ANTECH DESIGN AND ENGINEERING GROUP

32 ZATONSKI AVENUE • BRANTFORD, ON N3V 1G1

FUNCTIONAL SERVICING REPORT

850 Kings Highway, Fort Frances

Abstract

Functional Servicing Report for a new Great Canadian Oil Change with car wash at 850 King's Highway

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Appendix B – Proposed Site Plan ..... Encl.

Appendix C – Site Services Design Sheet ..... Encl.

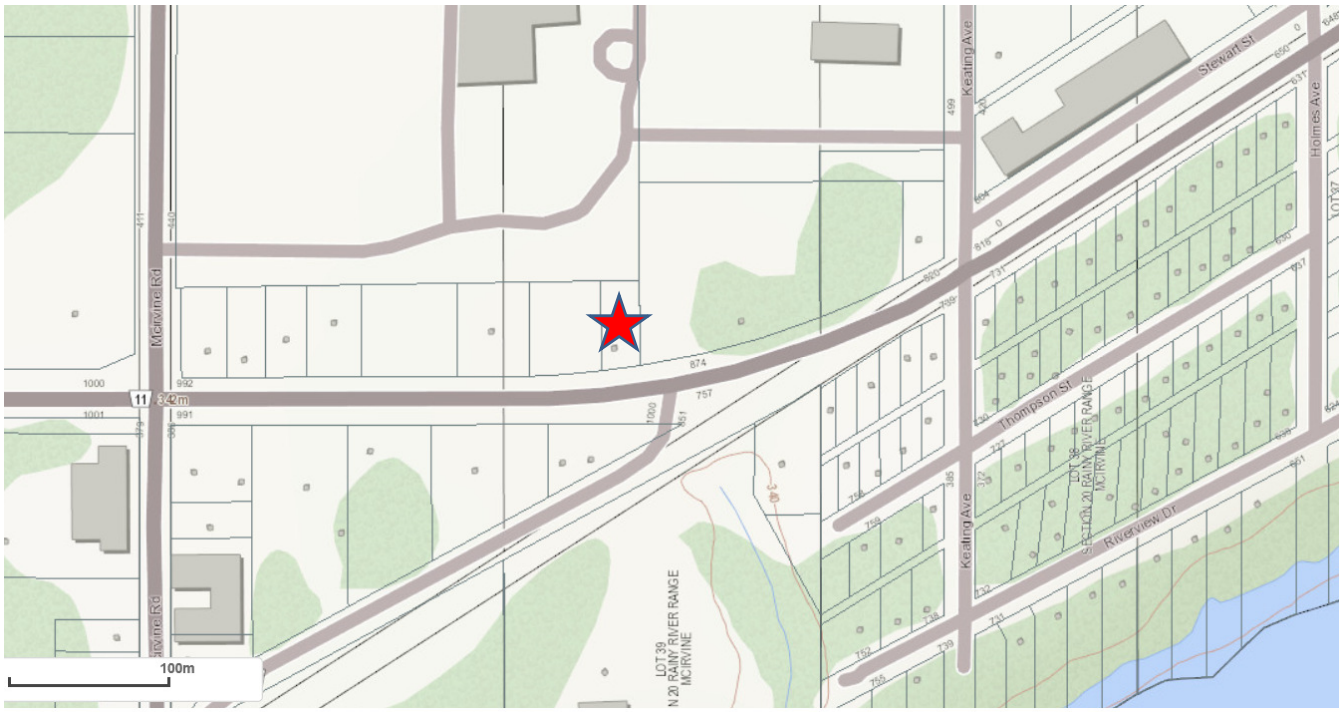
Appendix D – Stormwater Management Information / Calculations ..... Encl.

Appendix E- Preliminary Stormwater Management Plan ..... Encl.

1.0 INTRODUCTION

In support of the proposed development, a 136m^2 Great Canadian Oil Change with carwash, this report documents the preliminary site servicing and stormwater management design for the development of 850 Kings Highway in the Town of Fort Frances. Figure 1 below is a site location map.

FIGURE 1 SITE LOCATION MAP



2.0 SITE INFORMATION

The subject property has an area of 1378.3m^2 (0.13783ha). The subject property has a frontage of 24.8m on The Kings Highway.

The site is bounded to the north by Confederation College – Rainy River District Campus. The site is bounded to the south by The King's Highway. The site is bounded to the east by Boston Pizza. The site is bounded to the west by A&W.

The site is developed with a single-family dwelling operating a commercial business (Insurance). The subject property is primarily flat and even throughout. The Appendix A contains the existing plan of survey which illustrates the pre-development property.

FIGURE 2 AREIAL PHOTO

3.0 PROPOSED DEVELOPMENT

This report is in support of the site plan requirements for the Town of Fort Frances. The proposed development is a 136m^2 Great Canadian Oil Change with carwash. The site plan of the proposed development can be found in Appendix B.

3.1 SANITARY SEWERS

Sanitary demand for the proposed development is based on the number of fixture units and is calculated as per Ontario Building Code (OBC) Section 7 Table 7.6.3.2.A, sizing of water distribution system and OBC Appendix B Table 7.6.3.1, pipe size based on the number of fixture units served. Appendix C of this report contains the site services design calculation sheet.

A proposed 6" (150mm) diameter sanitary sewer, at a minimum slope of 0.75%, is to be connected to the existing 250mm diameter sewer on The Kings Highway will service the proposed development.

3.2 STORM SEWERS

Storm sewer demand is based on the storm water management calculations. The composite runoff coefficient (Cr) of the existing site is less than the proposed developed site. For the proposed development, a 10" (250mm storm), 3 new catch basins and an orifice plate will connect to the existing 750mm diameter storm sewer on The King's Highway. This is further detailed in Section 4.0 Stormwater Management.

3.3 WATER USAGE / WATERMAIN

Water demand for the proposed development is based on the chart in Appendix C. Total peak water usage for the site was derived from the fixture unit count as per OBC 7.4.10.5.(a).

A proposed minimum 1 1/2" (38mm) diameter water service connected to the existing 150mm diameter water service on The Kings Highway will service the proposed development based on 62.5 fixture units as per OBC Appendix A Table A-7.6.3.1.

3.4 FIRE FLOW ESTIMATE

The proposed development consists of a one-storey Great Canadian Oil Change with carwash with the associated parking and landscaped areas. The proposed building has a ground floor area of approximately 136m^2 as per the Site Plan attached in Appendix B. The fire flow estimate is based on Water Supply for Public Fire Protection – 1999 issued by Fire Underwriters Survey.

The fire flow estimate is calculated from the following formula:

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

The proposed building will be of non-combustible construction (C= 0.8). Exposure corrections are added to the value for C and are based on the following table:

FIGURE 3 EXPOSURE CORRECTIONS

FACE OF BUILDING	EXPOSURE	CORRECTION %
North	36.1m	5 %
South	12.3m	15 %
East	10.7m	15 %
West	4.1m	20 %
TOTAL		55 %

Using the formula above with A being (136*1=136), C = 0.8 and the percent correction is equal to 55 %, the required fire flow F for the proposed development is 3,000 l/min.

3.5 WASTEWATER GENERATION ASSESSMENT

Wastewater design flow is to be determined by the designer of the building. It is strongly recommended that wastewater regeneration measures are employed on site in order to limit wastewater quantity.

4.0 STORMWATER MANAGEMENT

4.1 DESIGN CRITERIA

The storm water management criteria provided by the Town of Fort Frances used for the analysis on the site are as follows:

- Quantity Control – 50-year post development flow should be controlled to 2-year pre-development flow or to the capacity of the existing storm lateral, whichever is less
- Quantity Control – quality control Level 1 (Enhanced) quality control should be provided
- Erosion and sediment control measures will be implemented in accordance with the standards of the City

The Town of Fort Frances storm parameters used to model the 2-year and 50-year design rainfall events for the site are summarized in the table below.

FIGURE 4 STORM PARAMETERS

Coefficient	2 Year	50 Year
A	576.11	1350.00
B	3.80	5.50
C	0.7418	0.7497
R	0.4	0.4
Duration (min)	180	180
Total Depth (mm)	36.136	80.701
Maximum Intensity (mm/hr)	114.786	231.605

4.2 PRE-DEVELOPMENT SITE CONDTIONS

In the existing condition the site is developed with a gravel area, some curbing, and landscaping as per the legal survey contained in Appendix A.

One catchment area, Catchment 101, has been identified in the existing condition. Catchment 101 represents drainage from the entire site, which drains towards The King's Highway (Figure 5 below).

FIGURE 5 EXISTING CONDITION CATCHMENT AREAS

Catchment ID	Description	Area (ha)	% Impervious	Runoff Coeff. (Cr)
101	Entire Site	0.13783	44.2	0.442

An analysis was performed on the existing condition site using hydrologic modeling for the 2-year, and 50-year Town of Fort Frances. These results can be found in Figure 6 below.

FIGURE 6 EXISTING CONDITION SITE DISCHARGE – CATCHMENT 101

Event	Volume (m^3)	Max Flow (m^3/s)
2 Year Event	24.14	0.013
50 Year Event	71.28	0.030

4.3 POST-DEVELOPMENT CONDITIONS

Two catchment areas, Catchments 201 and 202, have been identified for the proposed development condition (see Figure 7 below). Catchment 201 represents drainage from the roof area which will be diverted to the proposed catch basin in the parking lot. Catchment 202 represents the remainder of the property which will drain into a catch basin located in the parking area of the property. Note that the

composite runoff coefficient for the post-development condition is 0.763 and the pre-development condition is 0.442. Appendix E contains the storm water management drawing illustrating the ponding areas.

FIGURE 7 PROPOSED CONDITION CATCHMENT AREAS

Catchment ID	Description	Area (ha)	% Impervious	Runoff Coeff. (Cr)
201	Roof	0.01356	90%	0.90
202	Remaining	0.12427	75%	0.75

An analysis was performed on the post-development condition of the site using hydrologic modeling for the 2-year and 50-year City of Fort Frances design storms. These results are shown in Figures 8 and 9 below.

FIGURE 8 POST-DEVELOPMENT SITE DISCHARGE – CATCHMENT 201

Event	Volume (m^3)	Max Flow (m^3/s)
2 Year Event	3.88	0.003
50 Year Event	9.61	0.006

FIGURE 9 POST-DEVELOPMENT SITE DISCHARGE – CATCHMENT 202

Event	Volume (m^3)	Max Flow (m^3/s)
2 Year Event	31.04	0.020
50 Year Event	80.26	0.044

5.0 WATER QUANTITY CONTROL

It is required to provide water quantity control measures to restrict the discharge from the subject property to the existing 2-year discharge rate during all storm events, up to and including the 50-year event. From Figure 6 this rate is 0.013 m^3/s. For Catchment 201 initial storm flow will be held on the roof using flow control drains and then diverted to the parking lot catch basin. The catch basin closest to the street will be equipped with a 60mm orifice plate that will limit the flow to 0.013m^3/s.

The parking area of the property will be graded to provide approximately 17 m^3 of storage behind the building. As mentioned previously, flow control roof drains can be employed to use the roof as a storage area for storm water. Approximately 17m^3 of water will need to be stored during the 50 year storm. Water in excess of the 50-year amount will flow overland to the street.

6.0 WATER QUALITY CONTROL

Quality of Storm water runoff from the proposed development will be maintained through landscaping and property design. The water generated from the automobile washing facility will be filtered through an oil and grit separator beneath the wash bay and then directed to the sanitary sewer system.

7.0 MAINTENANCE RECOMMENDATIONS

The maintenance of the storm water management systems is crucial to the functionality of the system. The following are the minimum maintenance requirements:

1. Inspection of all catchbasins and manholes a minimum of monthly
2. Any structure that requires repair must be immediately repaired or replaced
3. All sediment buildup to be removed a minimum of twice annually at the beginning of spring and before first frost or within 7 days of monthly inspection when 70% full, whichever is sooner.
4. All areas of landscaping shall be maintained. Where grass or ground cover is required these areas shall be kept up
5. All sediment disposal to be in accordance with MOE standards.

8.0 SEDIMENT AND EROSION CONTROL

To protect watercourses, existing developments and the sewer system it is suggested that the following erosion control measures be implemented for the subject development.

1) Medium Duty Sediment Control Fence Barrier
   To inhibit the transport of sediment to surrounding properties and to provide opportunity for suspended sediments to settle on site
2) Use of mud matts at the entrance / exits of the property during construction
   To inhibit the transport of sediment to other properties
3) Catchbasin / Manhole inserts
   To capture suspended solids prior to entering the storm sewer network

Using these practices will assist in addressing water quality during the construction and post construction phases. It is advised that these measures be implemented prior to the commencement of work and be maintained throughout the construction processes until the site is fully restored and vegetated.

9.0 CONCLUSIONS

Based on the information contained within this report and its appendices, it is concluded that the proposed development at 850 Kings Highway can be constructed to meet the requirements of the Town of Fort Frances.

In summary, the features of the design for the proposed development are as follows:

- Sanitary service to the proposed building will be provided via a 150mm service
- Water service to the proposed building will be provided via a minimum 38mm service to the building
- 3 new catch basins an orifice plate and storm sewer are proposed to be connected to the existing storm sewer system
- The stormwater discharge rate from the proposed site shall be controlled to the existing 2-year discharge rate during all storm events up to and including the 50-year event,

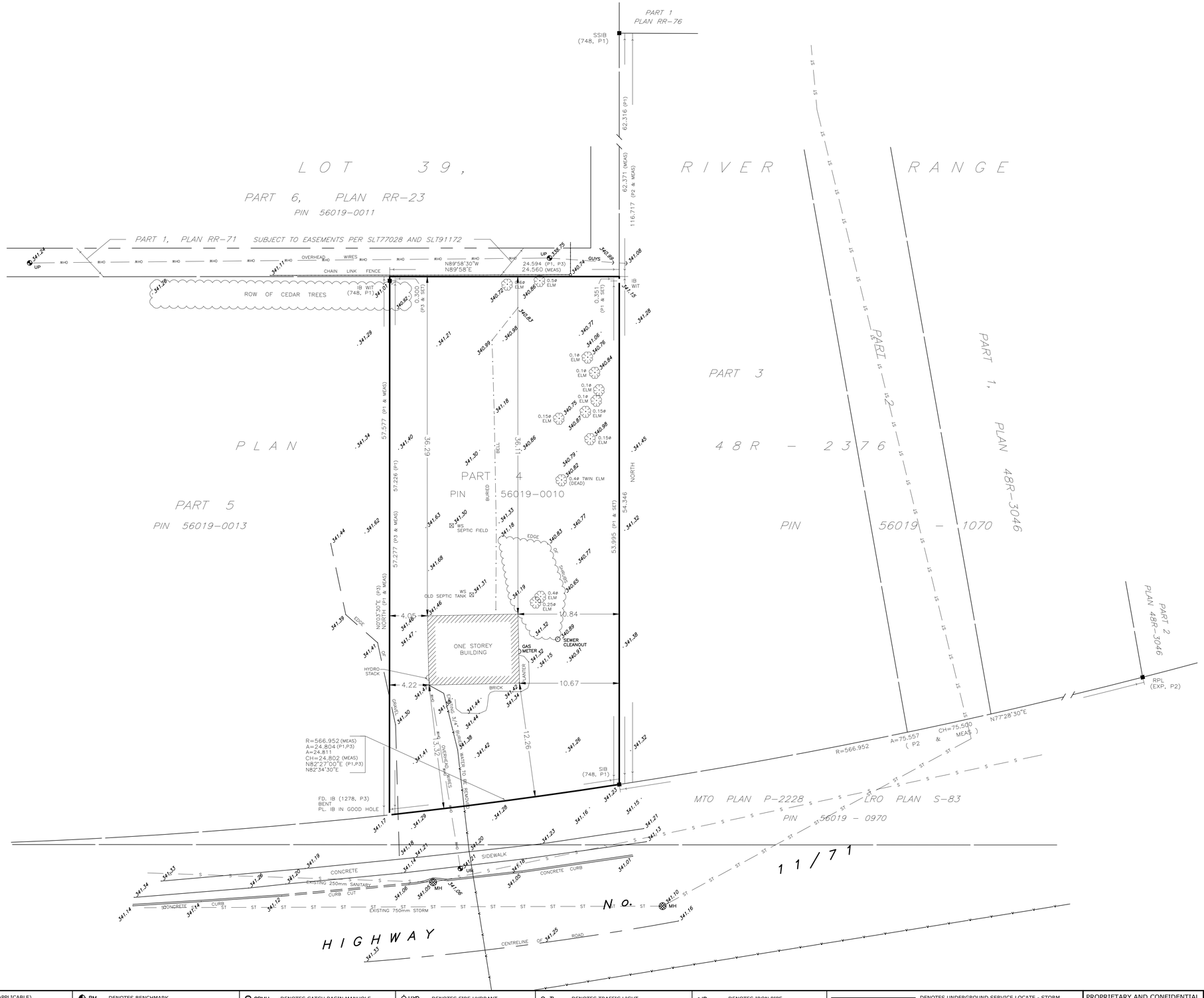
- Erosion and sediment control measures will be implemented in accordance with the standards of the Town of Fort Frances

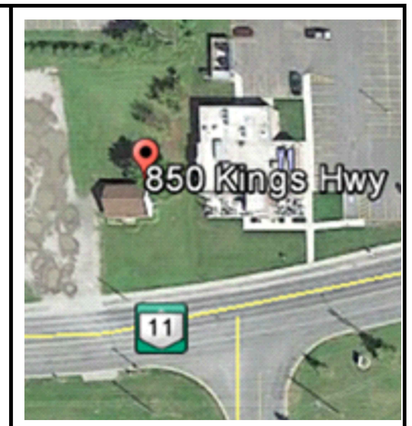
Candice Micucci, MCIP, RPP

Andrew Butler P.Eng.

LICENSED PROFESSIONAL ENGINEER
J. A. BUTLER
2017.02.21
09:26:07 -05'00'
PROVINCE OF ONTARIO

APPENDIX A
Legal Survey Plan





NOTES
1. ALL TOPOGRAPHIC & SERVICE INFORMATION COMPLETED BY EXP., ONTARIO LAND SURVEYORS. SEE ORIGINAL SURVEY DATED SEPTEMBER 30TH, 2016.
2. THE POSITION & SIZE OF POLE LINES, CONDUITS, WATERMAINS, SEWERS & OTHER UNDERGROUND & ABOVE GROUND UTILITIES & STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION & SIZE OF SUCH UTILITIES & STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES & STRUCTURES & SHALL ASSUME ALL LIABILITY FROM DAMAGE TO SAME.

SOVEREIGN ASSET MANAGEMENT

REV:	DESCRIPTION	DATE	APPROVED BY

ANTECH DESIGN & ENGINEERING GROUP
Engineers and Urban Planners
32 Zatonski Avenue
Brantford, ON. N3V 1G2
www.antechdesign.com

PROJECT:
SITE PLAN OF PROPOSED NEW CONSTRUCTION OF

PART OF LOT 39, RIVER RANGE
TOWNSHIP OF MCIRVINE
TOWN OF FORT FRANCES
DISTRICT OF RAINY RIVER
DESIGNATED AS PART 4, PLAN 48R-2376

850 KING'S HIGHWAY, FORT FRANCES, ONTARIO

Scale 1 : 200
8 6.0 4.0 2.0 0 4 8 Metres

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

ELEVATION NOTE:
ELEVATIONS ARE REFERRED TO BENCH MARK No. 0011979U171, LOCATED ON THE ADVENTURE INN, HAVING AN ELEVATION OF 341.184 METRES CGVD28.

SHEET 2 OF 9

TITLE: EXISTING CONDITION PLAN

DRAWN BY: CHM	CHECKED BY: JAB	DRAWING DATE: 2017.01.31

CUSTOMER: SOVEREIGN ASSET MANAGEMENT
DRAWING NUMBER: 161709

LEGEND & NOTES: (IF APPLICABLE)

■	DENOTES FOUND MONUMENTS
□	DENOTES SET MONUMENTS
IB	DENOTES IRON BAR
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
CC	DENOTES CUT CROSS
N&W	DENOTES NAIL & WASHER
PL	DENOTES REGISTERED PLAN
OU	DENOTES ORIGIN UNKNOWN
M	DENOTES MEASURED
PROP	DENOTES PROPORTIONED
WIT	DENOTES WITNESS
BM	DENOTES BENCHMARK
	DENOTES TREELINE
INV	DENOTES INVERT
VCM	DENOTES VERTICAL CONTROL MONUMENT
BP	DENOTES BELL PEDESTAL
FL	DENOTES FLOOD LIGHT
	DENOTES TRAFFIC SIGN
AC	DENOTES AIR CONDITIONER
GMRK	DENOTES GAS MARKER
CUL	DENOTES CULVERT
CB	DENOTES DOUBLE CATCH BASIN
CBMH	DENOTES CATCH BASIN MANHOLE
CB	DENOTES CATCH BASIN
DCBMH	DENOTES DOUBLE CATCH BASIN MANHOLE
DICB	DENOTES DITCH INLET CATCH BASIN
MH-ST	DENOTES STORM MANHOLE
MH-F	DENOTES FIBER OPTIC MANHOLE
MH-S	DENOTES SANITARY MANHOLE
MH-BMH	DENOTES BELL MANHOLE
MH-H	DENOTES HYDRO MANHOLE
MH-T	DENOTES TRAFFIC MANHOLE
VC	DENOTES VALVE CHAMBER
DRN	DENOTES DRAIN
WELL	DENOTES WATER WELL
HYD	DENOTES FIRE HYDRANT
HGLY	DENOTES HYDRO GUIDE WIRE
UP	DENOTES UTILITY POLE
HP	DENOTES HYDRO POLE
LS	DENOTES LIGHT STANDARD
HLS	DENOTES HYDRO LIGHT STANDARD
FP	DENOTES FLAG POLE
HH	DENOTES HAND HOLE
SN	DENOTES SIGN
MB	DENOTES MAIL BOX
BP	DENOTES BELL POLE
BLRD	DENOTES BOLLARD
OW	DENOTES OBSERVATION WELL
TL	DENOTES TRAFFIC LIGHT
MP	DENOTES MONITORING PIN
CS	DENOTES CURB STOP VALVE
RXS	DENOTES RAILWAY SIGN
RSB	DENOTES RAILWAY SIGNAL CONTROL BOX
BGLY	DENOTES BELL GUIDE WIRE
CTV	DENOTES CABLE PEDESTAL
TCB	DENOTES TRAFFIC CONTROL BOX
WV	DENOTES WATER VALVE
DP	DENOTES DECORATIVE POLE
GV	DENOTES GAS VALVE
PLR	DENOTES PILLAR
GP	DENOTES GUARD POST
IP	DENOTES IRON PIPE
IS	DENOTES SPRINKLER HEAD
OFC	DENOTES OIL FILLER CAP
HW	DENOTES HAND WELL
HTRAN	DENOTES HYDRO TRANSFORMER
PS	DENOTES POWER SUPPLY
PKM	DENOTES PARKING METER
TH	DENOTES TEST HOLE
BH	DENOTES BOREHOLE
MW	DENOTES MONITORING WELL
BMRK	DENOTES BELL MARKER
	DENOTES VALVE BOX
CMRK	DENOTES CABLE TV MARKER
	DENOTES UNDERGROUND SERVICE LOCATE - STORM
	DENOTES UNDERGROUND SERVICE LOCATE - SANITARY
B	DENOTES UNDERGROUND SERVICE LOCATE - BELL, TELEPHONE, CABLE
P	DENOTES UNDERGROUND SERVICE LOCATE - HYDRO
GAS	DENOTES UNDERGROUND SERVICE LOCATE - GAS
	DENOTES UNDERGROUND SERVICE LOCATE - WATER
OHW	DENOTES OVERHEAD WIRES
	DENOTES PROPERTY LINE
	DENOTES TRAFFIC FLOW DIRECTION
	DENOTES DIRECTION OF SURFACE WATER

PROPRIETARY AND CONFIDENTIAL

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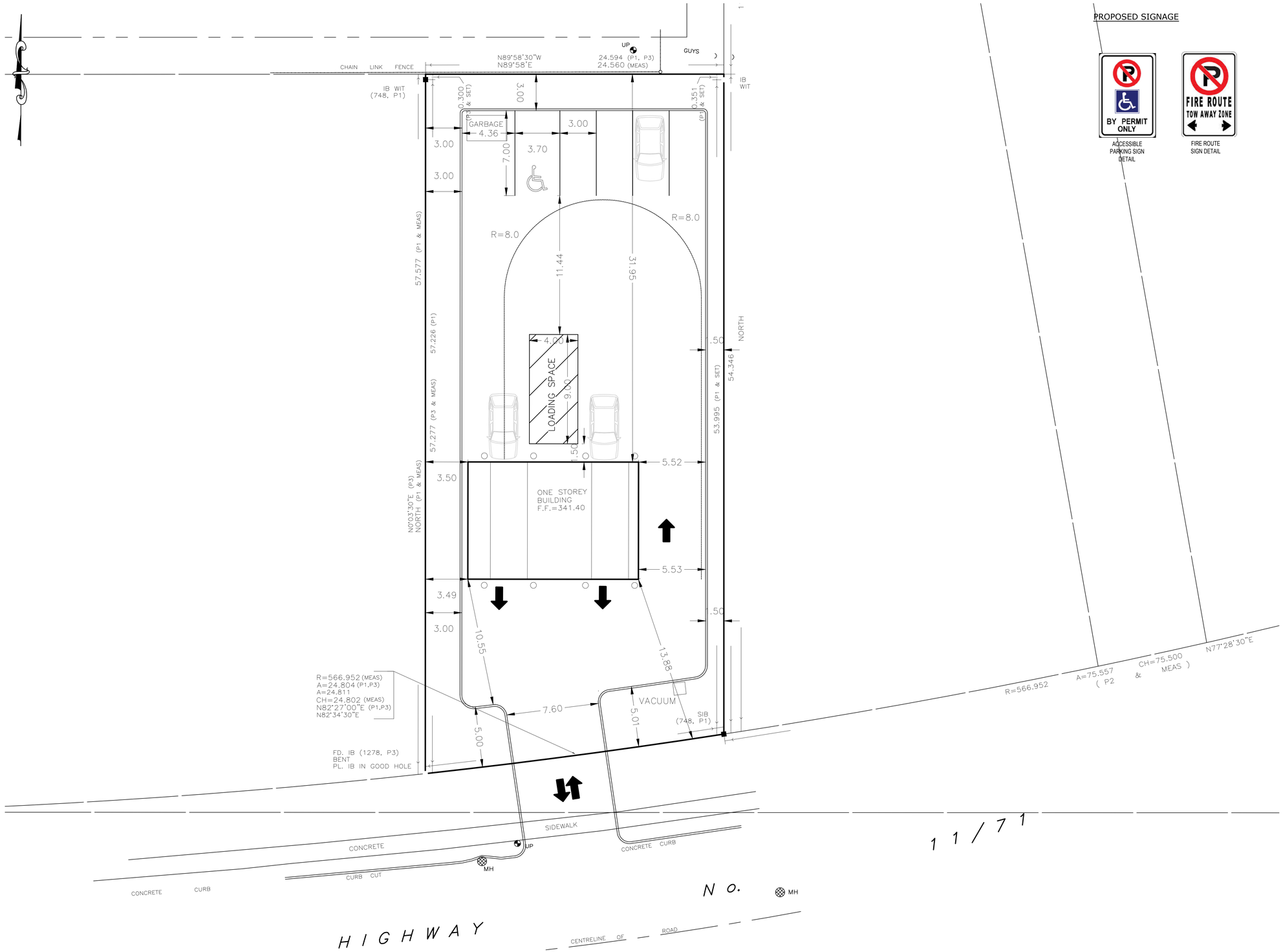
LICENSED PROFESSIONAL ENGINEER
J. A. BUTLER
PROVINCE OF ONTARIO

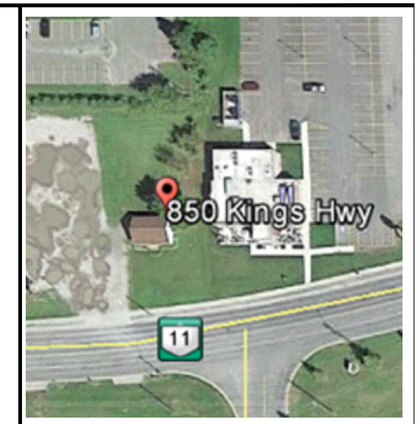
APPENDIX B
Site Plan



PROPOSED SIGNAGE

ACCESSIBLE PARKING SIGN DETAIL

FIRE ROUTE SIGN DETAIL



SITE STATISTICS

	ZONING REQUIREMENTS	EXISTING	PROPOSED
OFFICIAL PLAN DESIGNATION			
ZONING CATEGORY	E	E	E
E REQUIREMENTS			
MINIMUM LOT AREA	930m²		1378.3m²
MINIMUM LOT FRONTAGE	23m		24.8m ARC
MAXIMUM LOT COVERAGE	30%		9.9%
BUILDING AREA			136m²
MAXIMUM BUILDING HEIGHT	10.0m		10.0m
FRONT YARD SETBACK	7.5m		13.8m
REAR YARD SETBACK	10m		31.9m
SIDE YARD			
INTERIOR	3.5m		3.5m
INTERIOR	3.5m		7.0m
MINIMUM LANDSCAPE OPEN SPACE	20%		27%
PLANTING STRIP	3.0m / 1.5m		3.0 / 1.5m
PARKING SPACES	SECTION 3.20		
NO. OF ACCESSIBLE SPACES	1 SPACES		1
PARKING SPACE DIM.	3.0m x 7.00m		
ACC. PARKING SPACE DIM.	3.7m x 6.7m		3.7m X 6.7m
LOADING SPACE DIMENSIONS	3.50m X 9.00m		3.5m X 9.0m
TOTAL PARKING			
DRIVE THRU QUEUING	3.0m X 6.5m		
INBOUND QUEUING SPACES	5		5
MEASURED FROM THE ENTRANCE			

NOTES

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3. ALL WORKS INVOLVED IN THE CONSTRUCTION, RELOCATION AND REPAIR OF MUNICIPAL SERVICES SHALL BE TO THE SATISFACTION OF THE GENERAL MANAGER OF PUBLIC WORKS
4. STREET EXCAVATION PERMITS ARE REQUIRED FOR ANY WORK IN CITY RIGHT OF WAY BY ANY CONTRACTOR
5. REMOVE CURBS AND POUR NEW CURBS FOR ANY NEW DRIVEWAYS OR DRIVEWAYS TO BE ABANDONED AND / OR MADE GOOD.
6. STORM WATER DRAINAGE MUST NOT HAVE A NEGATIVE IMPACT ON ADJACENT PROPERTIES
7. NO PERSON SHALL CONSTRUCT OR DEMOLISH A BUILDING OR CAUSE A BUILDING TO BE CONSTRUCTED OR DEMOLISHED (INCLUDING SITE SERVICING) UNLESS A BUILDING PERMIT HAS BEEN ISSUED BY THE CHIEF BUILDING OFFICIAL
8. STOP BARS TO BE PAINTED ON PARKING AREAS TO CONTROL TRAFFIC FLOW
9. ABANDONED ENTRANCES TO BE REMOVED AND CURBS / SIDEWALKS RESTORED AS REQUIRED
10. ACCESSIBLE PARKING SPACES TO BE INDICATED WITH PAINTED SYMBOL ON ASPHALT AND EITHER POLE-MOUNT OR BUILDING-MOUNT SIGNS IN ACCORDANCE WITH LOCAL BY-LAWS

SOVEREIGN ASSET MANAGEMENT

REV:	DESCRIPTION	DATE	APPROVED BY
1	MISC.	2017.01.26	AB

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Scale 1 : 150

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SHEET 1 OF 9

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DRAWN BY: CHM | CHECKED BY: JAB | DRAWING DATE: 2017.01.31

CUSTOMER: SOVEREIGN ASSET MANAGEMENT

DRAWING NUMBER: 161709

LEGEND & NOTES: (IF APPLICABLE)

■	DENOTES FOUND MONUMENTS	BM	DENOTES BENCHMARK	CBMH	DENOTES CATCH BASIN MANHOLE	HYD	DENOTES FIRE HYDRANT	TL	DENOTES TRAFFIC LIGHT	IP	DENOTES IRON PIPE
□	DENOTES SET MONUMENTS		DENOTES TREELINE	CB	DENOTES CATCH BASIN	HGUY	DENOTES HYDRO GUIDE WIRE	MP	DENOTES MONITORING PIN	IS	DENOTES SPRINKLER HEAD
IB	DENOTES IRON BAR	INV	DENOTES INVERT	DCBMH	DENOTES DOUBLE CATCH BASIN MANHOLE	UP	DENOTES UTILITY POLE	CS	DENOTES CURB STOP VALVE	OFC	DENOTES OIL FILLER CAP
SIB	DENOTES STANDARD IRON BAR	VCM	DENOTES VERTICAL CONTROL MONUMENT	DICB	DENOTES DITCH INLET CATCH BASIN	HP	DENOTES HYDRO POLE	RXS	DENOTES RAILWAY SIGN	HW	DENOTES HAND WELL
SSIB	DENOTES SHORT STANDARD IRON BAR	BP	DENOTES BELL PEDESTAL	MH-ST	DENOTES STORM MANHOLE	LS	DENOTES LIGHT STANDARD	RSB	DENOTES RAILWAY SIGNAL CONTROL BOX	HTRAN	DENOTES HYDRO TRANSFORMER
CC	DENOTES CUT CROSS	FL	DENOTES FLOOD LIGHT	MH-F	DENOTES FIBER OPTIC MANHOLE	HLS	DENOTES HYDRO LIGHT STANDARD	BGUY	DENOTES BELL GUIDE WIRE	PS	DENOTES POWER SUPPLY
N&W	DENOTES NAIL & WASHER		DENOTES TRAFFIC SIGN	MH-S	DENOTES SANITARY MANHOLE	FP	DENOTES FLAG POLE	CTV	DENOTES CABLE PEDESTAL	PKM	DENOTES PARKING METER
PL	DENOTES REGISTERED PLAN	AC	DENOTES AIR CONDITIONER	MH-BMH	DENOTES BELL MANHOLE	HH	DENOTES HAND HOLE	TCB	DENOTES TRAFFIC CONTROL BOX	TH	DENOTES TEST HOLE
OU	DENOTES ORIGIN UNKNOWN	GMRK	DENOTES GAS MARKER	MH-H	DENOTES HYDRO MANHOLE	SN	DENOTES SIGN	WV	DENOTES WATER VALVE	BH	DENOTES BOREHOLE
M	DENOTES MEASURED	CUL	DENOTES CULVERT	MH-T	DENOTES TRAFFIC MANHOLE	MB	DENOTES MAIL BOX	DP	DENOTES DECORATIVE POLE	MW	DENOTES MONITORING WELL
PROP	DENOTES PROPORTIONED	CB	DENOTES DOUBLE CATCH BASIN	VC	DENOTES VALVE CHAMBER	BP	DENOTES BELL POLE	GV	DENOTES GAS VALVE	BMRK	DENOTES BELL MARKER
WIT	DENOTES WITNESS			DRN	DENOTES DRAIN	BLRD	DENOTES BOLLARD	PLR	DENOTES VALVE BOX		
				WELL	DENOTES WATER WELL	OW	DENOTES OBSERVATION WELL	GP	DENOTES GUARD POST	CMRK	DENOTES CABLE TV MARKER

	DENOTES UNDERGROUND SERVICE LOCATE - STORM
	DENOTES UNDERGROUND SERVICE LOCATE - SANITARY
B	DENOTES UNDERGROUND SERVICE LOCATE - BELL, TELEPHONE, CABLE
P P	DENOTES UNDERGROUND SERVICE LOCATE - HYDRO
GAS	DENOTES UNDERGROUND SERVICE LOCATE - GAS
	DENOTES UNDERGROUND SERVICE LOCATE - WATER
OHW OHW	DENOTES OVERHEAD WIRES
	DENOTES PROPERTY LINE
	DENOTES TRAFFIC FLOW DIRECTION
	DENOTES DIRECTION OF SURFACE WATER

PROPRIETARY AND CONFIDENTIAL

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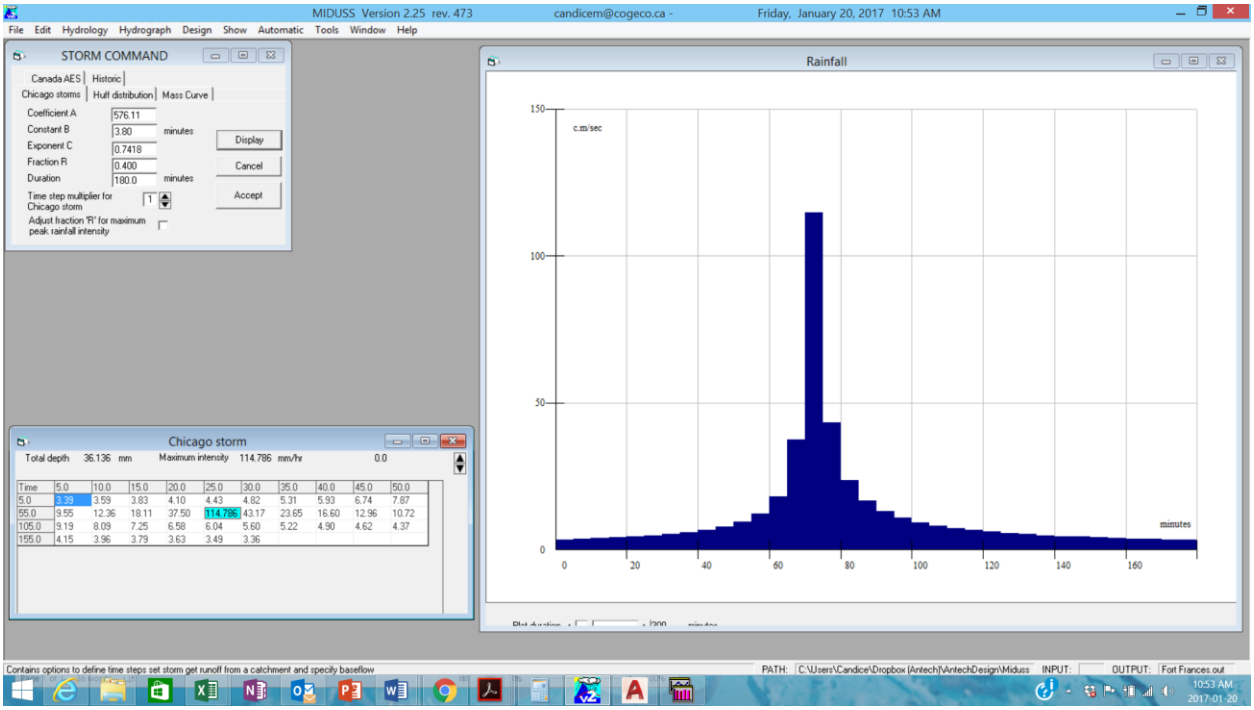
LICENSED PROFESSIONAL ENGINEER
J. A. BUTLER
PROVINCE OF ONTARIO

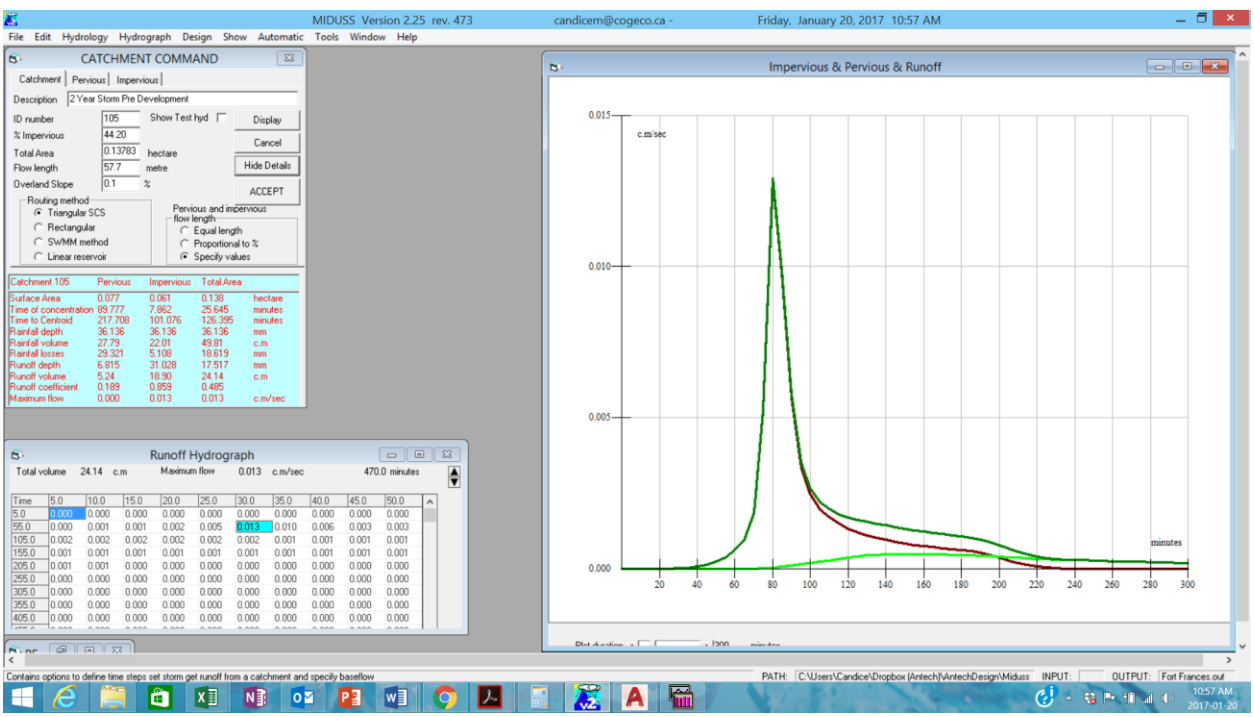
APPENDIX C
Site Services Design Sheet

	Hydraulic Load				Hydraulic Load			
	Supply				Waste			
Fixture or Device	**Supply Size**	**Fixture Units**	**Quantity**	**Total**	**Outlet Pipe**	**Fixture Units**	**Quantity**	**Total**
Toliet	3/8"	5	1	5	3	6	1	6
Bathroom sink	3/8"	2	1	2	1 1/2"	3	1	3
Hose Bib	1/2"	2.5	1	2.5				
Hot Water Expansion Tank	1/2"	4		0				
Mop Sink	1/2"	3	0	0	1 1/2"	3	1	3
Water Softener	3/4"	6	0	0				
Three Compartment Sink	1/2"	4	0	0	1 1/2"	3		0
Wall Mount Sink - Eye Wash Station	1/2"	4	1	4	1 1/2"	3	1	3
Commercial Dishwasher	1/2"	15	0	0	2	3		0
Wall Mount Sink	1/2"	4	1	4	1 1/2"	3		0
Coffee Machine	1/2"	4	0	0				
Iced Cappuccino Machine	1/2"	4	0	0				
Ice Machine	1"	10	0	0				
Pop Despenser	1/2"	10	0	0				
Funnel Floor Drain				0	2	3		0
Typical Floor Drain				0	2	3	3	9
Hub Drain				0	2	3		0
Carwash		45	1	45		100	1	100
Total Fixture Units				**62.5**				**124**

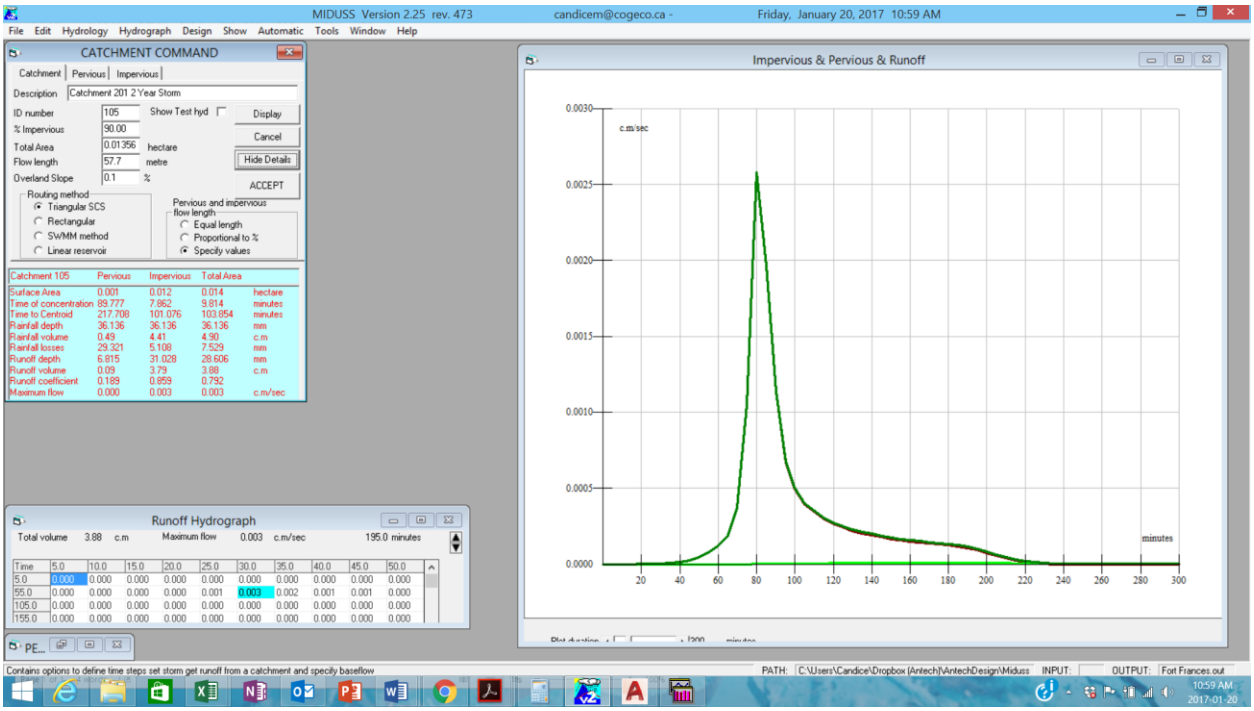
APPENDIX D
Stormwater Management Information/ Calculations

2 Year Pre Development

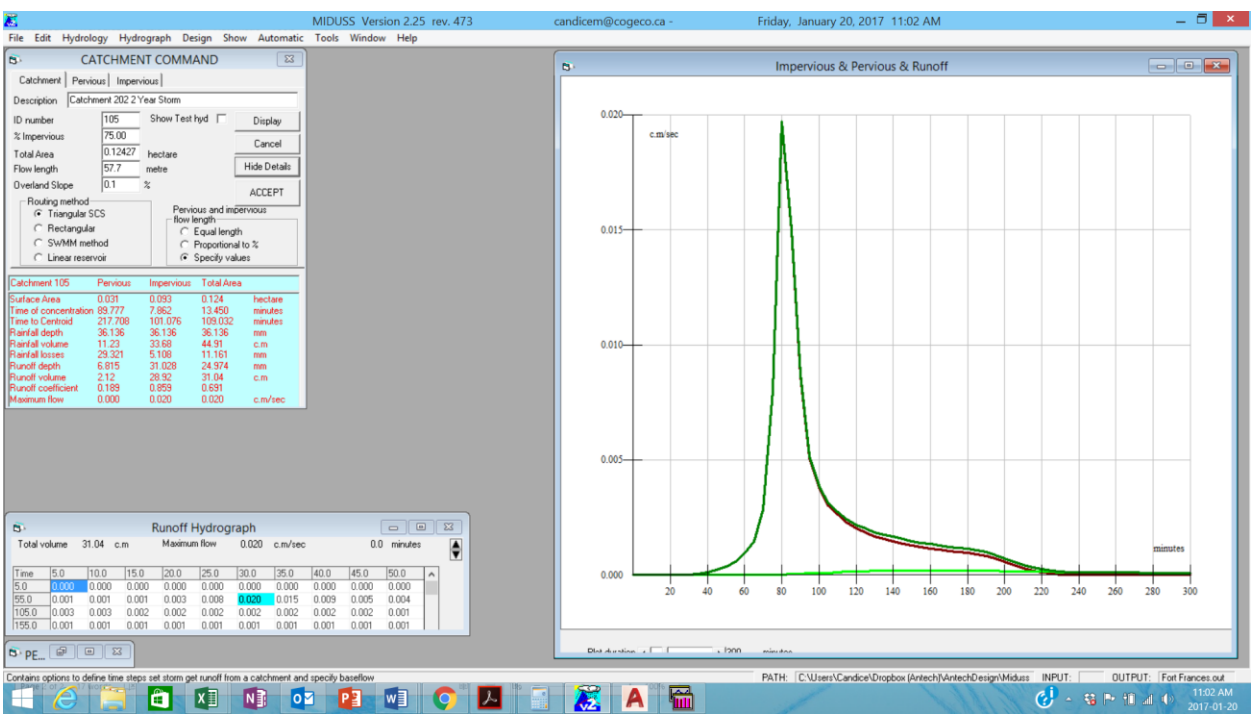




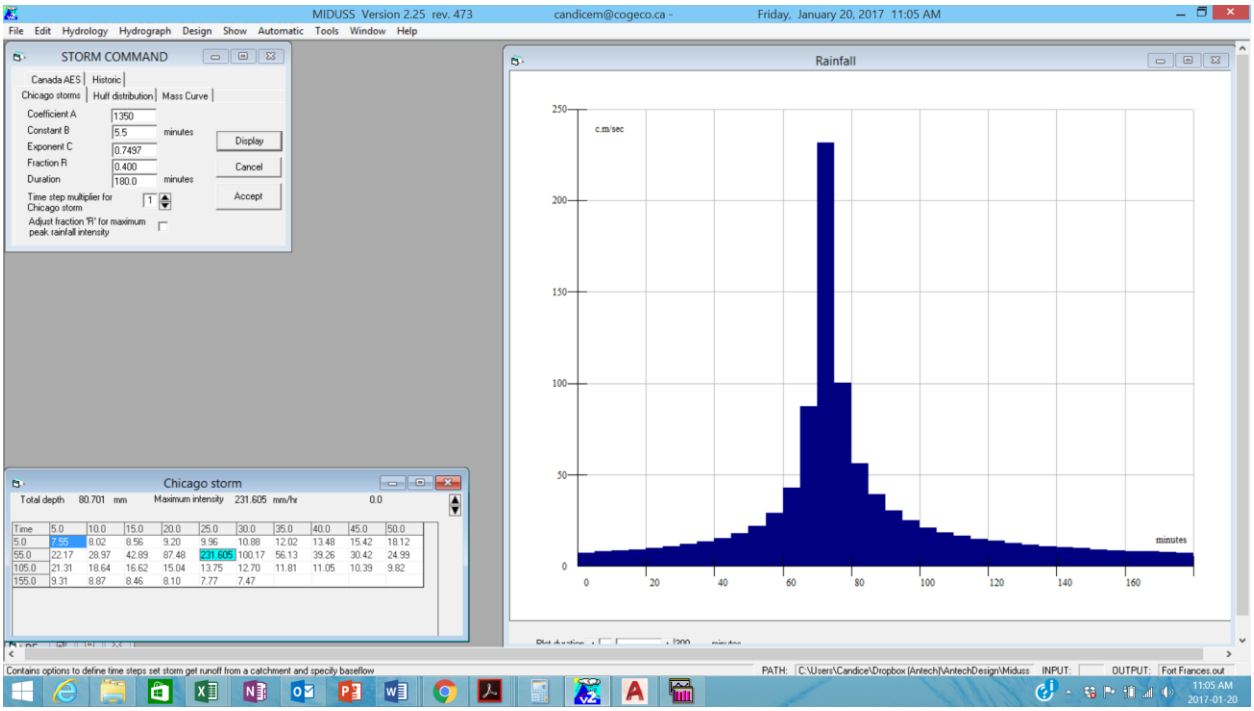
Post Development Catchment 201 (roof) 2 Year Storm

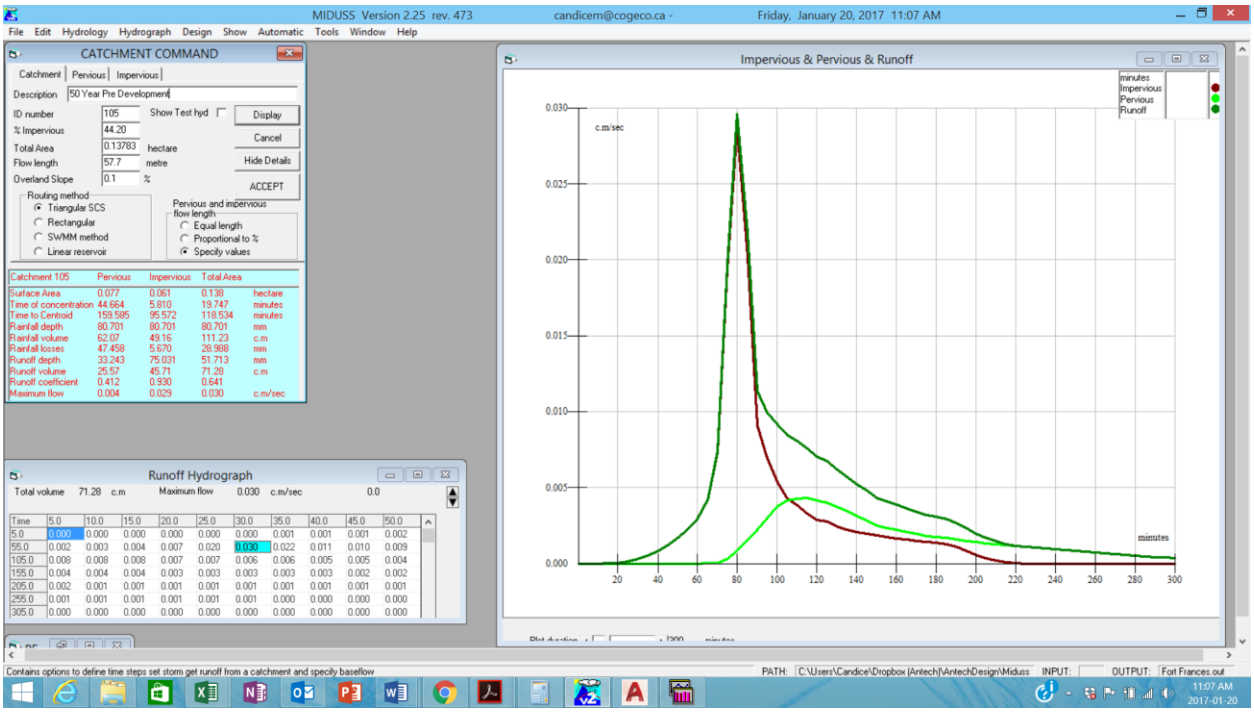


Catchment 202 (remainder) 2 Year Storm

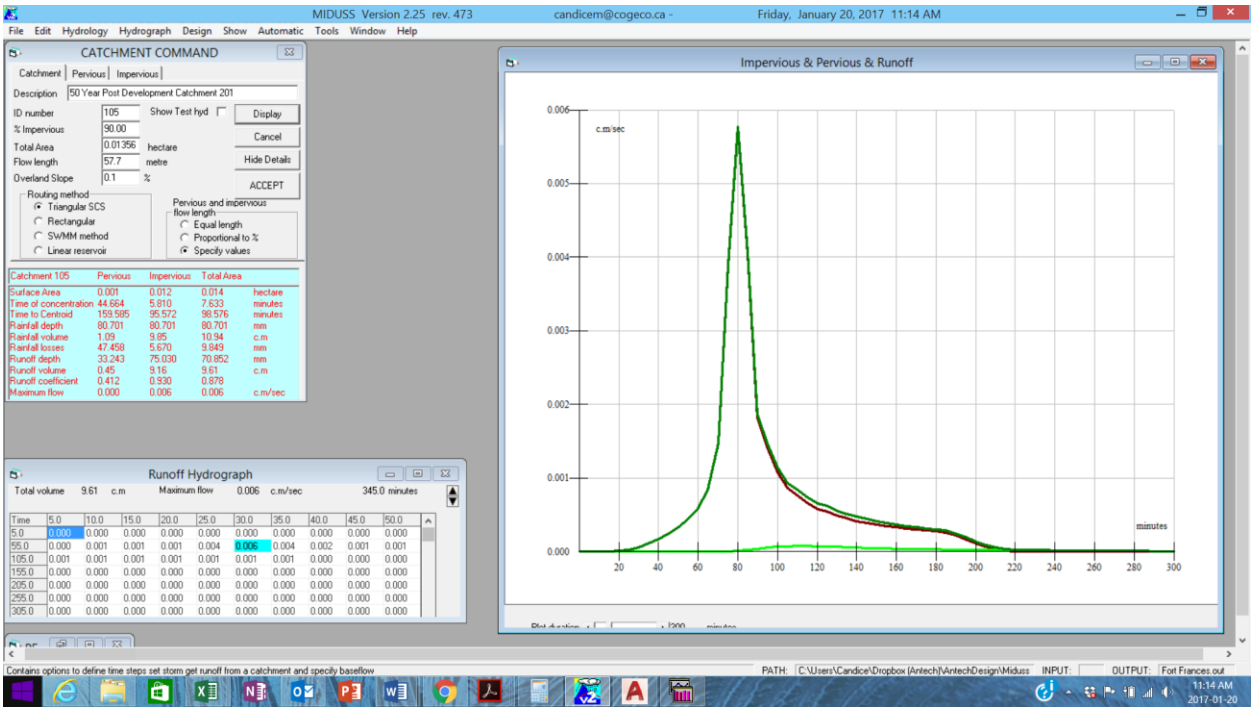


50 Year Storm Pre Development

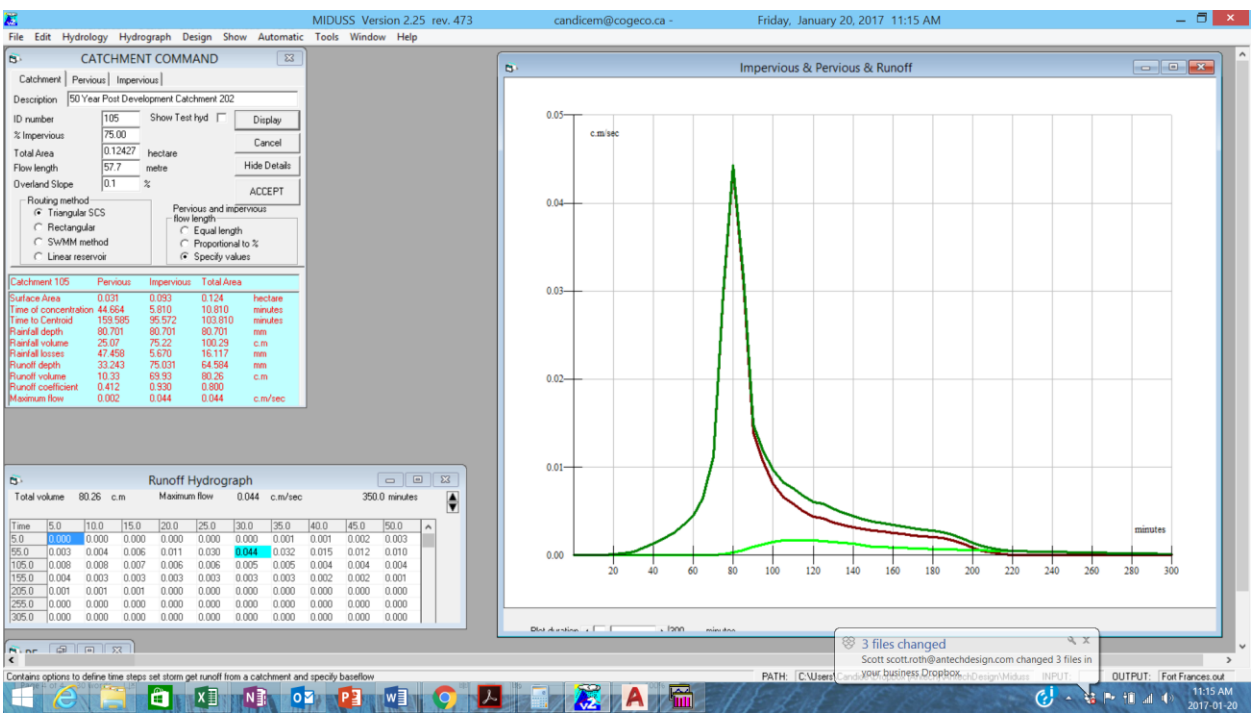




Post Development Catchment 201 50 Year Storm



Post Development Catchment 202 50 Year Storm



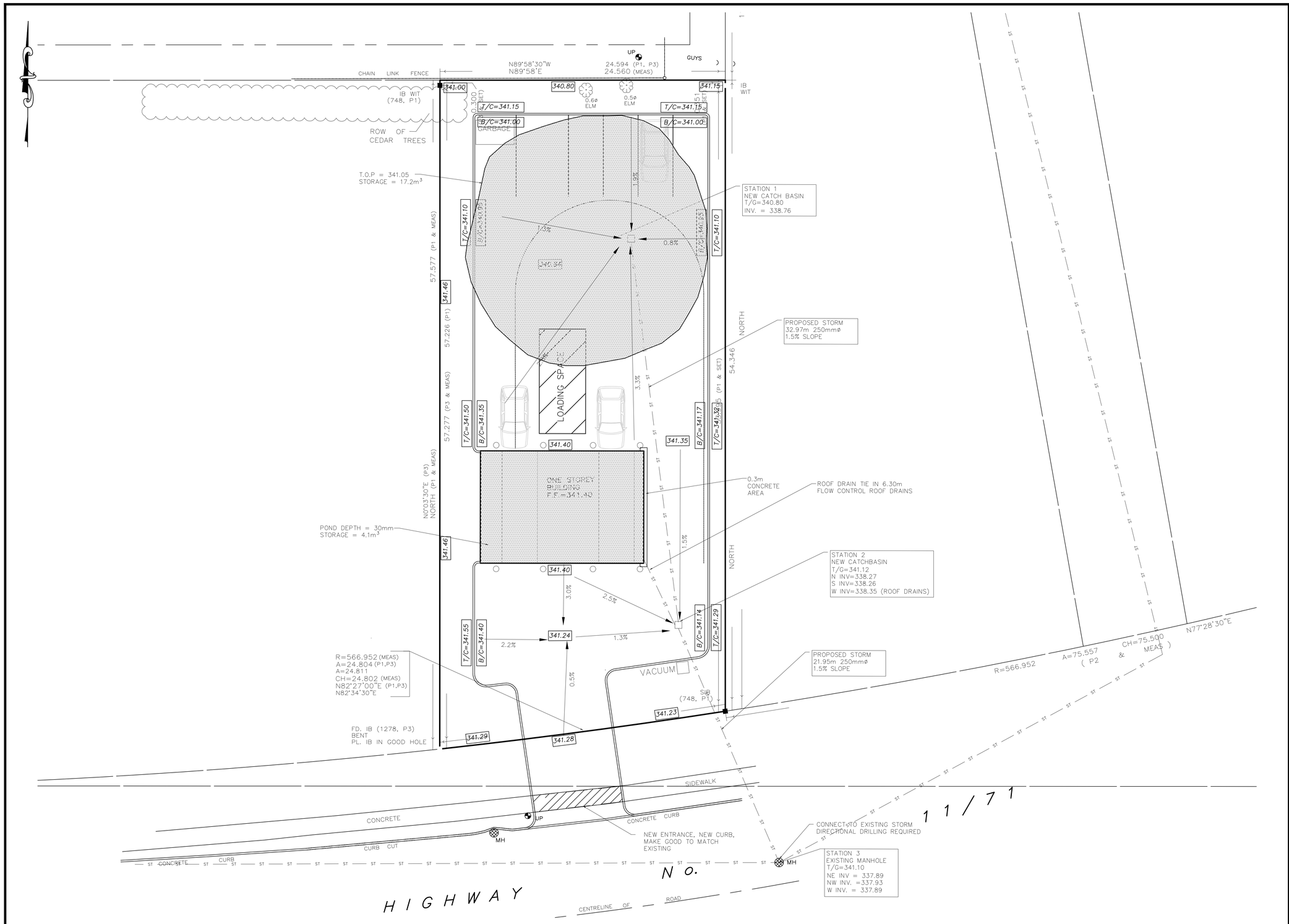
Storm Water Management Analysis Worksheet

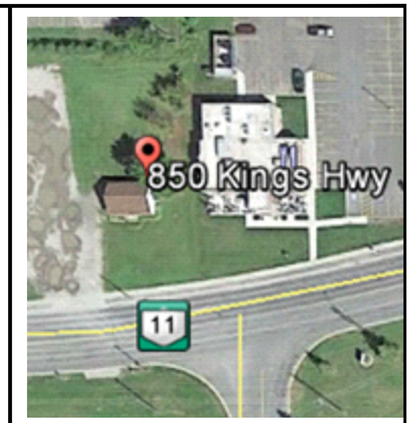
Project: 161709 **Client:** SAM
Date: 2017.01.20 **Property:** 850 Kings Highway

	Existing Site				Proposed Development			
Property Details	**Existing**	**Fraction**	**Runoff Coeff. Cr**	**Cr Total**	**Proposed**	**Fraction**	**Runoff Coeff. Cr**	**Cr Total**
Total Area (m^2)	1378.3	1.0000			1378.3	1.0000		
Buildings	71.7	0.0520	0.90	0.047	135.6	0.0984	0.90	0.089
Asphalt area	0	0.0000	0.90	0.000	865.5	0.6279	0.90	0.565
Gravel drive and parking	62	0.0450	0.75	0.034	0	0.0000	0.75	0.000
Bush	0	0.0000	0.35	0.000	0	0.0000	0.35	0.000
Marsh	0	0.0000	0.15	0.000	0	0.0000	0.15	0.000
Grass area	1244.6	0.9030	0.40	0.361	377.2	0.2737	0.40	0.109
Permeable Pavers	0	0.0000	0.60	0.000	0	0.0000	0.60	0.000
Composite Cr				**0.442**				**0.763**

Catchment Areas	**Existing Site**				**Proposed Development Catchment Area 202**				**Post Development Catchment Area 201**			
Property Details	**Existing**	**Fraction**	**Runoff Coeff. Cr**	**Cr Total**	**Proposed**	**Fraction**	**Runoff Coeff. Cr**	**Cr Total**	**Proposed**	**Fraction**	**Runoff Coeff. Cr**	**Cr Total**
Total Area (m^2)	1378.30	0.00			1242.70	1.00			135.60	1.00		
Buildings					0.00	0.00	0.90	0.00	135.60	1.00	0.90	0.90
Asphalt area					865.10	0.70	0.90	0.63	0.00	0.00	0.90	0.00
Gravel drive and parking					0.00	0.00	0.75	0.00	0.00	0.00	0.75	0.00
Bush					0.00	0.00	0.35	0.00	0.00	0.00	0.35	0.00
Marsh					0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00
Grass area					377.20	0.30	0.40	0.12	0.00	0.00	0.40	0.00
Permeable Pavers					0.00	0.00	0.60	0.00	0.00	0.00	0.60	0.00
Composite Cr								**0.75**				**0.90**

APPENDIX E
Stormwater Management Plan





NOTES

1. THIS PLAN IS NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.
2. ALL TOPOGRAPHIC & SERVICE INFORMATION COMPILED FROM SURVEY DATA COMPLETED BY EXP., ONTARIO LAND SURVEYORS.
3. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE:
   A. SITE PLAN
   B. EXISTING CONDITIONS PLAN
   C. SITE SERVICING
   D. STORM WATER MANAGEMENT REPORT
4. THIS PLAN IS TO BE USED FOR STORM WATER MANAGEMENT ONLY; ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THIS PLAN MUST NOT BE USED TO SITE THE PROPOSED BUILDING OR SERVICES.
5. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST
   A. CHECK AND VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND ELEVATIONS WHICH INCLUDED BUT IS NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS. REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING
   B. OBTAIN ALL UTILITY LOCATED AND REQUIRED PERMITS AND LICENSES
   C. VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND / OR BASEMENT FLOOR ELEVATIONS (WHICHEVER MAY APPEAR ON THE FACE OF THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.
   D. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE THE MOST RECENT REVISIONS
6. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO THE LOCAL STANDARDS.
7. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR THEIR REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, THEY MUST OBTAIN WRITTEN PERMISSION FORM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO INFRASTRUCTURE SERVICES - ENGINEERING DEVELOPMENT DIVISION, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
8. ALL WORK WITHIN THE MUNICIPAL OR REGIONAL RIGHT-OF-WAY MUST GO THROUGH THE LOCAL OFF-SITE WORKS PROCESS AND MUST BE COMPLETED BY A DEVELOPMENT SELECTED CONTRACTOR SOLELY AT THE DEVELOPER'S EXPENSE.
9. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE ENGINEER.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIODS INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO LOCAL STANDARDS OF THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

SOVEREIGN ASSET MANAGEMENT

REV:	DESCRIPTION	DATE	APPROVED BY

ANTECH DESIGN & ENGINEERING GROUP
Engineers and Urban Planners
32 Zatonski Avenue
Brantford, ON. N3V 1G2
www.antechdesign.com

PROJECT:
SITE PLAN OF PROPOSED NEW CONSTRUCTION OF

PART OF LOT 39, RIVER RANGE
TOWNSHIP OF MCIRVINE
TOWN OF FORT FRANCES
DISTRICT OF RAINY RIVER
DESIGNATED AS PART 4, PLAN 48R-2376

850 KING'S HIGHWAY, FORT FRANCES, ONTARIO

Scale 1 : 200

8 6.0 4.0 2.0 0 4 8 Metres

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

ELEVATION NOTE:
ELEVATIONS ARE REFERRED TO BENCH MARK No. 0011979U171, LOCATED ON THE ADVENTURE INN, HAVING AN ELEVATION OF 341.184 METRES CGVD28.

SHEET 1 OF 1

TITLE: STORM WATER MANAGEMENT PLAN

DRAWN BY: CHM	CHECKED BY: JAB	DRAWING DATE: 2017.01.31

CUSTOMER: MELKO DEVELOPMENT INC.

DRAWING NUMBER: 161709

LEGEND & NOTES: (IF APPLICABLE)

■	DENOTES FOUND MONUMENTS
□	DENOTES SET MONUMENTS
IB	DENOTES IRON BAR
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
CC	DENOTES CUT CROSS
N&W	DENOTES NAIL & WASHER
PL	DENOTES REGISTERED PLAN
OU	DENOTES ORIGIN UNKNOWN
M	DENOTES MEASURED
PROP	DENOTES PROPORTIONED
WIT	DENOTES WITNESS
BM	DENOTES BENCHMARK
	DENOTES TREELINE
INV	DENOTES INVERT
VCM	DENOTES VERTICAL CONTROL MONUMENT
BP	DENOTES BELL PEDESTAL
FL	DENOTES FLOOD LIGHT
	DENOTES TRAFFIC SIGN
AC	DENOTES AIR CONDITIONER
GMRK	DENOTES GAS MARKER
CUL	DENOTES CULVERT
CB	DENOTES DOUBLE CATCH BASIN
CBMH	DENOTES CATCH BASIN MANHOLE
CB	DENOTES CATCH BASIN
DCBMH	DENOTES DOUBLE CATCH BASIN MANHOLE
DICB	DENOTES DITCH INLET CATCH BASIN
MH–ST	DENOTES STORM MANHOLE
MH–F	DENOTES FIBER OPTIC MANHOLE
MH–S	DENOTES SANITARY MANHOLE
MH–BMH	DENOTES BELL MANHOLE
MH–H	DENOTES HYDRO MANHOLE
MH–T	DENOTES TRAFFIC MANHOLE
VC	DENOTES VALVE CHAMBER
DRN	DENOTES DRAIN
WELL	DENOTES WATER WELL
HYD	DENOTES FIRE HYDRANT
HGUY	DENOTES HYDRO GUIDE WIRE
UP	DENOTES UTILITY POLE
HP	DENOTES HYDRO POLE
LS	DENOTES LIGHT STANDARD
HLS	DENOTES HYDRO LIGHT STANDARD
FP	DENOTES FLAG POLE
HH	DENOTES HAND HOLE
SN	DENOTES SIGN
MB	DENOTES MAIL BOX
BP	DENOTES BELL POLE
BLRD	DENOTES BOLLARD
OW	DENOTES OBSERVATION WELL
TL	DENOTES TRAFFIC LIGHT
MP	DENOTES MONITORING PIN
CS	DENOTES CURB STOP VALVE
RXS	DENOTES RAILWAY SIGN
RSB	DENOTES RAILWAY SIGNAL CONTROL BOX
BGUY	DENOTES BELL GUIDE WIRE
CTV	DENOTES CABLE PEDESTAL
TCB	DENOTES TRAFFIC CONTROL BOX
WV	DENOTES WATER VALVE
DP	DENOTES DECORATIVE POLE
GV	DENOTES GAS VALVE
PLR	DENOTES PILLAR
GP	DENOTES GUARD POST
IP	DENOTES IRON PIPE
IS	DENOTES SPRINKLER HEAD
OFC	DENOTES OIL FILLER CAP
HW	DENOTES HAND WELL
HTRAN	DENOTES HYDRO TRANSFORMER
PS	DENOTES POWER SUPPLY
PKM	DENOTES PARKING METER
TH	DENOTES TEST HOLE
BH	DENOTES BOREHOLE
MW	DENOTES MONITORING WELL
BMRK	DENOTES BELL MARKER
	DENOTES VALVE BOX
CMRK	DENOTES CABLE TV MARKER
	DENOTES UNDERGROUND SERVICE LOCATE - STORM
	DENOTES UNDERGROUND SERVICE LOCATE - SANITARY
B	DENOTES UNDERGROUND SERVICE LOCATE - BELL, TELEPHONE, CABLE
P	DENOTES UNDERGROUND SERVICE LOCATE - HYDRO
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