Robinson
Land Development

3823 County Road 6, Elizabethtown-Kitley ON Site Plan Residential Development Conceptual Servicing and Stormwater Management Report

Prepared For:

Campus Habitations

Prepared By:

Robinson Land Development

Project No. 23075
December 2023

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LEGAL NOTIFICATION

This report was prepared by Robinson Land Development for the account of **Campus Habitations**

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **Robinson Land Development** accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project

1.0 INTRODUCTION

Robinson Land Development has been retained by Campus Habitations to prepare a conceptual servicing and stormwater management design for a proposed residential development located at 3823 County Road 6 in Elizabethtown-Kitley, Ontario. The subject site is proposed to be developed into fourteen (14) three-storey buildings (along with a basement level) and one commercial/retail block along with the associated access roads, parking, sidewalks, parks and paths (specific amenities to be determined) all to support a Site Plan Application process.

The site frontage and access is along County Road 6. The property surrounding the site has a single ownership with a municipal address of 3815 County Road 6. Refer to topographic survey and property index map provided in **Appendix A** for reference.

This report will provide the conceptual servicing of water, sanitary, and stormwater.

This conceptual report assumes that a trunk sanitary sewer and watermain from the City of Brockville will be provided to service the site.

Discussions with the Township of Elizabethtown-Kitley and the City of Brockville indicate that a watermain and sanitary main will be extended to the site as part of a separate project. A conceptual servicing plan was prepared for these discussions and presented in **Appendix A** for reference. For the sanitary service this will involve approximately 1.8 km of gravity sewer, a pump station, and 0.5 km of forcemain (Scenario 1 is currently the preferred option). For the water service this will involve at minimum 2.0 km of watermain (more if looping is required).

2.0 EXISTING CONDITIONS

The property was the former Elizabethtown-Kitley Fair Grounds which at the time had a rich history of providing recreational and farm-related activities. Over the years, the site has slowly been used less and less as the site would suggest. Because of this, the municipality has decided to re-develop the property to allow for better use.

The 12 ha site is currently zoned Open Space and includes a significant woodland to the north, a track, three corrals, two shed buildings, and a central “canteen” which is privately serviced with a well and indications of a septic system. The existing structures and track will be demolished as part of this development apart from the existing woodlands and the “canteen” that will be retained for posterity. North of the property is an existing forest that has been designated as ‘Significant Woodlands’ within the current OP and will remain untouched. East and south of the property are open fields and single family residential properties that are designated ‘Rural’ and west is County Road 6 and a solar farm beyond.

Currently stormwater runoff sheet drains generally from the southwest corner of the property to the northeast corner where it eventually enters Butlers Creek tributary stream. The areas to the north and east of the property are PSW and wetlands per the Elizabethtown-Kitley Official Plan, therefore drainage routes beyond the property (whether natural or artificial) are ill-defined.

There are no municipal services within the County Road 6 road allowance adjacent to the site.

Public utilities are provided at or adjacent to the site including Hydro One and Bell. Hydro One and Bell are found attached to hydro poles on the west side of County Road 6 that extend from the intersection of County Road 6 and Centennial Road to the site. This is a single feed with the pole line terminating at the entrance to the site. Gas is not available in close proximity to

the site. The existing local residential homes have propane cylinders adjacent to their homes for gas supply.

It is understood that the property falls within an area of Significant Groundwater Recharge and will therefore abide by the Cataraqui Conservation Authority's Source Protection Plan.

3.0 DEVELOPMENT PROPOSAL

The Owner has developed a concept where they are proposing to build a modular 3 story above ground and 1 below housing block with multiple suites that can be duplicated as needed for the site. For this site, 2 and 3 block buildings are proposed and are sited in a configuration that allows for open space vistas in the rear and still provide open and landscaped areas in the remainder of the site. There will be a total of 12 - 3 block buildings (24 apartment units, 48 bedrooms), 2 – 2 block buildings (16 apartment units, 32 bedrooms) and a commercial/retail building with at-grade parking for each building. The site will also be provided with internal access roads, sidewalks and a centralized park with amenity space (specific amenities to be determined).

The two-block buildings have a footprint of approximately 400 m^2 and the three-block buildings have a footprint of approximately 600 m^2. The site will have a single access off County Road 6, and the future commercial building will have its own access off County Road 6 and connect with the rest of the site. Refer to the Site Plan in **Appendix A** for more details.

Site access will be from County Road 6 where a 6.0m in and 6.0m out lanes with a median will be provided. The interior of the site provides for a looped 7.5m wide asphalt main road that intersects with a round-a-bout which will allow vehicle traffic to navigation in either direction on the loop. This main entrance with the round-a-bout will allow a bus route to navigate into and out of the site with ease. The entrance has also been developed to allow for two-way traffic in either leg in the event of an emergency and one of the legs closed. Parking and fire vehicle access has been provided for each housing block from the main road.

Pedestrian movement will be via 2.0m wide sidewalks throughout the site. The main objective of the sidewalks is to move pedestrians from the blocks to the central parks and green spaces without having to negotiate the roads.

The proposed development will connect to the sanitary sewer and watermain being provided on County Road 6. Storm runoff is proposed to be discharged (after being controlled for quantity and quality) to the existing County Road 6 ROW ditch at the north-west corner of the site, where it will continue to flow north and eventually disperse and flow overland through the wetland area to the eventual Butlers Creek. The conceptual civil design drawings are provided in **Appendix B.**

In accordance with the Cataraqui Source Protection Plan, Section 5.5.1 the proposed development does not include any land use considered a threat to groundwater drinking water.

4.0 CONCEPTUAL WATER SERVICING

The site will connect to the watermain on County Road 6 previously provided by extending the servicing from the City of Brockville as discussed above. The watermain within the site will consist of a 250 mm loop with leads to the hydrants and buildings off the loop. Refer to the conceptual watermain plan in **Appendix B** for reference.

The conceptual watermain system has been designed according to the following standards and guidelines:

- Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020)
- City of Brockville Site Plan Control Manual (2018)
- MECP Design Guidelines for Drinking-Water Systems (2008)

Accordingly, the following watermain design criteria have been utilized for the subject site:

- Residential Demand: 450 L/cap/d
- Residential Density: 2.5 cap/unit
- Residential Peaking Factor: MECP Table 3-3
- Retail Flow: 50 cap/ha
- Commercial Peaking Factor: 1.5 Max Day; 1.8 Peak Hour
- Minimum Pressure During Peak Hour 276 kPa (40 psi)
- Minimum Pressure During Maximum Day Plus Fire 140 kPa (20 psi)
- Maximum Pressure in Unoccupied Areas 689 kPa (100 psi)
- Maximum Pressure in Occupied Areas 552 kPa (80 psi)

4.1 Proposed Demand

Based on the above criteria the total domestic water demand is 4.27, 15.15, and 22.77 L/s for the average, max. day, and peak hour condition, respectively. The maximum fire demand for the buildings is estimated at 8,000 L/min (133.3 L/s). It is currently understood the buildings are wood frame and will not be sprinklered, however the individual blocks in each two- and three-block buildings will include vertical fire walls to maintain a manageable fire flow. Refer to **Appendix C** for proposed domestic and fire demand calculations.

4.2 Fire Protection

The site will be complete with hydrants to supply water to the pumper trucks. Hydrants are placed at a minimum 90 m spacing.

4.3 Hydraulic Model

An EPANET hydraulic model was setup for the internal site to determine maximum headloss expected within the site, to be used in further discussions with the City to validate the servicing and required pressure at the connection on County Road 6. The model was run for the average day, peak hour, and max day + fire (at the two worst case scenarios: highest and furthest demands at Building F and Building B) conditions. The boundary condition was assumed at 42 m head (60 psi) in order to calculate system losses. The results are summarized in **Table 1** below with the detailed model output provided in **Appendix C**.

Table 1 – Hydraulic Model Results

Criteria	Total Domestic Demand (L/s)	Fire Demand (L/min)	Max. Pressure Loss
Avg. Day	4.27	-	0.01 m (0.01 psi)
Peak Hour	22.77	-	0.18 m (0.3 psi) @ Bldg C & D
Max Day + Fire (Bldg F)	15.15	8,000	6.8 m (9.7 psi) @ Hyd 6
Max Day + Fire (Bldg B)	15.15	8,000	18.8 m (26.7 psi) @ Hyd 5

As indicated in **Table 1** above, if water service can be brought to the property at minimum 350 kPa (50 psi) during domestic and fire demands then the site is serviceable as presented.

Based on current understanding of the Brockville water distribution system, the site would be part of Pressure Zone II which has a hydraulic grade line of 158 m at the Parkdale reservoir

and pumping station. Accordingly, there should be sufficient pressure to supply the required demand to the site. Further discussions will be required with the City of Brockville to validate the assumptions and confirm capacity.

5.0 CONCEPTUAL SANITARY SERVICING

5.1 Design Criteria

Sanitary flows from the site will discharge to the sanitary sewer on County Road 6 previously provided by extending the servicing to the site from the City of Brockville as discussed above. The sanitary sewer design follows the following standards and guidelines:

- City of Brockville Site Plan Control Manual (2018)
- MECP Design Guidelines for Sewage Works (2008)

Accordingly, the following design parameters have been implemented for the subject site:

- Residential Demand: 450 L/cap/d
- Residential Density: 2.5 cap/unit
- Retail Flow: 50 cap/ha
- Peaking Factor: 2.5
- Infiltration Allowance: 0.28 L/s/ha
- Velocity Range: 0.60-3.0 m/s

5.2 Proposed Design

Based on the above criteria the peak sanitary demand was calculated to be 14.14 L/s. The conceptual sanitary sewer system includes 200mm sewers at 0.4% slope, with building services being 150mm at 1% slope. For the purposes of this design it has been assumed the site will connect to a sanitary system on County Road 6 at an invert of 102.00 m. A monitoring maintenance hole is proposed at the site entrance near the property line prior to discharge to the proposed County Road 6 sewer. Refer to the conceptual sanitary plan in **Appendix B** and the sanitary sewer design sheet in **Appendix D** for more details.

Further discussions will be required with the City of Brockville to confirm the demand can be serviced downstream.

6.0 CONCEPTUAL STORM SERVICING

6.1 Design Criteria

The majority of the stormwater runoff collected on the site will be discharged to the existing ditch along County Road 6 ROW at the north-west corner of the property. From there the flow will travel naturally overland through the wetlands to the existing Butlers Creek northeast of the site. The current roadside ditch, however, is undefined and under this concept, a defined ditch will be constructed to contain the runoff from the site to the eventual outlet. The boundaries of the site (rear yards of the buildings) will be captured by a ditch system that will control and discharge to natural outlet at the north corner of the site.

The storm sewer design follows the following standards and guidelines:

- MECP Stormwater Management Planning and Design Manual (2003)
- City of Brockville Site Plan Control Manual (2018)
- Preconsultation notes from Cataraqui Conservation Authority dated August 8, 2023 regarding this development (provided in **Appendix E** for reference)

Accordingly, the following design parameters have been implemented for the subject site:

- Quantity Control: Post-development to 2-yr pre-development

- Quality Control: Enhanced (80% TSS reduction)
- Storm Curve: Brockville Site Plan Control Manual, App K
- Time of Concentration: 15 minutes (min.)
- Velocity Range: 0.80-3.0 m/s

The 2-yr pre-development flow rate was calculated for the development area (property up to the north bush area) using the Uplands method for Time of Concentration for the overall flow path of the south corner to the north corner. For the controlled drainage areas the required storage to achieve 100-yr post-development to 2-yr pre-development quantity control was calculated, summing both the main site that flows to the storm pond and the rear yards captured by the ditch. Refer to **Appendix B** for the pre-development storm area drainage plan and **Appendix D** for details of the calculations. The summary of the calculations are as follows:

- 2-yr Pre-Development Flow Rate: **170 L/s**
- 100-yr Post- to 2-yr Pre-Development Storage: **2,630 m^3**

6.2 Minor System

Stormwater runoff from the site will be captured within a gravity storm sewer system and directed to a dry stormwater pond at the north-west corner of the property. The sizing of the sewers are such that no ponding will occur during the 2-yr design storm. Catch basins will be outfitted with inlet control devices to control local discharge (though still allowing unrestricted flow during the 2-yr design storm). The pond outlet and rear yard ditch outlet will each be configured with an orifice plate to control discharge below the allowable rate. Refer to the conceptual storm sewer plan in **Appendix B** and the storm sewer design sheet in **Appendix E** for details.

6.3 Major System / Quantity Control

The major stormwater system involves local ponding within the parking lots and roadways, with cascading overflows down to the dry pond system. Catch basins outfitted with inlet control devices will control the local flows and ponding in each individual drainage areas. The pond outlet and rear yard ditch outlet will each be configured with an orifice plate to control discharge below the allowable rate. Up to the 100-yr design storm all controlled runoff will be contained within the site. The ponding within the site (not including the pond) will be limited to 300 mm and the local overflows will be minimum 300 mm below the nearby building entrances.

Based on the conceptual post-development storm area drainage plan the maximum storage required during the 100-yr design storm is approximately 2,630 m^3 as noted above (2,400 m^3 in the pond side and 240 m^3 in the rear yard ditch side). The pond provides approximately 2,440 m^3 of storage. The additional storage will be provided within the parking lots and roadways across the site as well as the rear yard ditch. Refer to the storm storage calculations in **Appendix E** for details.

The pond will have an emergency overflow for beyond the 100-yr design storm to directed excessive flows north directly to the bush area where the flow will follow the natural drainage path through the bush area to the north corner of the site. Likewise the rear yard ditch will also have an emergency overflow for beyond the 100-yr design storm to direct excessive flows to the natural drainage path.

6.4 Quality Control

Quality control will be provided by oil-grit separators downstream of the controlled outlets and prior to discharge to the ROW ditch. This will provide the 80% TSS reduction targeted,

however additional settlement of solids will occur within the pond and ditch which provides greater efficiency and backup to the OGS.

6.5 Alternate Discharge Options

Based on the proposed discharge location to existing roadside ditch (approximate elevation 103.59 m) the site will require considerable fill to ensure gravity flow in the sewers and maintain minimum cover. Further discussions should be considered for off-site stormwater discharge including a storm sewer along County Road 6 to a suitable discharge location, especially considering water and sanitary services are already being proposed to be brought to the site along County Road 6. A stormwater lift station may also be considered as another option to reduce the required fill.

7.0 EROSION AND SEDIMENT CONTROL

Prior to construction erosion and sediment control measures must be implemented to mitigate the impact on receiving storm sewers. The following erosion and sediment control (ESC) measures have been proposed for the subject site:

- Limiting the extent of exposed soils at any given time.
- Erosion and sediment control measures shall be maintained until building structure has been completed.
- Installation of silt sacks between frame and cover on all nearby proposed catch basins and open cover storm manholes until construction is completed.
- Silt fence to be installed and maintained along the property boundaries.
- During active construction periods, visual inspections shall be undertaken on a weekly basis and after major storm events (>25mm of rain in 24 hour period) on ESC and any damage repaired immediately.
- ESC shall also be assessed (and repaired as required) following significant snowmelt events.
- Visual inspections shall also be undertaken in anticipation of large storm events (or a series of rainfall and/or snowmelt days) that could potentially yield significant runoff volumes.
- Care shall be taken to prevent damage to ESC during construction operations.
- In some cases, barriers may be removed temporarily to accommodate construction operations. The affected barriers shall be reinstated immediately after construction operations are completed.
- ESC should be adjusted during construction to adapt to site features as the site becomes developed.
- ESC shall be cleaned of accumulated sedimentation as required and replaced as necessary.
- During the course of construction, if the Engineer believes that additional prevention methods are required to control erosion and sedimentation, the Contractor shall implement additional measures, as required, to the satisfaction of the Engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

Refer to the Erosion and Sediment Control Plan provided in **Appendix B** for more details.

8.0 CONCLUSIONS

This conceptual servicing and stormwater management report has been prepared to support the Site Plan Application for the development of the property located at 3823 County Road 6

in Elizabethtown-Kitley. The report has detailed the proposed means of internally servicing the site for potable water, sanitary sewer, and storm sewer. Further discussions will be required regarding the sanitary and water servicing of the site from the City of Brockville. The proposed servicing and stormwater management designs will be achieved by implementing the following key features:

- The proposed development includes fourteen (14) three-storey residential buildings and a future freestanding commercial building, all with at-grade parking.
- Water supply will be provided internally by a new 250 mm diameter watermain loop for domestic and fire demands. Maximum pressure loss within the site is estimated at 1.9 m (2.7 psi) during domestic demand and 13.3 m (18.9 psi) during max day + fire demand.
- Sanitary flows will be conveyed in an internal 200 mm sewer network discharging to County Road 6 at an assumed invert of 102.00m. Peak sanitary demand is estimated at 14.14 L/s.
- Majority of the stormwater runoff will be conveyed to the existing County Road 6 ROW ditch at the north-west corner of the site, where the natural drainage path continues through the undeveloped bush area to the north corner and the existing drainage path.
- A rear yard ditch will collect the stormwater runoff behind the outer-most buildings of the site and discharge to the existing drainage path at the north corner of the site.
- Stormwater runoff will be controlled up to the 100-yr design storm through a dry pond and local ponding within the roadways, parking lots, and rear yard ditch. The roadway and parking lot ponding will have cascading overflows that are directed to the pond.
- Stormwater runoff will be provided with quality control via oil grit separators downstream of the controlled outlets and prior to discharge.
- Erosion and sediment control measures will be implemented prior to construction and maintained until vegetation has been re-established in disturbed areas.

Report Prepared By:

Stephen McCaughey, P.Eng.
Project Engineer

Appendix A

PLAN SHOWING TOPOGRAPHIC INFORMATION

PART OF LOT 6, CONCESSION 3

Geographic Township of Elizabethtown

TOWNSHIP OF ELIZABETHTOWN-KITLEY

COUNTY of LEEDS

SCALE=1:500

10metres 0 10 20 30 40 50metres

HOPKINS CHITTY LAND SURVEYORS INC.

-2023-

THE INTENDED PLOT SIZE OF THIS PLAN IS 1219MM IN HEIGHT BY 762MM IN WIDTH WHEN PLOTTED AT A SCALE OF 1:500

NOTES:

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 18, NAD83 (CSRS) (2010)

FOR BEARING COMPARISONS, A ROTATION OF 7°31'55" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON (P1).

FOR BEARING COMPARISONS, A ROTATION OF 1°02'15" CLOCKWISE WAS APPLIED TO BEARINGS ON (P2).

FOR BEARING COMPARISONS, A ROTATION OF 0°26'45" CLOCKWISE WAS APPLIED TO BEARINGS ON (P3).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996263.

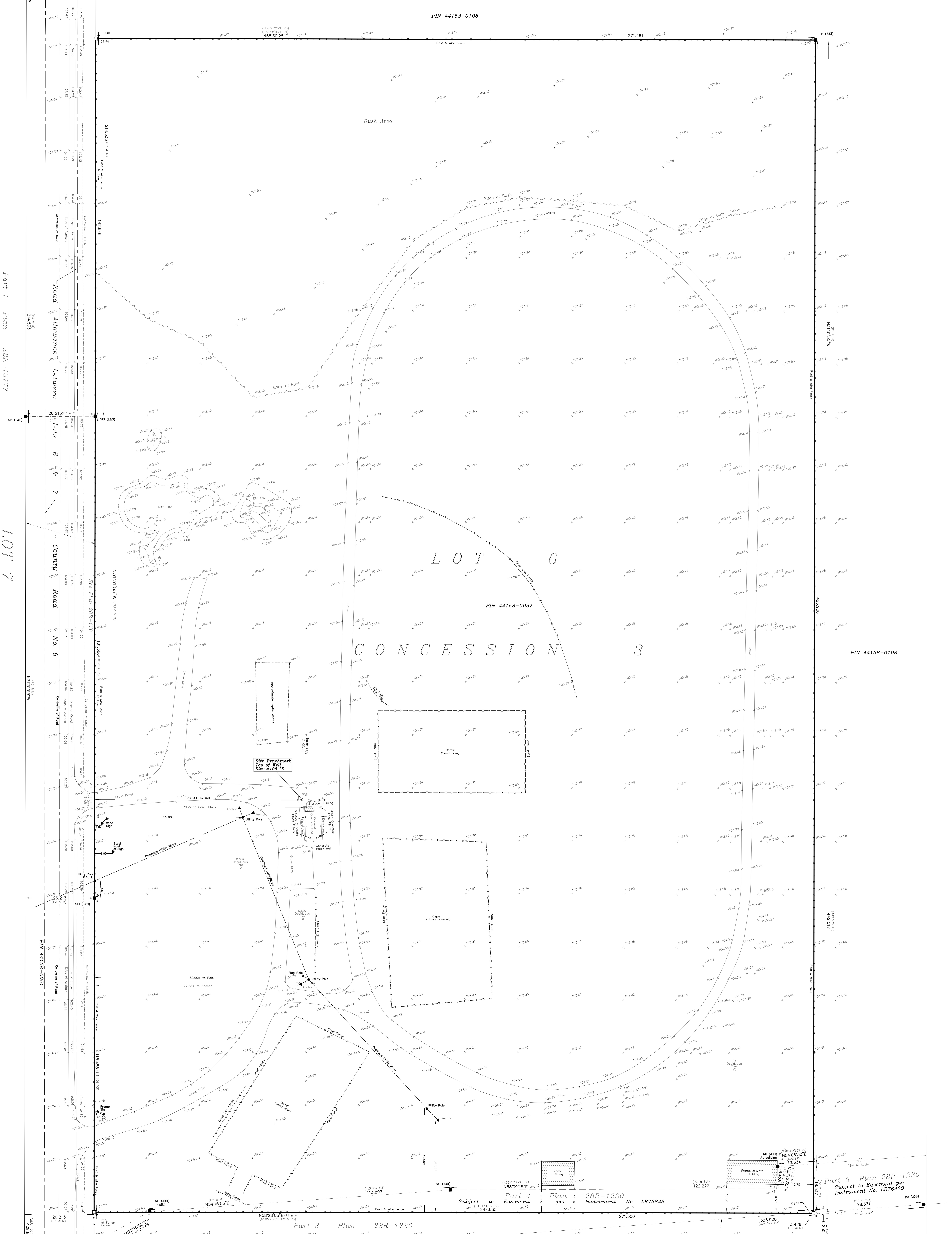
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

THIS PLAN IS NOT INTENDED TO BE USED FOR ESCAVATION PURPOSES. CONTRACTORS REQUIRE SITE SPECIFIC LOCATES PRIOR TO ANY EXCAVATION.

Site Area = 12.01 ha (29.69 acres)

This Plan was Prepared for

Campus Habitations Ontario Ltee.
and the Undersigned Accepts no Responsibility for use by Other Parties.



ELEVATION NOTE:

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE HT2_0 GEOID MODEL BEING A PRODUCT OF THE GEODETIC SURVEY DIVISION (GSD) OF NATURAL RESOURCES CANADA, DERIVED FROM RTN OBSERVATIONS. THE ELEVATIONS ARE REFERRED TO A SITE BENCHMARK BEING THE TOP OF WELL TO THE NORTHWEST OF THE COVERED CONCRETE PAD HAVING AN ELEVATION OF 105.16.

LEGEND:

SSIB'S PLANTED DUE TO INSUFFICIENT OVERBURDEN

☐	denotes	Planted Survey Monument
■	"	Found Survey Monument
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
RB	"	Rock Bar
RPL	"	Rock Plug
(M)	"	Measured
(JDB)	"	J.D. Barnes Ltd.-O.L.S.
(783)	"	K.M. Wiseman-O.L.S.
(L&G)	"	Leeds & Grenville
(P1)	"	Plan by (783) dated November 22, 1965
(P2)	"	Reference Plan 28R-1230
(P3)	"	Reference Plan 28R-176

SURVEYOR'S CERTIFICATE:

I CERTIFY THAT:

1. This Survey and Plan are correct and in accordance with the SURVEYS ACT, the SURVEYORS ACT and the REGULATIONS made under them.

2. The FIELDWORK was completed on the 11th day of October, 2023.

HOPKINS CHITTY LAND SURVEYORS INC.

DATE: OCTOBER 18, 2023

[illegible]

PHIL R. DEJONG - O.L.S.

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-61725.

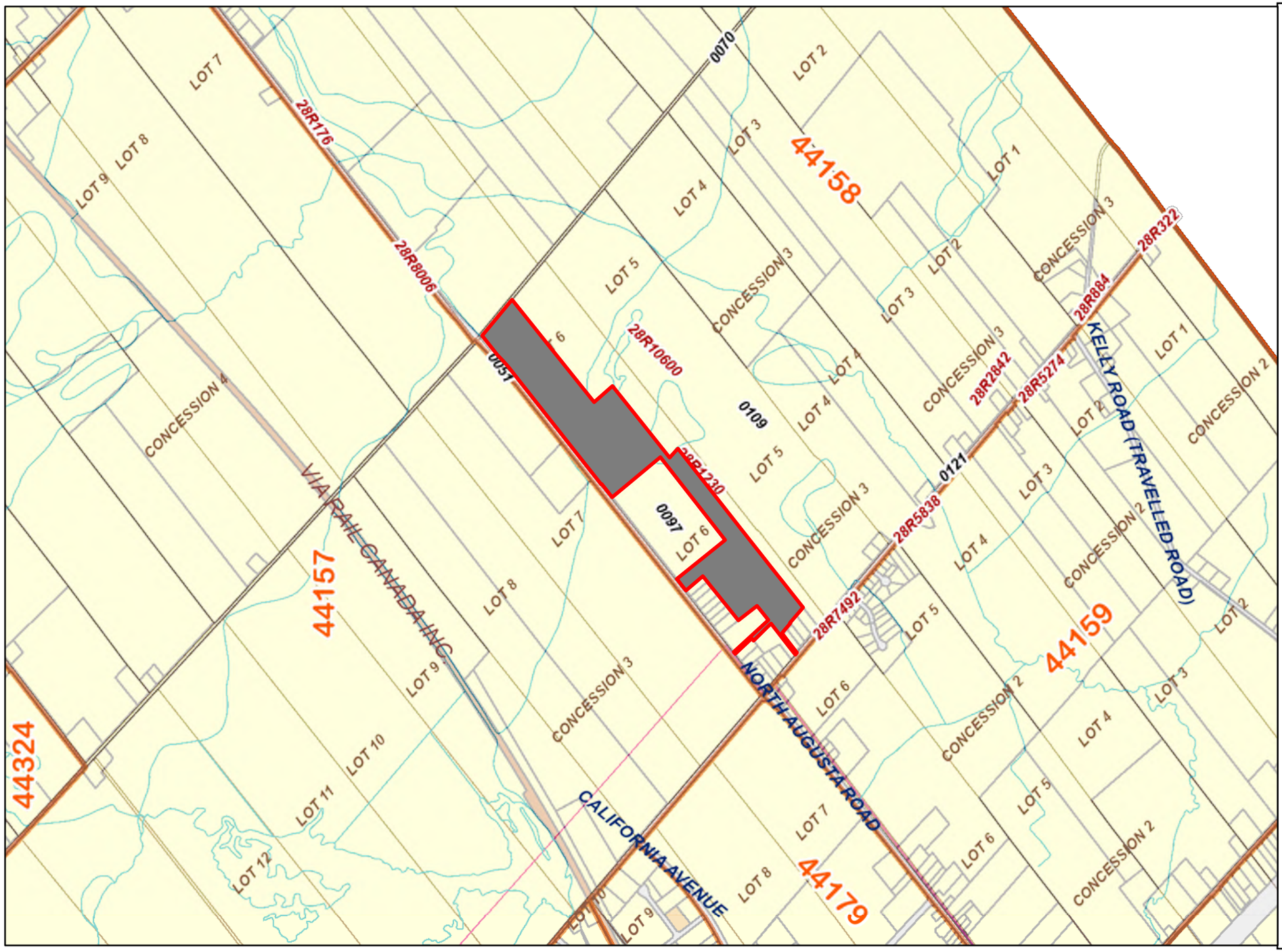
Party Chief: BK	Instrument: PK	Checked By: PdJ	Plan By: FF

HCLS

HOPKINS CHITTY LAND SURVEYORS INC.
Ontario Land Surveyors
www.hopkinschitty.com

1224 GARDINERS ROAD, SUITE 102
KINGSTON, ONTARIO K7P-0G2
Tel (613) 384-9266
Fax (613) 384-3513

PROJECT No. 2023-0514
LOT 6, CONCESSION 3
TOWNSHIP OF ELIZABETHTOWN



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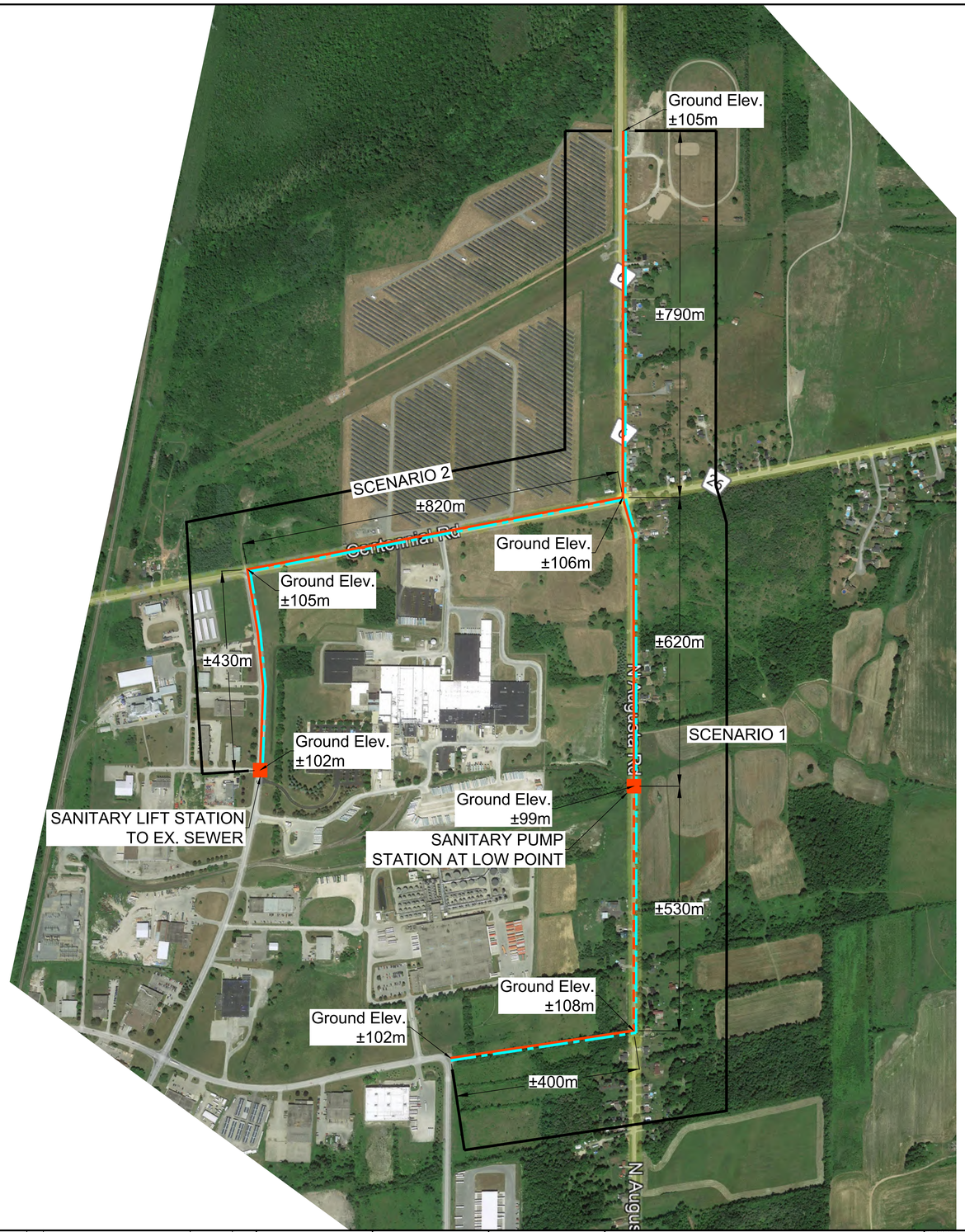
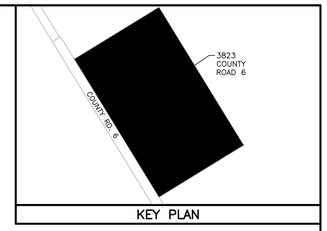




LEGEND

- GRAVITY SANITARY SEWER
- SANITARY FORCEMAIN
- SANITARY PUMP STATION
- WATERMAIN

SANITARY SEWER

SCENARIO 1
TOTAL GRAVITY SEWER: ±1810m
AVG. SLOPE (TO PS): ±0.3%
AVG. TRENCH DEPTH (TO PS): 7.5m
AVG. SLOPE (TO EX.): ±1.5%
AVG. TRENCH DEPTH (TO EX.): 3m

TOTAL FORCEMAIN: ±530m
AVG. TRENCH DEPTH: ±3m

SCENARIO 2
TOTAL GRAVITY SEWER: ±2040m
AVG. SLOPE: ±0.3%
AVG. TRENCH DEPTH: ±9m

PRELIMINARY
NOT FOR CONSTRUCTION

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

NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE
0 50m 100m 200m
HORIZONTAL 1:5000

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

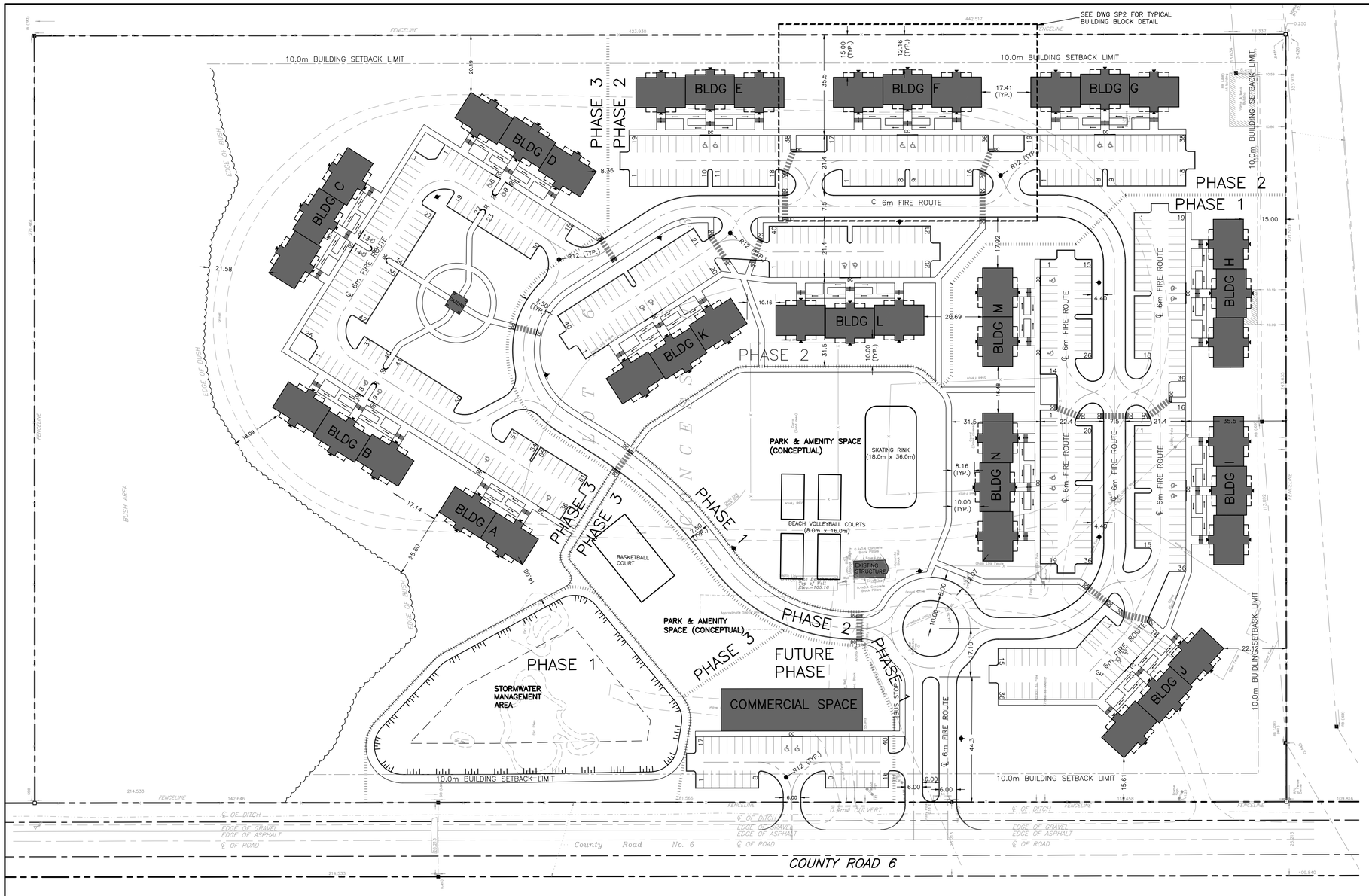
DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

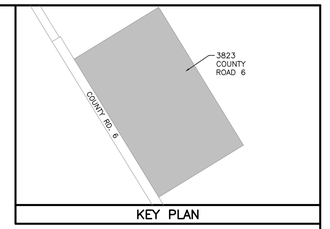
CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

CONCEPTUAL SERVICING PLAN
TO SITE

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	SERV1





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- ZONING SETBACKS
- PHASING LINE
- CENTRELINE OF 6m FIRE ACCESS ROUTE
- BUILDING ENTRANCE
- ACCESSIBLE PARKING SPACE
- DEPRESSED CURB AND TWSI
- PEDESTRIAN CROSSING LINES
- FIRE HYDRANT

NOTE: FOR MORE DETAILED INFORMATION SEE SITE PLAN PHASING PLANS

Zoning Information: RU (Rural)

RU (Rural)	Zoning Requirement	Provided
Minimum Lot Area:	0.4ha	12.01ha
Minimum Lot Frontage:	45m	442.5m
Minimum Front Yard:	10m	N/A
Minimum Rear Yard:	7.5m	>10m
Minimum Interior Side Yard:	6m	min. 10.2m (Bldg K to L)
Minimum Exterior Side Yard:	6m	min. 22.1m (Bldg J)
Maximum Building Height:	10m	14.2m - 3 Storeys
Maximum Lot Coverage:	20%	6.6% (0.79ha / 12.01ha)
Minimum Parkland Dedication	N/A	10.4% (1.25ha/12.01ha)
Maximum Dwellings/Dwelling Units:	1	14

Building Information:

Typical 3-Building Block	Details	
Building Footprint (Above Grade):	594.5m²	
Basement Floor Area:	538.4m²	(6) Dwelling Units
1st Floor Area:	538.4m²	(6) Dwelling Units
2nd Floor Area:	538.4m²	(6) Dwelling Units
3rd Floor Area:	538.4m²	(6) Dwelling Units
Gross Floor Area (GFA):	2,153.8m²	(24) Dwelling Units
Proposed Building Height:	14.2m measured from grade to top of parapet	
Number of Storeys:	(3) storeys above grade + (1) storey underground	

Typical 2-Building Block	Details	
Building Footprint (Above Grade):	396.4m²	
Basement Floor Area:	359.0m²	(4) Dwelling Units
Ground Floor Area:	359.0m²	(4) Dwelling Units
2nd Floor Area:	359.0m²	(4) Dwelling Units
3rd Floor Area:	359.0m²	(4) Dwelling Units
Gross Floor Area (GFA):	1,436.0m²	(16) Dwelling Units
Proposed Building Height:	14.2m measured from grade to top of parapet	
Number of Storeys:	(3) storeys above grade + (1) storey underground	

Commercial Building	Details
Building Footprint (Above Grade):	800m²

Site Information:

Municipal Address: 3823 County Road 6, Township of Elizabethtown-Kitley

Legal Description: Part of Lot 6, Concession 3
Geographic Township of Elizabethtown
Township of Elizabethtown-Kitley
County of Leeds
Pin 44158-0097

This site plan has been compiled using information contained in the the topographic plan signed and dated Oct 18, 2023 provided by:

Hopkins Chitty Land Surveyors Inc., Ontario Land Surveyors

Parking Information:

Proposed 3-Building Block - Vehicular Parking Requirements		Zoning Requirement
Apartment - Resident: consisting of:	0.75 spaces per Bed = 48 x 0.75 = 36 spaces min. 34 spaces (2.75m x 6m) 2 accessible spaces (3.7m x 6m)	1 space per Unit 1 accessible per 30 spaces

Proposed 2-Building Block - Vehicle Parking Requirements		Zoning Requirement
Apartment - Resident: consisting of:	0.75 spaces per Bed = 32 x 0.75 = 24 spaces min. 22 spaces (2.75m x 6m) 2 accessible spaces (3.7m x 6m)	1 space per Unit 1 accessible per 30 spaces

Proposed Commercial - Vehicle Parking Requirements		Zoning Requirement
Commercial Building: consisting of:	1 space per 20m² = 800 / 20 = 40 spaces 38 spaces (2.75m x 6m) 2 accessible spaces (3.7m x 6m)	1 space per 20m² 1 accessible per 30 spaces

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NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

0 5m 10m 30m

HORIZONTAL 1:750

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

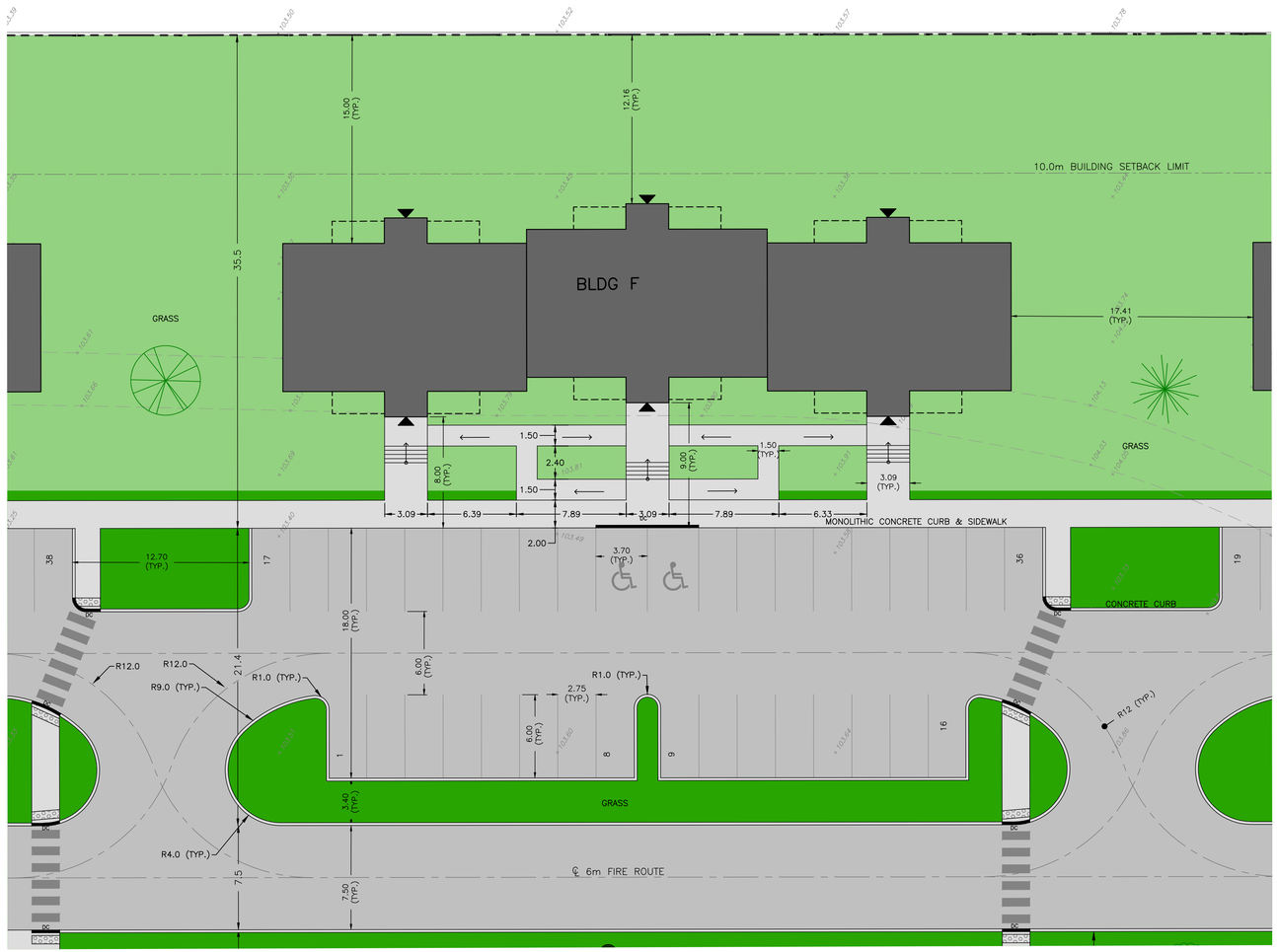
DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

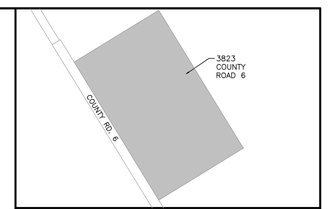
CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

SITE PLAN

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	SP1





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- ZONING SETBACKS
- CENTRELINE OF 6m FIRE ACCESS ROUTE
- BUILDING ENTRANCE
- ACCESSIBLE PARKING SPACE
- DEPRESSED CURB AND TWSI
- PEDESTRIAN CROSSING LINES
- FIRE HYDRANT

DRAFT

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

0 2m 4m 8m

HORIZONTAL 1:200

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(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

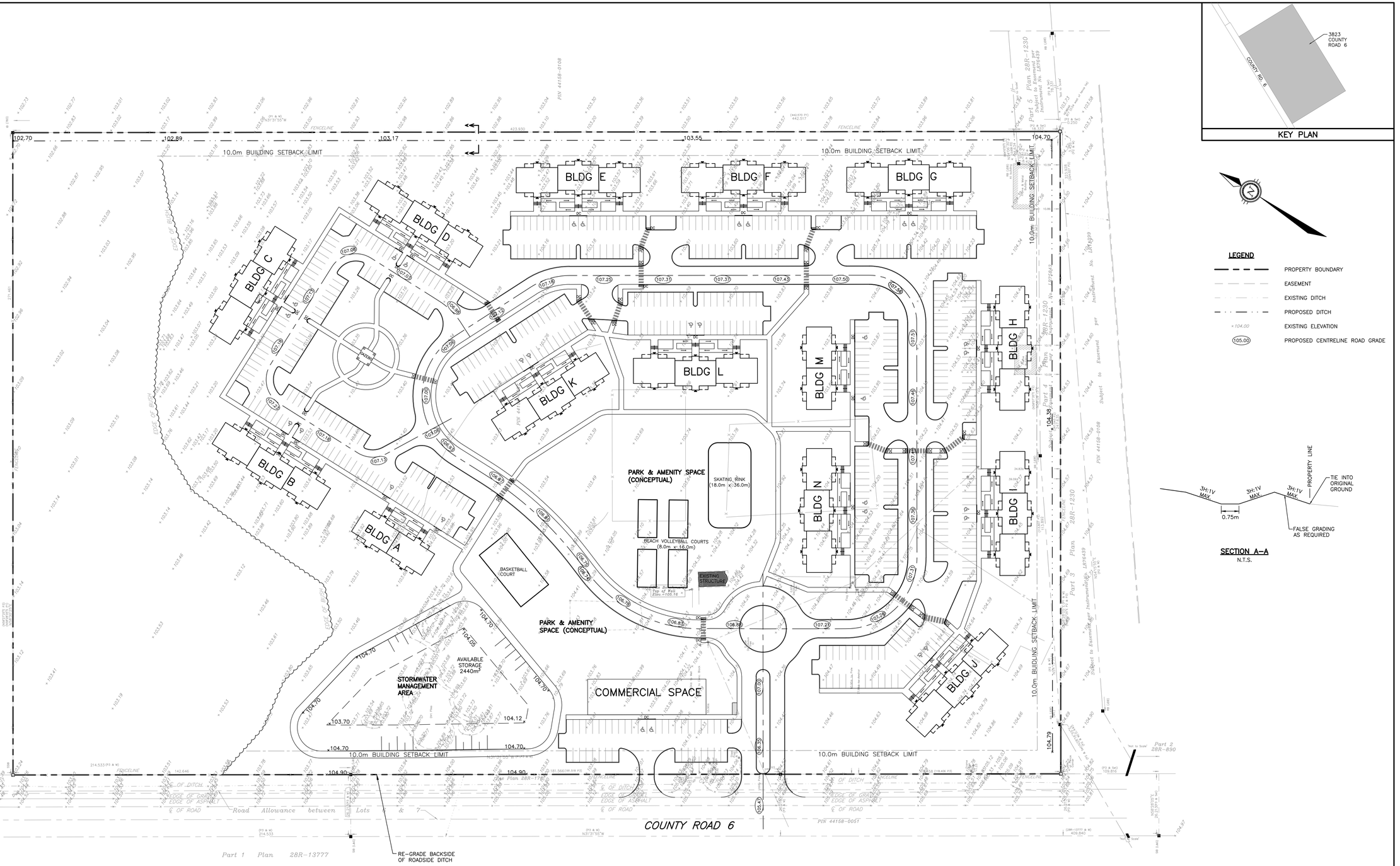
CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

SITE PLAN DETAIL

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	SP2

Appendix B



DRAFT

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

0 5m 10m 30m

HORIZONTAL 1:750

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Ottawa, ON K2V 1A8
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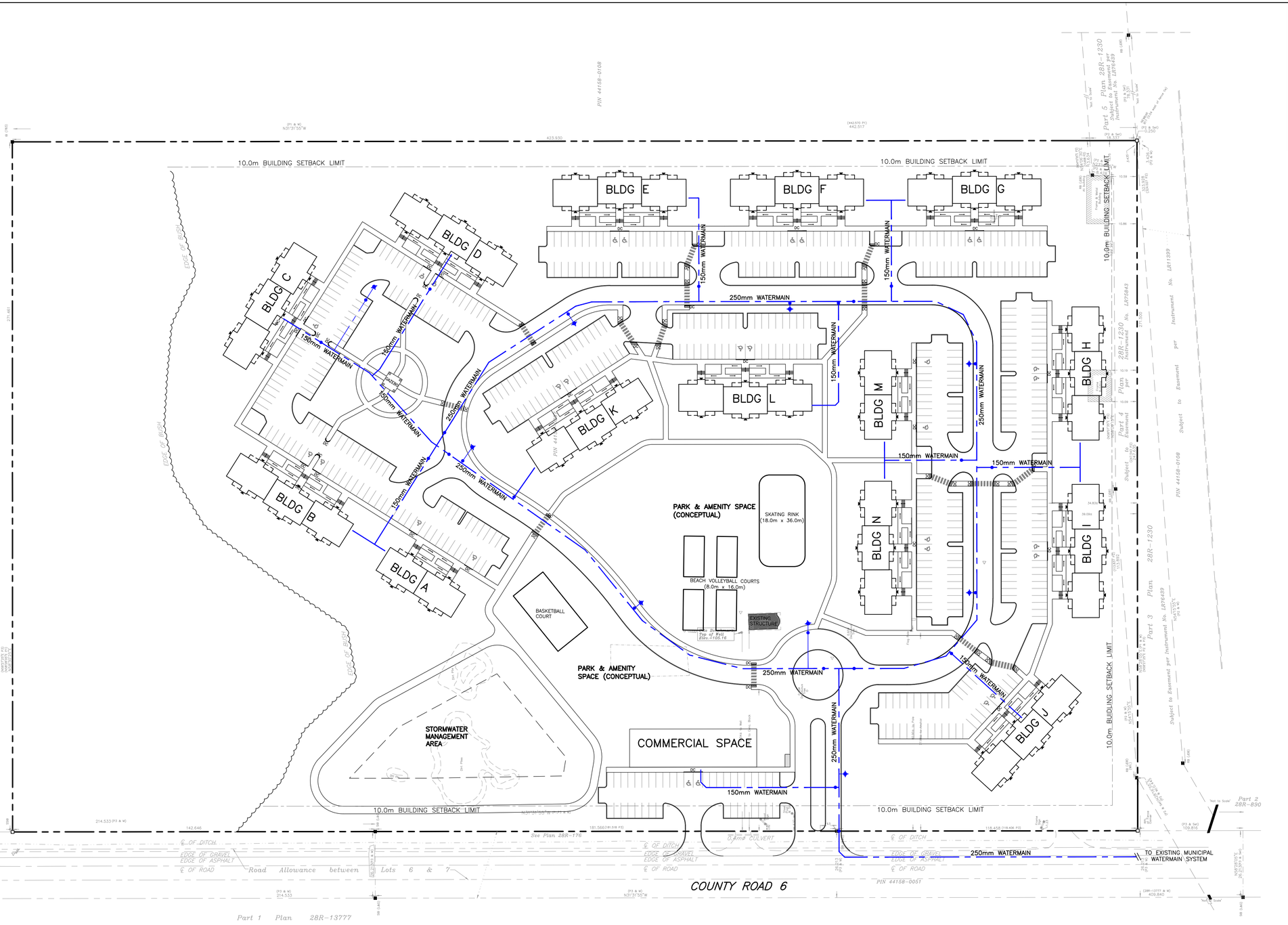
DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

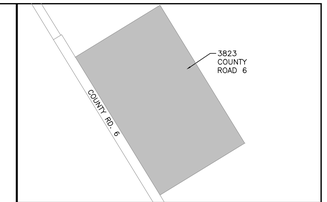
CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

CONCEPTUAL GRADING DESIGN

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	23075-GR1





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- PROPOSED WATERMAIN
- PROPOSED HYDRANT

DRAFT

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

0 5m 10m 30m

HORIZONTAL 1:750

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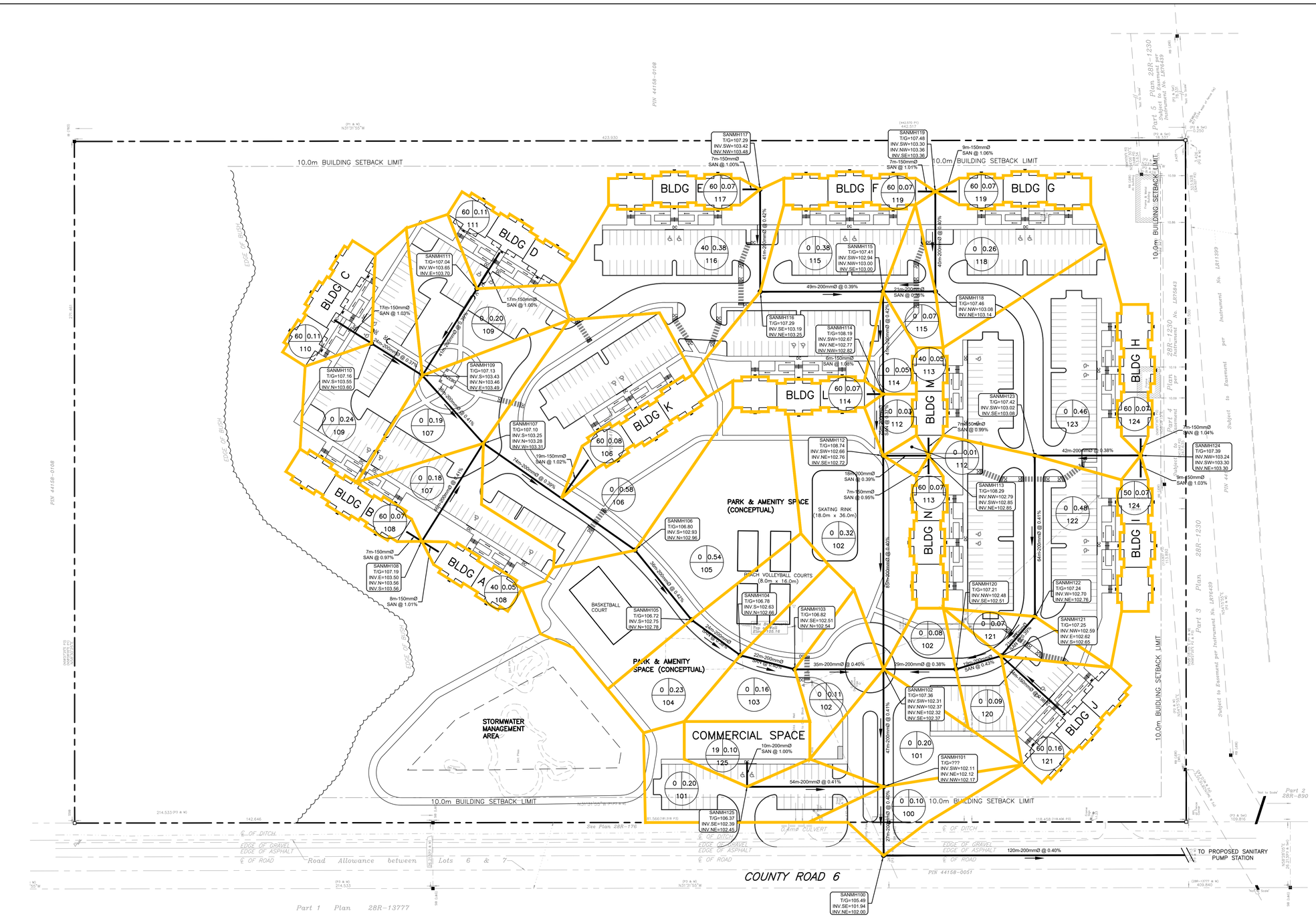
DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

CONCEPTUAL WATERMAIN DESIGN

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	23075-WM1



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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

HORIZONTAL 1:750

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Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	SM
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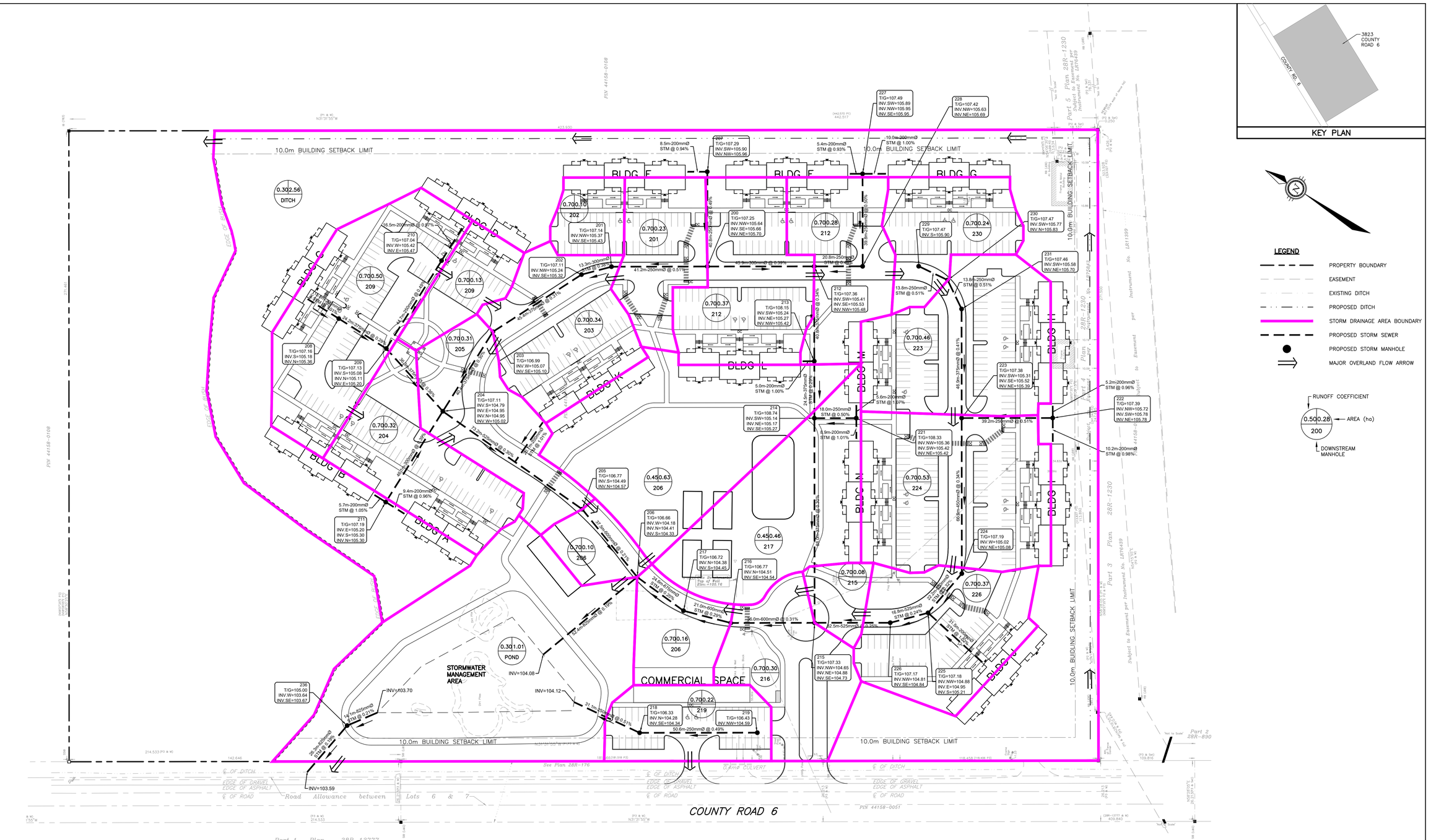
DRAWN	SM
CHECKED	CC
APPROVED	CC

CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

CONCEPTUAL SANITARY DESIGN

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	23075-SAN1



LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- EXISTING DITCH
- PROPOSED DITCH
- STORM DRAINAGE AREA BOUNDARY
- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE
- MAJOR OVERLAND FLOW ARROW

DRAFT

NOT FOR CONSTRUCTION

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

0 5m 10m 30m

HORIZONTAL 1:750

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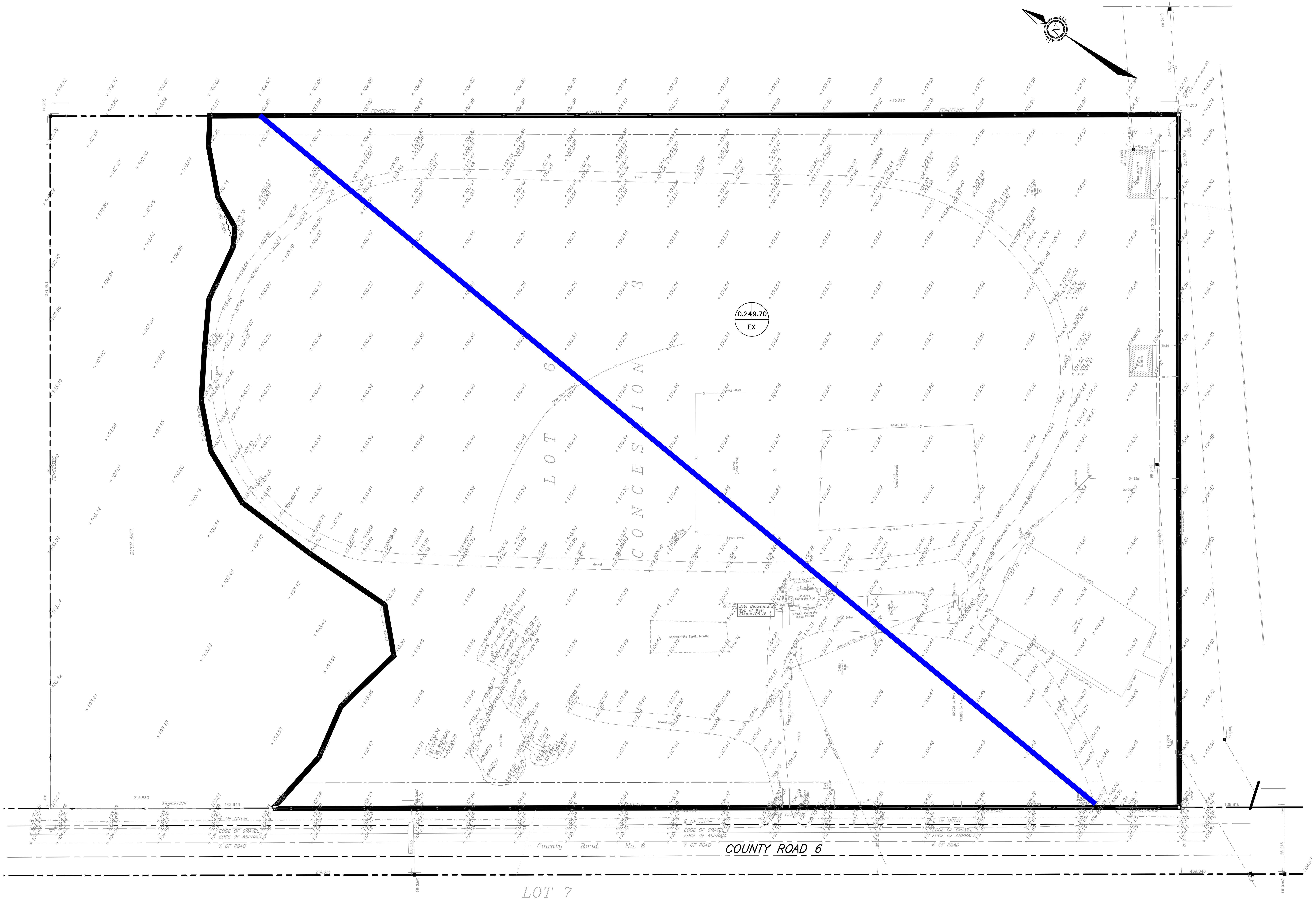
DRAWN	SM
CHECKED	CC
APPROVED	CC

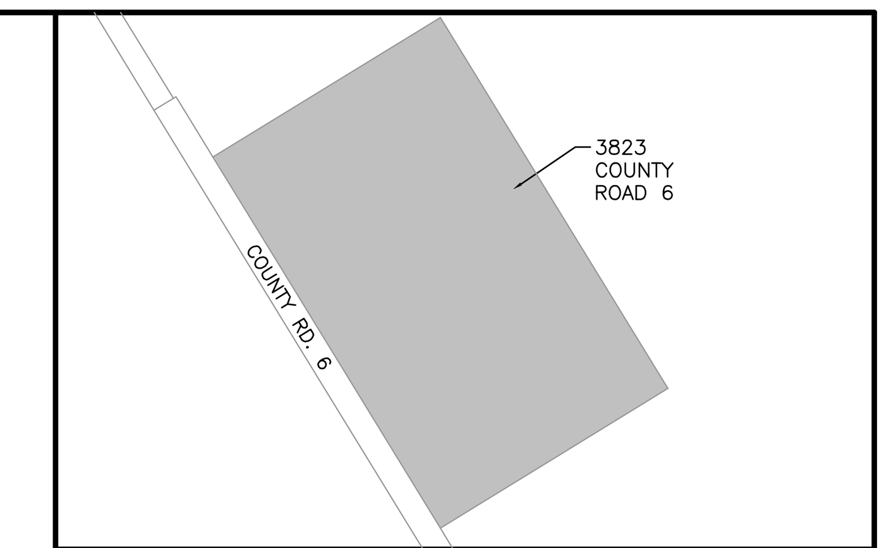
CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

CONCEPTUAL STORM DESIGN

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	23075-STM1





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- TIME OF CONCENTRATION FLOW LENGTH REACH

RUNOFF COEFFICIENT — 0.50 | 0.28 — AREA (ha) — STM1 — DRAINAGE AREA ID

DRAFT

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NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE

0 5m 10m 30m
HORIZONTAL 1:750

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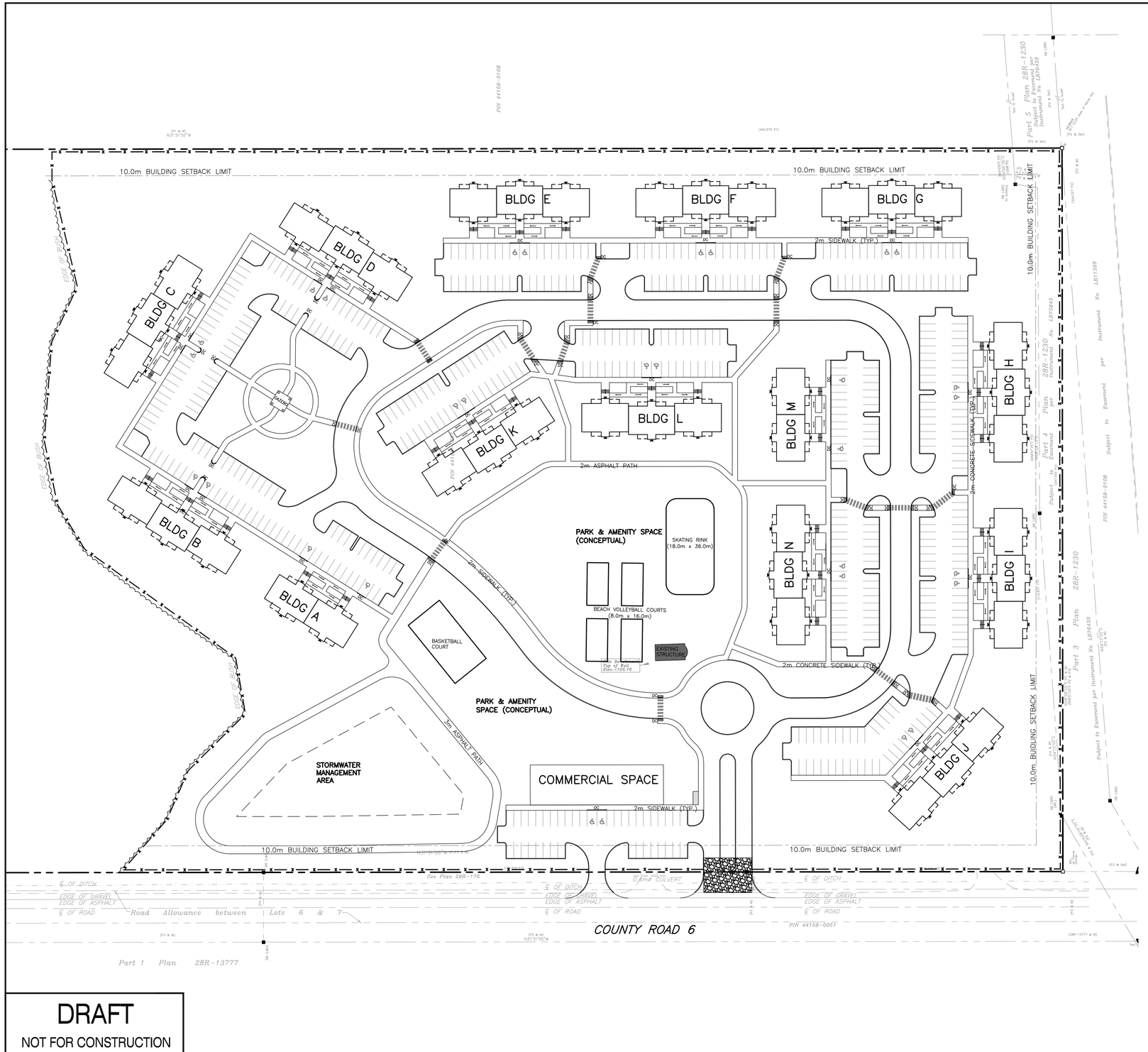
DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

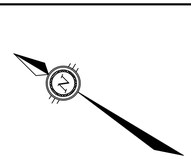
EXISTING STORM AREA
DRAINAGE PLAN

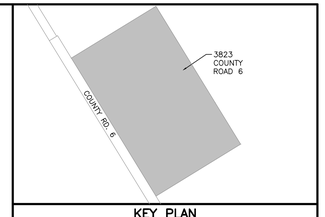
PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	STM1



NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION HAS BEEN RE-ESTABLISHED IN ALL DISTURBED AREAS. RE-VEGETATE DISTURBED AREAS AS SOON AS POSSIBLE.
4. STOCKPILE SOIL AWAY (15 METRES OR GREATER) FROM WATERCOURSES, DRAINAGE FEATURES AND TOP OF STEEP SLOPES.
5. SILT SACKS ARE TO BE PLACED UNDERNEATH THE FRAME AND COVER OF ALL PROPOSED AND EXISTING CATCH BASIN AND OPEN COVER STORM MANHOLES UNTIL CONSTRUCTION IS COMPLETED.
6. A SILT FENCE BARRIER SHALL BE INSTALLED AS PER OPSD 219.110 WHERE INDICATED AND MAINTAINED AS REQUIRED.
7. INSTALL MUD MATS AT ALL CONSTRUCTION ENTRANCES.
8. DURING ACTIVE CONSTRUCTION PERIODS, VISUAL INSPECTIONS SHALL BE UNDERTAKEN ON A WEEKLY BASIS AND AFTER MAJOR STORM EVENTS (>25mm RAIN IN 24 HOUR PERIOD) ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY.
9. EROSION AND SEDIMENT CONTROL BARRIERS SHALL ALSO BE ASSESSED (AND REPAIRED AS REQUIRED) FOLLOWING SIGNIFICANT SNOWMELT EVENTS.
10. VISUAL INSPECTIONS SHALL ALSO BE UNDERTAKEN IN ANTICIPATION OF LARGE STORM EVENTS (OR A SERIES OF RAINFALL AND/OR SNOWMELT DAYS) THAT COULD POTENTIALLY YIELD SIGNIFICANT RUNOFF VOLUMES.
11. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION OPERATIONS.
12. IN SOME CASES, BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS SHALL BE REINSTATED IMMEDIATELY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.
13. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED AS REQUIRED AS THE SITE BECOMES DEVELOPED.
14. SEDIMENT CONTROL DEVICES SHALL BE CLEANED OF ACCUMULATED SEDIMENTATION AS REQUIRED AND REPLACED AS NECESSARY.
15. DURING THE COURSE OF CONSTRUCTION, IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES, AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.
16. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS ARE TO COMPLY WITH OPSS 805.



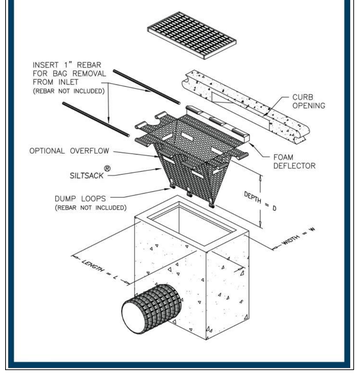


KEY PLAN

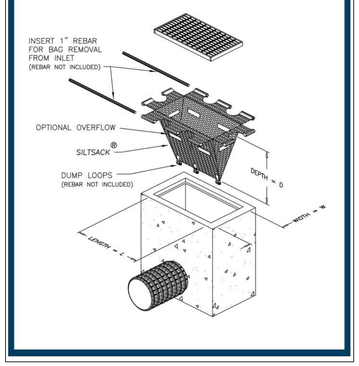
LEGEND

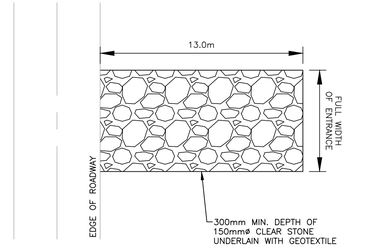
- PROPERTY BOUNDARY
- EASEMENT
- ZONING SETBACKS
- SILT FENCE

Typical Siltsack® Construction - Type A



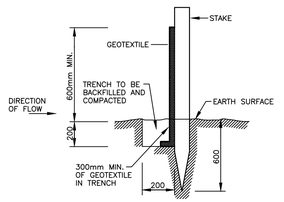
Typical Siltsack® Construction - Type B



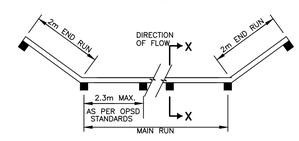


NOTES:
1. MUD MAT TO BE UNDERLAIN WITH A GEOTEXTILE FABRIC.
2. SEDIMENT SHALL BE CLEANED FROM ROADWAYS AS REQUIRED.
3. STORM INLETS IN CLOSE VICINITY TO MUD MAT SHALL BE PROTECTED WITH INLET CONTROL MEASURES.

MUD MAT DETAIL
N.T.S.



SECTION X-X
N.T.S.



SILT FENCE BARRIER DETAIL
N.T.S.

DRAFT
NOT FOR CONSTRUCTION

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NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SITE PLAN	15/12/23	CC

SCALE
0 5m 10m 30m
HORIZONTAL 1:750

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	CC
DRAWN	SM
CHECKED	CC
APPROVED	CC

CAMPUS HABITATIONS

3823 COUNTY ROAD 6
ELIZABETHTOWN-KITLEY, ON

EROSION & SEDIMENT CONTROL PLAN

PROJECT No.	23075
SURVEY	HCLS
DATED	DEC 2023
DWG. No:	ESC1

Appendix C

WATERMAIN DESIGN SHEET

3823 County Road 6, Elizabethtown-Kitley ON

Project No. 23075

Robinson Consultants

Junction Node Number	RESIDENTIAL POPULATION				NON-RES				AVG. DAILY					MAX. DAILY					PEAK HOURLY				
	ACTUAL COUNT				IND.	COMM.		INST.	DEMAND (L/s)					DEMAND (L/s)					DEMAND (L/s)				
	Low Density	Medium Density	High Density	Total Population	(m2)	(m2)	Pop.	(m2)	RES.	IND.	COMM.	INST.	TOTAL	RES.	IND.	COMM.	INST.	TOTAL	RES.	IND.	COMM.	INST.	TOTAL
A			16	40					0.21				0.21	0.75				0.75	1.13				1.13
B			24	60					0.31				0.31	1.13				1.13	1.69				1.69
C			24	60					0.31				0.31	1.13				1.13	1.69				1.69
D			24	60					0.31				0.31	1.13				1.13	1.69				1.69
E			24	60					0.31				0.31	1.13				1.13	1.69				1.69
F			24	60					0.31				0.31	1.13				1.13	1.69				1.69
G			24	60					0.31				0.31	1.13				1.13	1.69				1.69
H			24	60					0.31				0.31	1.13				1.13	1.69				1.69
I			24	60					0.31				0.31	1.13				1.13	1.69				1.69
J			24	60					0.31				0.31	1.13				1.13	1.69				1.69
K			24	60					0.31				0.31	1.13				1.13	1.69				1.69
L			24	60					0.31				0.31	1.13				1.13	1.69				1.69
M			16	40					0.21				0.21	0.75				0.75	1.13				1.13
N			24	60					0.31				0.31	1.13				1.13	1.69				1.69
Comm						3800	19				0.099		0.10			0.148		0.15			0.27		0.27
Total			**320**	**800.00**		**3800**	**19**		**4.17**		**0.10**		**4.27**	**15.00**		**0.15**		**15.15**	**22.50**		**0.27**		**22.77**

Residential Densities

Low Density (SFH's) =	3.4	cap/unit
Medium Density (Townhouses) =	2.7	cap/unit
High Density (Apartments) =	**2.5**	**cap/unit**

Avg. Daily Demand:			Max. Daily Demand:		Peak Hourly Demand:	
Demand =	**450**	**L/cap/day**	**3.6**	**x Avg. Day**	**5.4**	**Avg. Day**
Retail Density =	**50**	**cap/ha-gross**	**1.5**	**x Avg. Day**	**1.8**	**x Max. Day**
Industrial (Light) =	35000	L/day/ha-gross	1.5	x Avg. Day	1.8	x Max. Day
Commercial =	28000	L/day/ha-gross	1.5	x Avg. Day	1.8	x Max. Day
Institutional =	28000	L/day/ha-gross	1.5	x Avg. Day	1.8	x Max. Day

*per MECP 2008 Table 3-3 for fewer than 500 people

2023-12-14

Table 6

Distance to the Exposure (m)	Length-Height Factor of Exposing Building Face	Construction Type of Exposed Building Face				
		Type V	Type III-IV[2]	Type III-IV[3]	Type I-II[2]	Type I-II[3]
0 - 3	0-20	20%	15%	5%	10%	0%
	21-40	21%	16%	6%	11%	1%
	41-60	22%	17%	7%	12%	2%
	61-80	23%	18%	8%	13%	3%
	81-100	24%	19%	9%	14%	4%
	Over 100	25%	20%	10%	15%	5%
3.1 to 10	0-20	15%	10%	3%	6%	0%
	21-40	16%	11%	4%	7%	0%
	41-60	17%	12%	5%	8%	1%
	61-80	18%	13%	6%	9%	2%
	81-100	19%	14%	7%	10%	3%
	Over 100	20%	15%	8%	11%	4%
10.1 to 20	0-20	10%	5%	0%	3%	0%
	21-40	11%	6%	1%	4%	0%
	41-60	12%	7%	2%	5%	0%
	61-80	13%	8%	3%	6%	1%
	81-100	14%	9%	4%	7%	2%
	Over 100	15%	10%	5%	8%	3%
20.1 to 30	0-20	0%	0%	0%	0%	0%
	21-40	2%	1%	0%	0%	0%
	41-60	4%	2%	0%	1%	0%
	61-80	6%	3%	1%	2%	0%
	81-100	8%	4%	2%	3%	0%
	Over 100	10%	5%	3%	4%	0%
Over 30	All	0%	0%	0%	0%	0%

[2] *with unprotected openings*
[3] *without unprotected openings*

1.5 for **Type V** Wood Frame Construction
0.8 for **Type IV-A** Mass Timber Construction
0.9 for **Type IV-B** Mass Timber Construction
1.0 for **Type IV-C** Mass Timber Construction
1.5 for **Type IV-D** Mass Timber Construction
1.0 for **Type III** Ordinary Construction
0.8 for **Type II** Noncombustible Construction
0.6 for **Type I** Fire Resistive Construction

Type V

Seperation Distance	Length-Height Factor					
	0	20.00001	40.00001	60.00001	80.00001	100
0	20%	21%	22%	23%	24%	25%
3	15%	16%	17%	18%	19%	20%
10	10%	11%	12%	13%	14%	15%
20	0%	2%	4%	6%	8%	10%
30.00001	0%	0%	0%	0%	0%	0%

Type III-IV2

Seperation Distance	Length-Height Factor					
	0	20.00001	40.00001	60.00001	80.00001	100
0	15%	16%	17%	18%	19%	20%
3	10%	11%	12%	13%	14%	15%
10	5%	6%	7%	8%	9%	10%
20	0%	1%	2%	3%	4%	5%
30.00001	0%	0%	0%	0%	0%	0%

Type III-IV3

Seperation Distance	Length-Height Factor					
	0	20.00001	40.00001	60.00001	80.00001	100
0	5%	6%	7%	8%	9%	10%
3	3%	4%	5%	6%	7%	8%
10	0%	1%	2%	3%	4%	5%
20	0%	0%	0%	1%	2%	3%
30.00001	0%	0%	0%	0%	0%	0%

Type I-II2

Seperation Distance	Length-Height Factor					
	0	20.00001	40.00001	60.00001	80.00001	100
0	10%	11%	12%	13%	14%	15%
3	6%	7%	8%	9%	10%	11%
10	3%	4%	5%	6%	7%	8%
20	0%	0%	1%	2%	3%	4%
30.00001	0%	0%	0%	0%	0%	0%

Type I-II3

Seperation Distance	Length-Height Factor					
	0	20.00001	40.00001	60.00001	80.00001	100
0	0%	1%	2%	3%	4%	5%
3	0%	0%	1%	2%	3%	4%
10	0%	0%	0%	1%	2%	3%
20	0%	0%	0%	0%	0%	0%
30.00001	0%	0%	0%	0%	0%	0%

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	A

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				35	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				105	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				17.1	m
	North Side Exposure Charge				**0.11**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			35	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			105	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	56	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.11**	**< 0.75**
	Increase for Exposures			**748**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	B

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	33.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			17.1	m
	South Side Exposure Charge			**0.11**	
	Total Exposure Charage			**0.11**	**< 0.75**
	Increase for Exposures			**748**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	C

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	33.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	33	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	D

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	33.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			29.6	m
	East Side Exposure Charge			**0.10**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	60	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.1**	**< 0.75**
	Increase for Exposures			**680**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	E

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	65.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				29.6	m
	North Side Exposure Charge				**0.02**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			17.4	m
	South Side Exposure Charge			**0.11**	
	Total Exposure Charage			**0.13**	**< 0.75**
	Increase for Exposures			**884**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	F

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	70.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				17.4	m
	North Side Exposure Charge				**0.11**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			17.4	m
	South Side Exposure Charge			**0.11**	
	Total Exposure Charage			**0.22**	**< 0.75**
	Increase for Exposures			**1496**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	G

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	41.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				17.4	m
	North Side Exposure Charge				**0.11**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.11**	**< 0.75**
	Increase for Exposures			**748**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	H

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	17.4	m
	West Side Exposure Charge				**0.11**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	65.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	41	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	50	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.11**	**< 0.75**
	Increase for Exposures			**748**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	I

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				25.8	m
	West Side Exposure Charge				**0.02**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	65.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			17.4	m
	East Side Exposure Charge			**0.11**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	50	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.13**	**< 0.75**
	Increase for Exposures			**884**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	J

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			25.8	m
	East Side Exposure Charge			**0.02**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	50	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.02**	**< 0.75**
	Increase for Exposures			**136**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	K

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	56.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	60.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	65	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			13.2	m
	South Side Exposure Charge			**0.11**	
	Total Exposure Charage			**0.11**	**< 0.75**
	Increase for Exposures			**748**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	L

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				13.2	m
	North Side Exposure Charge				**0.11**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	70	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			20.7	m
	South Side Exposure Charge			**0.02**	
	Total Exposure Charage			**0.13**	**< 0.75**
	Increase for Exposures			**884**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	M

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Limited Combustible	-0.15	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				16.5	m
	West Side Exposure Charge				**0.11**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				35	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				70	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				20.7	m
	North Side Exposure Charge				**0.06**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	56	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			35	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			105	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	70	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.17**	**< 0.75**
	Increase for Exposures			**1156**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Residential
Building Being Considered:	N

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				588.0	m^2
	Total Effective Floor Area				**588.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1200**	**L/min**
	Fire Flow				**6,800**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10.7	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				32.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				52	m
	Exposed Wall No. of Storeys				3	
	Length-Height Factor of Exposed Wall				156	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			10.7	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			32.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			16.5	m
	East Side Exposure Charge			**0.11**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			52	m
	Exposed Wall No. of Storeys			3	
	Length-Height Factor of Exposed Wall			156	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	70	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.11**	**< 0.75**
	Increase for Exposures			**748**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

3. Vertical firewall divides the blocks in each building

Project Name:	3823 County Road 6
Project Location:	Elizabethtown-Kitley, ON
Project No:	230575
Date:	13-Dec-23
Building Type:	Commercial
Building Being Considered:	Commercial

Robinson
Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				800.0	m^2
	Total Effective Floor Area				**800.0**	**m^2**
C	**Fire Flow**				**9,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1350**	**L/min**
	Fire Flow				**7,650**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	None	0.00	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				50	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				50	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				15	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				15	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100.0	m
	North Side Exposure Charge				**0.00**	
	East Side					

	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			50	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			50	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			15	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			15	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	85	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

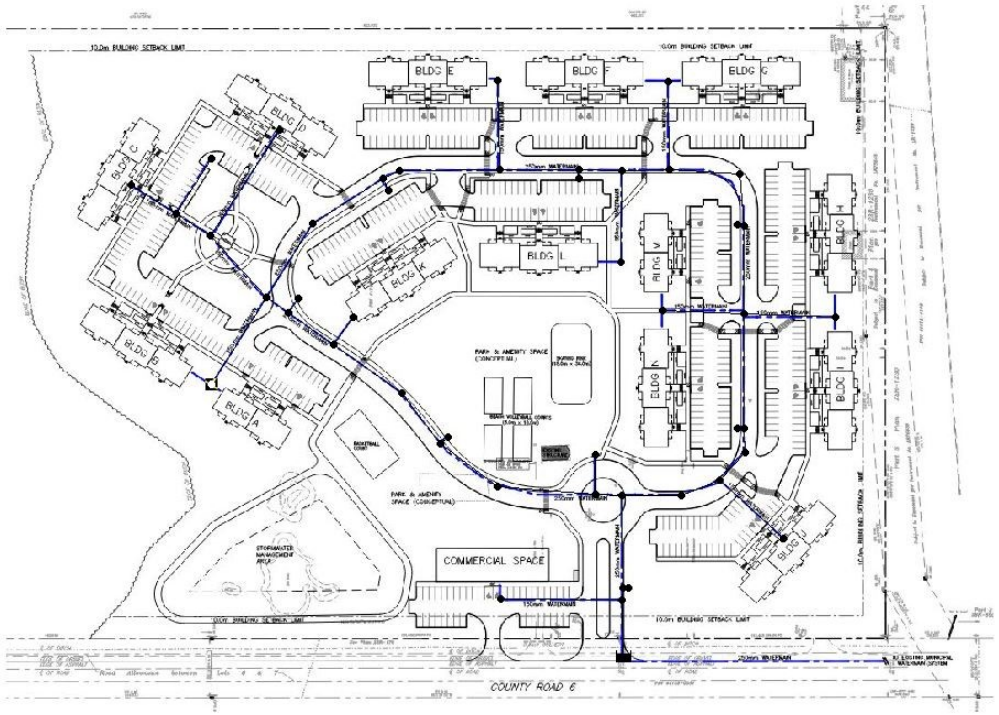
2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

EPANET 2.2 - Rows Corners.net

File Edit View Project Report Window Help

Network Map

Day 1, 12:00 AM



Browser

Data Map

Junctions

A+B
19
20
HYD5
C
D
24

Auto-Length Off LPS 100% X,Y: 1711.290, 8676.303

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                          Version 2.2                              *
*********************************************************************
```

Input File: Rows Corners.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	2	25	250
2	2	Comm	52	150
3	2	4	5	250
4	4	HYD1	3	150
5	6	4	41	250
6	6	7	12	250
7	7	HYD2	18	150
8	7	9	38	250
9	9	10	38	250
10	10	HYD3	4	150
11	12	10	30	250
12	12	13	35	250
13	13	K	15	150
14	13	15	25	250
15	15	HYD4	8	150
16	15	17	12	250
17	17	A+B	46	150
18	17	19	37	150
19	19	20	18	150
20	20	HYD5	30	150
21	20	C	24	150
22	19	D	57	150
23	17	24	39	250
24	24	25	37	250
25	25	HYD6	5	150
26	25	27	10	250
27	27	28	42	250
28	28	E	41	150
29	28	30	36	250
30	30	HYD7	3	150
31	30	32	19	250
32	32	L	40	150
33	34	32	21	250

34	34	F+G	40	150
35	34	36	30	250
36	36	37	20	250
37	37	HYD8	3	150

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
38	37	39	40	250
39	39	M+N	36	150
40	39	H+I	41	150
41	39	42	49	250
42	42	HYD9	3	150
43	42	44	11	250
44	44	45	17	250
45	45	J	38	150
46	45	47	20	250
47	47	6	25	250

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
2	0.00	42.00	42.00	0.00
Comm	0.10	42.00	42.00	0.00
4	0.00	42.00	42.00	0.00
HYD1	0.00	42.00	42.00	0.00
6	0.00	42.00	42.00	0.00
7	0.00	42.00	42.00	0.00
HYD2	0.00	42.00	42.00	0.00
9	0.00	42.00	42.00	0.00
10	0.00	41.99	41.99	0.00
HYD3	0.00	41.99	41.99	0.00
12	0.00	41.99	41.99	0.00
13	0.00	41.99	41.99	0.00
K	0.31	41.99	41.99	0.00
15	0.00	41.99	41.99	0.00
HYD4	0.00	41.99	41.99	0.00
17	0.00	41.99	41.99	0.00
A+B	0.52	41.99	41.99	0.00
19	0.00	41.99	41.99	0.00
20	0.00	41.99	41.99	0.00
HYD5	0.00	41.99	41.99	0.00
C	0.31	41.99	41.99	0.00
D	0.31	41.99	41.99	0.00

24	0.00	41.99	41.99	0.00
25	0.00	41.99	41.99	0.00
HYD6	0.00	41.99	41.99	0.00
27	0.00	41.99	41.99	0.00
28	0.00	41.99	41.99	0.00
E	0.31	41.99	41.99	0.00
30	0.00	41.99	41.99	0.00
HYD7	0.00	41.99	41.99	0.00
32	0.00	41.99	41.99	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
L	0.31	41.99	41.99	0.00	
34	0.00	41.99	41.99	0.00	
F+G	0.62	41.99	41.99	0.00	
36	0.00	41.99	41.99	0.00	
37	0.00	41.99	41.99	0.00	
HYD8	0.00	41.99	41.99	0.00	
39	0.00	41.99	41.99	0.00	
M+N	0.52	41.99	41.99	0.00	
H+I	0.62	41.99	41.99	0.00	
42	0.00	41.99	41.99	0.00	
HYD9	0.00	41.99	41.99	0.00	
44	0.00	41.99	41.99	0.00	
45	0.00	41.99	41.99	0.00	
J	0.31	41.99	41.99	0.00	
47	0.00	42.00	42.00	0.00	
1	-4.24	42.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	4.24	0.09	0.06	Open
2	0.10	0.01	0.00	Open
3	4.14	0.08	0.06	Open
4	0.00	0.00	0.00	Open
5	-4.14	0.08	0.06	Open
6	1.82	0.04	0.01	Open
7	0.00	0.00	0.00	Open
8	1.82	0.04	0.01	Open
9	1.82	0.04	0.01	Open
10	0.00	0.00	0.00	Open
11	-1.82	0.04	0.01	Open

12	1.82	0.04	0.01	Open
13	0.31	0.02	0.01	Open
14	1.51	0.03	0.01	Open
15	0.00	0.00	0.00	Open
16	1.51	0.03	0.01	Open
17	0.52	0.03	0.02	Open
18	0.62	0.04	0.03	Open
19	0.31	0.02	0.01	Open
20	0.00	0.00	0.00	Open
21	0.31	0.02	0.01	Open
22	0.31	0.02	0.01	Open
23	0.37	0.01	0.00	Open
24	0.37	0.01	0.00	Open
25	0.00	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
26	0.37	0.01	0.00	Open
27	0.37	0.01	0.00	Open
28	0.31	0.02	0.01	Open
29	0.06	0.00	0.00	Open
30	0.00	0.00	0.00	Open
31	0.06	0.00	0.00	Open
32	0.31	0.02	0.01	Open
33	0.25	0.01	0.00	Open
34	0.62	0.04	0.02	Open
35	-0.87	0.02	0.00	Open
36	-0.87	0.02	0.00	Open
37	0.00	0.00	0.00	Open
38	-0.87	0.02	0.00	Open
39	0.52	0.03	0.02	Open
40	0.62	0.04	0.02	Open
41	-2.01	0.04	0.02	Open
42	0.00	0.00	0.00	Open
43	-2.01	0.04	0.02	Open
44	-2.01	0.04	0.02	Open
45	0.31	0.02	0.01	Open
46	-2.32	0.05	0.02	Open
47	-2.32	0.05	0.02	Open

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                          Version 2.2                              *
*********************************************************************
```

Input File: Rows Corners.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	2	25	250
2	2	Comm	52	150
3	2	4	5	250
4	4	HYD1	3	150
5	6	4	41	250
6	6	7	12	250
7	7	HYD2	18	150
8	7	9	38	250
9	9	10	38	250
10	10	HYD3	4	150
11	12	10	30	250
12	12	13	35	250
13	13	K	15	150
14	13	15	25	250
15	15	HYD4	8	150
16	15	17	12	250
17	17	A+B	46	150
18	17	19	37	150
19	19	20	18	150
20	20	HYD5	30	150
21	20	C	24	150
22	19	D	57	150
23	17	24	39	250
24	24	25	37	250
25	25	HYD6	5	150
26	25	27	10	250
27	27	28	42	250
28	28	E	41	150
29	28	30	36	250
30	30	HYD7	3	150
31	30	32	19	250
32	32	L	40	150
33	34	32	21	250

34	34	F+G	40	150
35	34	36	30	250
36	36	37	20	250
37	37	HYD8	3	150

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
38	37	39	40	250
39	39	M+N	36	150
40	39	H+I	41	150
41	39	42	49	250
42	42	HYD9	3	150
43	42	44	11	250
44	44	45	17	250
45	45	J	38	150
46	45	47	20	250
47	47	6	25	250

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
2	0.00	41.97	41.97	0.00
Comm	0.27	41.97	41.97	0.00
4	0.00	41.96	41.96	0.00
HYD1	0.00	41.96	41.96	0.00
6	0.00	41.90	41.90	0.00
7	0.00	41.90	41.90	0.00
HYD2	0.00	41.90	41.90	0.00
9	0.00	41.89	41.89	0.00
10	0.00	41.88	41.88	0.00
HYD3	0.00	41.88	41.88	0.00
12	0.00	41.87	41.87	0.00
13	0.00	41.86	41.86	0.00
K	1.69	41.86	41.86	0.00
15	0.00	41.85	41.85	0.00
HYD4	0.00	41.85	41.85	0.00
17	0.00	41.85	41.85	0.00
A+B	2.82	41.83	41.83	0.00
19	0.00	41.83	41.83	0.00
20	0.00	41.83	41.83	0.00
HYD5	0.00	41.83	41.83	0.00
C	1.69	41.82	41.82	0.00
D	1.69	41.82	41.82	0.00

24	0.00	41.85	41.85	0.00
25	0.00	41.85	41.85	0.00
HYD6	0.00	41.85	41.85	0.00
27	0.00	41.85	41.85	0.00
28	0.00	41.85	41.85	0.00
E	1.69	41.84	41.84	0.00
30	0.00	41.85	41.85	0.00
HYD7	0.00	41.85	41.85	0.00
32	0.00	41.85	41.85	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
L	1.69	41.84	41.84	0.00	
34	0.00	41.85	41.85	0.00	
F+G	3.38	41.83	41.83	0.00	
36	0.00	41.85	41.85	0.00	
37	0.00	41.85	41.85	0.00	
HYD8	0.00	41.85	41.85	0.00	
39	0.00	41.86	41.86	0.00	
M+N	2.82	41.84	41.84	0.00	
H+I	3.38	41.83	41.83	0.00	
42	0.00	41.87	41.87	0.00	
HYD9	0.00	41.87	41.87	0.00	
44	0.00	41.88	41.88	0.00	
45	0.00	41.88	41.88	0.00	
J	1.69	41.88	41.88	0.00	
47	0.00	41.89	41.89	0.00	
1	-22.81	42.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	22.81	0.46	1.38	Open
2	0.27	0.02	0.01	Open
3	22.54	0.46	1.35	Open
4	0.00	0.00	0.00	Open
5	-22.54	0.46	1.35	Open
6	9.92	0.20	0.29	Open
7	0.00	0.00	0.00	Open
8	9.92	0.20	0.29	Open
9	9.92	0.20	0.29	Open
10	0.00	0.00	0.00	Open
11	-9.92	0.20	0.29	Open

12	9.92	0.20	0.29	Open
13	1.69	0.10	0.16	Open
14	8.23	0.17	0.21	Open
15	0.00	0.00	0.00	Open
16	8.23	0.17	0.21	Open
17	2.82	0.16	0.41	Open
18	3.38	0.19	0.58	Open
19	1.69	0.10	0.16	Open
20	0.00	0.00	0.00	Open
21	1.69	0.10	0.16	Open
22	1.69	0.10	0.16	Open
23	2.03	0.04	0.02	Open
24	2.03	0.04	0.02	Open
25	0.00	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
26	2.03	0.04	0.02	Open
27	2.03	0.04	0.02	Open
28	1.69	0.10	0.16	Open
29	0.34	0.01	0.00	Open
30	0.00	0.00	0.00	Open
31	0.34	0.01	0.00	Open
32	1.69	0.10	0.16	Open
33	1.35	0.03	0.01	Open
34	3.38	0.19	0.58	Open
35	-4.73	0.10	0.07	Open
36	-4.73	0.10	0.07	Open
37	0.00	0.00	0.00	Open
38	-4.73	0.10	0.07	Open
39	2.82	0.16	0.41	Open
40	3.38	0.19	0.58	Open
41	-10.93	0.22	0.35	Open
42	0.00	0.00	0.00	Open
43	-10.93	0.22	0.35	Open
44	-10.93	0.22	0.35	Open
45	1.69	0.10	0.16	Open
46	-12.62	0.26	0.46	Open
47	-12.62	0.26	0.46	Open

```
**************************************************************************
*                            E P A N E T                                 *
*                     Hydraulic and Water Quality                        *
*                     Analysis for Pipe Networks                         *
*                          Version 2.2                                   *
**************************************************************************
```

Input File: Rows Corners.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	2	25	250
2	2	Comm	52	150
3	2	4	5	250
4	4	HYD1	3	150
5	6	4	41	250
6	6	7	12	250
7	7	HYD2	18	150
8	7	9	38	250
9	9	10	38	250
10	10	HYD3	4	150
11	12	10	30	250
12	12	13	35	250
13	13	K	15	150
14	13	15	25	250
15	15	HYD4	8	150
16	15	17	12	250
17	17	A+B	46	150
18	17	19	37	150
19	19	20	18	150
20	20	HYD5	30	150
21	20	C	24	150
22	19	D	57	150
23	17	24	39	250
24	24	25	37	250
25	25	HYD6	5	150
26	25	27	10	250
27	27	28	42	250
28	28	E	41	150
29	28	30	36	250
30	30	HYD7	3	150
31	30	32	19	250
32	32	L	40	150
33	34	32	21	250

34	34	F+G	40	150
35	34	36	30	250
36	36	37	20	250
37	37	HYD8	3	150

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
38	37	39	40	250
39	39	M+N	36	150
40	39	H+I	41	150
41	39	42	49	250
42	42	HYD9	3	150
43	42	44	11	250
44	44	45	17	250
45	45	J	38	150
46	45	47	20	250
47	47	6	25	250

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
2	0.00	40.89	40.89	0.00
Comm	0.15	40.89	40.89	0.00
4	0.00	40.67	40.67	0.00
HYD1	0.00	40.67	40.67	0.00
6	0.00	38.86	38.86	0.00
7	0.00	38.72	38.72	0.00
HYD2	0.00	38.72	38.72	0.00
9	0.00	38.27	38.27	0.00
10	0.00	37.83	37.83	0.00
HYD3	0.00	37.83	37.83	0.00
12	0.00	37.48	37.48	0.00
13	0.00	37.07	37.07	0.00
K	1.13	37.07	37.07	0.00
15	0.00	36.79	36.79	0.00
HYD4	0.00	36.79	36.79	0.00
17	0.00	36.65	36.65	0.00
A+B	1.88	36.64	36.64	0.00
19	0.00	36.64	36.64	0.00
20	0.00	36.64	36.64	0.00
HYD5	0.00	36.64	36.64	0.00
C	1.13	36.64	36.64	0.00
D	1.13	36.64	36.64	0.00

24	0.00	36.26	36.26	0.00
25	0.00	35.88	35.88	0.00
HYD6	66.70	35.16	35.16	0.00
27	0.00	35.88	35.88	0.00
28	0.00	35.88	35.88	0.00
E	1.13	35.88	35.88	0.00
30	0.00	35.88	35.88	0.00
HYD7	66.70	35.45	35.45	0.00
32	0.00	36.08	36.08	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
L	1.13	36.08	36.08	0.00	
34	0.00	36.30	36.30	0.00	
F+G	2.26	36.29	36.29	0.00	
36	0.00	36.64	36.64	0.00	
37	0.00	36.86	36.86	0.00	
HYD8	0.00	36.86	36.86	0.00	
39	0.00	37.31	37.31	0.00	
M+N	1.88	37.31	37.31	0.00	
H+I	2.26	37.30	37.30	0.00	
42	0.00	37.93	37.93	0.00	
HYD9	0.00	37.93	37.93	0.00	
44	0.00	38.07	38.07	0.00	
45	0.00	38.28	38.28	0.00	
J	1.13	38.28	38.28	0.00	
47	0.00	38.54	38.54	0.00	
1	-148.61	42.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	148.61	3.03	44.32	Open
2	0.15	0.01	0.00	Open
3	148.46	3.02	44.24	Open
4	0.00	0.00	0.00	Open
5	-148.46	3.02	44.24	Open
6	72.27	1.47	11.66	Open
7	0.00	0.00	0.00	Open
8	72.27	1.47	11.66	Open
9	72.27	1.47	11.66	Open
10	0.00	0.00	0.00	Open
11	-72.27	1.47	11.66	Open

12	72.27	1.47	11.66	Open
13	1.13	0.06	0.08	Open
14	71.14	1.45	11.33	Open
15	0.00	0.00	0.00	Open
16	71.14	1.45	11.33	Open
17	1.88	0.11	0.19	Open
18	2.26	0.13	0.27	Open
19	1.13	0.06	0.08	Open
20	0.00	0.00	0.00	Open
21	1.13	0.06	0.08	Open
22	1.13	0.06	0.08	Open
23	67.00	1.36	10.14	Open
24	67.00	1.36	10.14	Open
25	66.70	3.77	144.40	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
26	0.30	0.01	0.00	Open
27	0.30	0.01	0.00	Open
28	1.13	0.06	0.08	Open
29	-0.83	0.02	0.00	Open
30	66.70	3.77	144.40	Open
31	-67.53	1.38	10.29	Open
32	1.13	0.06	0.08	Open
33	68.66	1.40	10.61	Open
34	2.26	0.13	0.27	Open
35	-70.92	1.44	11.26	Open
36	-70.92	1.44	11.26	Open
37	0.00	0.00	0.00	Open
38	-70.92	1.44	11.26	Open
39	1.88	0.11	0.19	Open
40	2.26	0.13	0.27	Open
41	-75.06	1.53	12.51	Open
42	0.00	0.00	0.00	Open
43	-75.06	1.53	12.51	Open
44	-75.06	1.53	12.51	Open
45	1.13	0.06	0.08	Open
46	-76.19	1.55	12.86	Open
47	-76.19	1.55	12.86	Open

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                          Version 2.2                              *
*********************************************************************
```

Input File: Rows Corners.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	2	25	250
2	2	Comm	52	150
3	2	4	5	250
4	4	HYD1	3	150
5	6	4	41	250
6	6	7	12	250
7	7	HYD2	18	150
8	7	9	38	250
9	9	10	38	250
10	10	HYD3	4	150
11	12	10	30	250
12	12	13	35	250
13	13	K	15	150
14	13	15	25	250
15	15	HYD4	8	150
16	15	17	12	250
17	17	A+B	46	150
18	17	19	37	150
19	19	20	18	150
20	20	HYD5	30	150
21	20	C	24	150
22	19	D	57	150
23	17	24	39	250
24	24	25	37	250
25	25	HYD6	5	150
26	25	27	10	250
27	27	28	42	250
28	28	E	41	150
29	28	30	36	250
30	30	HYD7	3	150
31	30	32	19	250
32	32	L	40	150
33	34	32	21	250

34	34	F+G	40	150
35	34	36	30	250
36	36	37	20	250
37	37	HYD8	3	150

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
38	37	39	40	250
39	39	M+N	36	150
40	39	H+I	41	150
41	39	42	49	250
42	42	HYD9	3	150
43	42	44	11	250
44	44	45	17	250
45	45	J	38	150
46	45	47	20	250
47	47	6	25	250

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
2	0.00	40.89	40.89	0.00
Comm	0.15	40.89	40.89	0.00
4	0.00	40.67	40.67	0.00
HYD1	0.00	40.67	40.67	0.00
6	0.00	38.86	38.86	0.00
7	0.00	38.66	38.66	0.00
HYD2	0.00	38.66	38.66	0.00
9	0.00	38.03	38.03	0.00
10	0.00	37.40	37.40	0.00
HYD3	0.00	37.40	37.40	0.00
12	0.00	36.90	36.90	0.00
13	0.00	36.32	36.32	0.00
K	1.13	36.32	36.32	0.00
15	0.00	35.92	35.92	0.00
HYD4	66.70	34.76	34.76	0.00
17	0.00	35.90	35.90	0.00
A+B	1.88	35.89	35.89	0.00
19	0.00	30.22	30.22	0.00
20	0.00	27.54	27.54	0.00
HYD5	66.70	23.21	23.21	0.00
C	1.13	27.54	27.54	0.00
D	1.13	30.22	30.22	0.00

24	0.00	36.14	36.14	0.00
25	0.00	36.37	36.37	0.00
HYD6	0.00	36.37	36.37	0.00
27	0.00	36.43	36.43	0.00
28	0.00	36.69	36.69	0.00
E	1.13	36.69	36.69	0.00
30	0.00	36.92	36.92	0.00
HYD7	0.00	36.92	36.92	0.00
32	0.00	37.05	37.05	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
L	1.13	37.04	37.04	0.00	
34	0.00	37.19	37.19	0.00	
F+G	2.26	37.18	37.18	0.00	
36	0.00	37.40	37.40	0.00	
37	0.00	37.55	37.55	0.00	
HYD8	0.00	37.55	37.55	0.00	
39	0.00	37.84	37.84	0.00	
M+N	1.88	37.83	37.83	0.00	
H+I	2.26	37.83	37.83	0.00	
42	0.00	38.24	38.24	0.00	
HYD9	0.00	38.24	38.24	0.00	
44	0.00	38.33	38.33	0.00	
45	0.00	38.47	38.47	0.00	
J	1.13	38.47	38.47	0.00	
47	0.00	38.64	38.64	0.00	
1	-148.61	42.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	148.61	3.03	44.32	Open
2	0.15	0.01	0.00	Open
3	148.46	3.02	44.24	Open
4	0.00	0.00	0.00	Open
5	-148.46	3.02	44.24	Open
6	87.39	1.78	16.58	Open
7	0.00	0.00	0.00	Open
8	87.39	1.78	16.58	Open
9	87.39	1.78	16.58	Open
10	0.00	0.00	0.00	Open
11	-87.39	1.78	16.58	Open

12	87.39	1.78	16.58	Open
13	1.13	0.06	0.08	Open
14	86.26	1.76	16.19	Open
15	66.70	3.77	144.40	Open
16	19.56	0.40	1.04	Open
17	1.88	0.11	0.19	Open
18	68.96	3.90	153.59	Open
19	67.83	3.84	148.96	Open
20	66.70	3.77	144.40	Open
21	1.13	0.06	0.08	Open
22	1.13	0.06	0.08	Open
23	-51.28	1.04	6.18	Open
24	-51.28	1.04	6.18	Open
25	0.00	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
26	-51.28	1.04	6.18	Open
27	-51.28	1.04	6.18	Open
28	1.13	0.06	0.08	Open
29	-52.41	1.07	6.43	Open
30	0.00	0.00	0.00	Open
31	-52.41	1.07	6.43	Open
32	1.13	0.06	0.08	Open
33	53.54	1.09	6.69	Open
34	2.26	0.13	0.27	Open
35	-55.80	1.14	7.22	Open
36	-55.80	1.14	7.22	Open
37	0.00	0.00	0.00	Open
38	-55.80	1.14	7.22	Open
39	1.88	0.11	0.19	Open
40	2.26	0.13	0.27	Open
41	-59.94	1.22	8.25	Open
42	0.00	0.00	0.00	Open
43	-59.94	1.22	8.25	Open
44	-59.94	1.22	8.25	Open
45	1.13	0.06	0.08	Open
46	-61.07	1.24	8.54	Open
47	-61.07	1.24	8.54	Open

Appendix D

SANITARY SEWER DESIGN SHEET
for
3823 County Road 6
Elizabethtown-Kitley, ON

Robinson Land Development

LOCATION				UNIT COUNT			RESIDENTIAL AREA AND POPULATION				RESIDENTIAL FLOW				COMM./INST. FLOW				CUM. PEAK DESIGN FLOW (L/s)	PIPE								
							INDIVIDUAL		CUMULATIVE																				
Area	FROM MH	TO MH	DRAINAGE AREA (ha)	SINGLE-FAMILY	APARTMENTS	TOWNHOUSE	POP.	AREA (ha)	POP.	AREA (ha)	AVG FLOW (L/s)	PEAK FACTOR	PEAK POP. FLOW (L/s)	EXTRAN. FLOW (L/s)	GROSS AREA (m2)	POP.	AVG FLOW (L/s)	PEAK FLOW (L/s)		LENGTH (m)	DIAMETER (mm)	UPSTREAM MH INV. (m)	DNSTREAM MH INV. (m)	SLOPE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	EXCESS CAPACITY (L/s)	PERCENT FULL
H	H	SANMH124	0.07		48		120		120		0.63	2.50	1.56	0.02					**1.58**	6.7	150	103.37	103.30	1.00%	15.24	0.86	13.66	10%
I	I	SANMH124	0.07		48		120		120		0.63	2.50	1.56	0.02					**1.58**	8.7	150	103.39	103.30	1.00%	15.24	0.86	13.66	10%
	SANMH124	SANMH123	0.46				0		0		0.00	4.50	0.00	0.13					**3.29**	42.2	200	103.24	103.08	0.40%	20.76	0.66	17.47	16%
	SANMH123	SANMH122	0.48				0		0		0.00	4.50	0.00	0.13					**3.43**	64.1	200	103.02	102.76	0.40%	20.76	0.66	17.34	17%
	SANMH122	SANMH121	0.07				0		0		0.00	4.50	0.00	0.02					**3.45**	20.7	200	102.70	102.62	0.40%	20.76	0.66	17.32	17%
J	J	SANMH121	0.16		24		60		60		0.31	2.50	0.78	0.04					**0.82**	33.6	150	102.98	102.65	1.00%	15.24	0.86	14.42	5%
	SANMH121	SANMH120	0.09				0		0		0.00	4.50	0.00	0.02					**4.30**	18.7	200	102.59	102.51	0.40%	20.76	0.66	16.47	21%
	SANMH120	SANMH102	0.08				0		0		0.00	4.50	0.00	0.02					**4.32**	28.9	200	102.48	102.37	0.40%	20.76	0.66	16.45	21%
F	F	SANMH119	0.07		24		60		60		0.31	2.50	0.78	0.02					**0.80**	6.9	150	103.43	103.36	1.00%	15.24	0.86	14.44	5%
G	G	SANMH119	0.07		24		60		60		0.31	2.50	0.78	0.02					**0.80**	8.5	150	103.45	103.36	1.00%	15.24	0.86	14.44	5%
	SANMH119	SANMH118	0.26				0		0		0.00	4.50	0.00	0.07					**1.67**	39.8	200	103.30	103.14	0.40%	20.76	0.66	19.09	8%
	SANMH118	SANMH115	0.07				0		0		0.00	4.50	0.00	0.02					**1.69**	20.8	200	103.08	103.00	0.40%	20.76	0.66	19.07	8%
E	E	SANMH117	0.07		24		60		60		0.31	2.50	0.78	0.02					**0.80**	7.0	150	103.55	103.48	1.00%	15.24	0.86	14.44	5%
	SANMH117	SANMH116	0.38				0		0		0.00	4.50	0.00	0.11					**0.91**	40.8	200	103.42	103.25	0.40%	20.76	0.66	19.86	4%
	SANMH116	SANMH115	0.38				0		0		0.00	4.50	0.00	0.11					**1.01**	48.9	200	103.19	103.00	0.40%	20.76	0.66	19.75	5%
	SANMH115	SANMH114	0.05				0		0		0.00	4.50	0.00	0.01					**2.72**	40.8	200	102.94	102.77	0.40%	20.76	0.66	18.04	13%
L	L	SANMH114	0.07		24		60		60		0.31	2.50	0.78	0.02					**0.80**	6.5	150	102.89	102.82	1.00%	15.24	0.86	14.44	5%
	SANMH114	SANMH112	0.03				0		0		0.00	4.50	0.00	0.01					**3.53**	24.5	200	102.76	102.67	0.40%	20.76	0.66	17.23	17%
M	M	SANMH113	0.05		16		40		40		0.21	2.50	0.52	0.01					**0.53**	7.1	150	102.92	102.85	1.00%	15.24	0.86	14.71	4%
N	N	SANMH113	0.07		24		60		60		0.31	2.50	0.78	0.02					**0.80**	7.4	150	102.92	102.85	1.00%	15.24	0.86	14.44	5%
	SANMH113	SANMH112	0.01				0		0		0.00	4.50	0.00	0.00					**1.34**	18.0	200	102.79	102.72	0.40%	20.76	0.66	19.42	6%
	SANMH112	SANMH102	0.32				0		0		0.00	4.50	0.00	0.09					**4.96**	85.0	200	102.66	102.32	0.40%	20.76	0.66	15.80	24%
D	D	SANMH111	0.11		24		60		60		0.31	2.50	0.78	0.03					**0.81**	17.0	150	103.87	103.70	1.00%	15.24	0.86	14.43	5%
	SANMH111	SANMH109	0.20				0		0		0.00	4.50	0.00	0.06					**0.87**	40.8	200	103.65	103.49	0.40%	20.76	0.66	19.90	4%
C	C	SANMH110	0.11		24		60		60		0.31	2.50	0.78	0.03					**0.81**	17.5	150	103.78	103.60	1.00%	15.24	0.86	14.43	5%
	SANMH110	SANMH109	0.24				0		0		0.00	4.50	0.00	0.07					**0.88**	24.0	200	103.55	103.46	0.40%	20.76	0.66	19.88	4%
	SANMH109	SANMH107	0.19				0		0		0.00	4.50	0.00	0.05					**1.80**	36.3	200	103.43	103.28	0.40%	20.76	0.66	18.96	9%
A	A	SANMH108	0.05		16		40		40		0.21	2.50	0.52	0.01					**0.53**	7.9	150	103.63	103.56	1.00%	15.24	0.86	14.71	4%
B	B	SANMH108	0.07		24		60		60		0.31	2.50	0.78	0.02					**0.80**	7.2	150	103.63	103.56	1.00%	15.24	0.86	14.44	5%
	SANMH108	SANMH107	0.18				0		0		0.00	4.50	0.00	0.05					**1.39**	46.0	200	103.50	103.31	0.40%	20.76	0.66	19.38	7%
K	K	107-106	0.08		24		60		60		0.31	2.50	0.78	0.02					**0.80**	18.6	150	103.34	103.16	1.00%	15.24	0.86	14.44	5%
	SANMH107	SANMH106	0.58				0		0		0.00	4.50	0.00	0.16					**4.15**	73.8	200	103.25	102.96	0.40%	20.76	0.66	16.61	20%
	SANMH106	SANMH105	0.54				0		0		0.00	4.50	0.00	0.15					**4.30**	35.7	200	102.93	102.78	0.40%	20.76	0.66	16.46	21%
	SANMH105	SANMH104	0.23				0		0		0.00	4.50	0.00	0.06					**4.37**	24.0	200	102.75	102.66	0.40%	20.76	0.66	16.40	21%
	SANMH104	SANMH103	0.16				0		0		0.00	4.50	0.00	0.05					**4.41**	22.4	200	102.63	102.54	0.40%	20.76	0.66	16.35	21%
	SANMH103	SANMH102	0.11				0		0		0.00	4.50	0.00	0.03					**4.44**	35.3	200	102.51	102.37	0.40%	20.76	0.66	16.32	21%
	SANMH102	SANMH101	0.20				0		0		0.00	4.50	0.00	0.06					**13.78**	46.7	200	102.31	102.12	0.40%	20.76	0.66	6.98	66%
Comm	Comm	SANMH125	0.10				0		0		0.00	4.50	0.00	0.03	3800	19	0.10	0.25	**0.28**	10.0	150	102.55	102.45	1.00%	15.24	0.86	14.97	2%
	SANMH125	SANMH101	0.20				0		0		0.00	4.50	0.00	0.05					**0.33**	54.3	200	102.39	102.17	0.40%	20.76	0.66	20.43	2%
County Road 6	SANMH101	SANMH100	0.10				0		0		0.00		0.00	0.03					**14.14**	27.4	200	102.11	102.00	0.40%	20.76	0.66	6.63	68%
			6.83										**11.98**	**1.91**				**0.25**										

DESIGN PARAMETERS

			Per Unit Populations:	
Average Daily Flow =	**450**	**L/cap/day**	Single Family	3.4 persons/unit
Comm./Inst. Flow =	28000	L/ha/day	Semi-detached	2.7 persons/unit
Retail Density =	**50**	**cap/ha**	Duplex	2.3 persons/unit
Industrial Flow =	35000	L/ha/day	Townhouse	2.7 persons/unit
Residential Peak Factor	**Harmon Eq'n**		Apartments:	
Residential/Commercial Peak Factor	**2.5**	**min.**	Apartments:	
Harmon - Correction Factor (K) =	**1.0**		Bachelor	1.4 persons/unit
Industrial Peak Factor =	7	per OSDG App. 4-B	Bachelor	1.4 persons/unit
Extraneous Flow =	**0.28**	**L/s/ha**	Bachelor	1.4 persons/unit
			1 Bedroom	1.4 persons/unit
Minimum Velocity =	0.6	m/s	2 Bedroom	2.1 persons/unit
Maximum Velocity =	3.0	m/s	3 Bedroom	3.1 persons/unit
			Average Apt.	**2.5 persons/unit**

Note: Criteria per City of Brockville Site Plan Control Manual

2023-12-15

Appendix E

August 8, 2023

Township of Elizabethtown-Kitley - Development Review Pre-Consultation
Cataraqui Conservation Notes
Emily Su, Resource Planner, EPt esu@crca.ca

3823 County Road 6

- The subject property appears to be occupied by areas of wetland within the northern portion of the lot. The wetland area is characteristic of a swamp where it is primarily occupied by trees.

- To the northwest of the property is Buell's Creek Reservoir Provincially Significant Wetland and the subject property falls within 120 metres of the wetland's boundary.

- Cataraqui Conservation regulates any development (buildings and structures) and site alteration (excavating, grading and placement of fill) within 120 metres of provincially significant wetlands and within 30 metres of non evaluated wetlands greater than 0.5 hectares in size.
    - Cataraqui Conservation would be involved in the review of the EIS as it pertains to the delineation of any wetland or watercourses within or adjacent to the subject property to ensure that all development occurs outside of 30 metres from any watercourse or wetland boundary.

- Cataraqui Conservation request the following information in support of an Official Plan and Zoning By-Law Amendment:
    - A preliminary stormwater management brief that would include:
        - conceptual grading and drainage plan.
        - entire scope of work.
        - demonstration that minimum quantity control standards can be achieved on the subject lands.
            - quantity control - post = pre-development conditions from a 2 through 100-year event.
        - Low Impact Development (LID) should be considered in the design.
        - A list of engineer consultants can be provided upon request.
    - Detailed designs can then be provided at a subsequent planning stage.

- The property falls within an area of Significant Groundwater Recharge (SGWRA).
    - In support of a future planning application (Zoning By-Law and Official Plan Amendment) the Cataraqui Source Protection Plan should be acknowledged noting that the proposal is in consideration of policy section 5.5.1 of the Source Protection Plan which speaks to significant ground water recharge areas.

- Portions of the subject lot are located within Cataraqui Conservation's regulatory boundary where any development (buildings and structures) or site alteration (excavation, grading and placement of fill) is subject to approvals under Ontario

Regulation 148/06. **Any development (buildings and structures) and site alteration (excavating, grading and placement of fill) within 120 metres of Buell's Creek Reservoir PSW and within 30 metres of any watercourse or wetland greater than 0.5 hectares will require review from Cataraqui Conservation.**

- Cataraqui Conservation charges fees for our review of *Planning Act* applications and supporting technical documents. Further information on CRCA fees can be found here: https://cataraquiconservation.ca/pages/permit-fees. We request that applicable fees be submitted to our office at the time of planning application submission.

Pre-Development Runoff Coefficient Calculations

Development Condition	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)
Pre-Development	0.04	9.06	0.60	9.70	0.24	0.30

Pre-Development Runoff Coefficient Calculations

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)
	0.30	2.26	0.00	2.56	0.28	0.35

Notes:

1. Runoff Coefficients: Cimp=0.90, Cper=0.20, Cgravel=0.80

2. C (100 YR) = C + 25% (to a mximum of 1.0)

Robinson Consultants

Time of Concentration - Uplands Method

PRE-EAST

Reach 1

L =	424	m
Upstream Elev. =	105.12	m
Dnstream Elev. =	102.99	m
Slope =	0.0050	m/m
V/sqrt(S) =	2.3	short grass pasture
V =	0.16	m/s
Tc =	**43.4**	**min**

Table 3.9 $V/S^{0.5}$ relationship for various land covers

Land Cover	$V/S^{0.5}$ (m/s)
Forest with heavy ground litter, hay meadow (overland flow)	0.6
Trash fallow or minimum tillage cultivation, contour, strip cropped woodland (overland flow)	1.5
Short grass pasture (overland flow)	2.3
Cultivated, straight row (overland flow)	2.7
Nearly bare and untilled (overland flow) or alluvial fans in Western mountain regions	3.0
Grassed waterway	4.6
Paved areas (sheet flow); small upland gullies	6.1

Source: Handbook of Steel Drainage & Highway Construction Products (Canadian Edition)

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City of Brockville Intensity-Duration Values

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
a	21.1	28.5	33.4	39.6	44.2	48.7
b	-0.680	-0.685	-0.687	-0.689	-0.690	-0.690

Pre-Development Flow Calculations

Given:

Area (ha) = 9.70

C = 0.24

C (100 YR) = 0.30

Return Period	Time of Concentration (min)	Rainfall Intensity, i (mm/hr)	Flow, Q (L/s)
2 Year	43.4	26.3	170.2
5 Year	43.4	35.6	230.2
100 Year	43.4	60.9	492.5

Notes:

1. Rainfall intensity from City of Brockville Site Plan Control Manual, App. K
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. C (100 YR) = C + 25% (to a maximum of 1.0)
4. Time of concentration calculated with Uplands Method.

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LOCATION				2 YEAR				FLOW				PROPOSED SEWER						
DRAINAGE AREA	STREET	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	2 YEAR RAINFALL INTENSITY (mm/hr)	2 YEAR PEAK FLOW (L/s)	DESIGN PEAK FLOW (L/s)	PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
TO SWM POND																		
	PRIVATE	BLDG C	208	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.01	15.8	33.51	1.05	0.25	0%
	PRIVATE	208	209	0.50	0.70	0.97	0.97	10.25	75.86	73.81	73.81	366.4	0.29	24.2	88.86	0.84	0.48	83%
	PRIVATE	BLDG D	210	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	0.97	16.5	32.84	1.03	0.27	0%
	PRIVATE	210	209	0.13	0.70	0.25	0.25	10.27	75.80	19.18	19.18	251.5	0.49	44.7	42.32	0.85	0.87	45%
	PRIVATE	209	204	0.00	0.00	0.00	1.23	11.14	66.30	81.29	81.29	366.4	0.36	36.3	99.00	0.94	0.64	82%
	PRIVATE	BLDG B	211	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.05	5.7	34.17	1.08	0.09	0%
	PRIVATE	BLDG A	211	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	0.96	9.4	32.67	1.03	0.15	0%
	PRIVATE	211	204	0.32	0.70	0.62	0.62	10.15	70.62	43.98	43.98	299.4	0.39	46.1	60.11	0.85	0.90	73%
	PRIVATE	BLDG E	207	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	0.94	8.5	32.33	1.02	0.14	0%
	PRIVATE	207	200	0.00	0.00	0.00	0.00	10.14	70.69	0.00	0.00	251.5	0.49	40.8	42.32	0.85	0.80	0%
	STREET 1	200	201	0.23	0.70	0.45	0.45	10.94	67.14	30.05	30.05	251.5	0.51	41.2	43.18	0.87	0.79	70%
	STREET 1	201	202	0.10	0.70	0.19	0.64	11.73	64.03	41.12	41.12	299.4	0.38	13.3	59.33	0.84	0.26	69%
	STREET 1	202	203	0.34	0.70	0.66	1.30	11.99	63.07	82.23	82.23	366.4	0.31	45.4	91.87	0.87	0.87	90%
	STREET 1	203	204	0.00	0.00	0.00	1.30	12.86	60.14	78.41	78.41	366.4	0.30	40.4	90.38	0.86	0.79	87%
	PRIVATE	BLDG K	MAIN	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.01	20.7	33.51	1.05	0.33	0%
	STREET 1	204	205	0.31	0.70	0.60	3.76	13.64	57.76	216.95	216.95	533.0	0.30	73.2	245.50	1.10	1.11	88%
	PARK	CBMH	MAIN	0.63	0.45	0.79	0.79	15.00	54.16	42.69	42.69	299.4	0.50	10.0	68.06	0.97	0.17	63%
	STREET 1	205	206	0.10	0.70	0.19	4.74	14.75	54.78	259.55	259.55	610.0	0.21	37.5	294.35	1.01	0.62	88%
	PRIVATE	BLDG F	227	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	0.93	5.4	32.15	1.01	0.09	0%
	PRIVATE	BLDG G	227	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.00	10.0	33.34	1.05	0.16	0%
	PRIVATE	227	228	0.00	0.00	0.00	0.00	10.16	70.59	0.00	0.00	251.5	0.50	39.8	42.75	0.86	0.77	0%
	STREET 1	228	212	0.28	0.70	0.54	0.54	10.93	67.17	36.60	36.60	251.5	0.48	20.8	41.89	0.84	0.41	87%
	STREET 1	200	212	0.37	0.70	0.72	0.72	10.00	71.36	51.38	51.38	299.4	0.39	45.9	60.11	0.85	0.90	85%
	PRIVATE	212	213	0.00	0.00	0.00	1.26	11.34	65.51	82.86	82.86	366.4	0.34	40.8	96.21	0.91	0.75	86%
	PRIVATE	BLDG L	213	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.00	5.0	33.34	1.05	0.08	0%
	PRIVATE	213	214	0.00	0.00	0.00	1.26	12.09	62.73	79.35	79.35	366.4	0.29	24.5	88.86	0.84	0.48	89%
	PRIVATE	BLDG M	221	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.07	5.6	34.49	1.09	0.09	0%
	PRIVATE	BLDG N	221	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.01	8.9	33.51	1.05	0.14	0%
	PRIVATE	221	214	0.00	0.00	0.00	0.00	10.14	70.68	0.00	0.00	251.5	0.50	18.0	42.75	0.86	0.35	0%
	PRIVATE	214	215	0.00	0.00	0.00	1.26	12.57	61.08	77.25	77.25	366.4	0.30	88.0	90.38	0.86	1.71	85%
	STREET 1	229	230	0.24	0.70	0.47	0.47	10.00	71.36	33.33	33.33	251.5	0.51	13.8	43.18	0.87	0.26	77%
	STREET 1	230	231	0.00	0.00	0.00	0.47	10.26	70.10	32.74	32.74	251.5	0.51	13.8	43.18	0.87	0.26	76%
	STREET 1	231	223	0.46	0.70	0.90	1.36	10.53	68.90	93.85	93.85	366.4	0.41	46.9	105.65	1.00	0.78	89%
	PRIVATE	BLDG H	222	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	0.96	5.2	32.67	1.03	0.08	0%
	PRIVATE	BLDG I	222	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	0.98	10.2	33.01	1.04	0.16	0%
	PRIVATE	222	223	0.00	0.00	0.00	0.00	10.16	70.57	0.00	0.00	251.5	0.51	39.2	43.18	0.87	0.75	0%
	STREET 1	223	224	0.53	0.70	1.03	2.39	11.31	65.63	157.09	157.09	457.0	0.34	66.9	173.40	1.06	1.05	91%
	STREET 1	224	225	0.00	0.00	0.00	2.39	12.36	61.77	147.84	147.84	457.0	0.32	22.2	168.23	1.03	0.36	88%
	PRIVATE	BLDG J	225	0.00	0.00	0.00	0.00	10.00	71.36	0.00	0.00	201.2	1.02	31.5	33.67	1.06	0.50	0%
	STREET 1	225	226	0.37	0.70	0.72	3.11	12.72	60.57	188.59	188.59	533.0	0.24	16.8	219.58	0.98	0.28	86%
	STREET 1	226	215	0.08	0.70	0.16	3.27	13.01	59.67	195.07	195.07	533.0	0.25	32.5	224.11	1.00	0.54	87%
	STREET 1	215	216	0.30	0.70	0.58	5.12	14.28	56.00	286.60	286.60	610.0	0.31	36.0	357.63	1.22	0.49	80%
	STREET 1	216	217	0.00	0.00	0.00	5.12	14.77	54.73	280.10	280.10	610.0	0.29	21.0	345.90	1.18	0.30	81%
	PARK	CBMH	MAIN	0.46	0.45	0.58	0.58	15.00	54.16	31.17	31.17	251.5	0.50	10.0	42.75	0.86	0.19	73%
	STREET 1	217	206	0.16	0.70	0.31	6.00	15.07	54.00	324.23	324.23	686.0	0.20	24.6	392.88	1.06	0.39	83%
	PRIVATE	206	OUTLET	0.00	0.00	0.00	10.74	15.37	53.26	572.21	572.21	838.0	0.19	52.4	652.99	1.18	0.74	88%
TO SWM POND																		
	PRIVATE	219	218	0.22	0.70	0.43	0.43	10.00	71.36	30.55	30.55	251.5	0.49	50.6	42.32	0.85	0.99	72%
	PRIVATE	218	OUTLET	0.00	0.00	0.00	0.43	10.99	66.92	28.65	28.65	251.5	0.51	31.1	43.18	0.87	0.60	66%
TO EXISTING DITCH																		
	PRIVATE	INLET	236	1.01	0.30	0.84	12.01	16.11	51.59	619.81	619.81	838.0	0.21	14.1	686.50	1.24	0.19	90%
	PRIVATE	236	OUTLET	0.00	0.00	0.00	12.01	16.30	51.18	614.92	614.92	838.0	0.19	26.3	652.99	1.18	0.37	94%

Design Parameters

Notes:
1. Rainfall intensity calculated using City of Brockville IDF curve equations.
2. Peak flows calculated using the Rational Method.
   Q = 2.78CIA, where:
   Q = Peak Flow (L/s)
   A = Drainage Area (ha)
   I = Rainfall Intensity (mm/hr)
   C = Runoff Coefficient
3. Manning's roughness coefficient = 0.013
4. Full flow velocity: MIN 0.6 m/s; MAX 4.5 m/s

City of Brockville Intensity-Duration Values

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
a	21.1	28.5	33.4	39.6	44.2	48.7
b	-0.680	-0.685	-0.687	-0.689	-0.690	-0.690

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City of Brockville Intensity-Duration Values

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
a	21.1	28.5	33.4	39.6	44.2	48.7
b	-0.680	-0.685	-0.687	-0.689	-0.690	-0.690

Storage Volume Calculations - SWM Pond

Given:

Area (ha) = 7.14 Release Rate = 90.0 L/s

C = 0.55

C (100 YR) = 0.69

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	35	30.4	332.3	90.0	242.3	508.9
	40	27.8	303.5	90.0	213.5	512.4
	45	**25.7**	**280.1**	**90.0**	**190.1**	**513.3**
	50	23.9	260.8	90.0	170.8	512.3
	55	22.4	244.4	90.0	154.4	509.5
	60	21.1	230.3	90.0	140.3	505.3
5 Year	60	28.5	311.1	90.0	221.1	796.1
	65	27.0	294.5	90.0	204.5	797.7
	70	**25.6**	**280.0**	**90.0**	**190.0**	**797.8**
	75	24.5	267.0	90.0	177.0	796.7
	80	23.4	255.5	90.0	165.5	794.3
	85	22.5	245.1	90.0	155.1	791.0
100 Year	190	22.0	300.0	90.0	210.0	2394.1
	195	21.6	294.7	90.0	204.7	2394.7
	200	**21.2**	**289.6**	**90.0**	**199.6**	**2394.9**
	205	20.9	284.7	90.0	194.7	2394.6
	210	20.5	280.0	90.0	190.0	2393.8
	215	20.2	275.5	90.0	185.5	2392.7

Notes:

1. Rainfall intensity from City of Brockville Site Plan Control Manual, App. K
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. C (100 YR) = C + 25% (to a maximum of 1.0)

Storage Volume Calculations - SWM Ditch

Given:

Area (ha) = 2.56 Release Rate = 80.0 L/s

C = 0.30

C (100 YR) = 0.38

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	**10**	**71.4**	**152.3**	**80.0**	**72.3**	**43.4**
	15	54.2	115.6	80.0	35.6	32.1
	20	44.5	95.1	80.0	15.1	18.1
	25	38.3	81.7	80.0	1.7	2.6
	30	33.8	72.2	80.0	-7.8	-14.1
	35	30.4	65.0	80.0	-15.0	-31.5
5 Year	**10**	**97.2**	**207.6**	**80.0**	**127.6**	**76.6**
	15	73.7	157.3	80.0	77.3	69.5
	20	60.5	129.1	80.0	49.1	59.0
	25	51.9	110.8	80.0	30.8	46.3
	30	45.8	97.8	80.0	17.8	32.1
	35	41.2	88.0	80.0	8.0	16.8
100 Year	10	167.7	447.5	80.0	367.5	220.5
	15	126.8	338.3	80.0	258.3	232.4
	20	**103.9**	**277.4**	**80.0**	**197.4**	**236.8**
	25	89.1	237.8	80.0	157.8	236.7
	30	78.6	209.7	80.0	129.7	233.4
	35	70.6	188.5	80.0	108.5	227.9

Notes:

1. Rainfall intensity from City of Brockville Site Plan Control Manual, App. K
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. C (100 YR) = C + 25% (to a maximum of 1.0)

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Orifice Calculations

Structure	Outlet Pipe Inv. Elev. (m)	Outlet Pipe Diam. (m)	C/L Orifice Elev. (m)	100-YR Ponding Elev. (m)	100-YR Head (m)	100-YR Outflow (L/s)	Orifice Area (m^2)	Orifice Diameter (mm)	Orifice Type
236	103.64	0.838	103.74	104.70	0.96	90.0	0.034	208.3	Circular