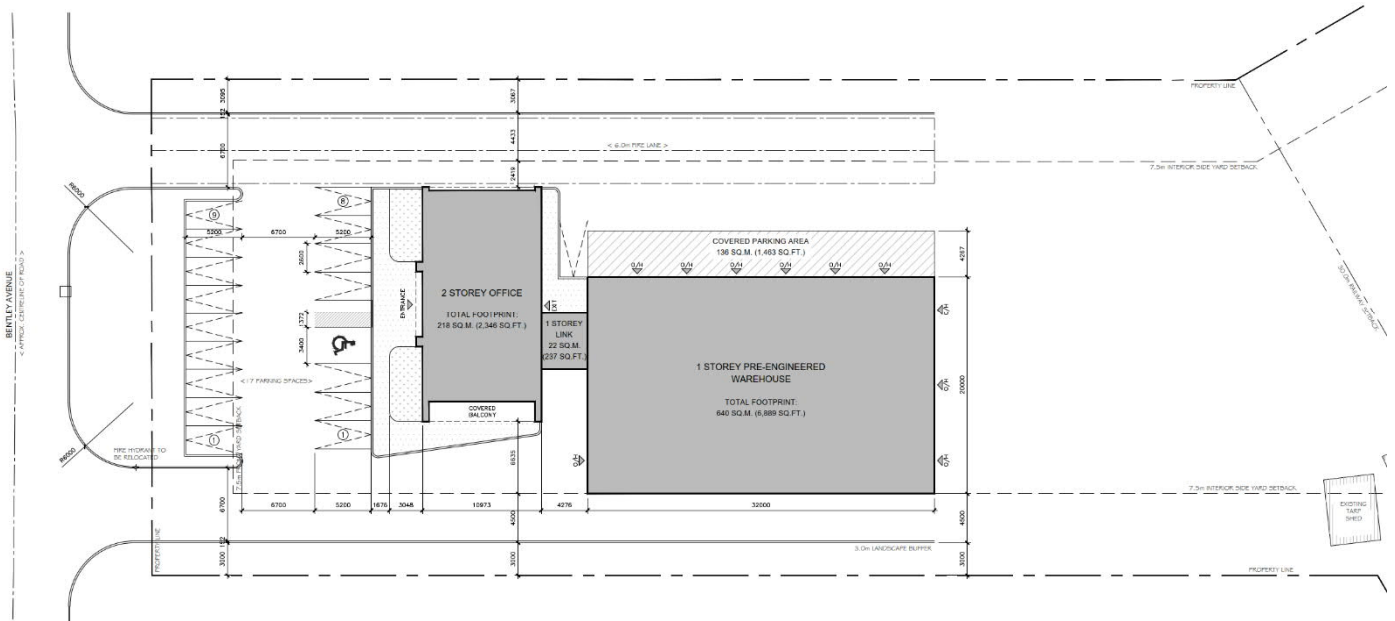


SERVICING AND STORMWATER MANAGEMENT REPORT

144 BENTLEY AVENUE – COMMERCIAL WAREHOUSE



MP Project No.: CCO-21-0675

City File No.:

Prepared for:

Cityscape Div A. Group Inc

PO Box 6937, Station J

Ottawa, Ontario

K2A 3Z5

Prepared by:

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August 12th, 2020

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Cityscape to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed commercial warehouse, located at 144 Bentley Avenue within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA), and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-21-0675, C101 – Site Grading, Drainage and Erosion & Sediment Control Plan, and
- CCO-21-0675, C102 – Site Servicing Plan.

1.2 Site Description

The property is located at 144 Bentley Avenue, within the City of Ottawa. It is described as Part of Lot 13, Registered Plan 459792 and Part of Lot 27, Concession A (Rideau Front), Geographic Township of Nepean, City of Ottawa. The developable land in question covers approximately 0.9 ha and is located on the south side of Bentley Avenue.

The existing site is currently undeveloped with gravel throughout the entire site area with some piled material. There is a rectangular piece of the property at the southeast extent of the site which is located adjacent to the Canadian National Railway (CNR). All of the development for this site will remain towards the front of the site along Bentley Avenue and away from the CNR.

Adjacent to the property along the west is an undeveloped gravel yard whereas the east adjacent property consists of fuel storage.

The proposed development consists of a two storey office building totaling 218 m² as well as a 1 storey warehouse with a building footprint of 640 m². Parking and drive aisles will be provided at the front of the site with storage located at the back of the site. Landscaping will be located at the front of the site along the street as well as along the perimeter of the property. There will be two site accesses for the development. A site location plan has been provided in Appendix A for reference.

2.0 BACKGROUND STUDIES

Background studies that have been completed for the site include a review of the City of Ottawa as-built drawings, a topographical survey of the site, a geotechnical report and a Phase I Environmental Site Assessment (ESA).

As-built drawings of the existing services within the vicinity of the site were reviewed in order to determine proper servicing and stormwater management schemes for the site.

A topographic survey of the site was completed by Annis, O'Sullivan, Vollebekk Ltd. dated July 20th, 2020 and can be found under separate cover.

The following reports have previously been completed and are available under separate cover:

- Geotechnical Investigation completed by Paterson Group dated August 11, 2020.
- Phase I ESA completed by Paterson Group.

3.0 PRE-CONSULTATION SUMMARY

City of Ottawa Staff have been pre-consulted regarding this proposed development via conference call on January 22, 2020. Specific design parameters to be incorporated within this design include the following:

- Quantity control to restrict flows from the 100 year post development storm to the 5 year pre development flow rate using a runoff coefficient 'C' of 0.5 or existing (whichever is smaller)
- Time of Concentration (Tc) cannot be less than 10 min;
- Flows to the storm sewer in excess of the allowable release rate, up to and including the 100-year storm event, must be detained on site;
- The downstream pond facility does not provide quality control for storm runoff, therefore, the site will require on-site quality control at an enhanced level (80% TSS removal), and
- Best management practices are to be employed on site.

Pre-Consultation notes from the City can be found in Appendix 'B'.

4.0 EXISTING SERVICES

There is an existing 675 mm diameter sanitary sewer as well as a 1050 mm storm sewer located within Bentley Avenue. There is also a 305 mm diameter watermain within Bentley Avenue and fire hydrants located along the south side of the street.

5.0 SERVICING PLAN

5.1 Proposed Servicing Overview

The overall servicing will be provided via service connections to the mains within Bentley Avenue. The water service will be extended from the 305 mm diameter watermain. Similarly, the storm and sanitary services will be connected to the 1050 mm storm sewer and 675 mm sanitary main. Details pertaining to the final proposed servicing locations have been reviewed and are shown on the proposed Site Servicing Plan included within the submission package.

5.2 Proposed Water Design

A new 150 mm PVC diameter water service will be connected to the existing 305 mm PVC watermain within Bentley Avenue, complete with a water valve located at the property line. The existing fire hydrants within Bentley Avenue will be used to service the site with fire protection. The water service is designed to have a minimum of 2.4 m of cover.

The Fire Underwriters Survey 1999 (FUS) method was utilized to determine the required fire flow for the site. The 'C' factor (type of construction) for the FUS calculation was determined to be 1.0 (ordinary type construction). The total floor area ('A' value) for the FUS calculation was determined to be 1,098 m². The results of the calculations yielded a required fire flow of 8,000 L/min. A fire flow of 2,700 L/min was calculated using the Ontario Building Code (OBC) requirements. The detailed calculations for the FUS and OBC can be found in Appendix 'C'.

The water demands for the proposed building have been calculated to adhere to the Ottawa Design Guidelines – Water Distribution manual and can be found in Appendix 'C'. The results have been summarized below:

Table 1: Water Demands

Site Area	0.9 ha
Industrial - Light	35,000 L/ha/day
Average Day Demand (L/s)	0.36
Maximum Daily Demand (L/s)	0.55
Peak Hourly Demand (L/s)	0.98
OBC Fire Flow Requirement (L/s)	45.00
FUS Fire Flow Requirement (L/s)	133.33
Max Day + Fire Flow (FUS) (L/s)	133.88

Boundary Conditions have been requested from the City however were not available at the time of submission. Once boundary conditions are provided by the City, the subject property will be hydraulically modelled using

WaterCAD to confirm the system has adequate capacity for the proposed development and the required fire flows can be met.

5.3 Proposed Sanitary Design

A new 150 mm diameter gravity sanitary service will be connected to the existing 675 mm diameter sewer within Bentley Avenue. The sanitary service will be complete with a maintenance manhole (MH1A) just inside the property line as per the City of Ottawa – Sewer Design Guidelines, October 2012, Clause 4.4.4.7 and City of Ottawa Sewer-Use By-Law 2003-514 (14).

The proposed 150mm diameter gravity sanitary service will be installed with a minimum full flow target velocity (cleansing velocity) of 0.6 m/s and a full flow velocity of not more than 3.0 m/s. Design parameters for the site include an infiltration rate of 0.33 L/s/ha.

The subject site is a proposed office/warehouse facility. The total area of the building is 880 m². The peak design flows for the proposed building were calculated using criteria from the City of Ottawa – Sewer Design Guidelines, October 2012. The peak design flow for the proposed site was determined to be 0.36 L/s, therefore the proposed 150 mm diameter lateral has sufficient capacity to convey the flows (See Appendix 'D' for detailed calculations). It is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary main within Bentley Avenue as the amount of flow leaving the site is minimal.

5.4 Proposed Storm Design

Stormwater runoff will be conveyed by way of overland sheet flow and a proposed storm sewer network. Runoff will be concentrated within the asphalt areas where it will flow towards the proposed catchbasins to then be conveyed through the on-site stormwater management system to the existing 1050 mm storm sewer within Bentley Avenue. The site will be constructed with adequate grading to ensure that all areas on the site are able to reach a suitable outlet and to ensure that the post-development restriction is achieved. Please see the Lot Grading, Drainage and Sediment & Erosion Control Plan for detailed locations of the proposed stormwater infrastructure. The direction and location of overland sheet flow has also been indicated.

Stormwater management (SWM) design for the site will make use of on-site storage with an inlet control device (ICD). The intent of the overall stormwater management design is to provide a system capable of capturing runoff, restricting flows to allowable flow rate, and providing the on-site storage necessary to accommodate the reduced runoff rate. In the event of a failure or blockage within the system, stormwater will be conveyed to Bentley Avenue. The stormwater management design will be further detailed in Section 6.0.

6.0 PROPOSED STORMWATER MANAGEMENT

6.1 Design Criteria and Methodology

Stormwater management for this site will be maintained through positive drainage away from the proposed building and into a new storm sewer system within the site. This SWM plan will implement quantity control strategies. The storm runoff will enter the pipe system through catchbasins (CB's) and catchbasin manholes (CBMH's) located throughout the site. The restricted stormwater runoff will be directed to the existing sewer within Bentley Avenue; similarly, overland flow will be directed towards Bentley Avenue through the proposed drainage patterns. The quantitative and qualitative properties of the storm runoff for both the pre- and post-development flows are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. These concepts will be explained further in Section 6.3.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the RVCA and the City:

Quality Control

- Enhanced (80% TSS removal) quality control is required. Quality control will be provided via an oil and grit separator.

Quantity Control

- Post-development flow (5 & 100 year) is to be restricted to match the 5-year pre-development flow with a C value of 0.5 and time of concentration (Tc) of 10 minutes.

6.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where	C	= Runoff coefficient
	I	= Rainfall intensity in mm/hr (City of Kingston IDF curves)
	A	= Drainage area in hectares

It is recognized that the rational method tends to overestimate runoff rates. As a by-product of using extremely conservative prediction method, any facilities that are sized using these results are expected to function as intended in real world conditions.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the City of Ottawa Sewer Design Guidelines, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

As per the pre-consultation meeting with the City of Ottawa the time of concentration (T_c) used for pre-development shall be calculated using a time of concentration (T_c) not less than 10 minutes and post-development flows shall be calculated using a time of concentration (T_c) of 10 minutes.

6.2.1 Pre-Development Drainage

The existing site has been demonstrated as drainage area A1. The Pre-development Drainage Area Plan indicates the limits of the drainage area, see CCO-21-0675 – PRE in Appendix 'E' of this report for more details. Drainage area A1 represents the flow that goes to the Bentley Avenue right of way. The development area is covered entirely with gravel. A summary of the pre-development runoff calculations can be found below.

Table 2: Pre-Development Runoff Summary

Area ID	Drainage Area (ha)	5-Year Runoff Coefficient	100-Year Runoff Coefficient	T _c (min)	Unrestricted 5-year Peak Flow (L/s)	Unrestricted 100-year Peak Flow (L/s)
A1	0.90	0.58	0.72	10	151.25	321.51
Total	0.90				151.25	321.51

See CCO-21-0675 – PRE in Appendix 'E' and Appendix 'G' for calculations

6.2.2 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-21-0675 – POST in Appendix 'F' of this report for more details. A summary of the Post-Development Runoff Calculations can be found below.

Table 3: Post-Development Runoff Summary

Area ID	Drainage Area (ha)	5-Year Runoff Coefficient	100-Year Runoff Coefficient	T _c (min)	Unrestricted 5-year Peak Flow (L/s)	Unrestricted 100-year Peak Flow (L/s)
B1	0.05	0.39	0.45	10	5.15	10.26
B2	0.05	0.81	0.90	10	12.82	24.51
B3	0.06	0.84	0.94	10	13.60	25.95
B4	0.07	0.82	0.91	10	15.97	30.52
B5	0.54	0.61	0.75	10	96.13	202.53
B6	0.08	0.85	0.94	10	19.14	36.52
B7	0.05	0.90	1.00	10	12.26	23.35
Total	0.90				175.06	353.65

See CCO-21-0675 – POST in Appendix ‘F’ and Appendix ‘G’ for calculations

Runoff will be captured and conveyed to a new storm sewer network which will connect to the existing 1050 mm storm sewer within Bentley Avenue. In order to match pre-development flows, on site storage will be required. Storage will be provided above the CB’s and CBMH’s located around the building. All other runoff with exception to drainage area B1 will be captured and directed to the proposed storm network. An Inlet control device within MH1 will then restrict all the captured runoff to the 5-year pre-development flow. See Appendix ‘G’ for calculations.

6.3 Quantity Control

After discussing the stormwater management criteria for the site with City staff, the total post-development runoff for this site has been restricted to match the 5-year pre-development flow rates with a C value of 0.5. (See Appendix ‘B’ for pre-consultation notes). These values create the following allowable release rates and storage volumes for the development site.

Table 4: Allowable Release Rate

Area ID	Drainage Area (ha)	Runoff Coefficient	T _c (min)	Required Restricted Flow 5-year (L/s)
A1	0.90	0.5	10	129.86
Total	0.90			129.85

See Appendix ‘G’ for calculations

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from areas B2-B7 will be restricted as detailed in the table below.

Table 5: Post-Development Restricted Runoff

Area ID	Drainage Area (ha)	5-Year Runoff Coefficient	100-Year Runoff Coefficient	T _c (min)	Restricted 5-year Peak Flow (L/s)	Restricted 100-year Peak Flow (L/s)
B1	0.05	0.39	0.45	10	5.15	10.26
B2	0.05	0.81	0.90	10	116.30	119.60
B3	0.06	0.84	0.94	10		
B4	0.07	0.82	0.91	10		
B5	0.54	0.61	0.75	10		
B6	0.08	0.85	0.94	10		
B7	0.05	0.90	1.00	10		
Total	0.90				121.45	129.86

See Appendix 'G' for calculations

Runoff from Area B2 through B7 will be restricted at MH1 through a Hydrovex 300VHV-2 (or approved equivalent) ICD (Design Head of 2.27). This ICD will restrict areas B2 through B7 to 116.30 L/s for the 5-year and 119.60 L/s for the 100-year storm event. The restriction creates a required storage volume of 35.61 m³ and a corresponding water surface elevation (WSEL) of 88.59 m for the 5-year storm event. Likewise, the restriction creates required storage volume of 139.78 m³ and a WSEL of 88.70 m for the 100-year storm event. The storage for these areas will be provided above the CB's and MH's throughout the site. Table 8 details the required and provided storage volumes for the site. Runoff from area B1 will be unrestricted and follow existing drainage patterns.

As per City standards, no ponding of water is to be located above CB's and CBHM's in parking/drive aisle areas for the 2 year storm event. The flow leaving the site during the 2 year storm event will be 90.15 L/s. The restriction creates a required storage volume of 24.28 m³. The pipe network through the site including the structures themselves provide a storage volume of 28.95 m³. Therefore, all storage for the 2 year storm event is provided below ground.

In the event that there is rainfall above the 100-year storm event, or a blockage within the storm network occurs, an emergency overland flow route has been provided for the entire site such that the storm water runoff will be conveyed away from the buildings and off of the site towards Bentley Avenue. The following table summarizes the storage requirements during the 5 and 100-year storm events and the provided storage volumes.

It should be noted that the available storage for the 5 and 100 year storm events do not include underground storage. Alternatively, the available storage for the 2 year storm event does not include above ground storage. No combination of above and below storage is being used for any one storm event, therefore, there is no requirement to halve the restricted flow rate or double the available capacity of the storage system.

Table 6: Storage Summary

Drainage Area	Depth of Ponding (m)	Storage Required (m ³)	Storage Available (m ³)	Depth of Ponding (m)	Storage Required (m ³)	Storage Available (m ³)	Depth of Ponding (m)	Storage Required (m ³)	Storage Available (m ³)
	2-Year			5-Year			100-Year		
B2-B7	NA	24.28	28.95	0.19	35.61	35.69	0.30	139.78	139.85

See Appendix 'G' for calculations

6.4 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

As per the discussions with the RVCA and the City, the downstream pond facility does not provide quality control, therefore, on-site quality control at an enhanced level is required prior to site runoff entering the storm system within Bentley Avenue.

A quality treatment unit manufactured by Hydro International First Defence unit has been proposed downstream of MH1 to provide 80% TSS removal. Refer to Appendix 'H' for more information.

7.0 SEDIMENT EROSION CONTROL

7.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all-natural runoff outlets from the property. For this Project, areas of concern include the roadside ditches along the property line where runoff and sheet flow may leave the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City of Ottawa, RVCA or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Geosock is to be installed under the grates of all existing structures along the frontage of the site and any new structures immediately upon installation. The Geosock is to be removed only after all areas have been paved. Care shall be taken at the

removal stage to ensure that any silt that has accumulated is properly handled and disposed of. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the RVCA to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions both warrant and permit. Please see the Site Grading and Drainage Plan for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

8.0 SUMMARY

- A new 2 storey office and warehouse will be constructed on the site located at 144 Bentley Avenue.
- A new 150 mm diameter sanitary service and monitoring manhole will be installed and connected to the existing 675 mm diameter sewer within Bentley Avenue.
- A new 150mm diameter water lateral will be extended from the existing 305 mm diameter main within Bentley Avenue to service the development.
- A new storm network will be installed onsite and will connect to the existing 1050 mm storm sewer within Bentley Avenue.
- As discussed with the City of Ottawa staff, the stormwater management design will ensure that the post-development flow rates are restricted to the 5-year pre-development flow rate calculated with a C value of 0.5.
- Storage for the 5- through 100-year storm events will be provided above the CB's and CBMH's located within the asphalt areas of the site.
- Hydro International First Defense Units will be provided to meet the enhanced level of quality control for the site as per the RVCA.

9.0 RECOMMENDATIONS

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management Report in support of the proposed office/warehouse development at 144 Bentley Avenue.

The sediment and erosion control plan outlined in Section 7.0 and detailed in the Grading and Drainage Plan notes are to be implemented by the contractor.

This report is respectfully being submitted for approval.

Ryan Kennedy, P.Eng.
Practice Area Lead – Land Development
McIntosh Perry Consulting Engineers
T: 613.903.5766
E: r.kennedy@mcintoshperry.com



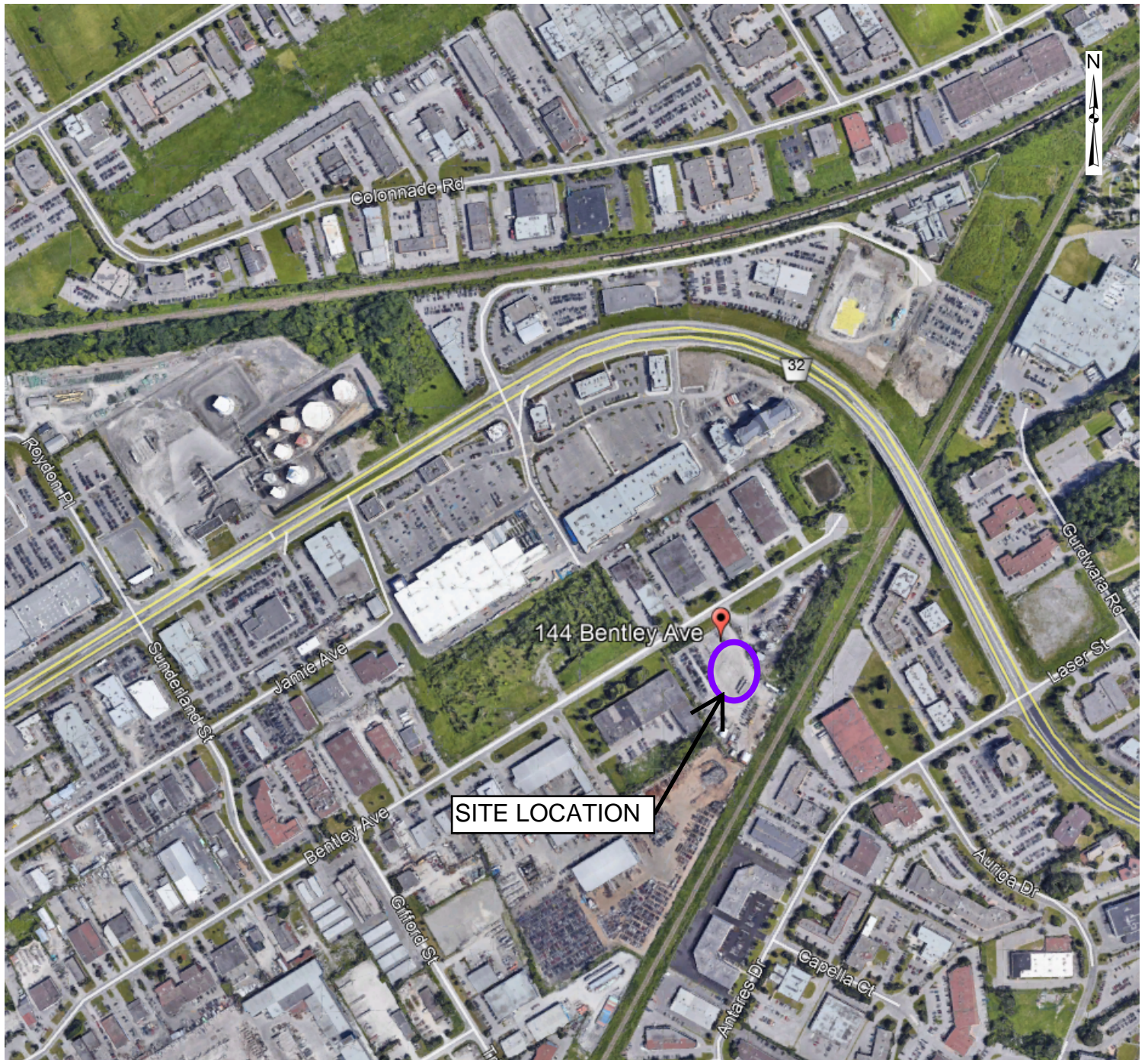
10.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of Cityscape Div A. Group Inc. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A SITE LOCATION MAP



LEGEND

- Site Location
- Local Road
- Major Road

CLIENT:			CITYSCAPE	
PROJECT:			CITYSCAPE COMMERCIAL WAREHOUSE	
TITLE:			SITE LOCATION	
McINTOSH PERRY 115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742 www.mcintoshperry.com			PROJECT NO:	FIGURE:
			Date	Aug 12
			GIS	N/A
			Checked By	CJM
			1	

APPENDIX B
CITY OF OTTAWA PRE-CONSULTATION NOTES

July 9, 2020

Pre-Application Consultation Meeting Notes

Property Address: 144144 Bentley Avenue

File No.: PC2020-0153

Date: July 2, 2020, 1:00 – 2:00 PM, Held via Teleconference

Subject: Pre-Application Consultation Meeting Minutes
144 Bentley Avenue

Attendees: Colette Gorni – Planner, City of Ottawa
Josiane Gervais – Project Manager (Transportation), City of Ottawa
Santhosh Kuruvilla – Project Manager (Infrastructure), City of Ottawa
Randolph Wang – Planner (Urban Design), City of Ottawa
Alison Stirling – Consultant, The Stirling Group
Jack Stirling – Consultant, The Stirling Group
Curtis Melanson – Civil Engineering Consultant, McIntosh Perry
Brandon Lawrence – Architect, S.J. Lawrence Architect Inc.
Gino Aiello – Property Owner
Frank Aiello – Property Owner

Regrets: Justyna Garbos – Planner (Parks), City of Ottawa
Sami Rehman – Planner (Environment), City of Ottawa
Mark Richardson – Forester (Planning), City of Ottawa

Comments from the Applicant:

1. The applicant is proposing to build a 12,500 square feet warehouse and office building with associated parking at the front of the site and associated outdoor storage at the rear. The proposed building will be mainly warehouse space, with a small office at the front.
2. The perimeter of the site will be fenced for security purposes. There will also be a portion of the interior of the site that will be fenced, which is intended to be used for the outdoor storage of vehicles and equipment.
3. Two one-way accesses are provided along Bentley Avenue to provide access to the site.

July 9, 2020

Staff Comments:

Planning

1. The subject site is within the Smith Falls rail corridor, which is considered an active rail corridor. Therefore, please note that all proposed buildings should be located outside the 30-metre setback area.
2. Please ensure that vehicle parking is provided in accordance with the rates set out in Section 101 of the Zoning By-law for Area C on [Schedule 1A](#):
 - Warehouse – 0.8 per 100 m² of gross floor area;
 - Office – 2.4 per 100 m² of gross floor area; and,
 - Storage Yard – 1 per 100 m² of gross floor area.
3. Please ensure that bicycle parking is provided in accordance with the rates set out in Section 111 of the Zoning By-law for Area C on [Schedule 1A](#):
 - Warehouse – 1 per 2000 m² of gross floor area;
 - Office – 1 per 250 m² of gross floor area; and,
 - Storage Yard – 1 per 2000 m² of gross floor area.
4. Parks will collect cash-in-lieu of parkland calculated at 2% of the gross land area of the site being developed. The applicant will also be required to pay a \$565 (including HST) fee for appraisal services.
5. The proposed development is subject to Site Plan Control and will be a “New – Site Plan Control – Standard” application. Application, timeline and fees can be found [here](#).
6. You are encouraged to contact the Ward Councillor, Councillor Keith Egli, at Keith.Egli@ottawa.ca about the proposal.

Engineering

1. The Servicing Study Guidelines for Development Applications are available at the following link: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans>
2. Record drawings and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at informationcentre@ottawa.ca or by phone at (613) 580-2424 x44455
3. Stormwater quantity control criteria – control the 100-year release rate to the 5-year using C= 0.5 or existing (whichever is smaller) and TC = no less than 10 minutes.

July 9, 2020

4. Stormwater quality control criteria – Contact the Conservation Authority (RVCA-Rideau Valley Conservation Authority) for their requirements. Include the correspondence in the Stormwater Management Report / Site Servicing Report. An oil grit separator may be required for this development. Please confirm this requirement with RVCA.
5. Existing sanitary sewer (675 mm diameter) is available on Bentley Ave. to make lateral service connection. Please ensure the existing sewer has adequate capacity to receive flow from this site.
6. Existing watermain (305 mm diameter) is available on Bentley Ave. for service connection.
7. Existing storm sewer (1050 mm diameter) is available on Bentley Ave. for lateral service connection. Please ensure the existing sewer has adequate capacity to receive flow from this site.
8. MECP ECA (Environmental Compliance Approval) is required due to Industrial Zoning. ECA application will be direct submission to MECP.
9. As per the City of Ottawa Slope Stability Guidelines for Development Applications an engineering report is required for any retaining walls proposed 1.0 m or greater in height within the subject site that addresses the global stability of the wall and provides structural details. A Retaining Wall Stability Analysis Report and Retaining Wall Structural Details are required to be provided from a Professional Engineer licensed in the Province of Ontario that demonstrates the proposed retaining wall structure has been assessed for global instability as per City standards. Please ensure the analysis and required documentation are provided with the next submission to address this comment.
10. Emergency fire routes will need to be satisfactory to Fire Services. Please show fire routes on the site plan. For information regarding fire route provisions, please consult with Jennifer Therkelsen at Jennifer.Therkelsen@ottawa.ca.
11. Clearly show and label the property lines on all sides of the property.
12. Clearly show and label all the easements (if any) on the property, on all plans.
13. When calculating the post development composite runoff coefficient (C), please provide a drawing showing the individual drainage area and its runoff coefficient.
14. When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the

July 9, 2020

storage requirement prior to the 1:100-year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.

15. Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
16. Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
17. Provide the following information for water main boundary conditions:
 - a. Location map with water service connection location
 - b. Average daily demand (l/s)
 - c. Maximum daily demand (l/s)
 - d. Maximum hourly demand (l/s)
 - e. Fire flow demand (provide detailed fire flow calculations based on the fire underwriters survey method)
18. If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES) and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

Feel free to contact Santhosh Kuruvilla, Project Manager (Infrastructure), at Santhosh.Kuruvilla@ottawa.ca, for follow-up questions.

Transportation

1. Follow Traffic Impact Assessment Guidelines:
 - a. Based upon the plan presented today, a TIA is not required.
 - b. Submit Screening form as soon as possible for official sign-off. Then submit Screening Form with the application.

July 9, 2020

2. On site plan:

- a. Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
 - b. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site (emergency vehicles, garbage).
 - c. Turning movement diagrams required for internal movements (loading areas, garbage).
 - d. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible.
 - e. Show dimensions of lane/aisle widths.
 - f. Ensure the accesses meet the City's Private Approach Bylaw.
 - g. Grey out any area that will not be impacted by this application.
3. AODA legislation is in effect for all organizations, please ensure that the design conforms to these standards.
4. Noise Impact Studies required for the following:
- c. Rail – Smiths Falls Rail Corridor runs along the back-property line.
 - d. Aircraft – Site falls within the *Airport Vicinity Development Zone*.

Feel free to contact Josiane Gervais, Project Manager (Transportation), at Josiane.Gervais@ottawa.ca, for follow-up questions.

Urban Design

1. A Design Brief is required as part of the submission. The Terms of Reference of the Design Brief is attached for convenience.

Environmental Planning

1. No concerns.

Forestry

1. If there are trees present, a tree permit is required prior to any removal on site.
2. If there are trees present, they will need to submit a Tree Conservation Report, but it may be combined with the LP.
3. The applicant can contact Mark Richardson for information on submitting a TCR and obtaining a permit – mark.richardson@ottawa.ca

Corporate Real Estate Office (CREO)

1. REPDO has adopted the Guidelines for New Development in Proximity to Rail Operations, created by the Railway Association of Canada and the Federation of Canadian Municipalities, see: http://proximityissue.wpengine.com/wp-content/uploads/2017/09/2013_05_29_Guidelines_NewDevelopment_E.pdf
 - The main objective is to mitigate railway-oriented impacts such as noise, vibration, and safety hazards, to ensure that the quality of life of a building's occupants and users are not negatively affected and to the maintain the long-term integrity and viability of the corridor.
2. The guidelines are intended to be applied primarily to new residential development but are applicable to other sensitive/occupied dwellings.
3. According the guidelines, a 30-metre setback from the property line to the face of the building is recommended combined with an earthen berm 2 meters above grade (2.5:1) (see page 27 & 38). It is also recommended that a noise and vibration study should be conducted according to page 28 of the guidelines.
4. Appropriate uses within the 30-metre setback area include public and private roads; landscaping, parking spaces/structures; and storage sheds.
5. Consideration to reducing the stated setback is possible subject to engineered mitigation measures. (such as a crash wall, larger berm etc.)
6. In addition, the guidelines recommended that the future potential and the existence of the rail corridor be registered on title. The following clause should be inserted in all developments, offers to purchase, and agreements of Purchase and Sale or Lease for all developments within 300 meters of the railway right-of-way:

Warning: The City of Ottawa or its assigns or successors in interest has or have a right-of-way within 300 metres from the land subject hereof. There may be alteration to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the environment of the occupants in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. The City of Ottawa will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way

File No.: PC2020-0153

July 9, 2020

Please refer to the links to “[Guide to preparing studies and plans](#)” and [fees](#) for further information. Additional information is available related to [building permits](#), [development charges](#), and the [Accessibility Design Standards](#). Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-application consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Feel free to contact Colette Gorni at colette.gorni@ottawa.ca if you have any questions.

Curtis Melanson

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: July 23, 2020 10:14 AM
To: Curtis Melanson
Subject: FW: 144 Bentley Avenue

Hi Curtis,

Please see correction below.

Santhosh

From: Kuruvilla, Santhosh
Sent: July 22, 2020 6:50 PM
To: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: RE: 144 Bentley Avenue

Hello Curtis,

I checked with our Stormwater Branch regarding your question below and following is the response I received:

“Hi Santhosh,

Per your latest email, I just want to reinforce Eva’s note that the Bentley SWM facility was not designed for water quality treatment. Therefore, on-site WQ treatment will be required for the proposed site plan. This facility was only designed to provide detention of the 5-year event from the Bentley Avenue sewer drainage area. We have a couple of reports that speak to the design of the Bentley SWM facility – as mentioned by Eva below. If you would like copies, please don’t hesitate to reach out to Eva.

Cheers,
Ryan ”

Therefore, you will have to provide onsite treatment to satisfy **MVCA** **RVCA** criteria.

Thanks,

Santhosh

From: Curtis Melanson <c.melanson@mcintoshperry.com>
Sent: July 20, 2020 10:07 AM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Subject: FW: 144 Bentley Avenue

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Santhosh,
Please see below correspondence with RVCA indicating that if the pond provides quality control then our site doesn't require on-site quality control.

Can you let me know when you get a moment?

Thanks,

Curtis Melanson, C.E.T.

Practice Area Lead, Land Development

T. 613.714.4621 | **F.** 613.836.3742 | **C.** 613.857.0784

McINTOSH PERRY

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: July 2, 2020 2:19 PM
To: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: RE: 144 Bentley Avenue

Hi Curtis,

The RVCA requirement is quality protection prior to the outlet into a receiving watercourse. I don't have access to that ponds details at the moment. If you can confirm the pond provides quality protection as required by the RVCA, identify that in the SWM report and we will not require on-site quality control.

I hope this help,

Thanks,

Eric Lalande, MCIP, RPP

Planner, RVCA

613-692-3571 x1137

From: Curtis Melanson <c.melanson@mcintoshperry.com>
Sent: Thursday, July 2, 2020 2:16 PM

To: Eric Lalande <eric.lalande@rvca.ca>

Subject: RE: 144 Bentley Avenue

Thanks for the email Eric, it looks like there is a pond located just to the east at the end of Bentley Avenue. Does this provide quality control in lieu of us providing it on-site?

Thanks,

Curtis Melanson, C.E.T.

Practice Area Lead, Land Development

115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0

T. 613.714.4621 | F. 613.836.3742 | C. 613.857.0784

c.melanson@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

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Platinum
member

From: Eric Lalande <eric.lalande@rvca.ca>

Sent: July 2, 2020 2:08 PM

To: Curtis Melanson <c.melanson@mcintoshperry.com>

Subject: RE: 144 Bentley Avenue

Hi Curtis,

The RVCA will require enhanced water quality protection (80% TSS removal).

Thank you,

Eric Lalande, MCIP, RPP

Planner, RVCA

613-692-3571 x1137

From: Curtis Melanson <c.melanson@mcintoshperry.com>

Sent: Thursday, July 2, 2020 11:36 AM

To: Eric Lalande <eric.lalande@rvca.ca>

Subject: 144 Bentley Avenue

Hi Eric,

We just had a pre-consultation with the City regarding the attached site located at 144 Bentley in Nepean. It is a proposed office with warehouse in behind. The back of the site will continue to be for storage with equipment and landscape materials.

The City has asked that we consult with RVCA to confirm any quality control requirements for the project.

Can you please review and let me know if the site requires any onsite quality control?

If you have any questions don't hesitate to let me know.

Thanks,

Curtis Melanson, C.E.T.

Practice Area Lead, Land Development

115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0

T. 613.714.4621 | F. 613.836.3742 | C. 613.857.0784

c.melanson@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

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APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.

A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer [here](#):

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study / Assessment of Adequacy of Public Services	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
	2	5. Composite Utility Plan	6. Groundwater Impact Study		3
	3	7. Servicing Options Report	8. Wellhead Protection Study		3
	9	9. Transportation Impact Assessment (TIA)	10.Erosion and Sediment Control Plan / Brief	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		3
	3	13.Hydraulic Water main Analysis	14.Noise / Vibration Study	S	3
	PDF only	15.Roadway Modification Functional Design	16.Confederation Line Proximity Study		3

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	15	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		2
	5	19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	15	21.Site Plan	22.Minimum Distance Separation (MDS)		3
	15	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		3
	3	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		3
S	15	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: S (site plan) A (subdivision, condo)		3
S	2	29.Survey Plan	30.Shadow Analysis		3
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)	S	Available online
	3	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		3
	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		3
	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		3
S	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		3
	3	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45.Site Lighting Plan and Certification Letter		3

Meeting Date: July 2, 2020

Application Type: *Site Plan Control - Standard*

File Lead (Assigned Planner): Colette Gorni

Infrastructure Approvals Project Manager: Santhosh Kuruvilla

Site Address (Municipal Address): 144 Bentley Avenue *Preliminary Assessment: 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

Please note that PDF versions of all the listed requirements must be submitted with the application, stored in a USB drive or CD

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning, Infrastructure and Economic Development Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Infrastructure and Economic Development Department.

APPENDIX C WATERMAIN CALCULATIONS

McINTOSH PERRY

CCO-21-0675 - 144 Bentley Avenue - Water Demands

Project:	144 Bentley Avenue
Project No.:	CCO-21-0675
Designed By:	CJM
Checked By:	RPK
Date:	August 12, 2020
Site Area:	0.90 gross ha

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m ² /d)
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Othe Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	0.36	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 x avg. day	L/c/d
Industrial	1.5 x avg. day	L/gross ha/d
Commercial	1.5 x avg. day	L/gross ha/d
Institutional	1.5 x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	0.55	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. day	L/c/d
Industrial	1.8 x max. day	L/gross ha/d
Commercial	1.8 x max. day	L/gross ha/d
Institutional	1.8 x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	0.98	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

McINTOSH PERRY

CCO-21-0675 - 144 Bentley Avenue - OBC Fire Calculations

Project:	144 Bentley Avenue
Project No.:	CCO-21-0675
Designed By:	CJM
Checked By:	RPK
Date:	August 12, 2020

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Office & Warehouse Building

Building is classified as Group : D and F2 up to 2 Storeys (from table 3.2.2.55)
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with subsections 3.2.2., including loadbearing walls, columns and arches

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) $Q = K \times V \times Stot$

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

$Stot = 1.0 + [S_{side1} + S_{side2} + S_{side3} + \dots \text{etc.}]$

K	12	(from Table 1 pg A-31) (Worst case occupancy {F3} 'K' value used)
V	7,432	(Total building volume in m ³ .)
Stot	1.2	(From figure 1 pg A-32)
Q =	107,020.80 L	

From
Figure 1
(A-32)

Snorth	24	m	0.0
Seast	10	m	0.0
Ssouth	63	m	0.0
Swest	7.5	m	0.2

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2700 L/min (if Q > 108,000 L and Q < 135,000 L)
713 gpm

McINTOSH PERRY

CCO-21-0675 - 144 Bentley Avenue - Fire Underwriters Survey (FUS) Fire Calculations

1 of 2

Project:	144 Bentley
Project No.:	CCO-21-0675
Designed By:	CJM
Checked By:	RPK
Date:	August 12, 2020

From the Fire Underwriters Survey (1999)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:

$F = 220 \times C \times \sqrt{A}$ Where:

F = Required fire flow in liters per minute

C = Coefficient related to the type of construction.

A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

A. Determine The Coefficient Related To The Type Of Construction

The building is considered to be of ordinary construction type. Therefore,

C = 1.00

B. Determine Ground Floor Area

As provided by the Architect:

Office (2 Storey)	=	218.00	m ²
Link & Warehouse	=	662.00	m ²
A	=	1,098.00	m ²

This floor area represents the final build-out of the development; as outlined on the Site Plan drawing.

C. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys for Office	=	2.00
Number of Storeys for Link & Warehouse	=	1.00

D. Calculate Required Fire Flow

$F = 220 \times C \times \sqrt{A}$

F	=	220.00	X	1.00	X	$\sqrt{1098.00}$
F	=	7,289.94 L/min.				

E. Determine Increase or Decrease Based on Occupancy

From note 2, Page 18 of the Fire Underwriter Survey:

Low Hazard Light Industrial

No Change

Occupancy Decrease = 0.00 L/min.

F = 7,289.94 L/min.

McINTOSH PERRY

CCO-21-0675 - 144 Bentley Avenue - Fire Underwriters Survey (FUS) Fire Calculations

2 of 2

F. Determine the Decrease, if any for Sprinkler Protection

From note 3, Page 18 of the Fire Underwriter Survey:

- The flow requirement may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of the system.
- The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.
- Additional credit of 10% if water supply is standard for both the system and fire department hose lines
- If sprinkler system is fully supervised system, an additional 10% credit is granted
- There will be no sprinkler system
- Therefore the value obtained in Step E is reduced by 0% (The building is sprinklered with a standard system and fire department hose lines)

$$\text{Reduction} = 7,289.94 \text{ L/min.} \times 0\%$$

$$\text{Reduction} = 0.00 \text{ L/min.}$$

G. Determine the Total Increase for Exposures

From note 4, Page 18 of the Fire Underwriter Survey:

- Exposure distance to the building to the east is 32m
- There are no existing buildings surrounding the remainder of the site that are within 45m.
- Therefore the charge for exposure is 5% of the value obtained in Step E.

$$\text{Increase} = 7,289.94 \text{ L/min.} \times 5\%$$

$$\text{Increase} = 364.50 \text{ L/min.}$$

H. Determine the Total Fire Demand

- To the answer obtained in E, subtract the value obtained in F and add the value obtained in G
- Fire flow should be no less than 2,000L/min. and the maximum value should not exceed 45,000L/min.

$$F = 7,289.94 \text{ L/min.} - 0.00 \text{ L/min.} + 364.50 \text{ L/min.}$$

$$F = 7,654.44 \text{ L/min.}$$

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 8,000 L/min (2,642 GPM).

APPENDIX D
SANITARY SEWER CALCULATIONS

Project:	CCO-21-0675 – 144 Bentley Avenue
Designed By:	CJM
Checked By:	RK
Date:	August 10, 2020

Re: Sanitary Flow Calculations

1. Building Occupancy

The building is light industrial with a total building area of 880 m². The total site area is 0.9 ha.

2. Daily Volume in Litres

As per the extract of the City of Ottawa Sewer Design Guidelines, Daily Sewage Flow for Dwellings;

- Average Heavy Industrial Flow: 35,000 L/gross ha/d

3. Peak Flow (Q/p)

- $Q_{IND}(p) = F_{IND} \times P_{IND}$

Where:

F_{IND} = 35,000 Litres/Gross Hectare/Day (as per City of Ottawa Sewer Design Guidelines)

P_{IND} = 0.9 Hectares (Site Area)

- Therefore, $Q_{IND}(p) = (35,000) \times (0.9) = \underline{31,500 \text{ L/Day}}$
= 0.36 L/sec

It is expected that the existing 250mm diameter Sanitary Main within Bentley Avenue has the capacity to accommodate the new flows.

SANITARY SEWER DESIGN SHEET

PROJECT:144 Bentley Avenue

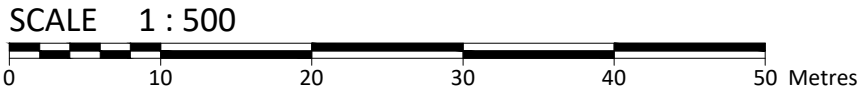
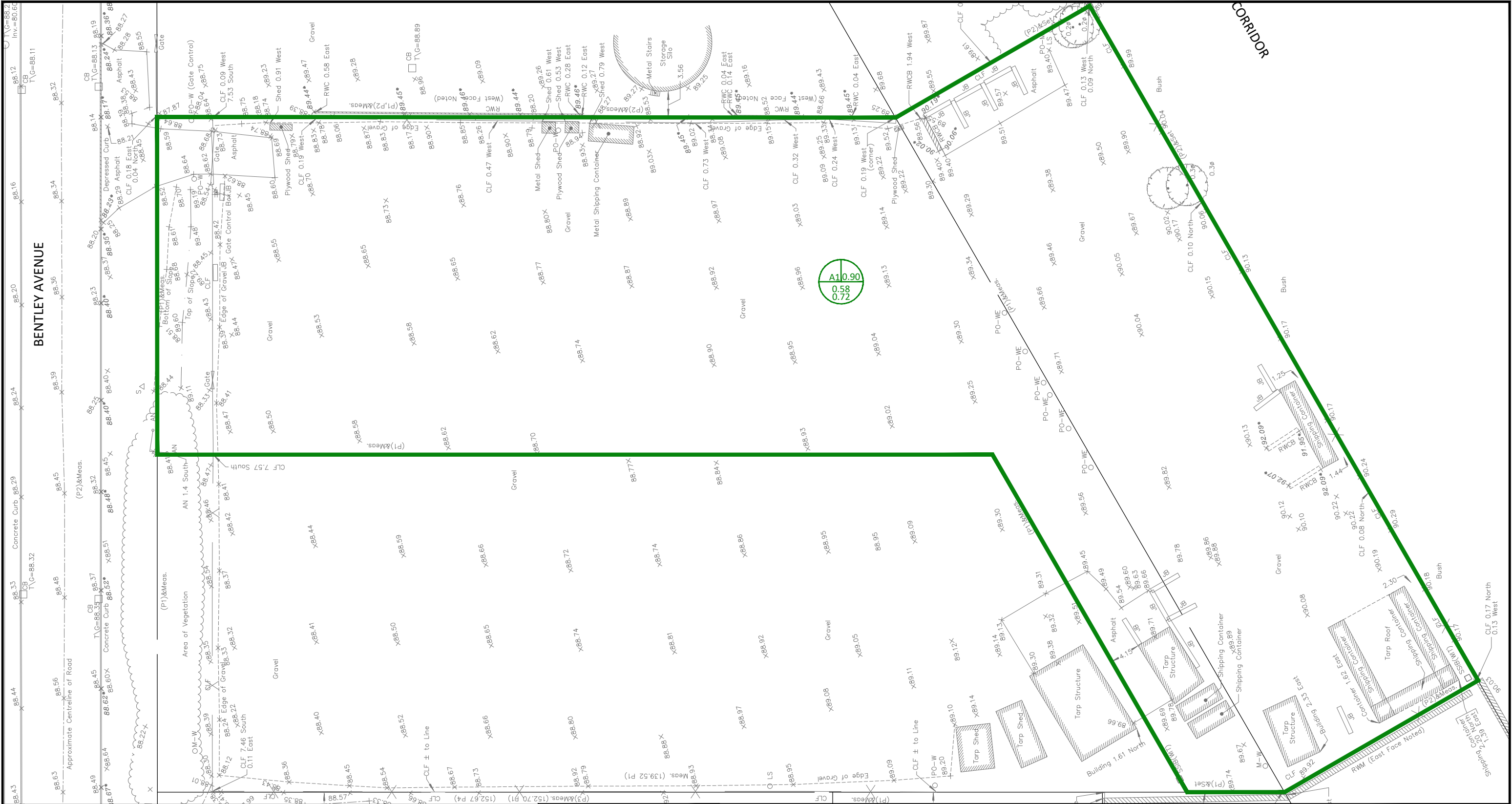
LOCATION:

CLIENT:CityScape



LOCATION				RESIDENTIAL								ICI AREAS								INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA (ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM									
				IND	CUM	IND	CUM	IND	CUM	IND			CUM	IND	CUM	IND	CUM	IND		CUM	IND								CUM	IND
	B1-B7	BLD	MH2A						0.0	0.0	4.00	0.00		0.00		0.00	0.90	0.90	0.36	0.90	0.90	0.30	0.66	22.47	5.30	150	2.00	1.232	21.81	97.06
		MH2A	MH1A						0.0	0.0	4.00	0.00		0.00		0.00	0.90	0.90	0.36	0.90	0.90	0.30	0.66	22.47	33.50	150	2.00	1.232	21.81	97.06
		MH1A	Ex 675mm						0.0	0.0	4.00	0.00		0.00		0.00	0.90	0.90	0.36	0.90	0.90	0.30	0.66	22.47	22.05	150	2.00	1.232	21.81	97.06
Design Parameters:				Notes: 1. Mannings coefficient (n) = 0.013 2. Demand (per capita): 280 L/day 3. Infiltration allowance: 0.33 L/s/Ha 4. Residential Peaking Factor: Harmon Formula = 1+(14/(4+P^0.5)*0.8) where P = population in thousands								Designed: CJM				No.	Revision							Date						
Residential				ICI Areas												1.	Issued for Review							2020-08-12						
SF	3.4	p/p/u																												
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day					1.5																				
APT	2.3	p/p/u	COM	28,000	L/Ha/day					1.5																				
Other	60	p/p/Ha	IND	35,000	L/Ha/day					MOE Chart																				
												Project No.: CCO-21-0675											Sheet No: 1 of 1							

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

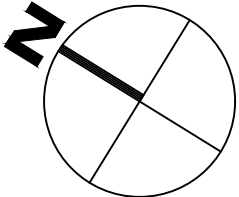


LEGEND

AREA I.D. →

AREA (ha) →

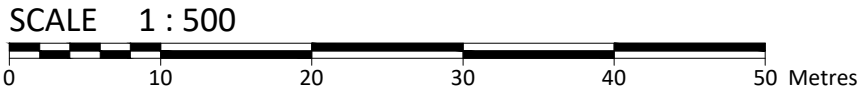
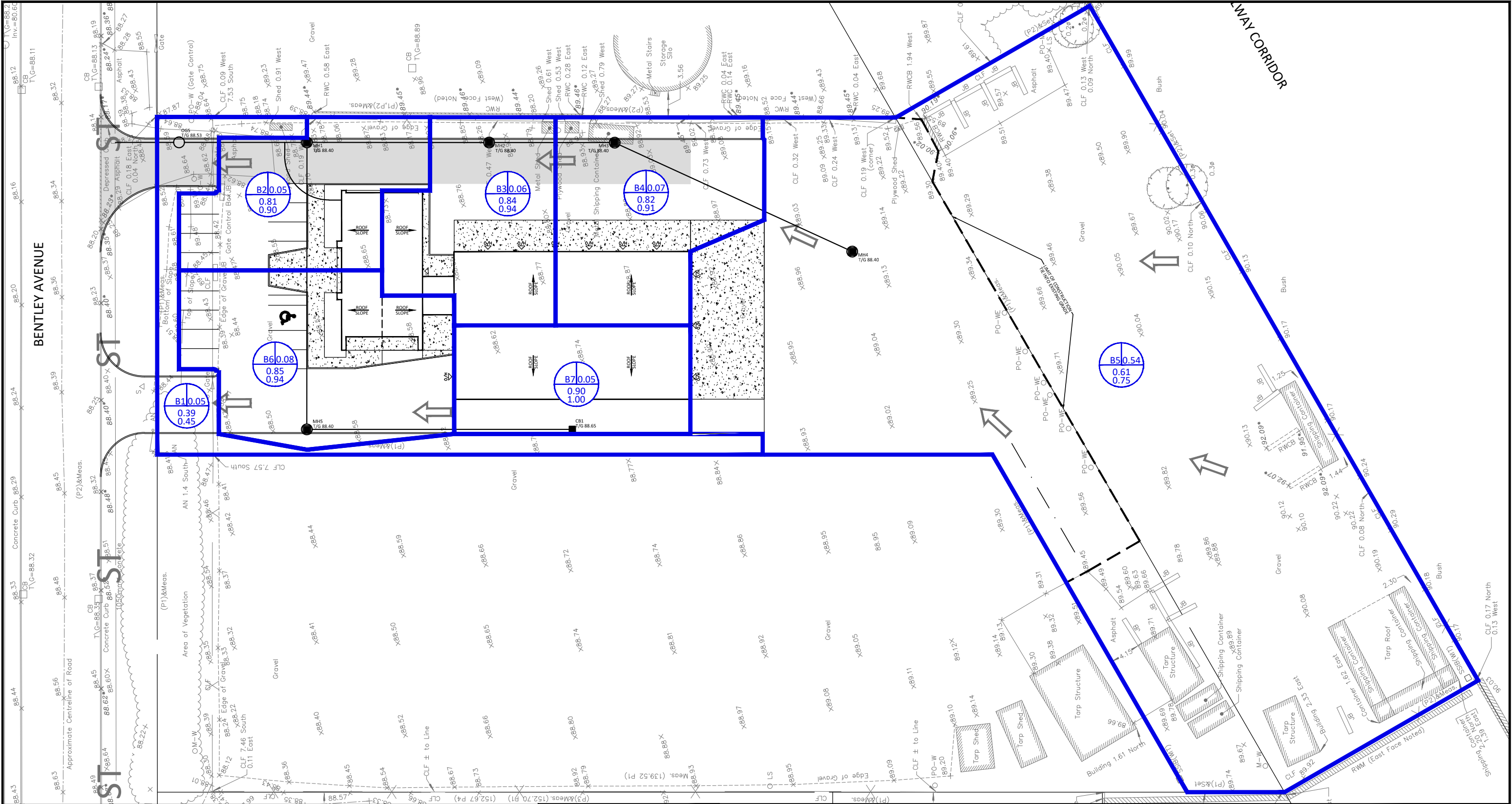
→ RUNOFF COEFFICIENT 5-YEAR 100-YEAR



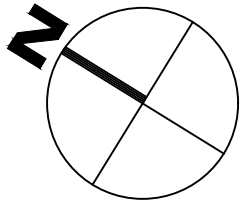
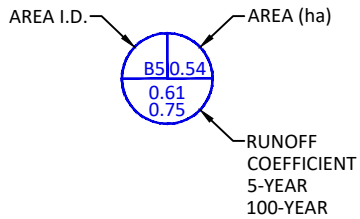
<div>McINTOSH PERRY</div> <div>115 Walgreen Road, RR3, Carp, ON K0A 1L0</div> <div>Tel: 613-836-2184 Fax: 613-836-3742</div> <div>www.mcintoshperry.com</div>		Client: <div>CITYSCAPE DIV A. GROUP INC.</div> <div>P.O. BOX 6937, STATION J K2A 3Z5</div>			
		Project: <div>CITYSCAPE COMMERCIAL WAREHOUSE</div> <div>144 BENTLEY AVENUE</div>			
		Drawing Title: <div>PRE-DEVELOPMENT DRAINAGE AREA PLAN</div>			
		Drawn by: <div>P.G.K.</div>		Checked By: <div>R.P.K.</div>	
Scale: <div>1:500</div>	Project Number: <div>CCO-21-0675</div>	1	ISSUED FOR SITE PLAN CONTROL	AUG. 12, 2020	
		No.	Revisions	Date	

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

FILENAME: C:\Users\p.kirkintz\OneDrive - McIntosh Perry\CCO-21-0675 Cityscape_spc_144 Bentley Road\12 Drawings\CCO-21-0675 Presentation.dwg
LAST SAVED: Wednesday, August 12, 2020 LAST SAVED BY: p.kirkintz
LAST PLOTTED: Wednesday, August 12, 2020 CIB FILE USED: ----



LEGEND



McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Drawn by:	P.G.K.	Checked By:	R.P.K.
Scale:	1:500	Project Number:	CCO-21-0675

Client:		CITYSCAPE DIV A. GROUP INC. P.O. BOX 6937, STATION J K2A 3Z5	
Project:		CITYSCAPE COMMERCIAL WAREHOUSE 144 BENTLEY AVENUE	
Drawing Title:		POST-DEVELOPMENT DRAINAGE AREA PLAN	
			Drawing Number: POST
1	ISSUED FOR SITE PLAN CONTROL	AUG. 12, 2020	
No.	Revisions	Date	

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

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CCO-21-0675 - 144 Bentley Road - Stormwater Management

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Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m ²)	C	Gravel Area (m ²)	C	Pervious Area (m ²)	C	C _{AVG} 2&5-Year	C _{AVG} 100-Year
A1	0.90	401.95	0.90	7,867.48	0.60	697.32	0.20	0.58	0.72

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
A1	0.90	0.58	0.72	10	76.8	104.2	178.6	111.49	151.25	321.51
Total	0.90							111.49	151.25	321.51

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m ²)	C	Gravel Area (m ²)	C	Pervious Area (m ²)	C	C _{AVG} 2&5-Year	C _{AVG} 100-Year
B1	0.05	122.67	0.90	0.00	0.60	336.46	0.20	0.39	0.45
B2	0.05	476.08	0.90	0.00	0.60	70.34	0.20	0.81	0.90
B3	0.06	510.95	0.90	0.00	0.60	47.66	0.20	0.84	0.94
B4	0.07	595.21	0.90	0.00	0.60	78.60	0.20	0.82	0.91
B5	0.54	546.22	0.90	4,615.76	0.60	288.01	0.20	0.61	0.75
B6	0.08	721.29	0.90	0.00	0.60	57.94	0.20	0.85	0.94
B7	0.05	470.40	0.90	0.00	0.60	0.00	0.20	0.90	1.00

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B1	0.05	0.39	0.45	10	76.8	104.2	178.6	3.79	5.15	10.26
B2	0.05	0.81	0.90	10	76.8	104.2	178.6	9.45	12.82	24.51
B3	0.06	0.84	0.94	10	76.8	104.2	178.6	10.02	13.60	25.95
B4	0.07	0.82	0.91	10	76.8	104.2	178.6	11.77	15.97	30.52
B5	0.54	0.61	0.75	10	76.8	104.2	178.6	70.86	96.13	202.53
B6	0.08	0.85	0.94	10	76.8	104.2	178.6	14.11	19.14	36.52
B7	0.05	0.90	1.00	10	76.8	104.2	178.6	9.04	12.26	23.35
Total	0.90							129.05	175.06	353.65

Required Restricted Flow

Drainage Area	Area (ha)	C 2&5-Year	Tc (min)	I (mm/hr) 5-Year	Q (L/s) 5-Year
A1	0.90	0.50	10	104.2	129.86

100-year restricted flow to match 5-year pre-development flow at a C = 0.50

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)			Restricted Flow (L/s)		
	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B1	3.79	5.15	10.26	3.79	5.15	10.26
B2	9.45	12.82	24.51	90.15	116.30	119.60
B3	10.02	13.60	25.95			
B4	11.77	15.97	30.52			
B5	70.86	96.13	202.53			
B6	14.11	19.14	36.52			
B7	9.04	12.26	23.35			
Total	129.05	175.06	353.65	93.94	121.45	129.86

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CCO-21-0675 - 144 Bentley Road - Stormwater Management

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Storage Requirements

2-Year Storm Event

Tc (min)	I (mm/hr)	B2 Runoff (L/s)	B3 Runoff (L/s)	B4 Runoff (L/s)	B5 Runoff (L/s)	B6 Runoff (L/s)	B7 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m ³)
3	121.5	14.94	15.85	18.62	112.06	22.31	14.30	90.15	107.93	19.43
4	111.7	13.74	14.58	17.13	103.07	20.52	13.15	90.15	92.05	22.09
5	103.6	12.74	13.51	15.88	95.55	19.02	12.19	90.15	78.75	23.63
6	96.6	11.89	12.61	14.81	89.16	17.75	11.37	90.15	67.45	24.28
7	90.7	11.15	11.83	13.90	83.65	16.65	10.67	90.15	57.70	24.24
8	85.5	10.51	11.15	13.10	78.84	15.70	10.06	90.15	49.21	23.62
9	80.9	9.95	10.55	12.40	74.61	14.86	9.52	90.15	41.74	22.54

Maximum Storage Required 2-Year (m³) = 24.28

5-Year Storm Event

Tc (min)	I (mm/hr)	B2 Runoff (L/s)	B3 Runoff (L/s)	B4 Runoff (L/s)	B5 Runoff (L/s)	B6 Runoff (L/s)	B7 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m ³)
4	152.5	18.76	19.90	23.38	140.70	28.01	17.95	116.30	132.41	31.78
5	141.2	17.37	18.42	21.64	130.25	25.93	16.62	116.30	113.93	34.18
6	131.6	16.19	17.17	20.17	121.38	24.17	15.48	116.30	98.26	35.37
7	123.3	15.17	16.09	18.90	113.76	22.65	14.51	116.30	84.78	35.61
8	116.1	14.28	15.15	17.80	107.12	21.33	13.67	116.30	73.05	35.07
9	109.8	13.51	14.33	16.83	101.29	20.17	12.92	116.30	62.75	33.88
10	104.2	12.82	13.60	15.97	96.13	19.14	12.26	116.30	53.62	32.17

Maximum Storage Required 5-Year (m³) = 35.61

100-Year Storm Event

Tc (min)	I (mm/hr)	B2 Runoff (L/s)	B3 Runoff (L/s)	B4 Runoff (L/s)	B5 Runoff (L/s)	B6 Runoff (L/s)	B7 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m ³)
11	169.9	23.32	24.70	29.04	192.72	34.75	22.22	119.60	207.15	136.72
12	162.1	22.25	23.57	27.71	183.90	33.16	21.20	119.60	192.20	138.38
13	155.1	21.29	22.55	26.51	175.93	31.73	20.28	119.60	178.69	139.38
14	148.7	20.41	21.62	25.42	168.69	30.42	19.45	119.60	166.41	139.78
15	142.9	19.61	20.77	24.43	162.08	29.23	18.69	119.60	155.20	139.68
16	137.5	18.88	19.99	23.51	156.02	28.14	17.99	119.60	144.92	139.12
17	132.6	18.20	19.28	22.67	150.43	27.13	17.34	119.60	135.46	138.17

Maximum Storage Required 100-Year (m³) = 139.78

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CCO-21-0675 - 144 Bentley Road - Stormwater Management

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Storage Provided
2-Year Storm Event

Structure/Pipe	Size (mm)	Depth/Length (m)	Area (m ²)	Volume (m ³)
MH1	1200	2.49	1.13	2.82
MH1-MH2	450	24.70	0.16	3.93
MH2	1200	2.36	1.13	2.67
MH2-MH3	450	17.00	0.16	2.70
MH3	1200	2.32	1.13	2.62
MH3-MH4	450	35.40	0.16	5.63
MH4	1200	2.22	1.13	2.51
MH1-MH5	250	38.85	0.05	1.91
MH5	1200	2.04	1.13	2.31
MH5-CB1	200	35.55	0.03	1.12
CB1	600x600	1.99	0.37	0.74

Maximum Storage Provided (m³) = 28.95

5-Year Storm Event

Water Elevation (m) = 88.59			OUTLET INVERT (m)	Area (m ²)	Depth (m)	Head (m)	Volume (m ³)
Structure	T/G (m)	Pipe dia. (mm)					
MH1	88.40	450	86.21	128.98	0.19	2.16	8.35
MH2	88.40	450	86.34	86.59	0.19	2.03	5.70
MH3	88.40	450	86.38	69.51	0.19	1.99	4.56
MH4	88.40	450	86.48	157.79	0.19	1.89	9.99
MH5	88.40	250	86.66	110.08	0.19	1.81	7.09
CB1	88.65	200	87.26	-	-	-	-

Maximum Storage Provided (m³) = 35.69

100-Year Storm Event

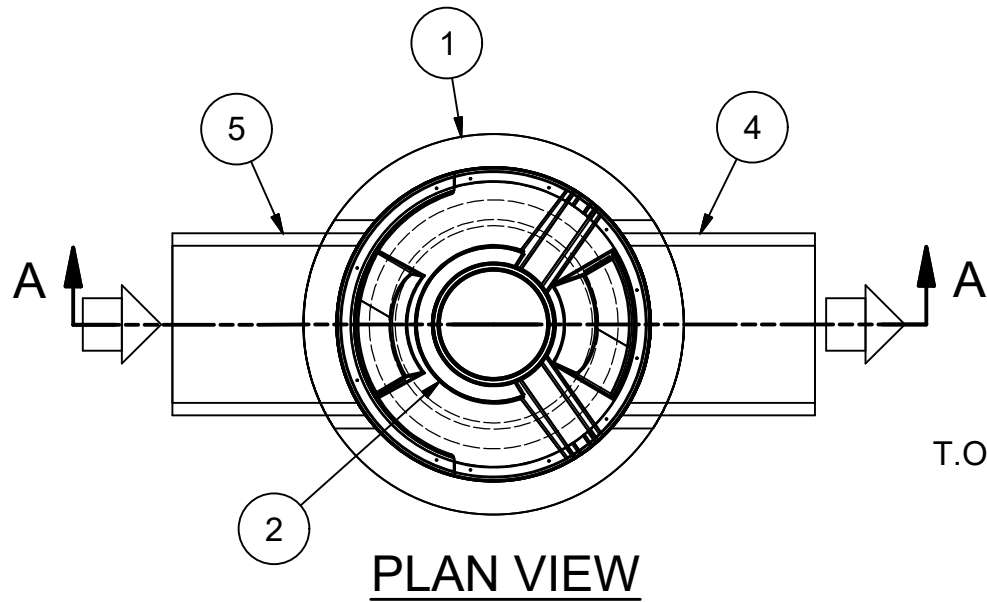
Water Elevation (m) = 88.70			OUTLET INVERT (m)	Area (m ²)	Depth (m)	Head (m)	Volume (m ³)
Structure	T/G (m)	Pipe dia. (mm)					
MH1	88.40	450	86.21	238.74	0.30	2.27	29.39
MH2	88.40	450	86.34	167.38	0.30	2.14	21.01
MH3	88.40	450	86.38	180.97	0.30	2.10	19.04
MH4	88.40	450	86.48	393.39	0.30	2.00	40.59
MH5	88.40	250	86.66	275.01	0.30	1.92	28.86
CB1	88.65	200	87.26	11.68	0.05	1.34	0.96

Maximum Storage Provided (m³) = 139.85

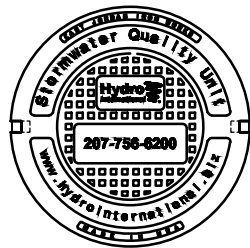
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APPENDIX H
HYDRO INTERNATIONAL FIRST DEFENSE UNIT

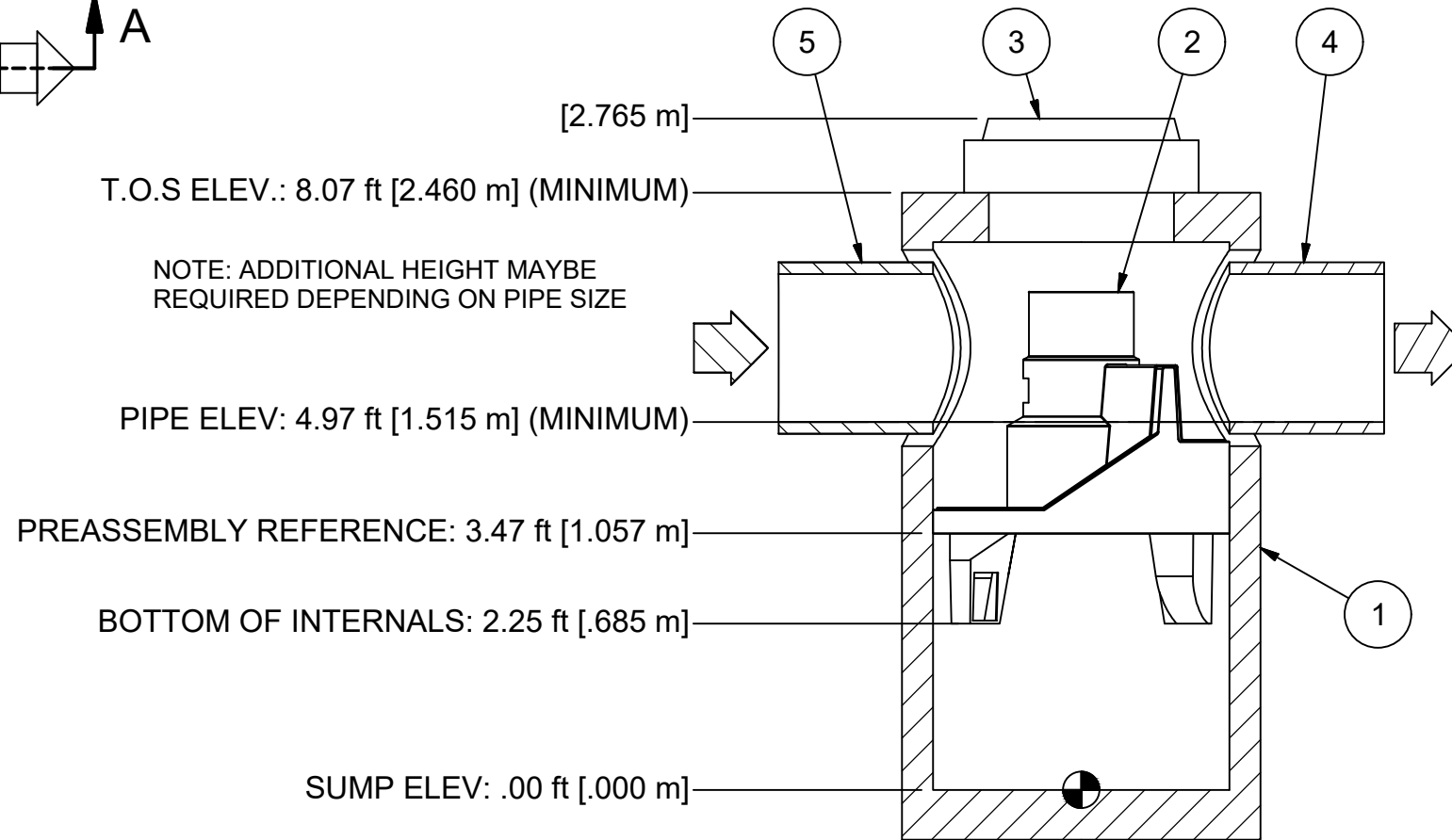


PLAN VIEW



HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS
AS REQUIRED



SECTION A-A



IF IN DOUBT ASK

- COMMENTS:
1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
 2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING FIRST DEFENSE MANHOLE.
 3. CONTRACTOR TO CONFIRM RIM, PIPE INVERTS, PIPE DIA. AND PIPE ORIENTATION PRIOR TO RELEASE OF UNIT TO FABRICATION.

DATE: 11/8/2019		SCALE: 1:30	
DRAWN BY: JLL3	CHECKED BY: -	APPROVED BY	

Title
4-ft DIAMETER
FIRST DEFENSE HIGH CAPACITY

GENERAL ARRANGEMENT



DO NOT SCALE DRAWING STEEL FABRICATION TOLERANCES UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.	
LINEAR 000 - 012in = ±0.04in 012 - 024in = ±0.06in 024 - 048in = ±0.08in 048 - 120in = ±0.12in 120in >>> = ±0.20in	ANGULAR 000 - 120in = ±1° 120 - 240in = ±0.5° 240in >>> = ±0.25°

WEIGHT: N/A	MATERIAL:
STOCK NUMBER:	
DRAWING NO.: 4FDHC_FDHC GA STD	
SHEET SIZE: B	SHEET: 1 OF 1
Rev: -	

PRODUCT SPECIFICATION:

1. PEAK HYDRAULIC FLOW: 18.0 cfs (510 l/s)
2. MIN SEDIMENT STORAGE CAPACITY: 0.7 cu. yd. (0.5 cu. m.)
3. OIL STORAGE CAPACITY: 191 gal. (723 liters)
4. MAXIMUM INLET/OUTLET PIPE DIAMETERS: 24 in. (600 mm)
5. THE TREATMENT SYSTEM SHALL USE AN INDUCED VORTEX TO SEPARATE POLLUTANTS FROM STORMWATER RUNOFF.
6. FOR MORE PRODUCT INFORMATION INCLUDING REGULATORY ACCEPTANCES, PLEASE VISIT <https://hydro-int.com/en/products/first-defense>

GENERAL NOTES:

1. General Arrangement drawings only. Contact Hydro International for site specific drawings.
2. The diameter of the inlet and outlet pipes may be no more than 24".
3. Multiple inlet pipes possible (refer to project plan).
4. Inlet/outlet pipe angle can vary to align with drainage network (refer to project plan.s)
5. Peak flow rate and minimum height limited by available cover and pipe diameter.
6. Larger sediment storage capacity may be provided with a deeper sump depth.

PARTS LIST				
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	48	1200	I.D. PRECAST MANHOLE
2	1			INTERNAL COMPONENTS (PRE-INSTALLED)
3	1	30	750	FRAME AND COVER (ROUND)
4	1	24 (MAX)	600 (MAX)	OUTLET PIPE (BY OTHERS)
5	1	24 (MAX)	600 (MAX)	INLET PIPE (BY OTHERS)

ANY WARRANTY GIVEN BY HYDRO INTERNATIONAL WILL APPLY ONLY TO THOSE ITEMS SUPPLIED BY IT. ACCORDINGLY HYDRO INTERNATIONAL CANNOT ACCEPT ANY RESPONSIBILITY FOR ANY STRUCTURE, PLANT, OR EQUIPMENT, (OR THE PERFORMANCE THERE OF) DESIGNED, BUILT, MANUFACTURED, OR SUPPLIED BY ANY THIRD PARTY. HYDRO INTERNATIONAL HAVE A POLICY OF CONTINUOUS DEVELOPMENT AND RESERVE THE RIGHT TO AMEND THE SPECIFICATION. HYDRO INTERNATIONAL CANNOT ACCEPT LIABILITY FOR PERFORMANCE OF ITS EQUIPMENT, (OR ANY PART THEREOF), IF THE EQUIPMENT IS SUBJECT TO CONDITIONS OUTSIDE ANY DESIGN SPECIFICATION. HYDRO INTERNATIONAL OWNS THE COPYRIGHT OF THIS DRAWING, WHICH IS SUPPLIED IN CONFIDENCE. IT MUST NOT BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SUPPLIED AND MUST NOT BE REPRODUCED, IN WHOLE OR IN PART, WITHOUT PRIOR PERMISSION IN WRITING FROM HYDRO INTERNATIONAL.

APPENDIX I
CITY OF OTTAWA DESIGN CHECKLIST

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

Criteria	Location (if applicable)
<input type="checkbox"/> Executive Summary (for larger reports only).	N/A
<input type="checkbox"/> Date and revision number of the report.	On Cover
<input type="checkbox"/> Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix E
<input type="checkbox"/> Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
<input type="checkbox"/> 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.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
<input type="checkbox"/> Summary of pre-consultation meetings with City and other approval agencies.	Appendix A
<input type="checkbox"/> Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
<input type="checkbox"/> Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

<input type="checkbox"/> Identification of existing and proposed infrastructure available in the immediate area.	N/A
<input type="checkbox"/> 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).	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
<input type="checkbox"/> 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 Grading, Drainage, Sediment & Erosion Control Plan (C101)
<input type="checkbox"/> 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
<input type="checkbox"/> Proposed phasing of the development, if applicable.	N/A
<input type="checkbox"/> Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies
<input type="checkbox"/> All preliminary and formal site plan submissions should have the following information: <ul style="list-style-type: none"> o Metric scale o North arrow (including construction North) o Key plan o Name and contact information of applicant and property owner o Property limits including bearings and dimensions o Existing and proposed structures and parking areas o Easements, road widening and rights-of-way o Adjacent street names 	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
<input type="checkbox"/> Confirm consistency with Master Servicing Study, if available	N/A
<input type="checkbox"/> Availability of public infrastructure to service proposed development	N/A
<input type="checkbox"/> Identification of system constraints	N/A
<input type="checkbox"/> Identify boundary conditions	N/A
<input type="checkbox"/> Confirmation of adequate domestic supply and pressure	N/A
<input type="checkbox"/> 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.	Appendix B
<input type="checkbox"/> 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.	N/A
<input type="checkbox"/> Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
<input type="checkbox"/> Address reliability requirements such as appropriate location of shut-off valves	N/A
<input type="checkbox"/> Check on the necessity of a pressure zone boundary modification.	N/A
<input type="checkbox"/> 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	N/A

<input type="checkbox"/> Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
<input type="checkbox"/> Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
<input type="checkbox"/> Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix B
<input type="checkbox"/> Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
<input type="checkbox"/> 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).	N/A
<input type="checkbox"/> Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
<input type="checkbox"/> 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
<input type="checkbox"/> Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2 Sanitary Sewer

<input type="checkbox"/> 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)	N/A
<input type="checkbox"/> 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
<input type="checkbox"/> Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Sanitary Sewer
<input type="checkbox"/> 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
<input type="checkbox"/> Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
<input type="checkbox"/> Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
<input type="checkbox"/> 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
<input type="checkbox"/> Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
<input type="checkbox"/> Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6.0 Stormwater Management
<input type="checkbox"/> Analysis of available capacity in existing public infrastructure.	N/A
<input type="checkbox"/> A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
<input type="checkbox"/> Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5-year event (dependent on the receiving sewer design) to 100-year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 6.0 Stormwater Management
<input type="checkbox"/> Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 6.0 Stormwater Management
<input type="checkbox"/> Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 Stormwater Management
<input type="checkbox"/> Set-back from private sewage disposal systems.	N/A
<input type="checkbox"/> Watercourse and hazard lands setbacks.	N/A
<input type="checkbox"/> Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
<input type="checkbox"/> Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
<input type="checkbox"/> Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5-year return period) and major events (1:100-year return period).	Appendix F

<input type="checkbox"/> Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Site Grading, Drainage, Sediment & Erosion Control Plan
<input type="checkbox"/> Calculate pre-and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 6.0 Stormwater Management Appendix F
<input type="checkbox"/> Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Management
<input type="checkbox"/> Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 Stormwater Management
<input type="checkbox"/> 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.	Appendix A
<input type="checkbox"/> Identification of potential impacts to receiving watercourses	N/A
<input type="checkbox"/> Identification of municipal drains and related approval requirements.	N/A
<input type="checkbox"/> Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.0 Stormwater Management
<input type="checkbox"/> 100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
<input type="checkbox"/> Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

<input type="checkbox"/> Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0 Sediment & Erosion Control
<input type="checkbox"/> 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
<input type="checkbox"/> Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

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 each approval. The approval and permitting shall include but not be limited to the following:

Criteria	Location (if applicable)
<input type="checkbox"/> 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
<input type="checkbox"/> Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
<input type="checkbox"/> Changes to Municipal Drains.	N/A
<input type="checkbox"/> Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

Criteria	Location (if applicable)
<input type="checkbox"/> Clearly stated conclusions and recommendations	Section 8.0 Summary Section 9.0 Recommendations
<input type="checkbox"/> 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 are stamped
<input type="checkbox"/> All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped