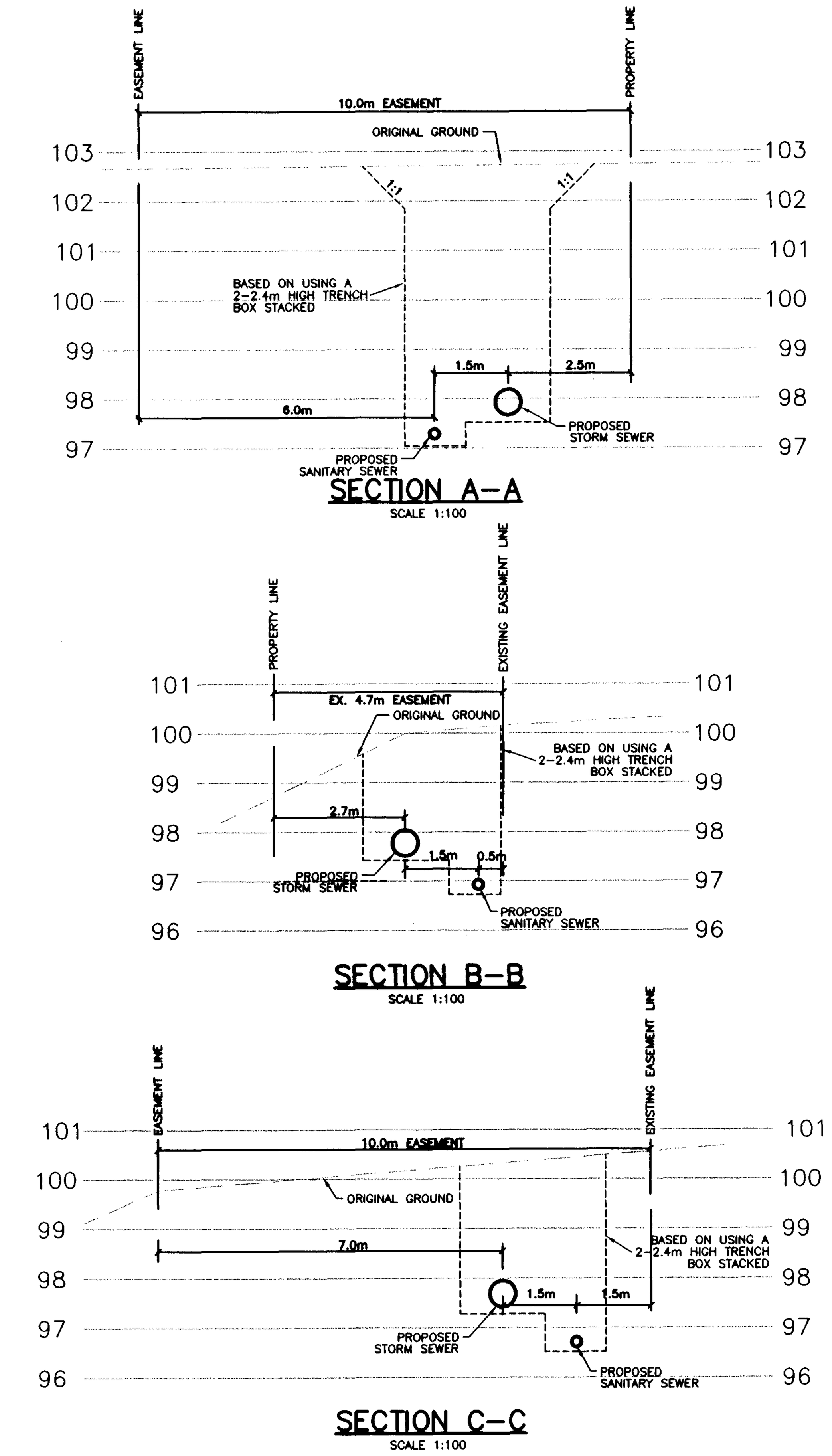
Drawing name; \\Autocad_srv\AUTOCAD\Projects\2600\2641 - Minto Area C-3\Cul-De-Sac Design\2641-S1-Westook Drive.dwg   x-refs: cul-de-sac master [W:\Projects\2600\2641 - Minto Area C-3\Cul-De-Sac Design\cul-de-sac master.dwg]

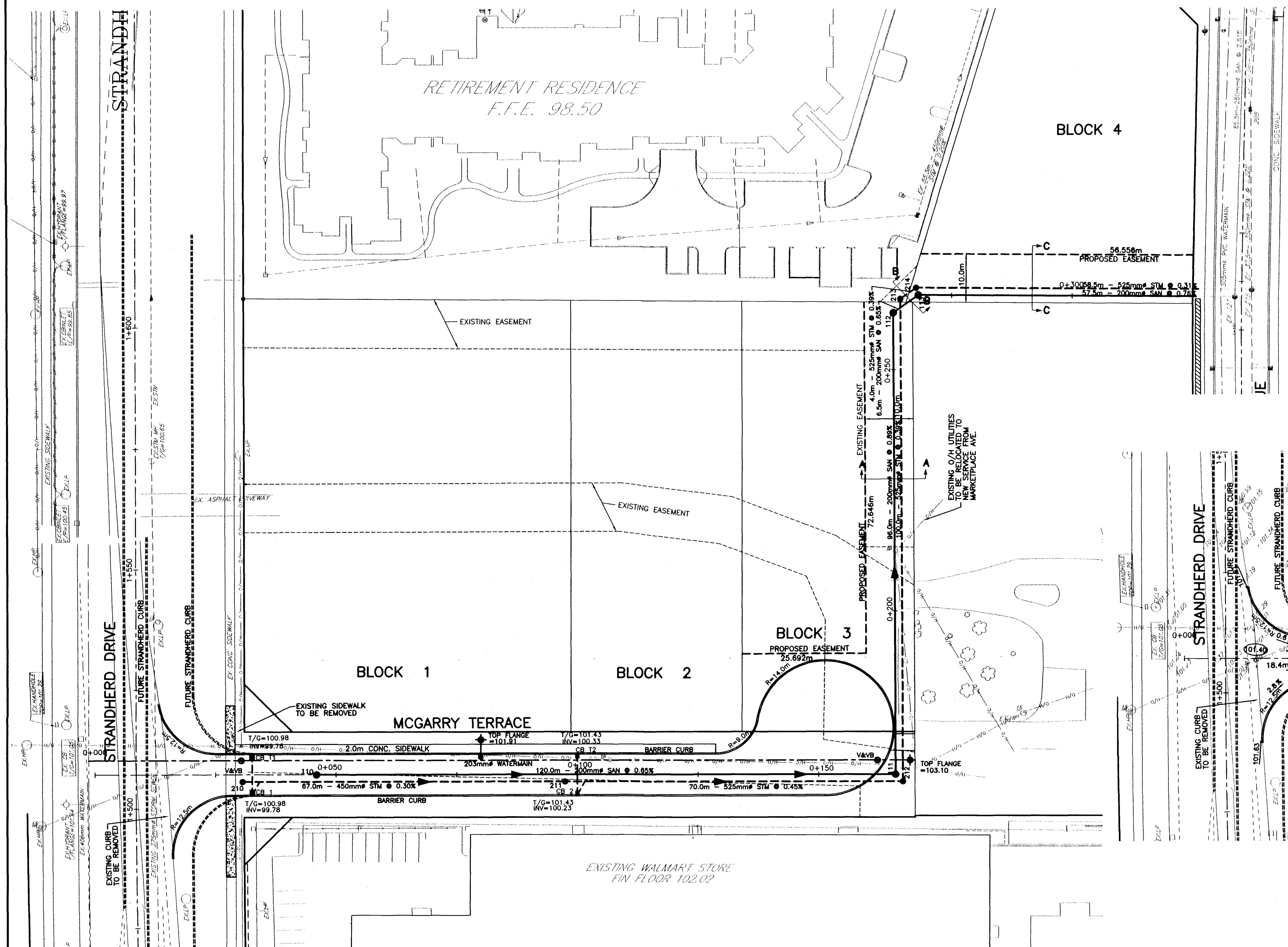
Date of plot; Mar 23, 2007 - 11:40am

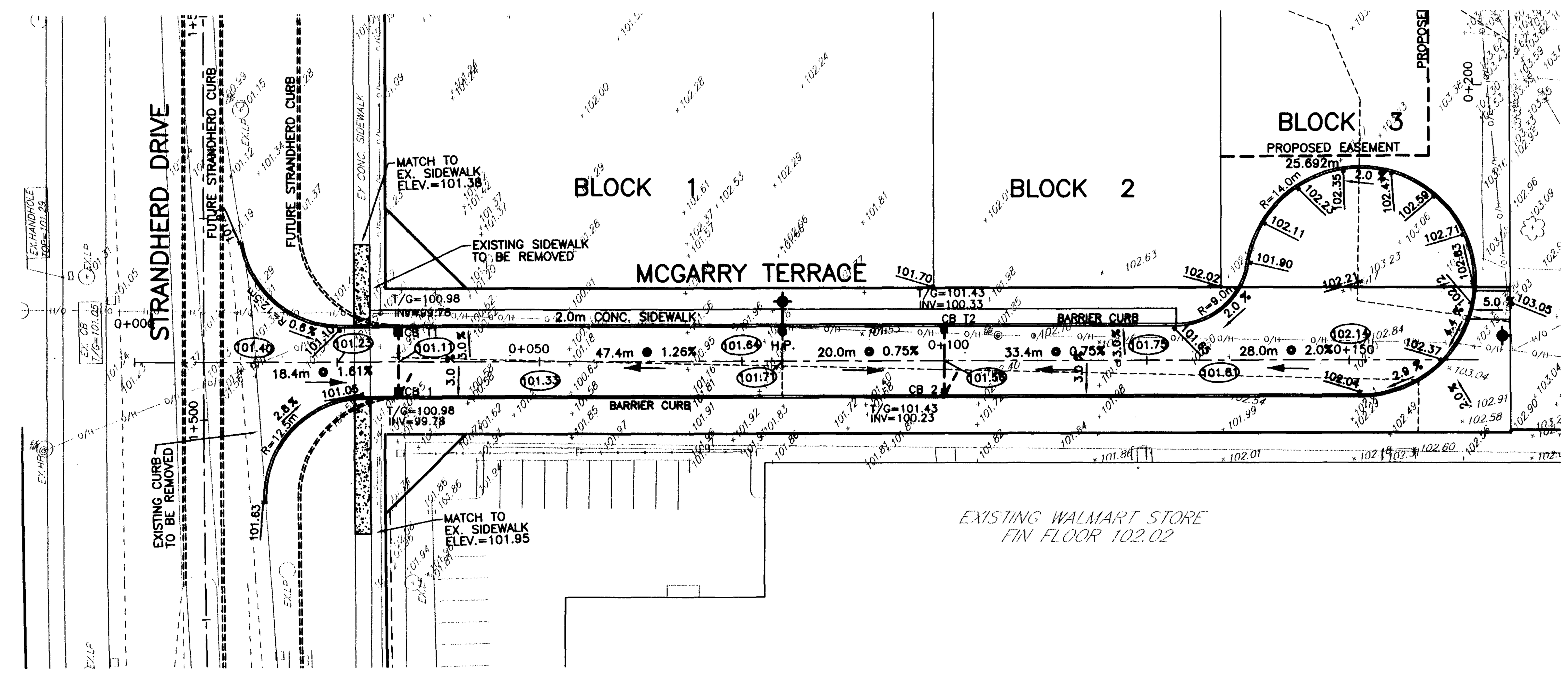
LEGEND

- PROPOSED HYDRANT WITH VALVE AND VALVE BOX
- THRUST BLOCK & RESTRAINING JOINTS TO ROC SPECS
- MH 109 — SANITARY SEWER WITH MANHOLE & NUMBER
- MH 209 — STORM SEWER WITH MANHOLE & NUMBER
- WATERMAIN
- STREET CATCHBASIN (200mmø LEAD)
- VALVE AND VALVE BOX (W-24)
- CB T4 — CATCHBASIN OUTLETTING TO ANOTHER CATCHBASIN
- CB 4 — CATCHBASIN OUTLETTING DIRECTLY TO STORM SEWER SYSTEM (C/W ICD 19.8 l/sec)
- 99.99 — PROPOSED CENTRELINE ROAD GRADE
- 98.21 — PROPOSED GRADE
- 88.52 — EXISTING ELEVATION
- 2.5% — DIRECTION & SLOPE OF REAR LOT AND CURB RADIUS DRAINAGE
- T/G=88.45 — TOP OF GRATE ELEVATION FOR CATCH BASINS









Reviewed by
Infrastructure Approvals Division
Signed: [signature]
Date: May 7, 2007
13968

NOTE
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Ottawa

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6.	ISSUED FOR TENDER	MAR 20/07	SMC
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4.	REVISED SEWER OUTLETS	OCT 20/06	SMC
3.	REVISED AS PER CITY COMMENTS	JUNE 16/06	SMC
2.	REVISED AS PER CITY COMMENTS	JUNE 9/06	SMC
1.	ISSUED FOR REVIEW	JUNE 6/06	SMC

PROFESSIONAL ENGINEER — M. CZHARTISKI — PROVINCE OF ONTARIO — MAR 23/07

minto — CANADA'S MOST HONOURED BUILDER

DME Ltd
David McManus Engineering Ltd.
400 - 30 Camelot Drive
Ottawa Ontario, K2G 5X8
E-mail: mcmanus@dmel.on.ca
Ph. 225-1929 Fax 225-7330

BASEPLAN	DME	SCALE	
DESIGN	MSB	1:500	
CHECKED	JHB		
CAD	MSB	0 5 10 15 20	
PROJ. MGR.	SMC		
APPROVED	SMC		

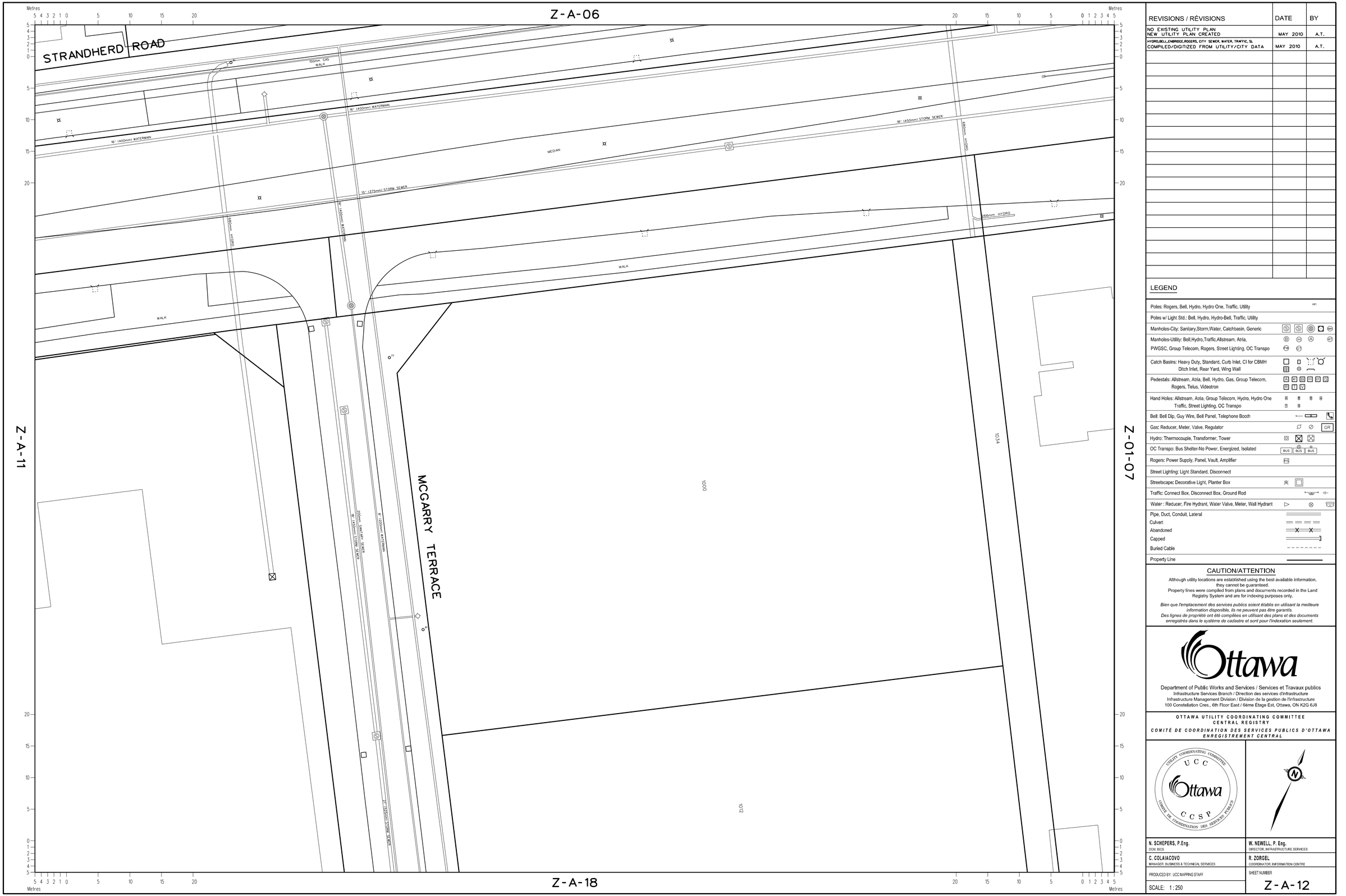
MINTO DEVELOPMENTS INC.
MCGARRY TERRACE
CITY OF OTTAWA

GENERAL PLAN OF SERVICES AND GRADING AND DRAINAGE PLAN

PROJECT No.	2641
SURVEY BY	D.M.E.
DATE	MAY 2006
DRAWING No.	2641-S1

13968

Z-A-06



Z-A-11

Z-01-07

Z-A-18

REVISIONS / RÉVISIONS	DATE	BY
NO EXISTING UTILITY PLAN NEW UTILITY PLAN CREATED	MAY 2010	A.T.
HYDRO,BELL,ENBRIDGE,ROGERS, CITY SEWER, WATER, TRAFFIC, SL COMPILED/DIGITIZED FROM UTILITY/CITY DATA	MAY 2010	A.T.

LEGEND

Poles: Rogers, Bell, Hydro, Hydro One, Traffic, Utility	H1
Poles w/ Light Std.: Bell, Hydro, Hydro-Bell, Traffic, Utility	
Manholes-City: Sanitary,Storm,Water, Catchbasin, Generic	MH
Manholes-Utility: Bell,Hydro,Traffic,Allstream, Atria, PWGSC, Group Telecom, Rogers, Street Lighting, OC Transpo	B H A K1 E9 E1
Catch Basins: Heavy Duty, Standard, Curb Inlet, CI for CBMH Ditch Inlet, Rear Yard, Wing Wall	
Pedestals: Allstream, Atria, Bell, Hydro, Gas, Group Telecom, Rogers, Telus, Videotron	A AT B H G C M T V
Hand Holes: Allstream, Atria, Group Telecom, Hydro, Hydro One Traffic, Street Lighting, OC Transpo	
Bell: Bell Dip, Guy Wire, Bell Panel, Telephone Booth	
Gas: Reducer, Meter, Valve, Regulator	GR
Hydro: Thermocouple, Transformer, Tower	
OC Transpo: Bus Shelter-No Power, Energized, Isolated	BUS BUS BUS
Rogers: Power Supply, Panel, Vault, Amplifier	PS
Street Lighting: Light Standard, Disconnect	
Streetscape: Decorative Light, Planter Box	
Traffic: Connect Box, Disconnect Box, Ground Rod	
Water : Reducer, Fire Hydrant, Water Valve, Meter, Wall Hydrant	
Pipe, Duct, Conduit, Lateral	
Culvert	
Abandoned	
Capped	
Buried Cable	
Property Line	

CAUTION/ATTENTION

Although utility locations are established using the best available information, they cannot be guaranteed.
Property lines were compiled from plans and documents recorded in the Land Registry System and are for indexing purposes only.

Bien que l'emplacement des services publics soient établis en utilisant la meilleure information disponible, ils ne peuvent pas être garantis.
Des lignes de propriété ont été compilées en utilisant des plans et des documents enregistrés dans le système de cadastre et sont pour l'indexation seulement.

Department of Public Works and Services / Services et Travaux publics
Infrastructure Services Branch / Direction des services d'infrastructure
Infrastructure Management Division / Division de la gestion de l'infrastructure
100 Constellation Cres., 6th Floor East / 6ème Etage Est, Ottawa, ON K2G 6J8

OTTAWA UTILITY COORDINATING COMMITTEE
CENTRAL REGISTRY
COMITÉ DE COORDINATION DES SERVICES PUBLICS D'OTTAWA
ENREGISTREMENT CENTRAL

N. SCHEPERS, P.Eng. DGM, BCS	W. NEWELL, P. Eng. DIRECTOR, INFRASTRUCTURE SERVICES
C. COLAIACOVO MANAGER, BUSINESS & TECHNICAL SERVICES	R. ZORGEL COORDINATOR, INFORMATION CENTRE
PRODUCED BY: UCC MAPPING STAFF	SHEET NUMBER Z-A-12
SCALE: 1 : 250	

Appendix C

Pre-Consultation
Correspondences

George Adom

From: Bliss Edwards <bedwards@dymon.ca>
Sent: December 13, 2017 12:45 PM
To: Karla Ferrey; Julie White; J. Santiago Guardia at Nicholas Caragianis Architect Inc.; tremblay@fotenn.com
Subject: FW: 1000 McGarry Terrace - Preconsultation Follow-up
Attachments: Pre-applicationMemo_1000 McGarry14112017.pdf; Studies and plans list.pdf

Bliss Edwards, MCIP RPP
Senior Director - Planning

Dymon Group of Companies
2-1830 Walkley Road | Ottawa ON K1H 8K3
Direct +14168443874 | E-mail bedwards@dymon.ca

From: Renaud, Jean-Charles [mailto:Jean-Charles.Renaud@ottawa.ca]
Sent: December 7, 2017 2:46 PM
To: Bliss Edwards <bedwards@dymon.ca>
Cc: Moise, Christopher <christopher.moise@ottawa.ca>; Baggs, Rosanna <Rosanna.Baggs@ottawa.ca>; Richardson, Mark <Mark.Richardson@ottawa.ca>; Sharif, Sharif <sharif.sharif@ottawa.ca>
Subject: 1000 McGarry Terrace - Preconsultation Followup

Good morning Bliss,

Further to our meeting on November 14, 2017, regarding a proposal to construct a new self-storage facility with at-grade retail, please find below an overview of what was discussed.

Official Plan and Zoning

- Official Plan: Designated "Mixed Use Centre" (Town Centre) under Schedule B
- Secondary Plan: Designated "Mid Rise Mixed Use" under Schedule 1 of South Nepean Town Centre Secondary Plan for Area 7
- Community Design Plan: Subject to the South Nepean Town Centre Community Design Plan
- Zoning: Mixed-Use Centre Zone, Exception 1440, Maximum Height 20 metres (MC[1440] H(20))

Planning (JC Renaud)

- You may proceed with the applications without an Official Plan Amendment, with the understanding that issues may come up during circulation. The safer bet may be to include an Official Plan Amendment from the onset, seeing as there is still some lack of comfort with considering the proposed use as a service commercial use.
- Please provide rationale supporting the proposal's jobs considerations. Staff is still uncertain that the projected 15 employees associated with the self-storage use is consistent with the policy's density targets for 4-6 storey buildings.
- Please consider relocating the building so that it fronts on both McGarry Terrace and Strandherd Drive. Introducing a use such as this one within the urban context of a town centre should be accompanied by lively urban façades on both streets.
- Staff will be looking at achieving design excellence in order to further justify the use's prominent placement within a Towncentre.
- Please provide buffering between this site and the neighbouring sites to the east and south.

- Provide ample landscaping, supporting the introduction of this type of use at this location.

Engineering (Golam Sharif)
- The engineering preconsultation memo is attached

Urban Design (Christopher Moise)
- Urban Design Panel review will be required.

Transportation (Rosanna Baggs)
- The McGarry Terrace access to the site should be tightened up as much as possible.
- Please show Strandherd Drive linework on plans.
- The Traffic Impact Assessment Screening form (attached) needs to be filled out and submitted as soon as possible so as to not delay the process.
- Any transportation studies should look at a worst case scenario including McGarry Terrace not being extended down to Marketplace Avenue.
- A Noise Impact Assessment will be required if there is exposed mechanical equipment.
- A 5x5 metre sight triangle will need to be protected.

Trees (Mark Richardson)
- A tree cutting permit will be required.
- A Tree Conservation Report will be required, and can be included as part of the Landscape Plan.
- The Landscape Plan will need to show how trees will mature and what measures are undertaken to ensure this (soil volumes, silva cells, etc.)

Development Applications Required
- Site Plan Control, Manager Approved, Public Consultation
- Major Zoning Bylaw Amendment
- Official Plan Amendment (recommended)
- The required plans and studies for the site plan control application are included in the attachment. You can reference the Guide to Preparing Studies and Plans in the link below. http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

I also encourage you to discuss the proposal with the area Councillor Michael Qaqish and local community associations.

I trust this information is helpful. Please do not hesitate to contact me if you have questions or require clarification.

JC
Jean-Charles Renaud, MCIP/*MICU*, RPP/*UPC*
Planner | *Urbaniste*
Development Review, South | *Examen des projets d'aménagement, Sud*
Planning, Infrastructure and Economic Development Department | *Services de la planification, de l'infrastructure et du développement économique*
City of Ottawa | *Ville d'Ottawa*
110 Laurier Avenue West. Ottawa, ON | *110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1*
613.580.2424 ext./poste 27629
ottawa.ca/planning / ottawa.ca/urbanisme

'

MEMO

Date: 15-11-2017

To / Destinataire	Jean Charles Renaud, Planner
From / Expéditeur	Golam Sharif, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** **1000 McGarry Terrace, Ward No 22,** *Mixed use building with retails and drive through storage facility by Dymon Group of Companies.*

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

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans#servicing-and-grading-plan-requirements

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

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

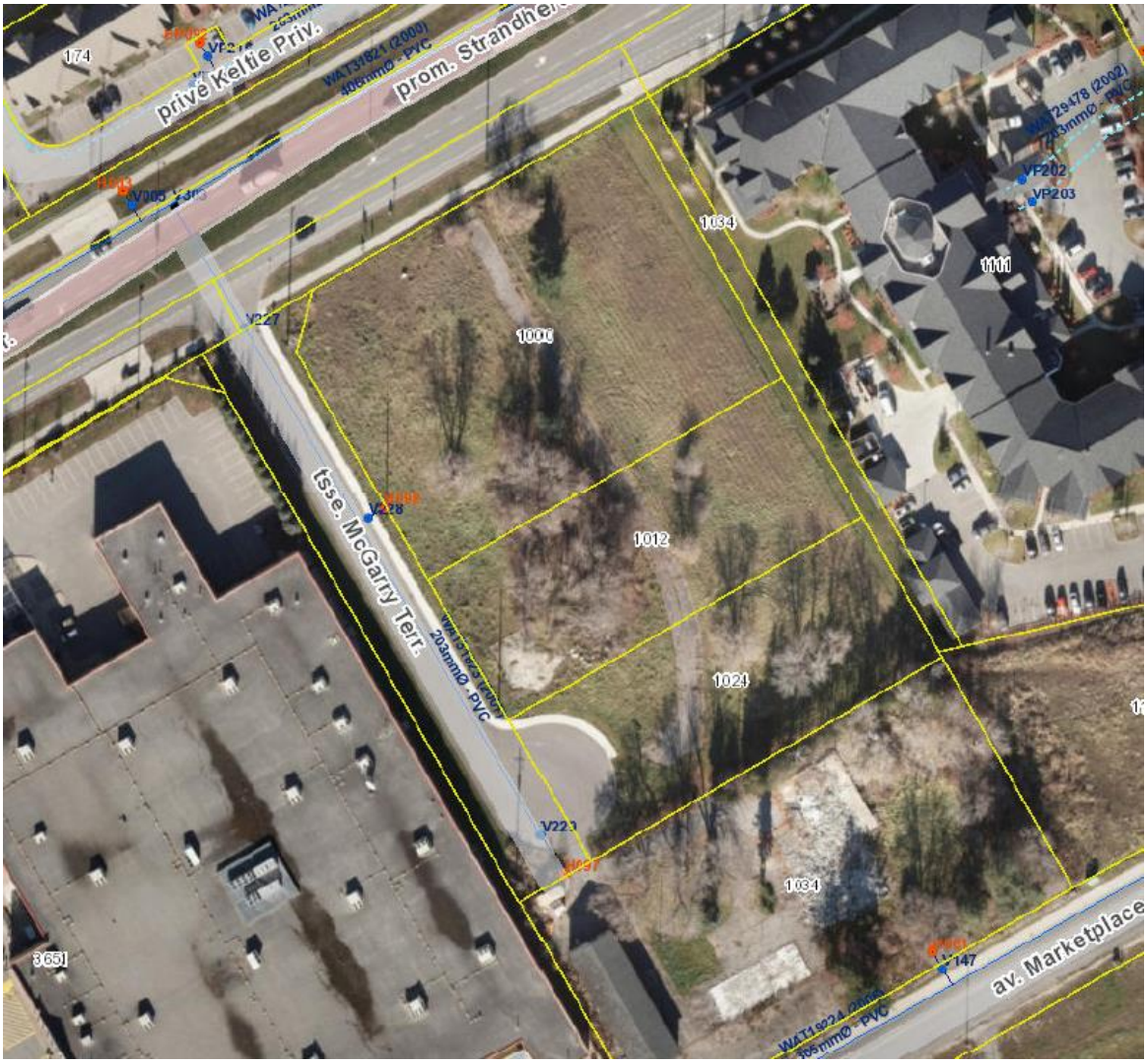
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

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

4. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   i. Barrhaven Town Center Master Servicing Study (MSS) is available for this area. 100-year storage must be provided on site and minor system capture rate must corresponds to 85 l/s/ha.

5. Deep Services (Storm, Sanitary & Water Supply)



Hydrants

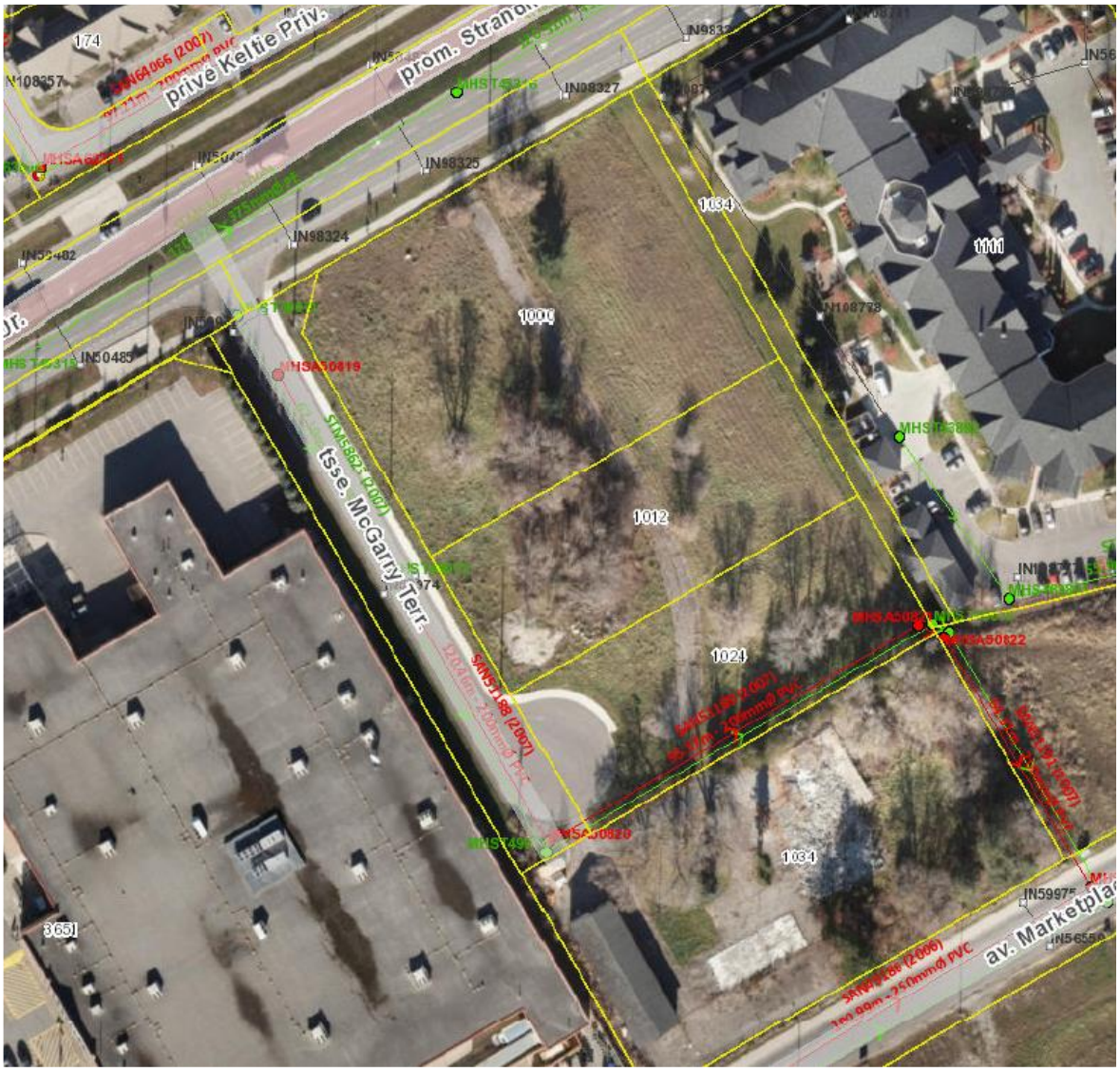
Hydrant Laterals

Water Pipes

- Public
- Private

Valves

- Valve
- TVS, A, D



Storm Manholes

Storm Inlets

Trunk Sewers
- Sanitary Pipe
- Combined Pipe
- Storm Pipe

i. A plan view of the existing services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of existing services is:

   a. McGarry Terrace:

      i. Sanitary – 200 mm PVC.

ii. Storm – 525 mm Conc.

iii. Water – 203 mm PVC.

b. Strandherd Drive:

i. Sanitary – None.

ii. Storm – 375 mm PE and 450 m PE.

iii. Water – 406 mm PVC.

ii. As per City's Sewer Design guideline a monitoring manhole shall be required just inside the property line located in an accessible location (ie. Not in a parking area) for all non-residential and multi residential buildings connections from a private sewer to a public sewer.

iii. New connections to sewer or watermain services within McGarry Terrace is subject to City approval and to be made above the springline of the sewermain as per:

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

b. Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*

c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,*

d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

e. No submerged outlet connections.

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

i. Location of service

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

iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

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

vi. Existing hydrant at the entrance of the McGarry Terrace may need to be relocated. Hydrant spacing to meet City's Water Design guidelines.

vii. The water main on McGarry Terrace is a dead end main. Subject to the site demand water service connection from the site to Strandherd Drive may be required. If required a $190 per meter of frontage is applicable for Strandherd Drive water main connection.

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

8. General comments:

i. There is significant slope at the east side of the property. Therefore, retaining wall may be required. Any retaining walls over 1 m in height must be designed and stamped by a Professional Engineer.

ii. The existing hydro pole at the entrance from the McGarry Terrace may need to be relocated.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 20763 or by email at sharif.sharif@ottawa.ca.

Golam Sharif
Project Manager – Infrastructure Approvals
Development Review, South Branch

Appendix D

City of Ottawa Development Servicing Checklist

DYMON SELF STORAGE, 1000 MCGARRY TERRACE DEVELOPMENT SERVICING STUDY CHECKLIST	
REFERENCED STUDIES AND REPORTS	**REFERENCE**
Site Servicing Report for Dymon Self Storage, 1000 McGarry Terrace (J.L. Richards & Associates Limited, February 2018)	SSR

4.1	GENERAL CONTENT	REFERENCE
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	SSR (Title Page)
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	SSR (Figure 1, Appendix A, Sections 1.2, 1.3)
☒	Plan showing the site and location of all existing services.	Site Servicing Grading Plan (SSG)
☐	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.	SSR (Appendix C)
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	SSR (Appendix C)
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	SSR (Sect. 1.4, 2.1, 3.1, 4.1)
☒	Statement of objectives and servicing criteria.	SSR (Sect. 1.1, 1.3, 2.1, 2.2, 3.1, 3.2, 4.1)
☒	Identification of existing and proposed infrastructure available in the immediate area.	SSR (Sect. 1.4) Site Servicing Grading Plan (SSG)
☐	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
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Servicing Grading Plan (SSG) Ponding Plan (SWM)
☐	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.	Site Servicing Grading Plan (SSG)
☒	All preliminary and formal site plan submissions should have the following information: ▪ Metric scale ▪ North arrow (including construction North) ▪ Key plan ▪ Name and contact information of applicant and property owner ▪ Property limits, including bearings and dimensions ▪ Existing and proposed structures and parking areas ▪ Easements, road widening and rights-of-way ▪ Adjacent street names	All Drawings

4.2	DEVELOPMENT SERVICING REPORT: WATER	REFERENCE
☐	Confirm consistency with Master Servicing Study, if available.	N/A
☒	Availability of public infrastructure to service proposed development.	SSR (Sect. 1.4) Site Servicing Grading Plan (SSG)
☒	Identification of system constraints.	SSR (Sect. 2.1, 2.2)
☒	Identify boundary conditions.	SSR (Sect. 2.6, Table 2.2)
☒	Confirmation of adequate domestic supply and pressure.	SSR (Sect. 2.2, 2.7.1, Appendix E5)
☒	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.	SSR (Sect. 2.2, 2.4, 2.7.2, Appendix E6)
☒	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.	SSR (Sect. 2.7, Appendix E)
☒	Definition of phasing constraints. Hydraulic modelling is required to confirm servicing for all defined phases of the project, including the ultimate design.	SSR (Sect. 2.7)
☒	Address reliability requirements, such as appropriate location of shutoff valves.	Site Servicing Grading Plan (SSG)
☒	Check on the necessity of a pressure zone boundary modification.	SSR (Sect. 2.7)

☒	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.	SSR (Sect. 2.3, 2.7, 2.9, Appendix E)
☒	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.	SSR (Sect. 2.9) Site Servicing Grading Plan (SSG)
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	SSR (Sect. 2.1)
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	SSR (Appendix E)

4.3	**DEVELOPMENT SERVICING REPORT: WASTEWATER**	**REFERENCE**
☒	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).	SSR (Sect. 3.1)
☐	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 and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	SSR (Sect. 1.4)
☒	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.)	SSR (Sect. 3.2, Appendix F)
☐	Calculations related to dry weather and wet weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☒	Description of proposed sewer network, including sewers, pumping stations and forcemains.	SSR (Sect. 3.3, Appendix F) Site Servicing Grading Plan (SSG)

☐	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, etc.	N/A

4.4	DEVELOPMENT SERVICING REPORT: STORMWATER	REFERENCE
☒	Description of Drainage outlets and downstream constraints, including legality of outlets (i.e., municipal drain, right-of-way, watercourse, or private property).	SSR (Sect. 1.4, 4.1, Appendix G)
☒	Analysis of available capacity in existing public infrastructure.	SSR (Section 4.1, 4.2, 4.3)
☒	A Drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	SSR (Figure 1) Site Servicing Grading Plan (SSG)
☒	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.	SSR (Sect. 4.1, 4.2, 4.3)
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	SSR (Sect. 4.1, 4.3)
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	SSR (Sect. 4.2, 4.3) Ponding Plan (SWM)
☐	Setback 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.	SSR (Appendix C)

☐	Confirm consistency with subwatershed and Master Servicing Study, if applicable study exists.	SSR (Sect. 4.1)
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	SSR (Sect. 4.3, Appendix G)
☐	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.	SSR (Sect. 4.1, 4.3, Appendix G)
☐	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.	SSR (Sect. 4.3, 4.4) Site Servicing Grading Plan (SSG) Ponding Plan (SWM)
☐	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
☒	Description of how the conveyance and storage capacity will be achieved for the development.	SSR (Sect. 4.3)
☒	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	SSR (Sect. 4.3) Site Servicing Grading Plan (SSG) Ponding Plan (SWM)
☐	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.	SSR (Sect. 5.0) Erosion & Sediment Control Plan (ESC)
☐	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

4.5	APPROVAL AND PERMIT REQUIREMENTS	REFERENCE
The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development, as well as the relevant issues affecting such approval. The approval and permitting shall include but not be limited to the following:		
☐	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 Environmental Compliance Approval (ECA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation, etc.).	N/A

4.6	CONCLUSION CHECKLIST	REFERENCE
☒	Clearly stated conclusions and recommendations.	SSR (Sect. 2.9, 3.3, 4.4)
☐	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.	
☒	All draft and final reports shall be signed and stamped by a Professional Engineer registered in Ontario.	SSR (Section 5.0)

Appendix E

Hydraulic Network Analysis
(Water Distribution System)

Appendix E1

Water Demands & Fire Flow

Annie Williams

From: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>
Sent: October 1, 2018 9:43 AM
To: Scott Vallier; Annie Williams
Cc: Bliss Edwards; Marc Trottier; Andre Bogdanowicz; Sheldon Dattenberger
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Yes, building configuration still similar to previous locations i.e.: Carling Richmond.

613-237-6801 (ext 225)

Best regards,

Santiago Guardia
BArch, OAA, MA, LEED AP
email jguardia@ncarchitect.ca
ext 225

nicholascaragianisarchitect inc.
137 Parella Street, Ottawa, ON K1S 3K9
tel phone 613 237 6801 fax 613 237 6289
www.ncarchitect.ca

From: Scott Vallier <svallier@gwal.com>
Sent: Monday, October 1, 2018 8:42 AM
To: Annie Williams <awilliams@jlrichards.ca>
Cc: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>; Bliss Edwards <bedwards@dymon.ca>; Marc Trottier <mtrottier@gwal.com>; Andre Bogdanowicz <andre@gwal.com>; Sheldon Dattenberger <sdattenberger@jlrichards.ca>
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hi Annie,

Based on past Dymon Storage buildings we probably can assume that the water demands are still valid but I have not seen any drawings for this job so I cannot confirm this.

Santaigo, please confirm with Annie that the water demands will be about the same as past Dymon projects. If so, the water demands are still valid.

Thanks,

Scott Vallier, Mechanical Designer
Goodkey, Weedmark & Associates Limited
Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 259
Fax: 613-727-5115
Email: svallier@gwal.com
Web: www.gwal.com

From: Annie Williams <awilliams@jlrichards.ca>
Sent: September 28, 2018 3:20 PM
To: Scott Vallier <svallier@gwal.com>
Cc: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>; Bliss Edwards <bedwards@dymon.ca>; Marc Trottier <mtrottier@gwal.com>; Andre Bogdanowicz <andre@gwal.com>; Sheldon Dattenberger <sdattenberger@jlrichards.ca>
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hi Scott,

Can you please confirm that the water demands given below are still valid for the latest Dymon McGarry Site Plan?

Thank you,

Annie Williams, EIT
Civil Engineering Intern

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

From: Scott Vallier <svallier@gwal.com>
Sent: February 8, 2018 11:10 AM
To: Julie White <JWhite@jlrichards.ca>; Marc Trottier <mtrottier@gwal.com>; Andre Bogdanowicz <andre@gwal.com>
Cc: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>; Bliss Edwards <bedwards@dymon.ca>; George Adom <gadom@jlrichards.ca>; Annie Williams <AWilliams@jlrichards.ca>
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hey Julie,

Please see my responses below in red.

Thanks,

Scott Vallier, Mechanical Designer
Goodkey, Weedmark & Associates Limited
Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 259
Fax: 613-727-5115
Email: svallier@gwal.com
Web: www.gwal.com

From: Julie White [mailto:jwhite@jlrichards.ca]
Sent: February-06-18 10:06 AM
To: Marc Trottier; Andre Bogdanowicz
Cc: Scott Vallier; Santiago Guardia at Nicholas Caragianis Architect Inc.; Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Annie Williams

From: Scott Vallier <svallier@gwal.com>
Sent: February 8, 2018 11:10 AM
To: Julie White; Marc Trottier; Andre Bogdanowicz
Cc: Santiago Guardia at Nicholas Caragianis Architect Inc.; Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Follow Up Flag: Follow up
Flag Status: Flagged

Hey Julie,

Please see my responses below in red.

Thanks,

Scott Vallier, Mechanical Designer
Goodkey, Weedmark & Associates Limited
Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 259
Fax: 613-727-5115
Email: svallier@gwal.com
Web: www.gwal.com

From: Julie White [mailto:jwhite@jlrichards.ca]
Sent: February-06-18 10:06 AM
To: Marc Trottier; Andre Bogdanowicz
Cc: Scott Vallier; Santiago Guardia at Nicholas Caragianis Architect Inc.; Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Good Morning,

In addition to my previous email, can we please ask that GWAL confirm the following:

- The domestic peak hour demand based on the fixture count. Based on past projects it is estimated the new building will have 32.2 Fixture units - 25GPM. Also based on past projects both retails will have similar fixture units so we can triple this to 75GPM . This does not include the irrigation system & fire suppression system.
- The domestic maximum day demand along with the fire flow requirement for the building (as per the OBC). For the buildings sprinkler system we will require 500GPM.
- The domestic average day demand. I suggest Dymon look at existing water meters at a similar Dymon building and obtain an average that way.
- Anticipated peak sanitary flow rate. Worst case scenario, the peak sanitary flow rate would be 75GPM + 10GPM for floor drains = 85GPM.

Please also confirm the watermain service size required at the building, as well as the storm sewer size and sanitary sewer size.
Based on a past project (Greenbank – Dymon Storage): 8”dia. Water Supply, 6”dia. Sanitary pipe, 10”dia. Storm pipe.

Julie White

From: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>
Sent: February 15, 2018 3:11 PM
To: Annie Williams
Cc: Julie White
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hi Annie,

Yes, that is typical.

Best regards,

Santiago Guardia
BArch, OAA, MA, LEED AP
email jguardia@ncarchitect.ca
ext 225

nicholascaragiansarchitect inc.
137 Pamela Street, Ottawa, ON K1S 3K9
telephone. 613 237 6801 fax: 613 237 8289
www.ncarchitect.ca

From: Annie Williams [mailto:awilliams@jlrichards.ca]
Sent: Thursday, February 15, 2018 3:08 PM
To: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>
Cc: Julie White <jwhite@jlrichards.ca>
Subject: FW: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hi Santiago,

Are all of the proposed fixtures for the 1000 McGarry site located on the ground floor of the proposed building?

Thank you,

Annie Williams, EIT
Civil Engineering Intern

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

From: Scott Vallier [mailto:svallier@gwal.com]
Sent: February 15, 2018 2:08 PM
To: Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

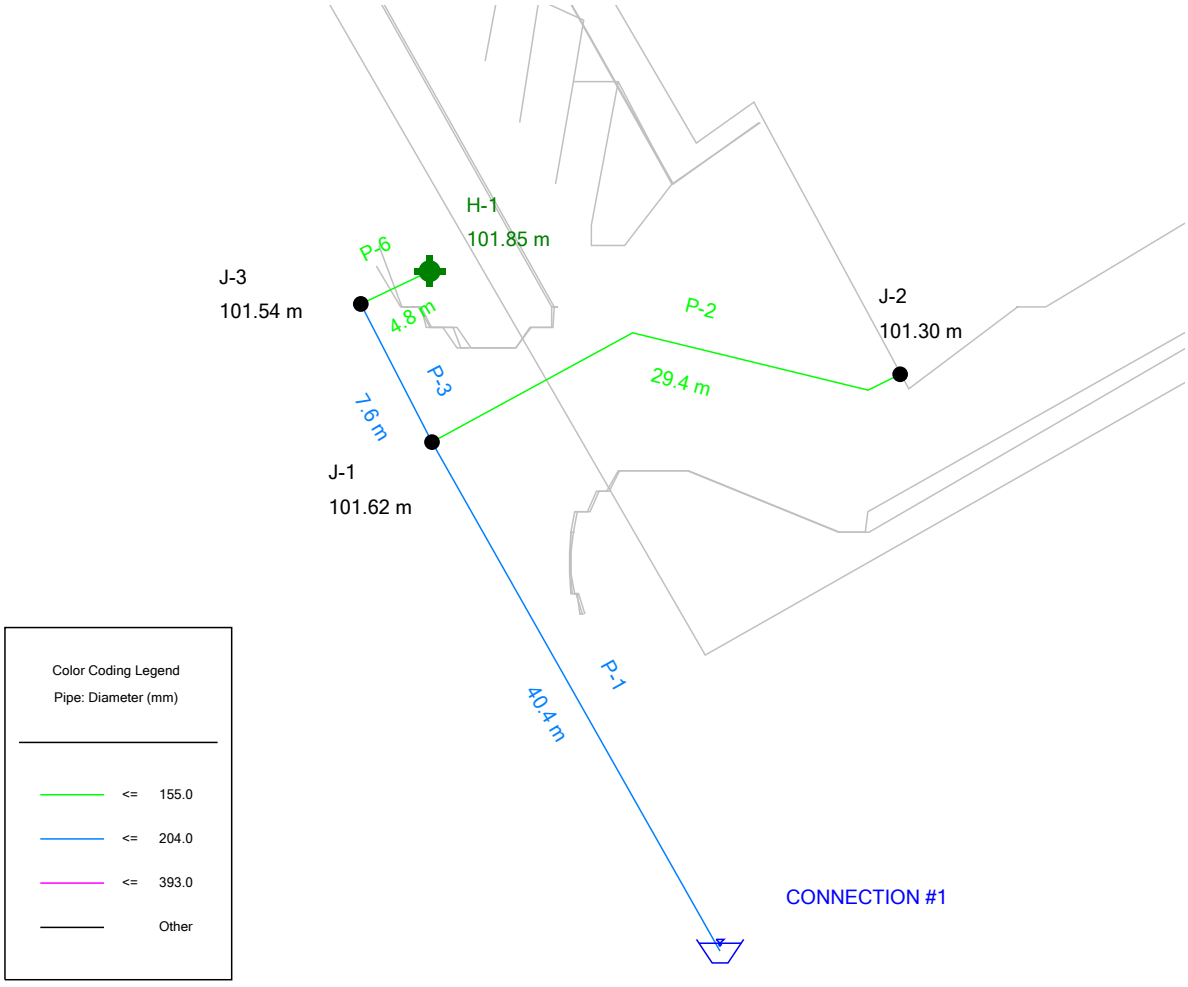
Hi Annie,

Appendix E2

Overall Schematic

Dymon Storage - 1000 McGarry Terrace

Overall Schematic



Appendix E3

Hydraulic Boundary Conditions
and City E-mail
Correspondence

Annie Williams

From: Sharif, Sharif <sharif.sharif@ottawa.ca>
Sent: February 13, 2018 9:57 AM
To: Annie Williams
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Hi Annie,

I noticed that when I received it from our water resources group. However, in this case it would not change anything, as this is a shorter watermain with dead end. Therefore, anywhere along the McGarry except very close to Strandherd or very close to the dead end the pressure would be pretty much same.

Yes, we are providing post zone configuration with the boundary condition analysis. However, those will be applicable after the update from the City (which won't be anytime soon around that area), therefore please use the more conservative pre configuration values. Thanks.

Sharif

From: Annie Williams [mailto:awilliams@jlrichards.ca]
Sent: Tuesday, February 13, 2018 9:43 AM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Hi Sharif,

Thank you for the new boundary conditions. Is there a reason the Connection #1 location is so far south of our service lateral location? As indicated previously, our service lateral for the site is 80.6 m south of where the existing 203mm watermain along McGarry Terrace connects to the existing 406mm watermain on Strandherd Drive. See figure below. Also, please confirm that we can ignore the Post-Zone Configuration values.

Thank you,

Annie Williams, EIT
Civil Engineering Intern

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

J.L. Richards & Associates Limited
ENGINEERS • ARCHITECTS • PLANNERS

BEST MANAGED COMPANIES

From: Sharif, Sharif [mailto:sharif.sharif@ottawa.ca]
Sent: February 12, 2018 11:29 AM
To: Annie Williams
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Good Morning Annie,

Here is the new boundary condition. If you have any question, please let me know. Thanks.

Sharif

Golam Sharif, P.Eng., M.Eng.
Project Manager, Infrastructure Approvals
Development Review, South Services
Planning, Infrastructure and Economic Development Department |
Services de planification, d'infrastructure et de développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **20763**, fax/téléc:613-580-2576, sharif.sharif@ottawa.ca

Boundary Conditions 1000 McGarry Terr

Information Provided

Date provided: 09 February 2018

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	105	1.8
Maximum Daily Demand	157.8	2.6
Peak Hour	283.8	4.7
Fire Flow Demand	1893	31.6

# of connections 1

Location

Results

Pre-Zone Configuration Model

Connection 1 - McGarry Terrace

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	156.7	77.2
Peak Hour	142.9	57.7
Max Day plus Fire (14,000 l/min)	139.8	53.2

[1] Ground Elevation = 101.6 m

Post-Zone Configuration Model

Connection 1 - McGarry Terrace

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	64.3
Peak Hour	146.1	62.0
Max Day plus Fire (14,000 l/min)	145.6	61.2

[1] Ground Elevation = 101.6 m

Considerations

1. Both pre-zone configuration and post-zone configuration hydraulic boundary conditions were provided.

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.

From: Annie Williams [mailto:awilliams@jlrichards.ca]
Sent: Thursday, February 08, 2018 3:44 PM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Bliss Edwards <bedwards@dymon.ca>; Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>; Julie White <jwhite@jlrichards.ca>; Guy Forget <gforget@jlrichards.ca>
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Sharif,

Please see attached, as requested.

Thank you,

Annie Williams, EIT
Civil Engineering Intern

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

From: Sharif, Sharif [mailto:sharif.sharif@ottawa.ca]
Sent: February 8, 2018 3:33 PM
To: Annie Williams
Cc: Bliss Edwards; Renaud, Jean-Charles; Julie White; Guy Forget
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Hi Annie,

Please provide a figure with a new location for the connection. I will go over the information and asked for Boundary Condition from our Water Resources Group. Thanks.

Sharif

From: Annie Williams [mailto:awilliams@jlrichards.ca]
Sent: Thursday, February 08, 2018 1:44 PM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Bliss Edwards <bedwards@dymon.ca>; Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>; Julie White <jwhite@jlrichards.ca>; Guy Forget <gforget@jlrichards.ca>
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Hi Sharif,

As discussed, the required fire flow for 1000 McGarry Terrace has been re-calculated as per the Ontario Building Code and domestic demands have been revised based on new information obtained from the Owner's mechanical engineer. As the proposed building will have a sprinkler system, the flow required by the sprinkler system is the reduced fire flow requirement for the site. Please see the table below for updated water demands.

Scenario	Demand	
	L/min	L/s
Average Daily Demand	105.00	1.75
Maximum Daily Demand	157.80	2.63
Peak Hour	283.80	4.73
Fire Flow Demand	1,893.00	31.55

*Note that we are proposing a different service connection location than shown previously as we would like to re-use the existing service connection off of McGarry Terrace. The existing service connection is located approximately 80.6 m from the Strandherd Drive watermain.

If the City could provide updated boundary conditions as soon as possible, it would be greatly appreciated.

Should you have any questions, please do not hesitate to contact me.

Thank you,

Annie Williams, EIT
Civil Engineering Intern

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

From: Sharif, Sharif [mailto:sharif.sharif@ottawa.ca]
Sent: February 1, 2018 12:10 PM
To: Annie Williams
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Good Afternoon Annie,

As per our discussion, It looks like the fire flow demand is very high from the site and failed. The table I sent you earlier regarding boundary condition, Max HGL and Peak hour was modelled from McGarry Terr; however, Max Day plus Fire was modelled from Strandherd. Therefore, the fire flow demand must be reduced. As this is a site plan application and you are not sizing the watermain, you can use the building code calculation for the fire demand. We can run the boundary condition again as per your updated water demand information. If you have any question let me know.

Regards,

Sharif

From: Sharif, Sharif
Sent: Monday, January 29, 2018 9:48 AM
To: 'Annie Williams' <awilliams@jlrichards.ca>
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Good Morning Annie,

Here are the boundary condition. Please advise that, our Water Resource Group had to relocated the max day plus fire scenario to the Standherd and McGarry because it failed. It is also adviced to model the 203 mm dia watermain underneath McGarry Terr. If you have any question please let me know. Thanks.

Golam Sharif, P.Eng., M.Eng.
Project Manager, Infrastructure Approvals
Development Review, South Services
Planning, Infrastructure and Economic Development Department |
Services de planification, d'infrastructure et de développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **20763**, fax/téléc:613-580-2576, sharif.sharif@ottawa.ca

Boundary Conditions 1000 McGarry Terr

Information Provided

Date provided: 25 Jan 2018

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	35.4	0.6
Maximum Daily Demand	52.8	0.9
Peak Hour	94.8	1.6
Fire Flow Demand	14000	233.3

# of connections 1

Location

Results

Pre-Zone Configuration Model

Connection 1 - McGarry Terrace

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.1	83.2
Peak Hour	143.2	59.2
Max Day plus Fire (14,000 l/min)	117.7	22.9

[1] Ground Elevation = 101.6 m

Post-Zone Configuration Model

Connection 1 - McGarry Terrace

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	65.6
Peak Hour	146.2	63.4
Max Day plus Fire (14,000 l/min)	123.5	31.2

[1] Ground Elevation = 101.6 m

Considerations

1. The 203 mm diameter watermain at McGarry Terr failed to deliver minimum City of Ottawa Design Guideline pressure of 20 psi for maximum day flow plus fire. HGL and pressure provided in this boundary condition for maximum day plus fire scenario was modelled from watermain beneath Strandherd Dr. Consultant must model and demonstrate a minimum pressure of 20 psi pressure at 203 mm watermain McGarry Terr to withstand proposed fire flow of 14,000 l/min.
2. Pressure reducing valves are to be installed due to pressure exceeding 80 psi (552 kPa) as per City of Ottawa Water Design Guidelines.
3. Both pre-zone configuration and post-zone configuration hydraulic boundary conditions were provided.

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.

From: Annie Williams [mailto:awilliams@jlrichards.ca]
Sent: Wednesday, January 24, 2018 1:34 PM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Julie White <jwhite@jlrichards.ca>
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Sharif,

Please find attached a figure showing the proposed watermain connection location, highlighted in blue.

Note that the design has not been finalized.

Thank you,

Annie Williams, EIT
Civil Engineering Intern

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

From: Sharif, Sharif [mailto:sharif.sharif@ottawa.ca]
Sent: January 24, 2018 1:20 PM
To: Annie Williams
Subject: RE: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Hi Annie,

Could you please send me exactly where the proposed connection to city watermain? You can just modify your first figure and show how its (from the proposed building) connecting to the watermain at McGarry Terr. Thanks.

Regards,

Sharif

From: Annie Williams [mailto:awilliams@jlrichards.ca]
Sent: Wednesday, January 24, 2018 12:12 PM
To: Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Bliss Edwards <bedwards@dymon.ca>; Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>; Julie White <jwhite@jlrichards.ca>; Guy Forget <gforget@jlrichards.ca>
Subject: Dymon Storage - 1000 McGarry Terrace - Request for Hydraulic Boundary Conditions

Hi Golam,

We would like to obtain hydraulic boundary conditions for Dymon Storage's development of a site located at 1000 McGarry Terrace in the City of Ottawa (refer to attached Location Plan).

The proposed usage is commercial and consists of a five-storey storage facility building with a covered drive-through garage. A preliminary Site Plan is attached.

We request boundary conditions on the existing 203 mm diameter watermain along McGarry Terrace.

Based on the mechanical fixture count of a similar Dymon Storage building, the following demands are anticipated:

Average Day = 0.59 L/s
Maximum Day = 0.88 L/s
Peak Hour = 1.58 L/s

A fire flow requirement of 233 L/s (14,000 L/min) was calculated as per the FUS (attached) and the building will have a fire suppression system.

Should you have any questions or require any further information, please do not hesitate to contact me.

Thank you,

Annie Williams, EIT
Civil Engineering Intern

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

'

Annie Williams

From: Sheldon Dattenberger
Sent: February 21, 2019 5:01 PM
To: Sharif, Sharif; Annie Williams
Cc: Bliss Edwards
Subject: RE: 1000 McGarry - Crossing Sketch

Thanks Sharif,
I didn't know if the City would want the shallower system, but it is understandable and reasonable with proper insulation.

We will update our information as suggested.
Thank you,
Sheldon

Sheldon Dattenberger, P.Eng., PMP, FEC
Senior Civil Engineer

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

From: Sharif, Sharif <sharif.sharif@ottawa.ca>
Sent: February 21, 2019 2:51 PM
To: Sheldon Dattenberger <sdattenberger@jlrichards.ca>; Annie Williams <awilliams@jlrichards.ca>
Cc: Bliss Edwards <bedwards@dymon.ca>
Subject: RE: 1000 McGarry - Crossing Sketch

Good Afternoon Sheldon/ Annie,

I have discussed internally and looks like you have to work on the existing watermain instead of proposed storm sewer and use W 25.2 watermain crossing over sewer. Therefore, if required will have to propose insulation as per W21, W22 or W23. Please include the discussion in the SWM report and also provide details within the servicing plan. Hope this helps.

Thanks.

Sharif

From: Sheldon Dattenberger <sdattenberger@jlrichards.ca>
Sent: Friday, February 15, 2019 11:37 AM
To: Annie Williams <awilliams@jlrichards.ca>; Sharif, Sharif <sharif.sharif@ottawa.ca>
Cc: Bliss Edwards <bedwards@dymon.ca>
Subject: RE: 1000 McGarry - Crossing Sketch

Hi Sharif,

I would just to add that we realize this is not an ideal situation in either case. Having more clearance but having additional fittings on a water main is not great either.

If it fits ok in the field, we would ensure that our pipe lengths are centred under the water line and ensure the water main is supported with concrete cradles with likely a compressible Styrofoam insulation between the pipes to have both support and not create pressure points on the main(s). The integrity of the water system is critical.

Let us know. We would be happy to discuss with the water group, and we want to work with the City to come up with what makes the most sense and provides a reasonable solution.

Given the lack of as-built information, we should have a contingency go either way in the field (providing the City would accept less than a 300mm separation) in case field conditions are different than expected. I doubt the sanitary will fluctuate much given that we have inverts on either end, but the water could be slightly deeper, which would necessitate a lowering of the water main anyway.

Some additional thoughts,
Sheldon

Sheldon Dattenberger, P.Eng., PMP, FEC
Senior Civil Engineer

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

From: Annie Williams <awilliams@jlrichards.ca>
Sent: February 15, 2019 10:47 AM
To: sharif.sharif@ottawa.ca
Cc: Sheldon Dattenberger <sdattenberger@jlrichards.ca>; Bliss Edwards <bedwards@dymon.ca>
Subject: 1000 McGarry - Crossing Sketch

Hi Sharif,

Per our discussion yesterday, here is a sketch showing the clearances between the proposed 375 dia. storm sewer outlet and the existing 200 dia. sanitary/watermain on McGarry Terrace.

Based on the available design information (not as-constructed information), the total vertical separation between the existing WM and SAN is 0.489 m. This means that we are not able to achieve a minimum of 0.3 m clearance between proposed ST and WM. We may be able to decrease our storm outlet size to 300 mm dia. but even then we will only achieve 0.136 m clearance to the existing watermain.

Please advise whether the City will accept our proposed clearance.

Thank you,

Annie Williams, EIT
Civil Engineering Intern

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

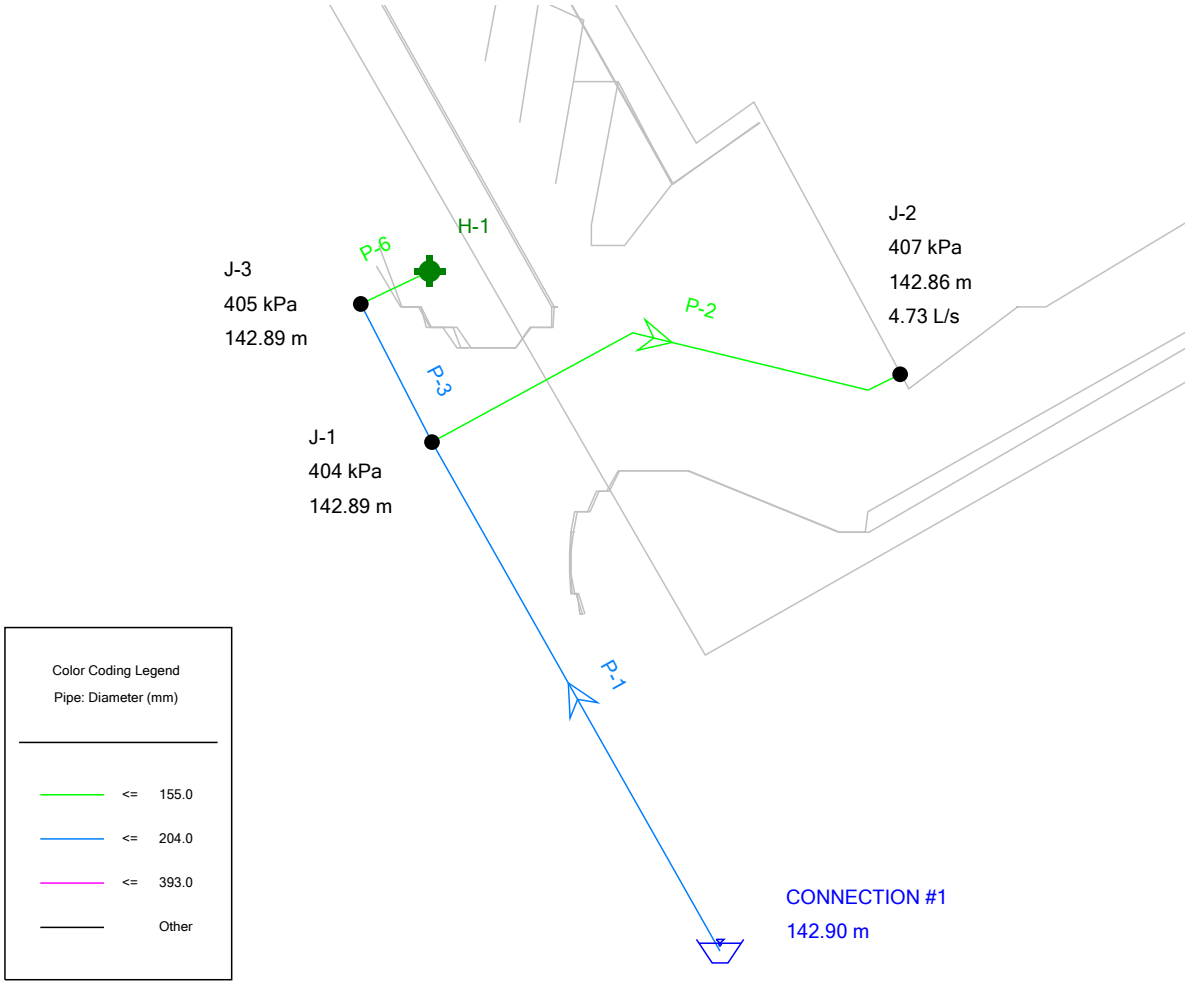
'

Appendix E4

Peak Hour Simulation Results

Dymon Storage - 1000 McGarry Terrace

Peak Hour Demand



Dymon Storage - 1000 McGarry Terrace

Peak Hour Demand

Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	101.62	0.00	142.89	404
J-2	101.30	4.73	142.86	407
J-3	101.54	0.00	142.89	405

Dymon Storage - 1000 McGarry Terrace

Peak Hour Demand

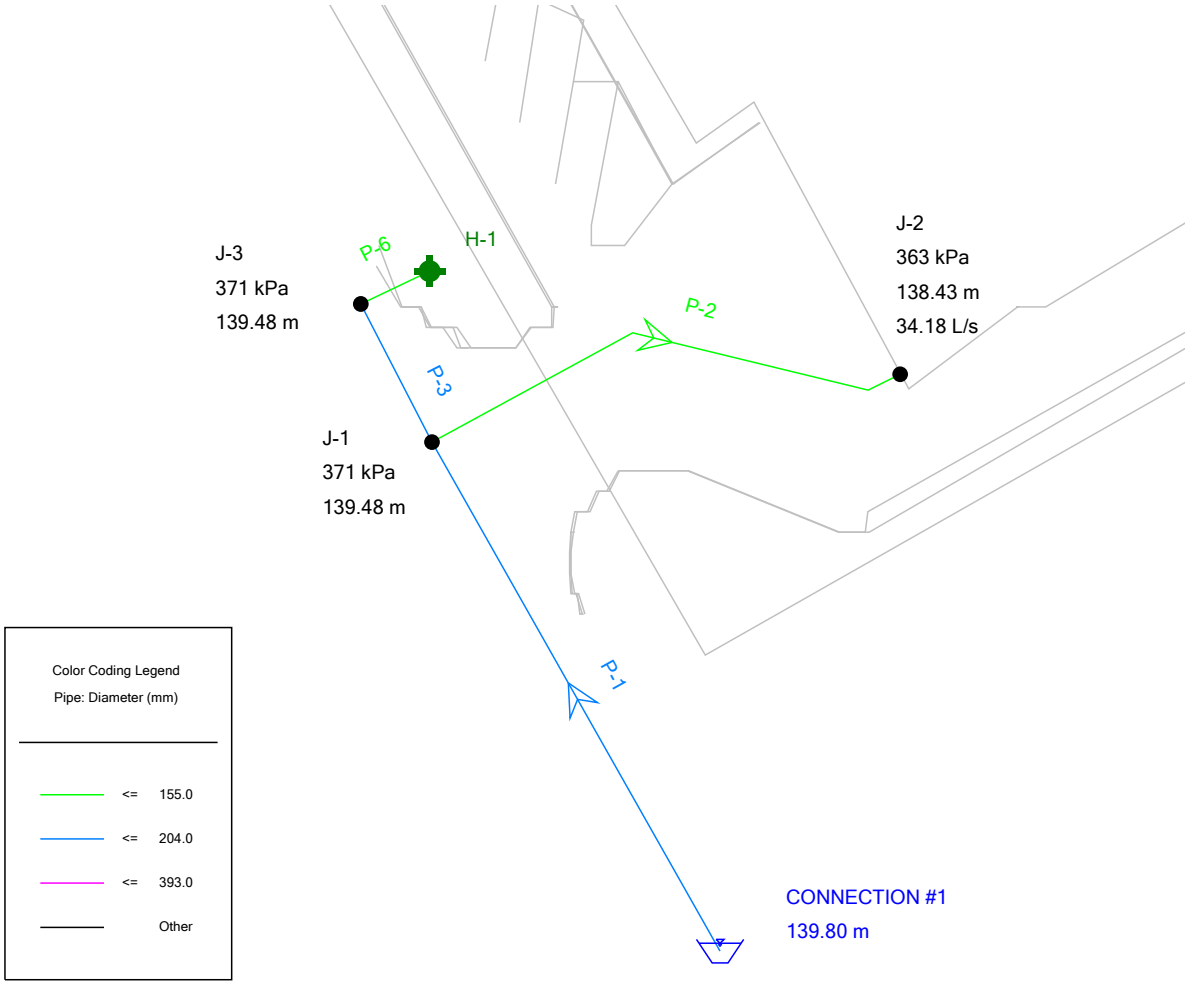
Pipe Table

Label	Diameter (mm)	Length (m)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Velocity (m/s)	Flow (L/s)
P-1	204.0	40.4	PVC	110.0	142.90	142.89	0.14	4.73
P-2	155.0	29.4	PVC	100.0	142.89	142.86	0.25	4.73
P-3	204.0	7.6	PVC	110.0	142.89	142.89	0.00	0.00
P-6	155.0	4.8	PVC	100.0	142.89	142.89	0.00	0.00

Appendix E5

Maximum Day Plus Fire Flow
Simulation Results

Dymon Storage - 1000 McGarry Terrace
Maximum Day + Sprinkler System Demand

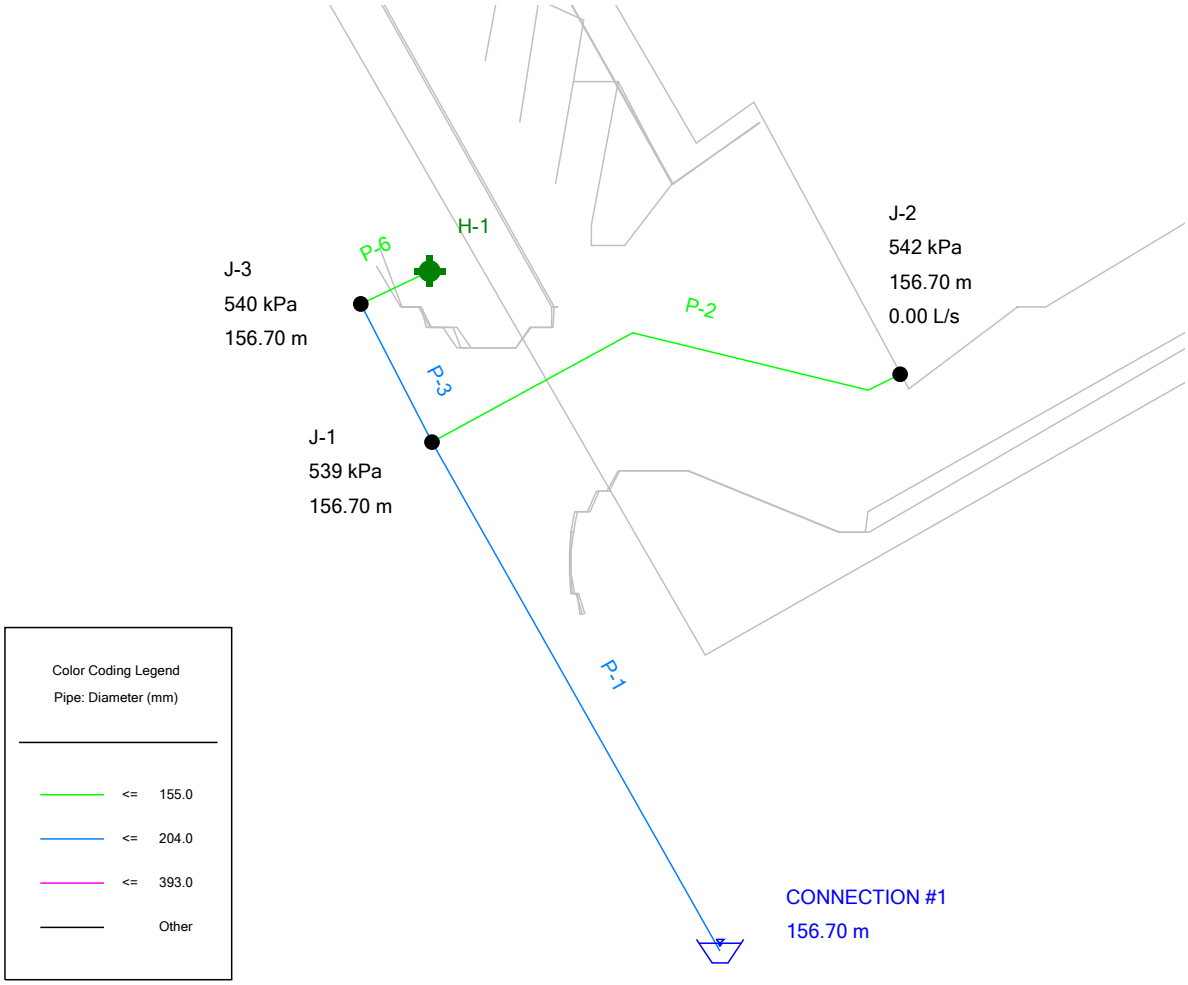


Appendix E6

Maximum Pressure Check

Dymon Storage - 1000 McGarry Terrace

Maximum Pressure



Dymon Storage - 1000 McGarry Terrace

Maximum Pressure

Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	101.62	0.00	156.70	539
J-2	101.30	0.00	156.70	542
J-3	101.54	0.00	156.70	540

Dymon Storage - 1000 McGarry Terrace

Maximum Pressure

Pipe Table

Label	Diameter (mm)	Length (m)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Velocity (m/s)	Flow (L/s)
P-1	204.0	40.4	PVC	110.0	156.70	156.70	0.00	0.00
P-2	155.0	29.4	PVC	100.0	156.70	156.70	0.00	0.00
P-3	204.0	7.6	PVC	110.0	156.70	156.70	0.00	0.00
P-6	155.0	4.8	PVC	100.0	156.70	156.70	0.00	0.00

Appendix F

Sanitary Sewer Calculations

Julie White

From: Scott Vallier <svallier@gwal.com>
Sent: February 8, 2018 11:10 AM
To: Julie White; Marc Trottier; Andre Bogdanowicz
Cc: Santiago Guardia at Nicholas Caragianis Architect Inc.; Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hey Julie,

Please see my responses below in red.

Thanks,

Scott Vallier, Mechanical Designer
Goodkey, Weedmark & Associates Limited
Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 259
Fax: 613-727-5115
Email: svallier@gwal.com
Web: www.gwal.com

From: Julie White [mailto:jwhite@jlrichards.ca]
Sent: February-06-18 10:06 AM
To: Marc Trottier; Andre Bogdanowicz
Cc: Scott Vallier; Santiago Guardia at Nicholas Caragianis Architect Inc.; Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Good Morning,

In addition to my previous email, can we please ask that GWAL confirm the following:

- The domestic peak hour demand based on the fixture count. Based on past projects it is estimated the new building will have 32.2 Fixture units - 25GPM. Also based on past projects both retails will have similar fixture units so we can triple this to 75GPM . This does not include the irrigation system & fire suppression system.
- The domestic maximum day demand along with the fire flow requirement for the building (as per the OBC). For the buildings sprinkler system we will require 500GPM.
- The domestic average day demand. I suggest Dymon look at existing water meters at a similar Dymon building and obtain an average that way.
- Anticipated peak sanitary flow rate. Worst case scenario, the peak sanitary flow rate would be 75GPM + 10GPM for floor drains = 85GPM.

Please also confirm the watermain service size required at the building, as well as the storm sewer size and sanitary sewer size.
Based on a past project (Greenbank – Dymon Storage): 8”dia. Water Supply, 6”dia. Sanitary pipe, 10”dia. Storm pipe.

Your earliest attention to this matter would be greatly appreciated. Should you have any questions please do not hesitate to call.

Julie

Dymon Self Stroage - 1000 McGarry Terrace

Wastewater Design Calculations

Calculation Method 1 (City of Ottawa Design Guidelines):

Total Gross Area =	0.603	ha
Theoritical Unit Rate =	28,000	L/ha/day - per City of Ottawa Design Guidelines
Average Wastewater Flow =	16884	L/day
Average Wastewater Volume =	0.39	L/s (assuming 12 hour operation)
Peaking Factor =	1.5	
Infiltration 0.33 L/s/ha=	0.20	L/s
Peak Design Flow =	0.79	L/s

Calculation Method 2 (Mechanical Fixture Count):

Proposed 5-Storey Building Sani. Flow =	75 GPM	= 4.73 L/s
Proposed Floor Drains of Building =	10 GPM	= 0.63 L/s
Anticipated Total Peak Flow =	85 GPM	= 5.36 L/s
Peak Design Flow =	5.36	L/s

Use the most conservative method; Q = 5.36 L/s

The proposed 150 mm diameter sanitary service with a slope of ± 0.5% has a capacity of 11.2 L/s and a full flow velocity of 0.62 m/s. Therefore, the proposed sanitary service has sufficient capacity to accommodate the Peak Design Flow of 5.36 L/s.

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

1000 McGarry Terrace
Dymon Self Storage
JLR No. 27296-003

SANITARY SEWER DESIGN SHEET

Institutional / Commercial Flow =	28,000	L / ha / day
Institutional / Commercial Flow =	56,000	L / ha / day
Inst. / Comm. Peaking Factor =	1.5	
Infiltration =	0.33	L / s / ha
Manning's Coeff. N =	0.013	

* Assuming building is in operation for 12 hours a day.

Designed by:	RM
Checked by:	AW
Date:	March 2019

Existing sanitary sewer as per approved McGarry Terrace plan and profile drawing No.2641-P1 (Rev.7 dated March 23, 2007)

M.H. #		INSTITUTIONAL / COMMERICAL			INFILTRATION			PEAK DES. Method 1	PEAK DES. Method 2	SEWER DATA					RESIDUAL	UPSTREAM					DOWNSTREAM				
		AREA	CUMM. AREA	PEAK FLOW	AREA	CUMM. AREA	PEAK EXTR.			DIA.	SLOPE	CAPAC.	VEL.	LENGTH	CAP.	T/G	Obvert Drop	Obvert	Invert	Cover	T/G	Obvert Drop	Obvert	Invert	Cover
FROM	TO	ha	ha	l/s	ha	ha	l/s	l/s	l/s	mm	%	l/s	m/s	m	l/s										
BLDG	SANMH3	0.603	0.603	0.59	0.603	0.603	0.20	**0.79**	**5.36**	150	1.00	15.9	0.87	6.6	10.53	101.30		98.80	98.65	2.50	101.29	0.03	98.73	98.58	2.56
SANMH3	SANMH2	0.000	0.603	0.59	0.000	0.603	0.20	**0.79**	**5.36**	150	0.50	11.2	0.62	9.5	5.87	101.29		98.70	98.55	2.59	101.45	0.03	98.65	98.50	2.80
SANMH2	SANMH1	0.000	0.603	0.59	0.000	0.603	0.20	**0.79**	**5.36**	150	0.50	11.2	0.62	14.3	5.87	101.45		98.62	98.47	2.83	101.65		98.55	98.40	3.10
																							INV @ MAIN =	98.40	
MH110	MH111									200	0.65	27.6	0.85	120.00	22.23	101.22		98.79	98.59	2.43	102.75		98.01	97.81	4.74

Appendix G

Storm Calculations and E-Mail Correspondences

Julie White

From: Scott Vallier <svallier@gwal.com>
Sent: February 8, 2018 9:36 AM
To: Julie White
Cc: Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Morning Julie,

Yes the rooftops can be designed such that the max. flow is 5.7l/s.

Thanks,

Scott Vallier, Mechanical Designer
Goodkey, Weedmark & Associates Limited
Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 259
Fax: 613-727-5115
Email: svallier@gwal.com
Web: www.gwal.com

From: Julie White [mailto:jwhite@jlrichards.ca]
Sent: February-06-18 8:58 AM
To: Marc Trottier; Andre Bogdanowicz
Cc: Scott Vallier; Santiago Guardia at Nicholas Caragianis Architect Inc.; Ryan Munden; Bliss Edwards; George Adom; Annie Williams
Subject: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Good Morning,

With regards to the proposed Dymon facility located at 1000 McGarry Terrace, JLR's stormwater management strategy includes parking lot retention with ICDs as well as rooftop restrictions combined with rooftop storage. We have assumed the following rooftop properties and release rates and will need your confirmation that you can fulfill our assumed controls.

Assumed Rooftop Properties:

Rooftop Area = 0.279 ha
Assumed rooftop area dedicated to storage = 75% x 0.279 ha = 0.209 ha or 2090 m2
Assumed depth of storage = 0.152m
Available rooftop volume = 2090 m2 x 0.152 m = 318 m3

Assumed Watts Adjustable Accutrol Weir at release rate of 15 GPM or 0.95 L/s
Assumed No. of drains = 6
Maximum 1:100 year rooftop flow = 6 drains x 0.95 L/s = **5.70 L/s**

Based on our calculations, a minimum rooftop storage of **143 m3** is required to fulfill the imposed storm discharge criterion. This calculated storage is found to be less than the above noted 318 m3 of available roof storage.

GWAL, please confirm that the rooftop drains can be designed based on a maximum flow restriction of 5.70 L/s.

Ryan / Santiago, please confirm that a minimum rooftop storage volume of 143 m3 can be provided.

Please feel free to give me a call should you have any questions.

Julie

Julie White, EIT
Civil Engineering Intern

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

Annie Williams

From: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>
Sent: February 5, 2019 9:32 AM
To: Sheldon Dattenberger; Bliss Edwards; Miguel Tremblay
Cc: Nico Church; Emilie Coyle; Annie Williams; Scott Vallier
Subject: RE: Resubmissions for Industrial, Clyde + McGarry Terr

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Sheldon,

In regards to **Site Servicing comment #11** the roof will have suppers in compliance with section 7.4.10.4 of the OBC. This will be included in the building permit.

613-237-6801 (ext 225)

Best regards,

Santiago Guardia
BArch, OAA, MIA, LEED AP
email jguardia@ncarchitect.ca
ext 225

nicholascaragianisarchitect inc.
137 Pamela Street, Ottawa, ON K1S 3K9
telephone 613 237 6801 fax 613 237 8289
www.ncarchitect.ca

From: Santiago Guardia at Nicholas Caragianis Architect Inc.
Sent: Thursday, January 31, 2019 8:36 PM
To: 'Sheldon Dattenberger' <sdattenberger@jlrichards.ca>; Bliss Edwards <bedwards@dymon.ca>; Miguel Tremblay <tremblay@fotenn.com>
Cc: Nico Church <church@fotenn.com>; Emilie Coyle <coyle@fotenn.com>; Annie Williams <awilliams@jlrichards.ca>
Subject: RE: Resubmissions for Industrial, Clyde + McGarry Terr

Miguel, Emilie, Nico,

Please send the comments for McGarry, I do not think our office has received them.

613-237-6801 (ext 225)

Best regards,

Santiago Guardia
BArch, OAA, MIA, LEED AP
email jguardia@ncarchitect.ca
ext 225

nicholascaragianisarchitect inc.
137 Pamela Street, Ottawa, ON K1S 3K9
telephone 613 237 6801 fax 613 237 8289
www.ncarchitect.ca

Julie White

From: Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>
Sent: February 6, 2018 10:49 AM
To: Julie White; mtrottier@gwal.com; Andre Bogdanowicz
Cc: Scott Vallier; Ryan Munden; Bliss Edwards; George Adom; Annie Williams
Subject: RE: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Hi Julie,

Please see my response in **blue** below.

Best regards,

Santiago Guardia
BArch, OAA, UIA, LEED AP
email jguardia@ncarchitect.ca
ext 225

nicholascaragianisarchitect inc.
137 Pamela Street, Ottawa, ON K1S 3K9
tel/phone: 613 237 6801 fax: 613 237 8289
www.ncarchitect.ca

From: Julie White [mailto:jwhite@jlrichards.ca]
Sent: Tuesday, February 6, 2018 8:58 AM
To: mtrottier@gwal.com; Andre Bogdanowicz <andre@gwal.com>
Cc: Scott Vallier <svallier@gwal.com>; Santiago Guardia at Nicholas Caragianis Architect Inc. <jguardia@ncarchitect.ca>; Ryan Munden <rmunden@clelandjardine.com>; Bliss Edwards <bedwards@dymon.ca>; George Adom <gadom@jlrichards.ca>; Annie Williams <awilliams@jlrichards.ca>
Subject: 1000 McGarry - Dymon Self Storage Facility - Rooftop Storage

Good Morning,

With regards to the proposed Dymon facility located at 1000 McGarry Terrace, JLR's stormwater management strategy includes parking lot retention with ICDs as well as rooftop restrictions combined with rooftop storage. We have assumed the following rooftop properties and release rates and will need your confirmation that you can fulfill our assumed controls.

Assumed Rooftop Properties:

Rooftop Area = 0.279 ha
Assumed rooftop area dedicated to storage = 75% x 0.279 ha = 0.209 ha or 2090 m2
Assumed depth of storage = 0.152m
Available rooftop volume = 2090 m2 x 0.152 m = 318 m3

Assumed Watts Adjustable Accutrol Weir at release rate of 15 GPM or 0.95 L/s
Assumed No. of drains = 6
Maximum 1:100 year rooftop flow = 6 drains x 0.95 L/s = **5.70 L/s**

Based on our calculations, a minimum rooftop storage of **143 m3** is required to fulfill the imposed storm discharge criterion. This calculated storage is found to be less than the above noted 318 m3 of available roof storage.

GWAL, please confirm that the rooftop drains can be designed based on a maximum flow restriction of 5.70 L/s.

Ryan / Santiago, please confirm that a minimum rooftop storage volume of 143 m3 can be provided. **Based on average roof slope the 143m3 can be provided.**

Please feel free to give me a call should you have any questions.

Julie

Julie White, EIT
Civil Engineering Intern

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

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

1000 McGarry Terrace

Dymon Self Storage

JLR No. 27296-003

STORM SEWER DESIGN SHEET

Manning's Coefficient n =	0.013
IDF CURVE =	2 year

Designed by:	AW
Checked by:	SD
Date:	March 2019

Restricted flow rate provided by rooftop restrictors (roof drains) combined with rooftop storage (refer to Drawing SWM).

M.H.		RUNOFF AREA		AREA		PEAK FLOW COMPUTATION					RESTRICTED	TOTAL PEAK	SEWER DATA						UPSTREAM					DOWNSTREAM				
FROM	TO	0.20	0.90	Total Area (ha)	CUM. Area (ha)	2.78AR	2.78AR (CUM.)	TIME (min.)	INTENS. (mm/hr)	PEAK FL. (L/s)	ROOF FLOW (L/s)	FLOWS (L/s)	DIA. (mm)	SLOPE (%)	CAPAC. (L/s)	VEL. (m/s)	LENGTH (m)	FL.TIME (min.)	Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line	Obvert Drop	Obvert	Invert	Cover
CB 3	ST 103	0.018	0.098	0.116	0.116	0.26	0.26	10.00	76.81	19.60		**19.60**	300	0.34	58.4	0.80	18.4	0.38	100.69		99.44	99.14	1.25	100.84	0.03	99.38	99.08	1.46
ST 103	ST 104	0.000	0.010	0.010	0.126	0.03	0.28	10.38	75.36	21.12		**21.12**	300	0.34	58.4	0.80	34.1	0.71	100.84		99.35	99.05	1.49	101.20	0.03	99.24	98.93	1.96
								11.09																				
BLDG	ST 104	0.000	0.246	0.246	0.246	0.00	0.00	10.00	76.81	0.00	5.70	**5.70**	300	1.00	100.9	1.38	3.7	0.04	101.16		99.28	98.97	1.88	101.20	0.03	99.24	98.93	1.96
								10.04																				
ST 104	ST 105	0.000	0.000	0.000	0.372	0.00	0.28	11.09	72.85	20.41		**26.11**	300	0.34	58.4	0.80	26.7	0.56	101.20		99.21	98.90	1.99	101.30	0.02	99.12	98.81	2.18
ST 105	ST 101	0.000	0.000	0.000	0.372	0.00	0.28	11.65	71.00	19.90		**19.90**	300	0.34	58.4	0.80	14.6	0.30	101.30		99.10	98.79	2.20	101.50	0.02	99.05	98.74	2.45
								11.95																				
CB 2	ST 102	0.000	0.071	0.071	0.071	0.18	0.18	10.00	76.81	13.64		**13.64**	300	0.34	58.4	0.80	36.7	0.76	100.65		99.37	99.06	1.28	100.96	0.03	99.24	98.94	1.72
ST 102	ST 101	0.024	0.077	0.101	0.172	0.21	0.38	10.76	73.99	28.39		**28.39**	300	0.34	58.4	0.80	45.6	0.95	100.96		99.21	98.91	1.75	101.50	0.03	99.06	98.75	2.44031
								11.71																				
ST 101	EX. ST 100	0.000	0.000	0.000	0.544	0.00	0.66	11.95	70.04	46.50		**52.20**	300	0.34	58.4	0.80	13.4	0.28	101.50		99.03	98.72	2.47	101.64		98.98	98.68	2.66
								12.23																			INV @ ST 100 =	98.68
		0.544 ha																										

Uncontrolled Area Total =	0.059	ha
Controlled Area Total =	0.544	ha
TOTAL SITE AREA =	**0.603**	**ha**

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STORMWATER MANAGEMENT CALCULATIONS
DYMON SELF STORAGE
1000 McGARRY TERRACE

DETERMINING THE TOTAL ALLOWABLE RELEASE RATE (MINOR SYSTEM CAPTURE RATE)

Total Area = **0.603 ha**
Uncontrolled Area = **0.059 ha**
Controlled Area = **0.544 ha**

Allowable Minor System Capture Rate Calculations

Allowable Peak Flow Rate = 85.00 L/s/ha (as per MSS for Barrhaven Town Center - Refer to Appendix B for City Pre-Application Consultation Memo)
Total Area = 0.603 ha
Allowable Peak Flow Rate: Q = **51.26 L/s** (85.00 L/s/ha x 0.603 ha = 51.26 L/s)

Storm servicing to be developed to limit the 1:100 year peak flows to the allowable peak flow of 51.26 L/s (controlled and uncontrolled areas)

SUMMARY OF STORMWATER MANAGEMENT CALCULATIONS FOR CONTROLLED AND UNCONTROLLED AREAS:

Drainage Area No.	Description	Area (ha) C=0.20	Area (ha) C=0.90	C-Factor (5 year)	C-Factor (100 year, +25%)	$Q_{(5\text{-yr})}$ (L/s)	$Q_{(100\text{-yr})}$ (L/s)	$Q_{(100\text{-yr})}$ (restricted) (L/s)	$Q_{(100\text{-yr})}$ (unrestricted) (L/s)	$Q_{(100\text{-yr})}$ (total) (L/s)	Hydrovex
ROOF	Building Roof		0.246	0.90	1.00	64.13	122.11	5.70		5.70	N/A
AREA 0	Uncontrolled	0.022	0.037	0.64	0.72	10.92	21.10		21.10	21.10	N/A
AREA 1	CB 1 - ICD 1	0.024	0.077	0.73	0.82	21.46	41.20	6.00		6.00	75 VHV-1
AREA 2	CB 2 - ICD 2	0.000	0.071	0.90	1.00	18.51	35.24	7.00		7.00	75 VHV-1
AREA 3	CB 3 - ICD 3	0.018	0.098	0.79	0.88	26.59	50.88	6.00		6.00	75 VHV-1
AREA 4	CB 4 - Unrestricted	0.000	0.010	0.90	1.00	2.61	4.96		4.96	4.96	N/A
		Area (ha) = 0.603				**Q(100-yr) = (total unrestricted)**	**275.50**		**Q(100-yr) = (total restricted release)**	**50.76**	

NOTE: $Q_{(100\text{ yr})}$ total restricted release rate of 50.76 L/s is less than the $Q_{(5\text{ yr})}$ total allowable release rate of 51.26 L/s

DETAILS OF STORAGE VOLUME CALCULATIONS FOR UNCONTROLLED AND CONTROLLED AREAS

Roof: **Rooftop - Dymon Building**

Assumed Rooftop Properties:

Total Area Roof = 0.246 ha
Unusable roof (25%) = 0.062 ha
Usable roof (75%) = 0.185 ha
Depth of Storage = 0.150 m

Rooftop Volume (m^3) = Usable rooftop area (m^2) x storage depth (m)
Rooftop Volume (m^3) = 1850 m^2 x 0.150 m
Rooftop Volume (m^3) = 277 m^3

Based on the Watts Adjustable Accutrol Weir, each weir can provide the following:

6 drains - 1/4 opening = 5.70 L/s (each drain = 0.95 L/s)
Total release rate = 5.70 L/s

Rooftop Area =	0.246
C-Factor (1:5 year) =	0.9
C-Factor (1:100 year) =	1.0

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
30	53.93	33.19	5.70	27.49	49.49	91.87	62.83	5.70	57.13	102.83
35	48.52	29.86	5.70	24.16	50.74	82.58	56.47	5.70	50.77	106.63
40	44.18	27.20	5.70	21.50	51.59	75.15	51.39	5.70	45.69	109.66
45	40.63	25.01	5.70	19.31	52.13	69.05	47.22	5.70	41.52	112.11
50	37.65	23.18	5.70	17.48	52.43	63.95	43.74	5.70	38.04	114.11
55	35.12	21.62	5.70	15.92	52.53	59.62	40.78	5.70	35.08	115.75
60	32.94	20.28	5.70	14.58	52.48	55.89	38.23	5.70	32.53	117.09
65	31.04	19.11	5.70	13.41	52.29	52.65	36.00	5.70	30.30	118.19
70	29.37	18.08	5.70	12.38	51.99	49.79	34.05	5.70	28.35	119.07
75	27.89	17.17	5.70	11.47	51.59	47.26	32.32	5.70	26.62	119.78
80	26.56	16.35	5.70	10.65	51.11	44.99	30.77	5.70	25.07	120.33
85	25.37	15.61	5.70	9.91	50.56	42.95	29.38	5.70	23.68	120.74
90	24.29	14.95	5.70	9.25	49.95	41.11	28.11	5.70	22.41	121.04
95	23.31	14.34	5.70	8.64	49.27	39.43	26.97	5.70	21.27	121.23
100	22.41	13.79	5.70	8.09	48.55	37.90	25.92	5.70	20.22	121.33
105	21.58	13.28	5.70	7.58	47.78	36.50	24.96	5.70	19.26	121.34
110	20.82	12.82	5.70	7.12	46.97	35.20	24.07	5.70	18.37	121.27
115	20.12	12.38	5.70	6.68	46.12	34.01	23.26	5.70	17.56	121.13
120	19.47	11.98	5.70	6.28	45.23	32.89	22.50	5.70	16.80	120.93
125	18.86	11.61	5.70	5.91	44.31	31.86	21.79	5.70	16.09	120.67
130	18.29	11.26	5.70	5.56	43.37	30.90	21.13	5.70	15.43	120.36
135	17.76	10.93	5.70	5.23	42.40	30.00	20.51	5.70	14.81	120.00

Minimum storage volume requirement = 121.34 m^3
Storage volume provided by Rooftop Ponding Area = 277 m^3

Area 0: **Uncontrolled Area** (Total Area = 0.059)

	5 year	100 year
A asph =	0.037	0.037
C-Factor =	0.900	1.000
A landscape =	0.022	0.022
C-Factor =	0.200	0.250
(AxC)asph + (AxC)grass =	0.038	0.043
C-Factor (overall) =	0.639	0.720

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.2	10.92	N/A	N/A	N/A	178.56	21.10	N/A	N/A	N/A
15	83.6	8.76	N/A	N/A	N/A	142.89	16.88	N/A	N/A	N/A
20	70.3	7.36	N/A	N/A	N/A	119.95	14.17	N/A	N/A	N/A
25	60.9	6.38	N/A	N/A	N/A	103.85	12.27	N/A	N/A	N/A

Area 1: **CB 1 - Ponding Area 1 - ICD 1** (Total Drainage Area = 0.101)

	5 year	100 year
Area (paved) =	0.077	0.077
C-Factor =	0.900	1.000
Area (landscape) =	0.024	0.024
C-Factor =	0.200	0.250
(AxC)pav + (AxC)land =	0.074	0.083
C-Factor (overall) =	0.734	0.822

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.19	21.46	6.00	15.46	9.28	178.56	41.20	6.00	35.20	21.12
15	83.56	17.21	6.00	11.21	10.09	142.89	32.97	6.00	26.97	24.27
20	70.25	14.47	6.00	8.47	10.17	119.95	27.68	6.00	21.68	26.01
25	60.90	12.54	6.00	6.54	9.82	103.85	23.96	6.00	17.96	26.94
30	53.93	11.11	6.00	5.11	9.20	91.87	21.20	6.00	15.20	27.36
35	48.52	9.99	6.00	3.99	8.39	82.58	19.05	6.00	13.05	27.41
40	44.18	9.10	6.00	3.10	7.44	75.15	17.34	6.00	11.34	27.21
45	40.63	8.37	6.00	2.37	6.40	69.05	15.93	6.00	9.93	26.82
50	37.65	7.76	6.00	1.76	5.27	63.95	14.76	6.00	8.76	26.27
55	35.12	7.24	6.00	1.24	4.08	59.62	13.76	6.00	7.76	25.60
60	32.94	6.79	6.00	0.79	2.83	55.89	12.90	6.00	6.90	24.83
65	31.04	6.39	6.00	0.39	1.54	52.65	12.15	6.00	6.15	23.98
70	29.37	6.05	6.00	0.05	0.21	49.79	11.49	6.00	5.49	23.05
75	27.89	5.74	6.00	N/A	N/A	47.26	10.90	6.00	4.90	22.07
80	26.56	5.47	6.00	N/A	N/A	44.99	10.38	6.00	4.38	21.03

Minimum storage volume requirement = 27.41 m^3
Storage volume provided by designed Ponding Area 1 = 38.16 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

Area 2: **CB 2 - Ponding Area 2 - ICD 2** (Total Drainage Area = 0.071)

	5 year	100 year
Area (paved) =	0.071	0.071
C-Factor =	0.900	1.000
Area (landscape) =	0.000	0.000
C-Factor =	0.200	0.250
(AxC)pav + (AxC)land =	0.064	0.071
C-Factor (overall) =	0.900	1.000

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.19	18.51	7.00	11.51	6.91	178.56	35.24	7.00	28.24	16.95
15	83.56	14.84	7.00	7.84	7.06	142.89	28.20	7.00	21.20	19.08
20	70.25	12.48	7.00	5.48	6.58	119.95	23.68	7.00	16.68	20.01
25	60.90	10.82	7.00	3.82	5.73	103.85	20.50	7.00	13.50	20.25
30	53.93	9.58	7.00	2.58	4.64	91.87	18.13	7.00	11.13	20.04
35	48.52	8.62	7.00	1.62	3.40	82.58	16.30	7.00	9.30	19.53
40	44.18	7.85	7.00	0.85	2.04	75.15	14.83	7.00	7.83	18.80
45	40.63	7.22	7.00	0.22	0.59	69.05	13.63	7.00	6.63	17.90
50	37.65	6.69	7.00	N/A	N/A	63.95	12.62	7.00	5.62	16.87
55	35.12	6.24	7.00	N/A	N/A	59.62	11.77	7.00	4.77	15.74
60	32.94	5.85	7.00	N/A	N/A	55.89	11.03	7.00	4.03	14.52
65	31.04	5.51	7.00	N/A	N/A	52.65	10.39	7.00	3.39	13.23
70	29.37	5.22	7.00	N/A	N/A	49.79	9.83	7.00	2.83	11.88
75	27.89	4.95	7.00	N/A	N/A	47.26	9.33	7.00	2.33	10.47
80	26.56	4.72	7.00	N/A	N/A	44.99	8.88	7.00	1.88	9.03

Minimum storage volume requirement = 20.25 m^3
Storage volume provided by designed Ponding Area 2 = 23.20 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

Area 3: **CB 3 - Ponding Area 3- ICD 3** (Total Drainage Area = 0.116)

	5 year	100 year
Area (paved) =	0.098	0.098
C-Factor =	0.900	1.000
Area (landscape) =	0.018	0.018
C-Factor =	0.200	0.250
(AxC)pav + (AxC)land =	0.092	0.103
C-Factor (overall) =	0.791	0.884

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.19	26.59	6.00	20.59	12.35	178.56	50.88	6.00	44.88	26.93
15	83.56	21.32	6.00	15.32	13.79	142.89	40.72	6.00	34.72	31.25
20	70.25	17.93	6.00	11.93	14.31	119.95	34.18	6.00	28.18	33.82
25	60.90	15.54	6.00	9.54	14.31	103.85	29.59	6.00	23.59	35.39
30	53.93	13.76	6.00	7.76	13.97	91.87	26.18	6.00	20.18	36.32
35	48.52	12.38	6.00	6.38	13.40	82.58	23.53	6.00	17.53	36.81
40	44.18	11.28	6.00	5.28	12.66	75.15	21.41	6.00	15.41	36.99
45	40.63	10.37	6.00	4.37	11.80	69.05	19.68	6.00	13.68	36.92
50	37.65	9.61	6.00	3.61	10.83	63.95	18.22	6.00	12.22	36.67
55	35.12	8.96	6.00	2.96	9.78	59.62	16.99	6.00	10.99	36.27
60	32.94	8.41	6.00	2.41	8.67	55.89	15.93	6.00	9.93	35.74
65	31.04	7.92	6.00	1.92	7.50	52.65	15.00	6.00	9.00	35.11
70	29.37	7.50	6.00	1.50	6.28	49.79	14.19	6.00	8.19	34.39
75	27.89	7.12	6.00	1.12	5.03	47.26	13.47	6.00	7.47	33.59
80	26.56	6.78	6.00	0.78	3.74	44.99	12.82	6.00	6.82	32.74

Minimum storage volume requirement = 36.99 m^3

Storage volume provided by designed Ponding Area 3 = 49.37 m^3

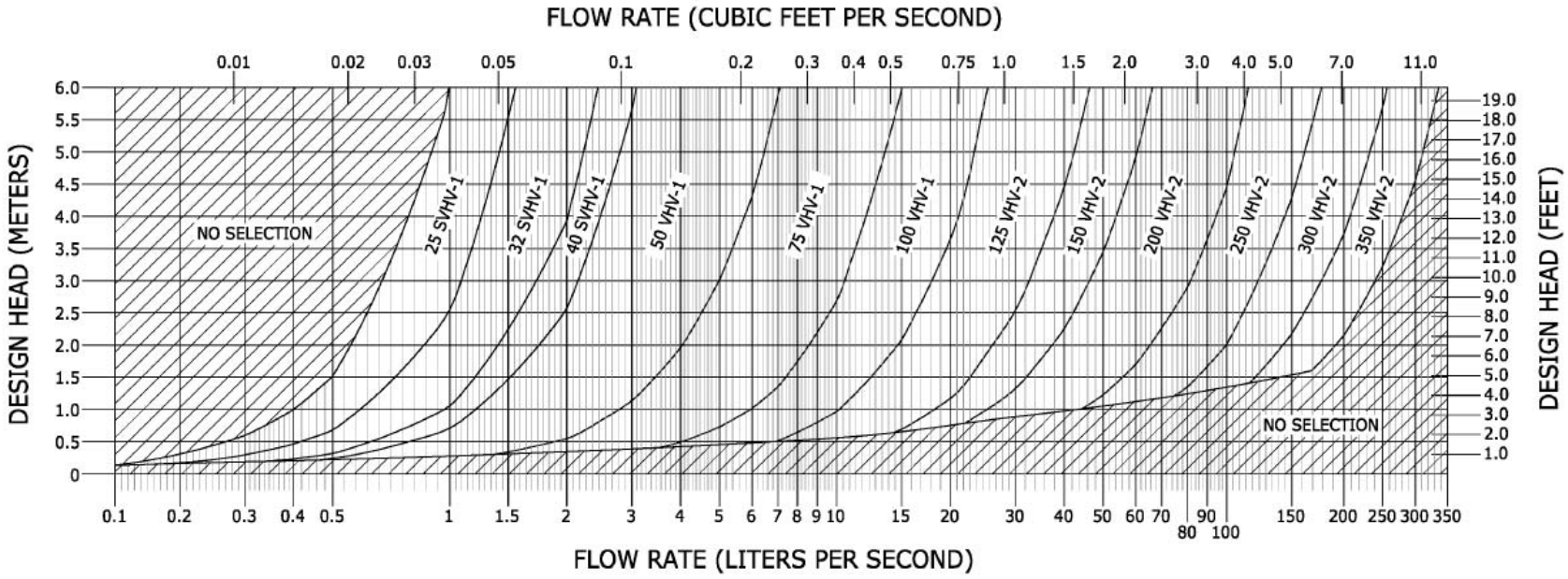
*** No spill-over volume is expected for the 1:100 year storm.**

Area 4: **CB 4 - Unrestricted (1:100 Year)** (Total Area = 0.010)

	5 year	100 year
A asph =	0.010	0.010
C-Factor =	0.900	1.000
A landscape =	0.000	0.000
C-Factor =	0.200	0.250
(AxC)asph + (AxC)grass =	0.009	0.010
C-Factor (overall) =	0.900	1.000

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.2	2.61	N/A	N/A	N/A	178.56	4.96	N/A	N/A	N/A
15	83.6	2.09	N/A	N/A	N/A	142.89	3.97	N/A	N/A	N/A
20	70.3	1.76	N/A	N/A	N/A	119.95	3.33	N/A	N/A	N/A
25	60.9	1.52	N/A	N/A	N/A	103.85	2.89	N/A	N/A	N/A
30	53.9	1.35	N/A	N/A	N/A	91.87	2.55	N/A	N/A	N/A
35	48.5	1.21	N/A	N/A	N/A	82.58	2.30	N/A	N/A	N/A
40	44.2	1.11	N/A	N/A	N/A	75.15	2.09	N/A	N/A	N/A
45	40.6	1.02	N/A	N/A	N/A	69.05	1.92	N/A	N/A	N/A
50	37.7	0.94	N/A	N/A	N/A	63.95	1.78	N/A	N/A	N/A
55	35.1	0.88	N/A	N/A	N/A	59.62	1.66	N/A	N/A	N/A
60	32.9	0.82	N/A	N/A	N/A	55.89	1.55	N/A	N/A	N/A
65	31.0	0.78	N/A	N/A	N/A	52.65	1.46	N/A	N/A	N/A
70	29.4	0.73	N/A	N/A	N/A	49.79	1.38	N/A	N/A	N/A
75	27.9	0.70	N/A	N/A	N/A	47.26	1.31	N/A	N/A	N/A
80	26.6	0.66	N/A	N/A	N/A	44.99	1.25	N/A	N/A	N/A

Figure 3 : HYDROVEX® VHV/SVHV Selection Chart



ICD TABLE							
ICD #	OUTLET PIPE DIA. (mm)	Qr (L/s)	OUTLET INVERT (m)	TOP OF GRATE (m)	MAX PONDING (m)	DESIGN HEAD (m)	HYDROVEX MODEL #
CB 1 - ICD 1	200	6.00	98.90	100.76	101.02	2.12	75 VHV-1
CB 2 - ICD 2	300	7.00	99.06	100.65	100.89	1.83	75 VHV-1
CB 3 - ICD 3	300	6.00	99.14	100.69	100.96	1.82	75 VHV-1

Appendix H

Drawings (A-100, SSG, SWM, ESC)

CANADA'S BEST MANAGED COMPANIES

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ottawa@jlrichards.ca

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K7L 5N4
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