SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Project No.: CP-18-0049 – 296 Somerset Street East, Ottawa, ON

Prepared for:

TC United Group
800 Industrial Avenue, Unit 9
Ottawa, ON K1G 4B8

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road,
Carp, ON K0A 1L0

Date: March 2018.

McINTOSH PERRY

Executive Summary

Developing a site within the City of Ottawa requires meeting a predefined set of requirements outlined in the City of Ottawa Sewer Design Guidelines (SDG) - 2012 along with meeting the local conservation authority requirements (Rideau Valley Conservation Authority - RVCA) and provincial requirements (Ministry of Environmental and Climate Change – MOECC). Site specific requirements are discussed and outlined in the pre-consultation meeting with the City of Ottawa before the detailed design process is initiated.

This report describes an innovative and cost-efficient design solution for the site servicing (water, sanitary, and storm) and stormwater management (SWM) requirements in order to develop this site. The site is within a combined sewer area and discharges directly into combined sewers, therefore, strict stormwater management criteria are present on the site.

Evaluation of the proposed site in addition to a review of the site grading was completed. Our review identified that rooftop storage is the optimal design solution to meet the SWM requirements. The rooftop storage will discharge onto grassed surfaces that will convey into an underground storm network. The network will be further restricted before discharge into the municipal infrastructure within Somerset Street East, while ensuring that no ponding or storage occurs within the right-of-way easement present on the property. Due the stormwater runoff discharging into a combined sewer, it is expected that the quality control requirements outlined by the RVCA will be met through existing municipal infrastructure.

The evaluation of the proposed development, existing site characteristics and surrounding municipal infrastructure suggests that the SWM design elements consisting of rooftop storage and quantity restriction will be sufficient solution to the site constraints. The proposed sanitary and water services will utilize the existing infrastructure surrounding the site to service the development. Therefore, it is our professional opinion that this site located at 296 Somerset Street East is able to be developed and fully serviced to support the proposed multi-use commercial and multi-unit residential building.

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1.0 PROJECT DESCRIPTION

1.1 Purpose

This report will address the servicing (water, sanitary, and storm) and stormwater management requirements associated with the proposed development located at 296 Somerset Street East within the City of Ottawa.

1.2 Site Description

The property is located at 296 Somerset Street East. It is described as Lot 15, Registered Plan 46666, City of Ottawa, Ontario. The land in question covers approximately 0.04 ha and is located east of the intersection of Somerset Street East and Russell Avenue.

The existing site is currently developed with a two-storey residential dwelling with a separated garage. The site is subject to an access easement (INST. CR624264) across the graveled drive aisle. The existing development is serviced with water and sanitary services which will be blanked and capped as per City standard drawing S11.4 in accordance with City Specification F-4104.

The proposed development consists of a 127 m², two-storey mixed commercial and multi-unit residential building. The drive aisle subject to the easement will be re-graded and re-surfaced with asphalt but will remain unobstructed. The existing entrance from Somerset Street East will be maintained to provide access for the development and thoroughfare to the property behind the site.

Figure 1: Key Map: 296 Somerset Street East, Ottawa

2.0 BACKGROUND STUDIES

Background studies that have been completed for the site include 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 January 17th, 2018 and can be found under separate cover.

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

- Phase I ESA completed by McIntosh Perry, dated March 2, 2018.
- Geotechnical Investigation by McIntosh Perry, dated March 2018.

3.0 CITY OF OTTAWA CORRESPONDENCE SUMMARY

City of Ottawa Staff have been consulted regarding this proposed development. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) of 10 minutes.
- Control 5 through 100-year post-development flows to the 5-year pre-development flows with a combined C value to a maximum of 0.40.

Correspondence with the City can be found in Appendix 'A'.

4.0 EXISTING SERVICES

This section provides a detailed account of the existing infrastructure within Somerset Street East. Due to the location and orientation of the property no other infrastructure is discussed.

There currently is an 1,800 mm diameter combined sewer with the right-of-way (ROW) of Somerset Street East. Correspondence with the Ministry of the Environment and Climate Change (MOECC) is in progress to acquire permission to connect to a combined sewer by completing an Environmental Compliance Application (ECA). A 400 mm diameter PVC watermain is present along the southern portion of the ROW as are two abandoned watermains. The 100 mm diameter abandoned watermain is present within the westbound travel lane while the 400 mm diameter abandoned watermain is within the eastbound travel lane south of the aforementioned combined sewer. The nearest hydrant is approximately 51 m east of the site on the southwestern corner of the intersection of Chapel Street and Somerset Street East.

A 50 mm diameter gas service is present within the northern portion of the ROW in close proximity to the property line. An abandoned 50 mm diameter gas main is also present within the southern portion of the ROW but is capped in front of the subject site.

A Bell conduit runs centrally along the ROW placed above the 1,800 mm diameter combined sewer. The maintenance of clearance and functionality of the conduit will be further discussed in Section 5.0. Hydro servicing is available through overhead wires. Rogers should be contacted to confirm if their services are available through the overhead wires since underground services are not available.

5.0 SERVICING PLAN

5.1 Proposed Servicing Overview

The overall servicing will be provided via service connections to the mains within Somerset Street East. The water service will be extended from the 400 mm diameter watermain. Sanitary and storm service will be provided by the 1,800 mm diameter combined sewer within Somerset Street East. In accordance with Section 5.7.4 within the Ottawa Sewer Design Guidelines (OSDG) SDG002, October 2012, City of Ottawa, two connections will be made to the combined sewer due to the commercial application of part of the development. A maintenance manhole located within 2 m of the property line will be included for both service connections. Service laterals will be located underneath the interlock pavers and grassed areas within the northwest portion of the site. Details pertaining to the final proposed servicing locations have been reviewed and are shown on the proposed Site Servicing Plan included within the drawing package submission.

5.2 Proposed Water Design

A new 50 mm PVC diameter water lateral complete with a water valve at the property line will be connected to the existing 400 mm PVC watermain within Somerset Street East.

The proposed building will not be equipped with a sprinkler system. Following Part 3 of the Ontario Building Code (OBC), the required fire protection is 2,700 L/min (See Appendix 'B' for calculation). The required fire protection from the Fire Underwriters Survey (FUS) is 11,000 L/min (provided for information purposes only).

The water demands for the new building have been calculated as per the Ottawa Design Guidelines – Water Distribution. Since the building has mixed occupancy, the water demands have been calculated separately. The commercial demands are as follows: the average and maximum daily demands are 0.002 L/s and 0.004 L/s respectively. The maximum hourly demand was calculated as 0.007 L/s (Refer to Appendix 'B' for flow details). The residential demands are as follows: the average and maximum daily demands are 0.03 L/s and 0.08 L/s respectively. The maximum hourly demand was calculated as 0.18 L/s (Refer to Appendix 'B' for flow details).

Boundary conditions were requested from the City of Ottawa and are available in Appendix 'B'. A water model was conducted and the results indicated that the watermain within Somerset Street East can accommodate the proposed development.

5.3 Proposed Sanitary Design

A new 150 mm diameter gravity sanitary service will be connected to the existing 1,800 mm diameter combined sewer within Somerset Street East. The sanitary service will be complete with a maintenance manhole (SAN MH1A) just inside the property line as per the Ottawa Sewer Design Guidelines (OSDG) SDG002, October 2012, City of Ottawa, Clause 4.4.4.7 and City of Ottawa Sewer-Use By-Law 2003-514 (14).

The peak design flow for the proposed site was determined to be 0.033 L/s. A 150 mm diameter pipe at a two percent slope has a capacity of 22.20 L/s, therefore the proposed 150 mm diameter lateral has sufficient capacity to convey the flows. It is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing combined sewer within Somerset Street East.

5.4 Proposed Strom Design (Conveyance and Management)

Stormwater runoff will be conveyed by way of overland sheet flow into the proposed storm network which will discharge into the existing infrastructure within Somerset Street East. Due to the site discharging into the combined sewer system within Somerset Street East, the Ministry of the Environment and Climate Change (MOECC) has been contacted. An Environmental Compliance Approval (ECA) application has been initiated and will be forwarded for approval at a later date.

Runoff will be collected within the proposed underground network. Since part of the network is proposed within a right-of-way easement, stormwater runoff will be directed to the rear of the property and be restricted within the catchbasin manhole. The storage requirements will be met by providing both storage within and above the structure. The direction and location of overland sheet flow has been indicated on the Lot, Grading and Drainage Plan (C101).

From discussions with the City of Ottawa and the Rideau Valley Conservation Authority (RVCA), quantity control will be provided. Quality control is expected to be handled by the combined sewer system within Somerset Street East. Further details and calculations pertaining to the quantity and quality of the stormwater management system are provided in Section 6.0.

5.5 Site Utilities

All relevant utility companies (telephone/cable – Bell/Rogers, gas – Enbridge and hydro – Hydro Ottawa) will be contacted prior to construction in order to confirm adequate utility servicing for the site. Existing utilities are present along Somerset Street East. Utility services are anticipated to be fed from the existing utilities currently within the Somerset Street East right-of-way.

5.6 Service Locations/Cover

The proposed sanitary and water services will be placed under the interlock pavers and grassed area in the northwest portion of the property. Hydro, cable, telephone and gas will be primarily placed in a common utility trench connecting to existing infrastructure along Somerset Street East. The minimum cover for the sanitary, storm and water will be as follows:

Table 1: Minimum Cover for Services

Service	Minimum Cover
Sanitary Sewer	2.0m
Storm Sewer	2.0m
Watermain	2.4m

All minimum cover requirements are as per City of Ottawa Standards. Separation distances between the storm, water and sanitary will be maintained as per the Ministry of the Environment requirements.

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 buildings and into a new underground storm sewer system within the site. This SWM plan will implement quantity control strategies. The storm runoff will enter the pipe system through catchbasin manholes (CBMH's) located throughout the site. The restricted stormwater runoff will be directed to the existing sewer within Somerset Street East; conversely, overland flow, surpassing the 100-year storm event, will be directed towards the back of the property as in pre-development conditions. The quantitative properties of the storm runoff for both the pre- and post-development flows are further detailed below. No quality control will be implemented due to its expected handling by the existing combined sewer.

Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. To summarize, roof water will be directed to grass surfaces that in turn will be collected into the proposed stormwater management swale. The low sloped swale built with a perforated subdrain will allow for infiltration as well as conveyance into the proposed storm network.

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:

Table 2: Average Runoff Coefficients (C)

Surface	Avg. C
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 (Tc) used for pre-development and post-development flows shall be 10 minutes.

6.2.1 Pre-Development Drainage

The existing site has been demonstrated as drainage area A1. Drawing CP-18-0049 PRE (Appendix 'D') indicates the limits of the drainage area. Existing conditions have the overland stormwater runoff flowing from a high point at the northeastern corner and draining southwest towards the back of the property and into the adjacent property. From what can be discerned from the topographical information available the runoff is further brought to the Russell Avenue right-of-way. Table 3 demonstrates the existing flow rates in pre-development conditions.

Table 3: Pre-Development Runoff Summary

Area ID	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-year Flow Rate (L/s)	100-year Flow Rate (L/s)
A1	0.037	0.40	0.67	4.30	12.35
Total	0.037			4.30	12.35

(See Appendix 'F') for Calculations)

6.2.2 Post-Development Drainage

The post-development drainage plan was designed to retain runoff generated by a 100-year event onsite. Stormwater exceeding this amount is directed to the southeastern property line. The proposed drainage and overland flow directions are indicated on drawing CP-18-0049 POST (Appendix 'E'). Table 4, displays the post-development runoff generated by the proposed site.

Table 4: Post-Development Runoff Summary

Area ID	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-year Flow Rate (L/s)	100-year Flow Rate (L/s)
B1	0.004	0.64	0.73	0.70	1.36
B2	0.013	0.90	1.00	3.29	6.26
B3	0.021	0.59	0.67	3.54	6.90
Total	0.037			7.53	14.52

(See Appendix 'F' for Calculations)

Runoff from areas B2 and B3 will be restricted before outletting to the existing combined sewer system within Somerset Street East. The total flow leaving the site will be controlled by a Tempest LMF inlet control device (ICD) located within CBMH#1. The restriction device will restrict the 100-yr runoff to the 5-yr pre-development flow rate. See Appendix 'F' for calculations. This restriction will be further detailed in Section 6.3.

6.3 Quantity Control

After discussing the stormwater management criteria for the site with City staff, the 100-yr post-development runoff for this site has been restricted to match the 5-year pre-development flow rate with a combined C value of 0.4. (See Appendix 'A' for pre-consultation notes). These values create the following allowable release rates and storage volumes for the development site.

Table 5: Allowable Release Rates

Area ID	Drainage Area (ha)	Balanced Runoff Coefficients (C) 5-yr	5-Year Flow Rate (l/s)
A1	0.037	0.40	4.30

(See Appendix 'F' for Calculations)

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from areas B2 and B3 will be restricted as detailed in the Table 6 on the following page.

Table 6: Post-Development Restricted Runoff Calculations

Area ID	Post-Development Unrestricted (l/s)		Post-Development (Restricted) (l/s)		
	5-yr	100-yr	5-yr	100-yr	
B1	0.70	1.36	0.70	1.36	UNRESTRICTED
B2	3.29	6.26	0.30	0.54	RESTRICTED
B3	3.54	6.90	2.40	2.40	RESTRICTED
Total	7.53	14.52	3.40	4.30	

(See Appendix 'F' for Calculations)

Runoff from Areas B2 and B3 will be restricted at CBMH#1 through a Tempest LMF ICD (Design Head of 1.75m). This ICD will restrict areas B2 and B3 to 1.6 L/s for the 5-year and 2.4 L/s for the 100-year storm event. The restriction does create a water surface elevation (WSEL) inside of CBMH#1 for the 5-year storm event of 56.86m and a water surface elevation above of CBMH#1 of 57.75 m for the 100-year storm event. Table 7 details the required and provided rooftop storage volumes for the development.

Table 7: Rooftop Storage Summary

Area	Depth of ponding (m) for 5-year storm	5-year required storage (m^3)	5-year available storage (m^3)	Depth of ponding (m) for 100-year storm	100-year required storage (m^3)	100-year available storage (m^3)
B2	0.025	2.6	3.1	0.045	5.1	5.6

(See Appendix 'F' for Calculations)

Table 8 details the required storage before discharge into the municipal infrastructure within Somerset Street East.

Table 8: Site Storage Summary

Area	Depth of ponding (m) for 5-year storm	5-year required storage (m^3)	5-year available storage (m^3)	Depth of ponding (m) for 100-year storm	100-year required storage (m^3)	100-year available storage (m^3)
B3	1.15 Inside CBMH#1	1.3	1.3	0.16 Above CBMH#1	3.3	3.3

(See Appendix 'F' 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 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, the existing municipal infrastructure is expected to handle the quality control requirements. Please refer to Appendix 'A' for correspondence with the RVCA and City of Ottawa. Due to the expectations outlined above no additional on-site quality treatment has been provided. The combination of the above BMP's and the proposed flow control measures will aid in the protection of the natural environment.

7.0 SEDIMENT EROSION CONTROL

The site-grading contractor is responsible for ensuring sediment control structures are installed in accordance with the Site Grading and Drainage Plan as indicated. Silt fences shall be installed on site before construction or earth-moving operations begin, as shown on the Site Grading and Drainage Plan.

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 and vegetation has been established. 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.

At the discretion of the project manager, municipal staff or conservation authority, additional silt control devices shall be installed at designated locations.

8.0 SUMMARY

- A new 127 m^2 three-storey mixed commercial and multi-unit residential building will be constructed centrally on the site located at 296 Somerset Street East.
- A new 150 mm diameter sanitary service and monitoring manhole will be installed and connected to the existing 1,800 mm diameter combined sewer within Somerset Street East.
- A new 50 mm diameter water lateral will be extended from the existing 400 mm diameter main within Somerset Street East.
- A new storm network will be installed onsite and will connect to the existing 1,800 mm combined sewer within Somerset Street East.
- As discussed with 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 0.4.
- Storage for the 100-year storm event will be provided within the proposed storm structures, on the surface above the rear yard structure and on the proposed flat roof.

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 TC United Group development located at 296 Somerset Street East within the City of Ottawa.

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: 613.836.2184 x 2243
E: r.kennedy@mcintoshperry.com

10.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of TC United Group. 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:
CORRESPONDENCE

From: Curtis Melanson
Sent: April 9, 2018 10:51 AM
To: Sean Leflar
Subject: Fwd: 296 Somerset Street East - PreConsultation Minutes and Notes
Attachments: image001.gif; ATT00001.htm; image002.jpg; ATT00002.htm; image003.jpg; ATT00003.htm; image004.jpg; ATT00004.htm; Report and Plan Identification List 227 Blackburn.pdf; ATT00005.htm

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my iPhone

Curtis Melanson, C.E.T.
Practice Area Lead, Land Development
T. 613.836.2184 (ext 2240) | **F.** 613.836.3742 | **C.** 613.857.0784

Begin forwarded message:

From: "Sandercott, Robert" <Robert.Sandercott@ottawa.ca>
Date: April 9, 2018 at 9:33:38 AM EDT
To: Daniel Boulanger <dan.boulanger@tcunitedgroup.com>
Cc: Curtis Melanson <c.melanson@mcintoshperry.com>, Amanda Sanford <amanda.theriaultdesign@gmail.com>, "Wessel, Shawn" <shawn.wessel@ottawa.ca>
Subject: RE: 296 Somerset Street East - PreConsultation Minutes and Notes

Hi Daniel,

My apologies for the delay in getting back to you on this file. Below are our follow-up notes, and attached is the reports and studies list required for this application.

Proposal
To construct a four-unit low-rise apartment building, plus a ground floor commercial unit facing Somerset Street East.

Zoning Information

- R4H[480]-c – Residential Fourth Density Zone
- Information regarding the "-c" suffix (Residential Neighbourhood Commercial suffix) can be found in Section 141 of the Zoning By-law.
- The property is located in the Mature Neighbourhoods Overlay and therefore a Streetscape Character Analysis will be required in support of the proposed development.
- Amenity area requirements are as per Section 137. In particular, 60 sq m of amenity area is required.
- Bicycle parking requirements are noted in Section 111. In particular, 2 bicycle parking spaces are required for four units (however you are encouraged to provide more.

Applications Required

- Site Plan Control application – Manager Approval with Public Consultation. For more information, click here.

Planning Comments (Robert Sandercott)

- Based on our discussion, it is our understanding that the driveway access is part of an existing right-of-way easement which is in favour of the townhouses located to the east of the site. As such, please consider reconfiguring the bicycle parking and garbage enclosure such that they are not directly facing the driveway, instead perhaps having them accessed via a path leading from the laneway. This will better prevent potential issues with the easement access.
- The minimum amenity area required in the Zoning By-law is 60 sq m (15 sq m per unit * 4). The zoning information shown on the plans should indicate the correct requirement. In order to avoid confusion, if the entire rear yard is to be landscaped save for the bicycle parking/garbage storage, then the plans should reflect that as amenity space rather than delineating the "required amenity area" separately.
- Given that the garbage storage will be used for both the residential tenants and the proposed commercial use, increasing the amount of garbage expected to be produced, you are encouraged to consider a common garbage storage area within the principal building.
    - Note that depending on the type of commercial use proposed and waste that will be generated, the commercial tenant may qualify for the "yellow bag" program, which would allow for City pickup of their waste. More information can be found in this link.

Engineering Comments (Shawn Wessel)

- A servicing plan/study will be required, as well as a grading and drainage plan and erosion and sediment control plan.
- A Phase I Environmental Site Assessment (ESA) will be required. A Phase II ESA may also be required depending on the results and recommendations of Phase I.
- A noise study will be required due to the proximity of the property to Somerset Street and Chapel Street, which are designated as collector roads under the Official Plan.
- The property is located within 500 metres of the Rideau River. Given the proposal for a commercial unit, it is strongly recommended that you contact the RVCA regarding your proposal. Depending on the commercial use proposed, they may want an oil and grit separator to be installed.
- A stormwater management report will be required, as well as a roof plan.
- The roof drains will require an MOE ECA for Storm Water Management to connect to the combined sewer with an independent connection; therefore, we recommend surface discharge with downspouts and eaves troughs.
- You will also be required to to apply for a MOECC ECA as the proposal will be connecting to a combined sewer for Sanitary and footing drains.

Required Plans/Studies

- I have attached the required plans and studies list. The Site Plan and Landscape Plan requirements can be combined into one plan, depending on the level of detail required for the landscape plan.
- Please refer to the City's guide to preparing studies and plans.

Next Steps

- It is encouraged that prior to filing your application, you consult with the Ward Councillor for the area (Mathieu Fleury). I understand that you have already had some discussion with his office regarding your proposal.

Please don't hesitate to contact me if you have any questions.

Thank you,

Robert Sandercott
Planner
Development Review - Central Branch
Planning, Infrastructure, and Economic Development Department
City of Ottawa | Ville d'Ottawa

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 to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	6	1. Site Servicing Plan	2. Assessment of Adequacy of Public Services / Site Servicing Study / Brief	S	6
S	6	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	4
	2	5. Composite Utility Plan	6. Groundwater Impact Study		6
	5	7. Servicing Options Report	8. Wellhead Protection Study		6
	9	9. Community Transportation Study and / or Transportation Impact Study / Brief	10.Erosion and Sediment Control Plan / Brief		6
S	6	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		8
	3	13.Hydraulic Water main Analysis	14.Noise / Vibration Study		3
	35/50/55	15.Roadway Modification Design Plan	16.Confederation Line Proximity Study		9

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	50	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		2
	30	19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	15	21.Site Plan	22.Minimum Distance Separation (MDS)		3
	20	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		5
	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)		Available online
	6	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	5	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		6
	5	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		7
	4	38.Record of Site Condition	39.Mineral Resource Impact Assessment		4
	10	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		11
	4	42.Mine Hazard Study / Abandoned Pit or Quarry Study			

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		43.	44.		

Meeting Date: 2017-Dec-04

Application Type: *Site Plan Control*

File Lead (Assigned Planner): Robert Sandercott

Infrastructure Approvals Project Manager:

Site Address (Municipal Address): 227 Blackburn 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.**

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 and Growth Management 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 and Growth Management Department.

Sean Leflar

From: Wu, John <John.Wu@ottawa.ca>
Sent: February 8, 2018 2:12 PM
To: Sean Leflar
Subject: RE: 296 Somerset Street East - Stormwater Management Criteria

5 year's with C=0.4

From: Sean Leflar [mailto:s.leflar@mcintoshperry.com]
Sent: Thursday, February 08, 2018 2:10 PM
To: Wu, John <John.Wu@ottawa.ca>
Subject: RE: 296 Somerset Street East - Stormwater Management Criteria

Hello John,

Thank you for your reply, due to its location I had an feeling that would be the case. Just to clarify, the 100-year post-development flows must be restricted to the 5-year pre-development flows?

Thanks again,

Sean Leflar
Civil Engineering Technolgist
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
T. 613.836.2184 (ext 2252) | **F.** 613.836.3742
s.leflar@mcintoshperry.com | www.mcintoshperry.com

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: February 8, 2018 2:03 PM
To: Sean Leflar <s.leflar@mcintoshperry.com>
Subject: RE: 296 Somerset Street East - Stormwater Management Criteria

No. it is combined sewer area, need MoE approval, c0.4,and 5 year's to restrict to 100 year's is required

---

From: Sean Leflar [mailto:s.leflar@mcintoshperry.com]
Sent: Thursday, February 08, 2018 1:59 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: 296 Somerset Street East - Stormwater Management Criteria

Good Afternoon John,

I am starting up the civil design work for 296 Somerset Street East. The development consists of a three storey mixed commercial and multi-unit residential building. I do not have any pre-consultation notes or As-Builts to go on at the moment. As far as I can tell, there are separate sewers within the right-of-way of Somerset Street. If you don't mind, I would like to take a minute and confirm the stormwater management criteria for the development with you before starting the preliminary work.

- Time of concentration shall be 10 min for both the pre and post-development runoff calculations (due to small site area).
- The 100-year post-development flows are to match the 5-year pre-development flows calculated with a maximum C value of 0.5.
- Stormwater up to and including the 100-year event will be stored onsite.
- An emergency overland flow route shall be provided towards the Somerset Street East right-of-way.

If there are any alterations required to these parameters, please let me know.

Thank you for your help,

Sean Leflar
Civil Engineering Technolgist
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McINTOSH PERRY

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'

Sean Leflar

From: Sean Leflar
Sent: March 20, 2018 9:09 AM
To: Eric Lalande
Subject: RE: 296 Somerset Street East - Stormwater Quality Control Requirments

Good Morning Eric,

It is quite alright. Thank you for getting back to me.

Regards,

Sean Leflar
Civil Engineering Technolgist
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
T. 613.836.2184 (ext 2252) | **F.** 613.836.3742
s.leflar@mcintoshperry.com | www.mcintoshperry.com

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: March 20, 2018 9:04 AM
To: Sean Leflar <s.leflar@McIntoshPerry.com>
Subject: RE: 296 Somerset Street East - Stormwater Quality Control Requirments

Hi Sean sorry for the delay,

The RVCA would encourage best management practices on site to achieve an enhanced level of protection (80% TSS removal, where possible); however, when connecting to a combined sewer, stormwater quality control will be provided through the municipal waste water treatment facilities.

Thanks,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Sean Leflar [mailto:s.leflar@mcintoshperry.com]
Sent: Tuesday, March 20, 2018 8:30 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Subject: RE: 296 Somerset Street East - Stormwater Quality Control Requirments

Good Morning Eric,

I would like to take a few moments and follow up with you about the stormwater quality control requirements for the development located at 296 Somerset Street East. Whenever you get a chance, I would appreciate hearing from you about the Rideau Valley Conservation Authorities requirements.

Regards,

Sean Leflar

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T. 613.836.2184 (ext 2252) | **F.** 613.836.3742
s.leflar@mcintoshperry.com | www.mcintoshperry.com

From: Sean Leflar
Sent: March 13, 2018 8:02 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Subject: 296 Somerset Street East - Stormwater Quality Control Requirments

Good Morning Eric,

I am working on the civil design for a three storey mixed residential and commercial development at 296 Somerset Street East, Ottawa. The site is within a combined sewer area. The site will discharge directly into a combined sewer within Somerset Street East. We will be contacting the MOECC for approval for the connections.

We have consulted the City and will be providing quantity control, what kind of quality control would the RVCA require for this development?

Can you please review and let me know. I have attached a rough draft of a site plan for your reference.

Thank you,

Sean Leflar
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s.leflar@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

APPENDIX B:
EXISTING WATERMAIN FLOW AND FIRE PROTECTION CALCULATIONS

McINTOSH PERRY

Sean Leflar

From: Sean Leflar
Sent: February 27, 2018 9:03 AM
To: Mottalib, Abdul
Cc: Wu, John
Subject: RE: 296 Somerset Street East - Request for Boundary Conditions.

Good Morning,

Thank you Abdul.

Sean Leflar
Civil Engineering Technolgist
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T. 613.836.2184 (ext 2252) | **F.** 613.836.3742
s.leflar@mcintoshperry.com | www.mcintoshperry.com

From: Mottalib, Abdul [mailto:Abdul.Mottalib@ottawa.ca]
Sent: February 27, 2018 8:50 AM
To: Sean Leflar <s.leflar@mcintoshperry.com>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>
Subject: FW: 296 Somerset Street East - Request for Boundary Conditions.

FYI

Thanks,

Abdul Mottalib, P. Eng.

From: ……
Sent: February 27, 2018 8:41 AM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 296 Somerset Street East - Request for Boundary Conditions.

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

The following are boundary conditions, HGL, for hydraulic analysis at 296 Somerset East (zone 1W) assumed to be connected to the 406mm on Somserset (see attached PDF for location).

Minimum HGL = 106.5m

Maximum HGL = 115.5m; the maximum pressure is estimated to be above 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required

Max Day + Fire Flow (183 L/s) = 105.3m

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

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.

From: Sean Leflar [mailto:s.leflar@mcintoshperry.com]
Sent: February 22, 2018 1:42 PM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Cc: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: 296 Somerset Street East - Request for Boundary Conditions.

Good Afternoon Abdul,

I am working on the civil design for the development located at 296 Somerset Street East and would like to request boundary conditions. The development consists of a 3-storey mixed use commercial and multi-unit residential building. The building is not sprinklered, there will be 1 commercial unit and 4 residential units. I have attached a site plan for your reference as well as a sketch (SK-1) showing the planned water connection to the 400 mm diameter watermain located within Somerset Street East.

If possible, could you pass on information on the available flows for the nearest hydrant that has an unobstructed path of travel to the development? From my research, the closest would be on the southwest corner of the intersection between Chapel Street and Somerset Street East.

Please find the below water demands to obtain the boundary conditions. Since the development holds both commercial and residential uses, I have included water demands for both uses.

Type of Development:	**Residential:**	**Commercial:**
Location of Service:	Connection to Somerset Street East.	
Amount of Fire Flow Required:	11,000 L/min or 183.33 L/sec (FUS)	
Population/Gross Area:	4 units x 1.8 = 7.2; Therefore, 8 persons	0.007 ha
Average Daily Demand:	0.03 L/sec	0.002 L/sec
Maximum Daily Demand:	0.08 L/sec	0.004 L/sec
Maximum Hourly Demand:	0.18 L/sec	0.007 L/sec

If you require any further information, please feel free to contact me.

Thank you,

Sean Leflar
Civil Engineering Technolgist
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
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s.leflar@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY


Boundary Condition for 296 Somerset East
SOMERSET ST E
RUSSELL AVE
CHAPEL ST
406mm
305mm
254mm
203mm
152mm
N
296
Legend
Pipe Ownership
Private
Public

296 SOMERSET STREET EAST - FIRE PROTECTION CALCULATION

Project:	296 SOMERSET STREET EAST
Project No.:	CP-18-0049
Designed By:	S.V.L
Checked By:	R.O.K
Date:	March 13, 2018

McINTOSH PERRY

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

***Water Supply for Fire-Fighting* - Store/Office & Warhouse Building**

Building is classified as Group : C,E up to 3 storeys (from table 3.2.2.55)
Building is of combustible construction with fire separations and fire resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.

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

(a) Q = K x V x 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 + [Sside1+Sside2+Sside3+...etc.]

K	**31**	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	**1,281**	(Total building volume in m^3.)
Stot	**2.0**	(From figure 1 pg A-32)
Q =	**79,447.79 L**	

→

From Figure 1 (A-32)

Snorth	11.56	m	0.0
Seast	3.05	m	0.5
Ssouth	9.48	m	0.0
Swest	1.5	m	0.5

*approximate distances

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

2700 L/min (if Q ≤ 108,000 L)
713 gpm

Table 1					
WATER SUPPLY COEFFICIENT - K					
TYPE OF CONSTRUCTION	Classification by Group or Division in Accordance with Table 3.1.2.1. of the Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

Table 3.2.2.55.
Maximum Building Area, Group D, up to 2 Storeys
Forming Part of Sentence 3.2.2.55.(1)

No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 000	1 250	1 500
2	800	1 000	1 200
Column 1	2	3	4

Table 2	
OBC Part 3 Buildings	Required Minimum Water Supply Flow Rate (L/min)
One-storey building with building area not exceeding 600 m^2	1800
All other buildings	2700 (if Q ≤ 108,000 L)(1) 3600 (if Q > 108,000 L and ≤ 135,000 L)(1) 4500 (if Q > 135,000 L and ≤ 162,000 L)(1) 5400 (if Q > 162,000 L and ≤ 190,000 L)(1) 6300 (if Q > 190,000 L and ≤ 270,000 L)(1) 9000 (if Q > 270,000 L)(1)

Note to Table 2:
(1) $Q = KVS_{To}$, as referenced in Paragraph 3(a)

296 SOMERSET STREET EAST - FUS FIRE CALCULATIONS

Project:	296 SOMERSET STREET EAST
Project No.:	CP-18-0049
Designed By:	S.V.L
Checked By:	R.P.K
Date:	March 13, 2018

McINTOSH PERRY

1. From the Fire Underwriters Survey (1999)

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

F = 220 x C x √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.

2. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor)	=	124.00	m²
Total Floor Area	**=**	**372.00**	**m²**

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

3. Calculate Required Fire Flow

F = 220 x C x √A

C = 1.50

A = 372.00

F = 220.00 X 1.50 X √ 372.00

F = 6,364.81 L/min.

4. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 3.00

5. Determine Increase or Decrease Based on Occupancy

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

Low Hazard - Primarily residential, one commercial unit on first floor.

No Change

F = 6,364.81 L/min.

6. 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
- The building will not be sprinklered.
- Therefore 6,364,81 L/min to remain unchanged.

F = 6,364.81 L/min.

7. Determine the Total Increase for Exposures

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

- Exposure distance to the existing buildings to the north & south of the proposed building is approximately 11.56m & 9.48m respectfully.
- Exposure distance to the existing buildings to the west & east of the proposed building is approximately 1.5m & 3.05m respectfully.
- Therefore the charge for exposure is 75% of the value obtained in Step 5.
- 6,364.81 L/min + (6,364.81 L/min x 75%)

F = 11,138.42 L/min.

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 11,000 L/min (2,906 GPM).

296 SOMERSET STREET EAST - Water Demands

McINTOSH PERRY

Project:	296 SOMERSET STREET EAST
Project No.:	CP-18-0049
Designed By:	S.V.L
Checked By:	R.P.K
Date:	March 13, 2018
Site Area:	0.037 gross ha
Population	**4 units x 1.8 = 7.2 persons; Therefore, 8 persons**
	1 Commercial Unit: 74.453 m^2 or 0.007 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
Other Commercial	**28,000**	**L/gross ha/d**
AVERAGE DAILY DEMAND	**0.035**	**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	**0.085**	**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	**0.185**	**L/s**

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

Peak Hourly

Current Time: 0.000 hours

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	55.95	11.10	71.75	106.50

Average Day

Current Time: 0.000 hours

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	55.95	2.10	84.53	115.50

Max Day + Fire Flow

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)
H-5	True	True	11,000.00	31,062.38	71.54	54.90
J-1	False	False	11,000.00	(N/A)	70.05	55.95
J-5	False	False	11,000.00	(N/A)	71.54	54.90

APPENDIX C:
SANITARY SEWER CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

March 12th, 2018.

Project Name: Proposed 3-storey multi-unit mixed commercial and residential development.

Re: Urban Sanitary Design Calculations.

1. BUILDING OCCUPANCY

The maximum number of bedroom units will be 4 units and one commercial unit (74 m^2) as per the floors plans from the Architect.

2. DAILY VOLUME IN LITRES

As per the extract of the City of Ottawa Sewer Design Guidelines, Appendix 4-A; Daily Sewage Flow for Dwellings;

- Each Average Dwelling unit
    - 350 Liters/Person/Day
- Commercial Unit
    - 50,000 Liters/Area/Day

3. PEAK FLOW (Q/P)

- $Q_{BED}(p) = F_{BED} \times P_{BED}$ Where:

  F_{BED} = 350 Litres/Person/Day (as per City of Ottawa Sewer Design Guidelines)

  P_{BED} = 4 Units (as per the preliminary floor plans)

- Therefore, $Q_{BED}(p) = (350) \times (4 \times 1.8) =$ <u>2,520 L/Day (0.029 L/sec)</u>
- $Q_{com}(p) = F_{com} \times A_{com}$ Where:

  F_{com} = 50,000 L/ha/day (as per City of Ottawa Sewer Design Guidelines)

  A_{com} = 0.0074 ha (as per the preliminary floor plan)

- Therefore, $Q_{com}(p) = (50,000) \times (0.0074) =$ <u>370 L/Day (0.0043 L/sec)</u>
- $Q_{TOTAL}(p) = Q_{BED} + Q_{com}$ Where:

  Q_{BED} = 2,520 L/Day

  Q_{com} = 370 L/Day

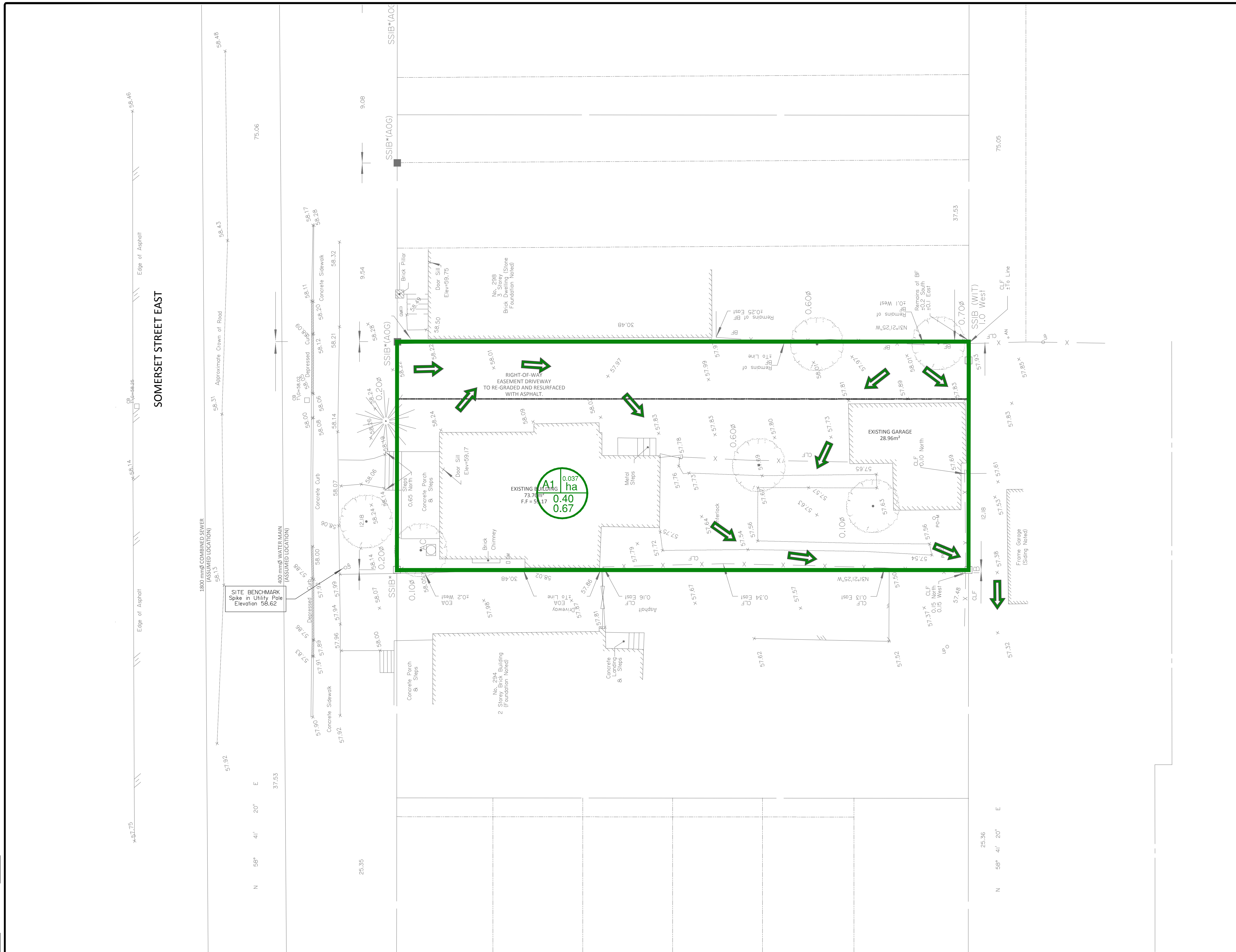
- Therefore, $Q_{TOTAL}(p) = (2,520) + (370) =$ **<u>2,890 L/Day (0.033 L/sec)</u>**

It is anticipated that there will be no issues with capacity constraints within the existing combined sewer as the amount of flow leaving the site is negligible. Therefore, the existing 1,800 mm diameter combined sewer within Somerset Street East has the capacity to accommodate the new flows.

H:\01 PROJECT - PROPOSALS\2018 JOBS\CP\0CP-18-0049 TCU_SPC MIXED USE BUILDING_296 SOMERSET STREET\03 - SERVICING\SANITARY\CP-18-0049 SANITARY FLOW CALCS.DOCX

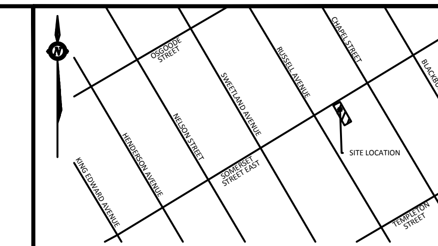
APPENDIX D:
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY

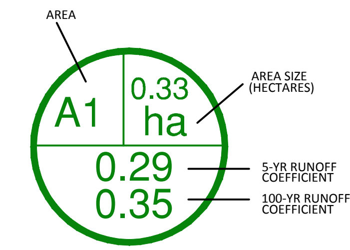


SOMERSET STREET EAST
SITE BENCHMARK
Spike in Utility Pole
Elevation 58.62
1800 mmØ COMBINED SEWER
(ASSUMED LOCATION)
400 mmØ WATER MAIN
(ASSUMED LOCATION)
RIGHT-OF-WAY
EASEMENT DRIVEWAY
TO RE-GRADED AND RESURFACED
WITH ASPHALT.
EXISTING BUILDING
73.70m²
EXISTING GARAGE
28.96m²
A1
0.037
ha
0.40
0.67
Concrete Sidewalk
Concrete Curb
Edge of Asphalt
Approximate Crown of Road
Concrete Porch & Steps
Metal Steps
Brick Chimney
Frame Garage (Siding Noted)
No. 294
2 Storey Brick Building (Foundation Noted)
No. 298
3 Storey Brick Dwelling (Stone Foundation Noted)
Concrete Landing & Steps

LOCATION PLAN



LEGEND



No.	Revision/Issue	Date
01	ISSUED FOR REVIEW	MAR 16, 2018

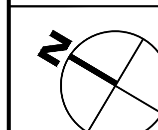
SCALE 1 : 200

0 10 20 Metres

Check and verify all dimensions before proceeding with the work

Do not scale drawings

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



Stamp:

Client:

TC UNITED GROUP

800 INDUSTRIAL AVENUE, UNIT 9, OTTAWA, ON K1G 4B8

Project:

926 SOMERSET STREET EAST

PROPOSED MIXED USE MULTI-UNIT RESIDENTIAL BUILDING.

OTTAWA ONTARIO

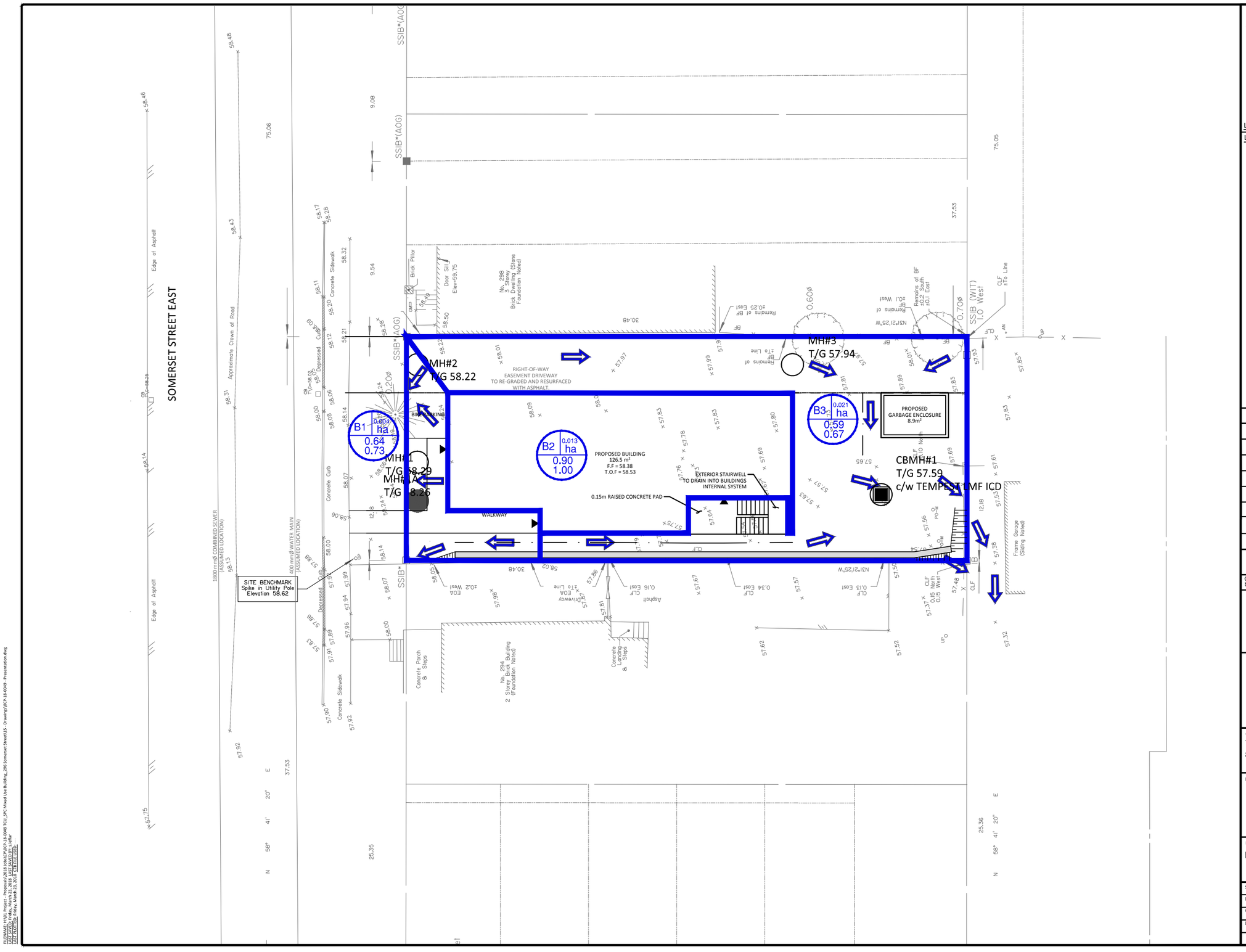
Drawing Title:

PRE-DEVELOPMENT DRAINAGE AREA

Scale:	1:200	Project Number:	CP-18-0049
Drawn by:	S.V.L		
Checked By:	R.P.K	Drawing Number:	
Designed By:	S.V.L	SHEET 1of 2	PRE
	FEB 08/18		

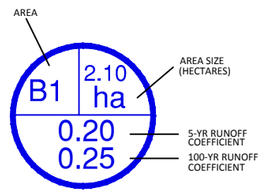
APPENDIX E:
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



LOCATION PLAN

LEGEND



No.	Revision/Issue	Date
01	ISSUED FOR REVIEW	MAR 23, 2018

SCALE 1 : 200

0 10 20 Metres

Check and verify all dimensions before proceeding with the work

Do not scale drawings

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Stamp:

Client:
TC UNITED GROUP
800 INDUSTRIAL AVENUE, UNIT 9, OTTAWA, ON K1G 4B8

Project:
926 SOMERSET STREET EAST
PROPOSED MIXED USE MULTI-UNIT RESIDENTIAL BUILDING.
OTTAWA ONTARIO

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA

Scale:	1:200
Drawn by:	S.V.L
Checked By:	R.P.K
Designed By:	S.V.L
	FEB 08/18

Project Number: CP-18-0049

Drawing Number: SHEET 2of 2 POST

FILENAME: H:\01 Project - Proposals\2018 Jobs\CP\PCP-18-0049 TCU_JLPC Mixed Use Building_296 Somerset Street\15 - Drawing\SCP-18-0049 - Presentation.dwg
LAST SAVED: Hafez, March 23, 2018 (LAST SAVED BY: Hafez)
LAST PLOTTED: Friday, March 23, 2018 (LAST PLOTTED BY: Hafez)

APPENDIX F:
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

AVERAGE PRE-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area A1	EXISTING SITE - NON-DEVELOPMENT AREA				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
GRAVEL	0.60	0.75	93.7	56.2	70.3
BUILDING	0.90	1.00	102.7	92.4	102.7
CONCRETE	0.90	1.00	40.6	36.6	40.6
GRASS	0.20	0.25	134.2	26.8	33.6
Avg C	**0.57**	**0.67**			

AVERAGE POST-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area B1	UNRESTRICTED FLOWS TOWARDS SOMERSET STREET EAST				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
ASPHALT	0.90	1.00	5.0	4.5	5.0
INTERLOCK	0.90	1.00	18.9	17.0	18.9
GRASS	0.20	0.25	13.8	2.8	3.4
Avg C	**0.64**	**0.73**			

Area B2	PROPOSED BUILDING				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
BUILDING	0.90	1.00	126.2	113.5	126.2
Avg C	**0.90**	**1.00**			

Area B3	RESTRICTED FLOWS				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
ASPHALT	0.90	1.00	89.9	80.9	89.9
CONCRETE	0.90	1.00	17.4	15.7	17.4
GARBAGE	0.90	1.00	8.9	8.0	8.9
GRASS	0.20	0.25	91.2	18.2	22.8
Avg C	**0.59**	**0.67**			

Time of concentration (min.)	5-Year (mm/hr)	100-Year (mm/hr)	
10.00	104.2	178.6	PRE-DEVELOPMENT
10.00	104.2	178.6	POST-DEVELOPMENT

PRE-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (L/s)	100-Year Flow Rate (L/s)
A1	0.037	0.40	0.67	4.30	12.35
Total	**0.037**			**4.30**	**12.35**

POST-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (L/s)	100-Year Flow Rate (L/s)
B1	0.004	0.64	0.73	0.70	1.36
B2	0.013	0.90	1.00	3.29	6.26
B3	0.021	0.59	0.67	3.54	6.90
Total	**0.037**			**7.53**	**14.52**

REQUIRED RESTRICTED FLOW

Area	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (L/s)	100-Year Flow Rate (L/s)
A1	0.037	0.4	0.7	4.30	12.35

ACTUAL STORM WATER RUNOFF FROM SITE (L/s)

Area	Post-Development Unrestricted (L/s)		Post-Development (Restricted) (L/s)		
	5-yr	100-yr	5-yr	100-yr	
B1	0.70	1.36	0.70	1.36	*UNRESTRICTED*
B2	3.29	6.26	0.30	0.54	*RESTRICTED*
B3	3.54	6.90	2.40	2.40	*RESTRICTED*
Total	**7.53**	**14.52**	**3.40**	**4.30**	

STORAGE REQUIRMENTS FOR AREA B2

5-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (L/s) B2	Allowable Outflow (L/s)	Runoff To Be Stored (L/s)	Storage Required (m^3)
80	26.6	0.84	0.30	0.54	2.6
90	24.3	0.77	0.30	0.47	2.5
100	22.4	0.71	0.30	0.41	2.4
110	20.8	0.66	0.30	0.36	2.4
120	19.5	0.62	0.30	0.32	2.3

Maximum Storage Required (m^3) =	2.6

100-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (L/s) B2	Allowable Outflow (L/s)	Runoff To Be Stored (L/s)	Storage Required (m^3)
10	178.6	6.26	0.54	5.72	3.4
20	120.0	4.21	0.54	3.67	4.4
30	91.9	3.22	0.54	2.68	4.8
40	75.1	2.63	0.54	2.09	5.0
50	64.0	2.24	0.54	1.70	5.1
60	55.9	1.96	0.54	1.42	5.1
70	49.8	1.75	0.54	1.21	5.1
80	45.0	1.58	0.54	1.04	5.0
90	41.1	1.44	0.54	0.90	4.9
100	37.9	1.33	0.54	0.79	4.7

Maximum Storage Required (m^3) =	5.1

STORAGE OCCUPIED IN AREA B2

5-YEAR STORM EVENT

Other Storage Areas on Site		Water Elev. (m) =			
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
ROOFTOP			124.00	0.025	3.1
				Total	3.1

Storage Available (m^3) =	3.1
Storage Required (m^3) =	2.6

100-YEAR STORM EVENT

Other Storage Areas on Site		Water Elev. (m) =			
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
ROOFTOP			124.00	0.045	5.6
				Total	5.6

Storage Available (m^3) =	5.6
Storage Required (m^3) =	5.1

STORAGE REQUIRMENTS FOR AREA B3

5-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (L/s) B2	Runoff (L/s) B3	Allowable Outflow (L/s)	Runoff To Be Stored (L/s)	Storage Required (m^3)
10	104.2	0.30	3.54	2.40	1.4	0.9
20	70.3	0.30	2.39	2.40	0.3	0.3
30	53.9	0.30	1.83	2.40	-0.3	-0.5
40	44.2	0.30	1.50	2.40	-0.6	-1.4
50	37.7	0.30	1.28	2.40	-0.8	-2.5

Maximum Storage Required (m^3) =	0.9

100-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (L/s) B2	Runoff (L/s) B3	Allowable Outflow (L/s)	Runoff To Be Stored (L/s)	Storage Required (m^3)
10	178.6	0.54	6.90	2.40	5.0	3.0
20	120.0	0.54	4.64	2.40	2.8	3.3
30	91.9	0.54	3.55	2.40	1.7	3.0
40	75.1	0.54	2.90	2.40	1.0	2.5
50	64.0	0.54	2.47	2.40	0.6	1.8
60	55.9	0.54	2.16	2.40	0.3	1.1
70	49.8	0.54	1.92	2.40	0.1	0.3
80	45.0	0.54	1.74	2.40	-0.1	-0.6
90	41.1	0.54	1.59	2.40	-0.3	-1.5
100	37.9	0.54	1.46	2.40	-0.4	-2.4

Maximum Storage Required (m^3) =	3.3

STORAGE OCCUPIED IN AREA B3

5-YEAR STORM EVENT

Other Storage Areas on Site		Water Elev. (m) =		56.51	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
CBMH#1	57.59	55.59	1.13	0.80	0.9
				Total	0.9

Storage Available (m^3) =	0.9
Storage Required (m^3) =	0.9

100-YEAR STORM EVENT

Other Storage Areas on Site		Water Elev. (m) =		57.75	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
INSIDE CBMH#1	57.59	55.59	1.13	1.88	2.1
				Total	2.1

Storage Available (m^3) =	2.1

Other Storage Areas on Site		Water Elev. (m) =		57.75	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
ABOVE CBMH#1	57.59	55.59	30.18	0.16	1.7
				Total	1.7

Storage Available (m^3) =	1.7

Storage Available (m^3) =	3.8
Storage Required (m^3) =	3.3

ROOF DRAIN FLOW FOR FLAT ROOF (B3)

Flow Rate Vs. Build-Up (One Weir)	
Metric	
Depth (mm)	Flow (L/s)
15	0.18
20	0.24
25	0.30
30	0.36
35	0.42
40	0.48
45	0.54
50	0.60
55	0.66

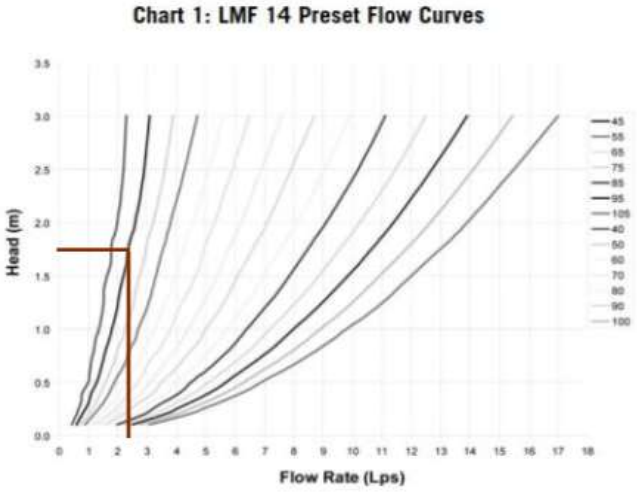
*Roof Drain model to be Accutrol Weirs, See attached sheets
*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

	Roof Drain Flow		
	Flow (l/s)	Storage Depth (mm)	2 Roof Drains Flow (l/s)
	0.18	15	0.36
	0.24	20	0.48
5-YR	**0.30**	**25**	**0.60**
	0.36	30	0.72
	0.42	35	0.84
	0.48	40	0.96
100-YR	**0.54**	**45**	**1.08**
	0.60	50	1.20
	0.66	55	1.32
	0.72	60	1.44
	0.78	65	1.56
	0.84	70	1.68
	0.90	75	1.80
	0.96	80	1.92
	1.02	85	2.04
	1.08	90	2.16
	1.14	95	2.28
	1.20	100	2.40
	1.26	105	2.52
	1.32	110	2.64
	1.38	115	2.76
	1.44	120	2.88
	1.50	125	3.00
	1.56	130	3.12
	1.62	135	3.24
	1.68	140	3.36
	1.74	145	3.48
	1.80	150	3.60

Note: The flow leaving through a restricted roof drain is based on flow vs. head information

TEMPEST LMF SIZING



STORM SEWER DESIGN SHEET

PROJECT: 296 Somerset Street East
LOCATION: Ottawa
CLIENT: TC United Group
PAGE: 6 of 6

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)							RATIONAL DESIGN FLOW											SEWER DATA								
1	2	3	4	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	32
STREET	AREA ID	FROM MH	TO MH	C-VALUE		AREA			INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
																								DIA	W	H			(L/s)	(%)
	B2	ROOF	B3	0.90		0.01			0.01	0.01	10.00			104.19	122.14	178.56	3.29				3.29									
														NOTE: ROOF FLOW DISCHARGED TO GROUND, 5-YEAR FLOW = 0.30 L/s													
	B3	CBMH#1	MH#3	0.59		0.02			0.01	0.01	10.00	0.20	10.20	104.19	122.14	178.56	3.54			0.30	3.84	36.17	8.56	250			0.34	0.714	32.33	89.37%
																	NOTE: IPEX TEMPEST LMF FLOW = 1.60 L/s													
		MH#3	MH#2							0.00	10.00	0.48	10.48	104.19	122.14	178.56	3.84			1.60	1.60	36.17	20.40	250			0.34	0.714	34.57	95.58%
		MH#2	MH#1							0.00	10.00	0.12	10.12	104.19	122.14	178.56	3.84				1.60	36.17	5.30	250			0.34	0.714	34.57	95.58%
		MH#1	EX.MAIN							0.00	10.00	0.25	10.25	104.19	122.14	178.56	3.84				1.60	36.17	10.85	250			0.34	0.714	34.57	95.58%

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

Notes:
1. Mannings coefficient (n) = 0.013

Designed: S.V.L
Checked: R.P.K
Project No.: CP-18-0049

No.	Revision	Date
1.	ISSUED FOR REVIEW	2018.03.16

Date: 2018-03-13
Sheet No: 5 of 5