SERVICING & STORMWATER MANAGEMENT REPORT

FOR

PROPOSED ADDITION TO FAIRFIELD INN AND SUITES AT

261 ESSA ROAD, BARRIE, ONTARIO

August 13, 2019

Prepared by:

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Professional Engineers Ontario

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1.0 INTRODUCTION

n Architecture Inc. was retained by owner of the property 1823800 Ontario Inc. to undertake the servicing and stormwater management design for the proposed property development. The purpose of this report is to present the storm water management, sanitary sewage disposal, water distribution and appropriate measures to mitigate the impact of storm runoff with the proposed development.

2.0 STUDY AREA

The subject site is located at west of Highway 404/ Essa Road and south of Ardagh Road as shown in Figure 1.

A legal and topographic survey has been prepared by Rudy Mak Surveying Ltd, dated 7th November 2016 which identifies the site as part the Block 39 of Registered 51M-374City of Barrie, County of Simcoe.

Figure 1 - Site Location Plan

3.0 PROPOSED DEVELOPMENT

Site is proposed to add 3 story storage with an elevator and 2 stories above the parking space on north side of the building.

Existing buildings ground floor level is at 273.95m. Existing grades around the addition are proposed to be matched with the existing grading. Proposed site servicing, grading and storm drainage plans are submitted separately as full-size drawings with this report.

4.0 OBJECTIVES OF STORMWATER DRAINAGE AND SITE SERVICING

Potential stormwater management (SWM) strategies to mitigate any potential impacts per design guidelines are presented in the report by studying following:

- Identifying existing runoff pattern and quantity of runoff discharge from proposed development area;
- Identifying post-development runoff from the site and changes due to proposed development;
- Evaluate the impact of proposed addition on existing stormwater management system, sanitary sewer and water supply;
- Evaluate existing servicing will be meeting the additional demand or not.

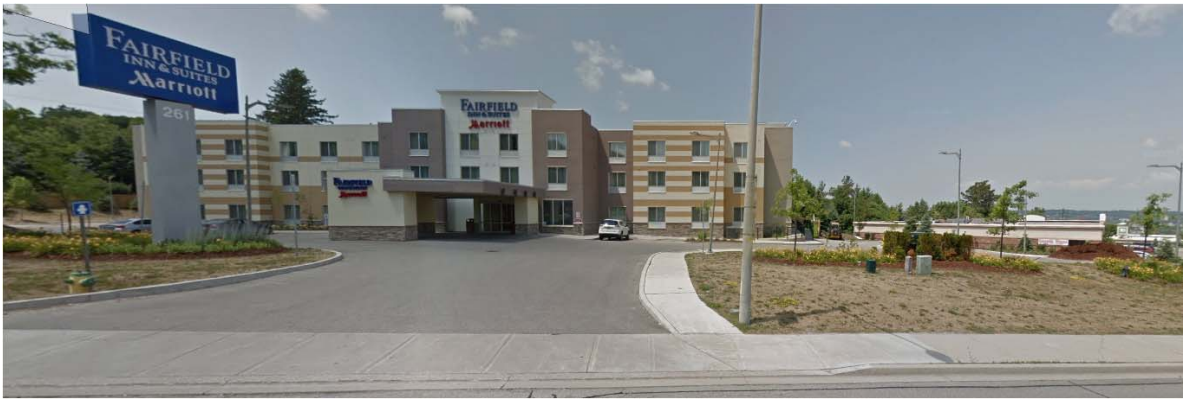


Figure 2 - Site Existing Condition

5.0 EXISTING TOPOGRAPHY AND DRAINAGE PATTERN

The total site has approximately 0.65 ha area, with land covered with grass, asphalt surface, concrete surface and a existing building as shown in Figure 2. The topographical survey (Refer: Topographical Map, Appendix A) indicates that the site is sloped from west towards east. Highest elevation at north-west corner of the property is 175.50 goes down at 170.30 at south-east corner at a slope of 1.6% approximately.

6.0 STORMWATER MANAGEMNET CRITERIA

Stromwater Management Criteria for proposed development site determined based on *Stormwater Drainage and Stormwater Management Policies and Design Guidelines, City of Barrie (2017)* and summarized as follows:

- **Water Quantity Control** - Post-to-pre quantity control shall be provided unless otherwise directed by the City or Conservation Authority or unless otherwise indicated in an approved master drainage plan or watershed plan;

- **Water Quality Control** –Stormwater discharged from the post development site are required to meet a minimum 80% TSS removal or an enhanced Level (Level 1) removal as referenced in the MOE (2003) SWMPD Manual;
- **Erosion and Sediment Control During Construction -** Requirements and concepts for erosion and sediment control measures during construction are to comply with the City of Barrie Site Alteration By-law 2006-101 and should be identified in the design drawing package.

7.0 STORMWATER MANAGEMNET STUDY

7.1 Comparison Existing Land Use and Proposed Conditions

Land-use under the proposed development was compared to land-use under existing conditions to assess the changes in runoff flows on the site. The comparison presented in Table 1. As revealed from the Table 1, there will be an overall no change in imperviousness under the proposed development condition.

Table 1 – Comparison between Existing and Proposed Condition Land Use

LANS USE TYPE	PAVED AREA (m3)	ROOF AREA (m3)	GRASS AREA (m3)	TOTAL AREA (Ha.)
Existing Condition	3137.06	1240.00	2112.91	0.65
Existing Condition (%)	48%	19%	33%	
Proposed Condition	2940.06	1436.03	2112.91	0.65
Proposed Condition (%)	45%	22%	33%	
Increase/Decrease (%)	-3%	3%	0%	

7.2 Runoff Coefficients

Runoff parameters used for site under existing and proposed conditions are shown in Table 2

Table 2 – Runoff Coefficients

Land Use	Runoff Coefficient
Open Space <7% Slope	0.25
Impervious Area(Asphalt, Concrete)	0.95
Impervious Area (Roof Area)	0.95

Pre-development composite runoff coefficients are calculated based on existing land use and presented in Appendix 2 (Calculation Sheet 1). Post development catchment area is shown in DR 102 in Appendix A. Calculations for pre-and post-development imperviousness are given in Appendix B and summarized below:

Table 3 – Composite Runoff Coefficients

Drainage Area	Runoff coefficient 'C' (Pre-development)	Runoff coefficient 'C' (Post-development)
SITE	0.72	0.72

7.3 Peak Flow Rates

Given the size and characteristics of the site and catchment areas, the Rational Formula was used to determine the peak flows from the subject site under pre-development and post-development conditions. The rainfall-runoff relationship is as follows:

$$Q = \frac{(c)(i)(A)}{360}$$

Where:
Q = Peak Flow in m^3/s;
A = Effective area of drainage basin in hectares (ha);
C = runoff coefficient; and
I = Rainfall intensity in mm/hr.

The runoff coefficient value (C) is determined based on the soil type, land use, and the antecedent moisture related to the condition of the catchment. The scenarios in which a catchment has more than one land use or soil type, a representative runoff coefficient is determined using areas of the different land cover as weighting factor.

Rainfall intensities were calculated using the rainfall intensity-duration-frequency (IDF) values for the location coordinate of proposed site. The IDF values were obtained from the Table 3.1 :Barrie WPCC IDF Curve Parameters – Adjusted to Account for Climate Change and are summarized in Table 3 below.

Table 4 – IDF Parameters

Return Period	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	678.085	853.608	975.865	1146.275	1236.152	1426.408
B	4.699	4.699	4.699	4.922	4.699	5.273
C	0.781	0.766	0.760	0.757	0.751	0.759

7.4 Pre-development Peak Flow

Pre-development peak flows are calculated based on existing land use and presented in Calculation Sheet 1, Appendix B. The results are summarized in Table 5.

Table 5 – Pre-development Peak Flow

2 Years	5 Years	10 Years	25 Years	50 Years	100 Years
108.27	141.91	164.87	212.32	256.75	293.39

(Unit of measurement L/sec)

7.5 Post-development Proposed Drainage Pattern and Peak Runoff Flow Rate

The proposed site enclosed a mix of paved and grassy areas as well as buildings. Proposed site grades were selected to ensure vehicular access was unimpeded as well as to provide a surface storage for rainfall events.

For the proposed development condition, the side is divided in four sub-catchments as shown in Figure DR 102 (Appendix A). Runoff from these sub-catchments will flow through proposed inlets as presented in Site Servicing Plan (Drawing C2).

Post-development peak flow are calculated and presented Calculation Sheet 2, Appendix B. The results are summarized in Table 6.

Table 6 – Post-development Peak Flow

2 Years	5 Years	10 Years	25 Years	50 Years	100 Years
108.25	141.88	164.84	212.27	256.70	293.33

(Unit of measurement L/sec)

7.6 Comparison of Existing and Proposed Runoff Rates

Flow rates under different storm events were calculated for both existing and proposed conditions using the Rational Method. Catchment areas and hydrologic parameters were determined using the available land use information and topographic maps (as shown in Figures DR 101 and DR 102 in Appendix A).

The primary goal of the drainage and hydrologic analysis is to examine the effect of the development on local storm drainage. This analysis was used to create goals for the stormwater management design. Table 7 presents the peak flow rates comparison for both existing and proposed conditions calculated for the entire site under, while the detailed flow calculations and are presented in Appendix B. It should be noted that the post-development flows in Tables 6 and 7 are to address the impact of the development only, and do not represent the final stormwater management design flows.

Table 7 – Comparison between Existing and Post-development Flow

CONDITIONS/FLOW (L/SEC)	2-Yrs	5-Yrs	10-Yrs	25-Yrs	50-Yrs	100-Yrs
Pre-Development Allowable Flow (L/sec)	108.27	141.91	164.87	212.32	256.75	293.39
Post-Development Peak Flow (L/sec)	108.25	141.88	164.84	212.27	256.70	293.33
Peak Flow Increase (L/sec)	-0.02	-0.03	-0.03	-0.04	-0.05	-0.06

7.7 Quantity Control Measure

7.7.1 Quantity Control

As shown in Table 7, there will be a minor change in flow from pre-development condition to post development condition – therefore no additional control measure is proposed. Existing 75mm dia. orifice plate continues to control Stromwater flow.

7.7.2 Storage for Quantity Control

Since there will be negligible change is flow in post development flow over pre development flow of rainfall events (2 years to 100 years) – no additional on site storage is considered to be implemented.

Since there is a change in storm sewer layout – following comparison shows there will be additional storage available after post development condition.

Table 8 – Changes in Pipe Storage

Development Condition	Location		Length (m)	Diameter (mm)	Storage Volume (m^3)
	From	To			
Pre-development	CBMH6	STM MH 5	23	600	11.98
	STM MH 5	MH 2	18	600	
Post-development	CBMH6	STM MH 5	32	600	16.07
	STM MH 5	MH 2	23	600	

On the other hand – existing grading for the area out of impact will remain same after the development – the ponding storage on parking lot and manholes will remain same and as shown in table 7 there will be additional 4.09 m^3 available due to change is pipe layout.

7.9 Water Quality Control

Long term average removal of 80% of Total Suspended Solids (TSS) on an annual basis all runoff leaving the site is required. Quality control will be achieved by using soft landscape areas and oil/grit separator.

As per Site Servicing Plan prepared by John Towle Associate Limited Consulting Engineers shows that an existing Oil/grit separator's (STC 300) is serving the site. As there will be no change in runoff coefficient and flow from pre-development to post development condition – no change in existing Oil and Grit separator is proposed.

7.10 Erosion and Sediment Control during Construction

The erosion potential of the study area was assessed using methods described in the City of Barrie Site Alteration By-law 2006-101 of temporary erosion and sediment control measures suitable for construction sites close to highways.

During Site construction, various temporary measures will be implemented to prevent the discharge of sediment laden stormwater from the Site. These measures include silt fencing, catch basin buffers and mud-mats.

In addition to the above, the following "good housekeeping" measures are recommended:

- All exposed soil shall be stabilized as soon as possible with a seed and mulch application as directed by the Engineer;
- No construction activity or machinery shall intrude beyond the silt/snow fence or limit of construction area;
- All construction vehicles shall leave the site at designated locations as shown on the plans;
- Stockpiles of soil shall be set back from any watercourse and stabilized against erosion as soon as possible. A set back of at least 15m from any top-of-bank, watercourse or pond is required;
- Cleaning and repairs of mud-mats and any other temporary sediment control measures shall be completed as deemed necessary through regular inspection;
- Sediment/slit shall be removed from the sediment control devices after storm events and deposited in areas as approved by the engineer;
- All re-graded areas within the development which are not occupied by buildings, roadways, sidewalks, or driveways shall be top-soiled and sodded/seeded immediately after completion of final grading operations as directed by the engineer.

8.0 MINOR SYSTEM DRAINAGE

Minor storm drainage was designed and constructed to convey stormwater to existing storm sewer during the construction of hotel (Refer: Drawing C1, Appendix D). To accommodate the proposed addition to the building – the location of manhole (STM MH5) and alignment of pipes connecting STM CBMH-6 to STM MH 5 proposed to re-align to avoid conflict with footings of building addition.

9.0 MAJOR SYSTEM DRAINAGE

Existing overland flow direction will remain same since there will be no change in grading of the surface due to proposed addition. The overland flow will not impact the building since the grading of the site ensures storm flows greater than 100 years will be able to flow overland through the site without any impact to proposed buildings and adjacent site.

10.0 WATER DEMAND

There will be no change in water demand because the addition of the building proposed to use as storage.

11.0 SANITARY

Waste water flow will remain same as existing condition due to addition of proposed storage space in the existing building.

12.0 SERVICE CONNECTIONS

12.1 Sanitary:

Existing 200 mm dia. sanitary sewer service connection proposed to serve the site.

12.2 Domestic / Fire Water

Existing 150mm diameter fire and 50 mm domestic water service connection will continue serving the site.

13.0 SUMMARY & CONCLUSIONS

This analysis presents a detailed stormwater management control plan addressing both quantity and quality controls required to meet all design criteria. Drainage boundaries have been established to estimate flows to the proposed drainage collection system for the site in order to develop a comprehensive drainage and stormwater management plan for the proposed development. There will be no negative impact or increase in stormwater peak flows under proposed controlled conditions.

The drainage summary of our findings and drainage analysis for the subject property is as follows:

- The hydrologic and hydraulic analysis presented in this report addresses the existing and proposed site conditions;
- Impervious areas were calculated under both existing and proposed conditions and a significant increase in impervious areas was found;
- Stormwater management design was reviewed for the subject site to provide flow quantity and quality control;

- Preliminary design was performed for the proposed storm sewer network to convey the minor system runoff;
- Recommended quantity control measures for the site are achieved through the use of a existing 75mm diameter orifice plate;
- Adequate stormwater runoff storage for large design storms is achieved through temporary surface storage;
- An existing Oil/Grit Separator of model Stormceptor (STC 300) is serving the site and continue to use to ensure the water quality control;
- These measures will provide the necessary quantity and quality control to meet the criteria provided by the City of Barrie.

We trust that this proposed stormwater management plan will provide appropriate service to the proposed site.

Respectfully Submitted,

n Architecture Inc.

Abu. S. Ziauddin M.Eng. P. Eng.
MUNICIPAL ENGINEER

n Architecture Inc.

Ramyar Mehraban M.Eng. EIT
MUNICIPAL PROJECT DESIGNER

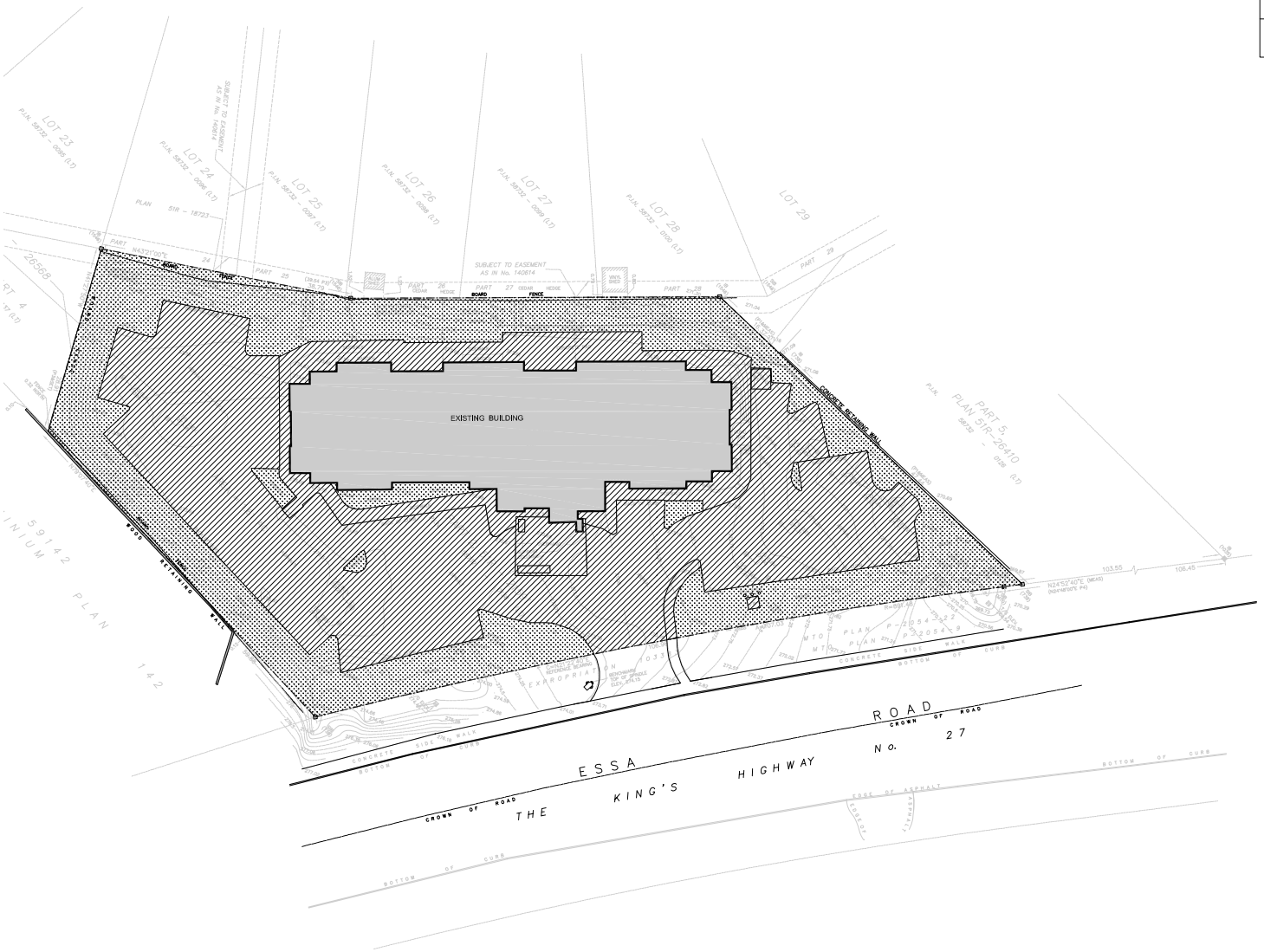
nArchitecture Inc.

Appendix A

Pre & Post Development Land-use Map

PRE-DEVELOPMENT LAND USE TABLE

LAND COVER	HATCH	AREA (SQ.M.)	RUNOFF CO-EFFICCIENT
ROOF		1240.00	0.95
LANDSCAPING		2112.91	0.25
CONCRETE/ ASPHALT		3137.06	0.95



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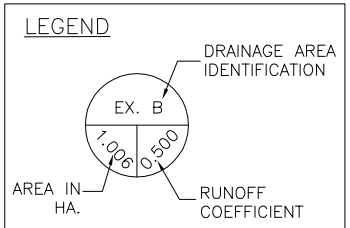

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PROJECT:

PROPOSED ADDITION TO FAIRFIELD INN AND SUITES (MARRIOTT) 261 ESSA ROAD BARRIE, ONTARIO

DRAWING TITLE:

PRE-DEVELOPMENT SITE DRAINAGE PLAN

DRAWN BY: AZ	DATE: 15 MAY. 2019
CHECKED BY: AZ	SCALE: NTS
PROJECT NO.: **13-15**	DRAWING NO.: **DR-101**

(GEODETIC NORTH) N

PROJECT NORTH

POST–DEVELOPMENT LAND USE TABLE

LAND COVER	HATCH	AREA (SQ.M.)	RUNOFF CO–EFFICCIENT
ROOF		1436.03	0.95
LANDSCAPING		2112.91	0.25
CONCRETE/ ASPHALT		2940.06	0.95

LEGEND

DRAINAGE AREA IDENTIFICATION

B8

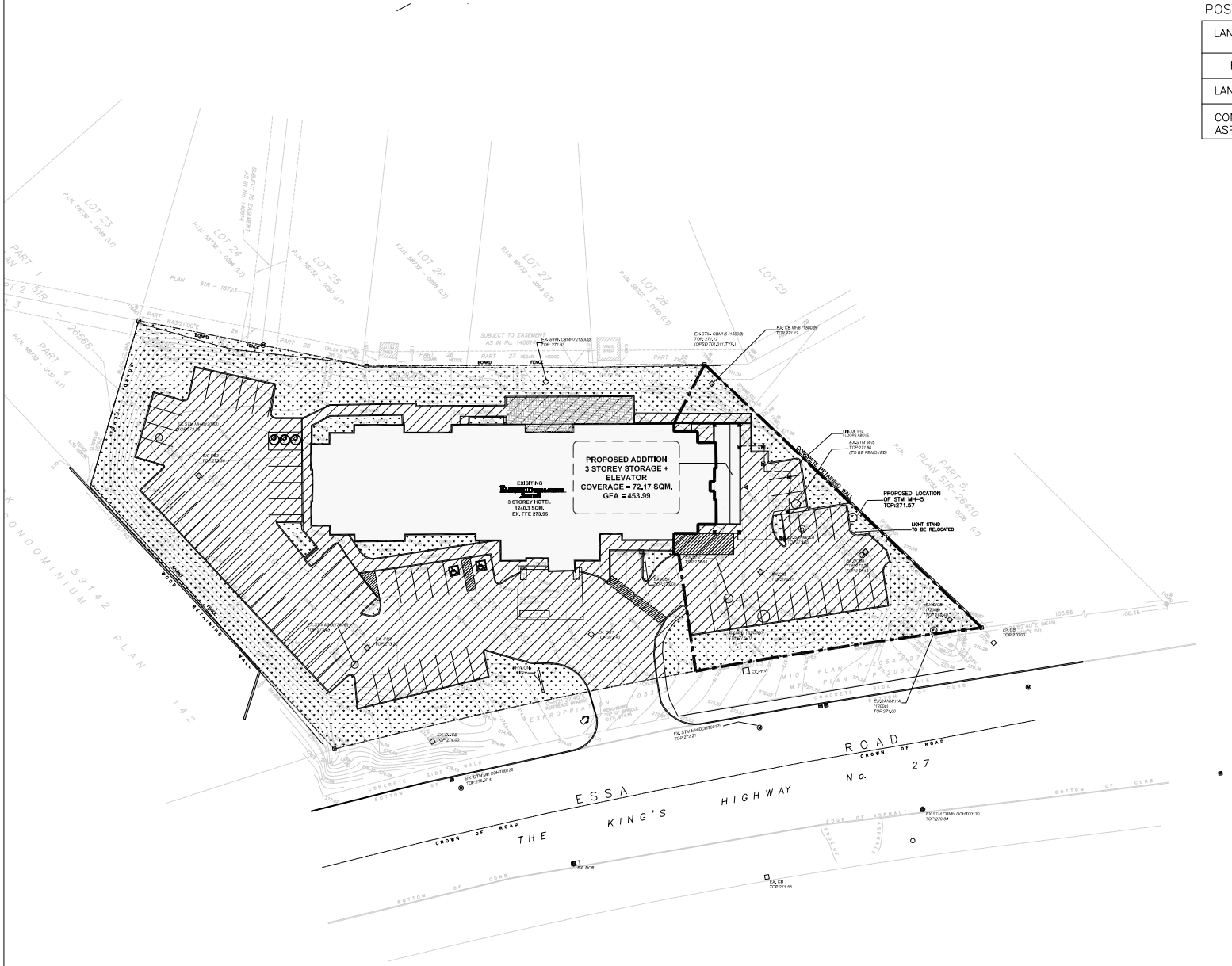
0.135 — AREA IN HA.

0.740 — RUNOFF COEFFICIENT

DRAINAGE BOUNDARY

SITE BOUNDARY

AFFECTED AREA FOR DEVELOPMENT



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E: info@narchitecture.com
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PROJECT:

PROPOSED ADDITION TO FAIRFIELD INN AND SUITES (MARRIOTT)
261 ESSA ROAD BARRIE, ONTARIO

DRAWING TITLE:

POST-DEVELOPMENT SITE DRAINAGE PLAN

DRAWN BY: AZ	DATE: 15 MAY. 2019
CHECKED BY: AZ	SCALE: NTS
PROJECT NO.: **13-15**	DRAWING NO.: **DR-102**

(GEODETIC NORTH) N

PROJECT NORTH

Appendix B

Pre & Post Development Flow Analysis

Calculation Sheet 1

n Architecture Inc

Project:	**Addition To Fairfield Inn & Suites**
Address:	**261 Essa Road**
Town/Township/City	**Barrie, ON**
Project No.	**n1315**
Proposed Development Area (m^2)	**6490**
Date:	**8/15/2019**

PRE-DEVELOPMENT RUNOFF COFFICENT

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "R"	AREA x C
ASPHALT/CONC.	3137.060	0.95	2980.21
BUILDING	1240.000	0.95	1178.00
LANDSCAPED AREA	2112.910	0.25	528.23
		ΣAREA X C	4686.43
		WEIGHTED AVERAGE "C"	**0.72**
		AREA "A" (Hectares)	0.6490

Rainfall intensity:

$$i = \frac{A}{(t_d + B)^C}$$

Where:
I = Rainfall Intensity (mm/hr)
A = Parameter
B = Parameter
C = Parameter
t =Time of concentration(min) 10.00

The runoff coefficinets used in above table applicable for 2,5 and 10-year frequencies. For less frequesnt storms Antecedent Precipitation Factor (Ca) used and Rational Formula modified accordingly.

Design Flow:

$$Q = \frac{(c)(i)(A)}{360}$$

Where:
Q= Flow (m^3/second)
R = Runoff coefficient
A = Draingae Area (hectares)
I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	678.085	853.608	975.865	1146.275	1236.152	1426.408
B	4.699	4.699	4.699	4.922	4.699	5.273
C	0.781	0.766	0.760	0.757	0.751	0.759
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	83.11	108.92	126.55	148.15	164.22	180.15
R	0.72	0.72	0.72	0.72	0.72	0.72
C_a	1.00	1.00	1.00	1.10	1.20	1.25
Q (m^3/sec)	0.11	0.14	0.16	0.21	0.26	0.29
Q (l/sec)	**108.27**	141.91	164.87	212.32	256.75	293.39

IDF Parameter from Table 3.1Barrie WPCC IDF Curve Parameters - Adjusted to Account for Climate Change

Calculation Sheet 2

n Architecture Inc

Project:	**Addition To Fairfield Inn & Suites**
Address:	**261 Essa Road**
Town/Township/City	**Barrie, ON**
Project No.	**n1315**
Proposed Development Area (m^2)	**6490**
Date:	**8/15/2019**

POST DEVELOPMENT RUNOFF COFFICENT

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C
ASPHALT/CONC.	2940.06	0.95	2793.06
BUILDING	1436.03	0.95	1364.23
LANDSCAPED AREA	2112.91	0.25	528.23
		ΣAREA X C	4685.51
		WEIGHTED AVERAGE "C"	**0.72**
		AREA "A" (Hectares)	0.6489

Rainfall intensity:

$$i = \frac{A}{(t_d + B)^C}$$

Where:
I = Rainfall Intensity (mm/hr)
A = coefficient
B = coefficient
C = coefficient
t =Time of concentration(min) 10.00

The runoff coefficinets used in above table applicable for 2,5 and 10-year frequencies. For less frequesnt storms Antecedent Precipitation Factor (Ca) used and Rational Formula modified accordingly.

Design Flow:

$$Q = \frac{(c)(i)(A)}{360}$$

Where:
Q= Flow (m^3/second)
R = Runoff coefficient
A = Draingae Area (hectares)
I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	678.085	853.608	975.865	1146.275	1236.152	1426.408
B	4.699	4.699	4.699	4.922	4.699	5.273
C	0.781	0.766	0.760	0.757	0.751	0.759
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	83.11	108.92	126.55	148.15	164.22	180.15
R	0.72	0.72	0.72	0.72	0.72	0.72
C_a	1.00	1.00	1.00	1.10	1.20	1.25
Q (m^3/sec)	0.108	0.142	0.165	0.212	0.257	0.293
Q (l/sec)	108.25	141.88	164.84	212.27	256.70	293.33

IDF Parameter from Table 3.1Barrie WPCC IDF Curve Parameters - Adjusted to Account for Climate Change

Appendix C

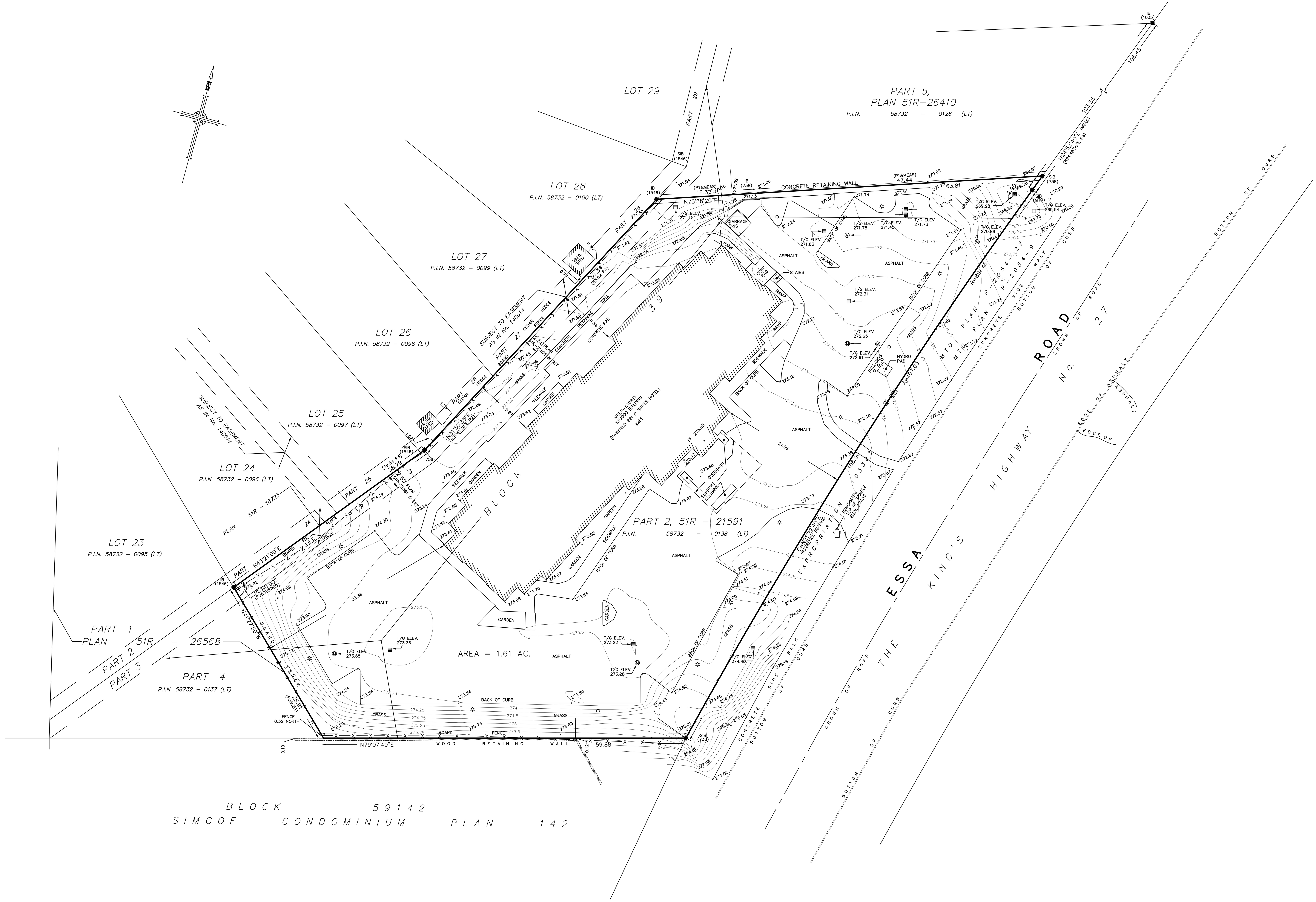
As Built Survey

TOPOGRAPHIC SURVEY OF PART OF

BLOCK 39
REGISTERED 51M–374
CITY OF BARRIE
COUNTY OF SIMCOE

SCALE 1 : 300

RUDY MAK SURVEYING LTD.



BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF ESSA ROAD, AS SHOWN ON PLAN 51R–21591, HAVING A BEARING OF N21°22'40"E.

SITE BENCHMARK

TOP OF SPINDLE OF FIRE HYDRANT ON ESSA ROAD ELEVATION 274.15.

NOTES:

THIS TOPOGRAPHIC SURVEY PLAN DELINEATES THE FEATURES AS SHOWN AND VISIBLE, GIVEN THE SITE CONDITIONS. CONSTRUCTION ACTIVITY, FROZEN GROUND, SNOW COVER, ETC. MAY HAVE HIDDEN FEATURES OTHERWISE VISIBLE. THE LOCATION OF UNDERGROUND SERVICES, IF SHOWN, WAS DERIVED FROM PLANS OBTAINED FROM OTHER AGENCIES. RUDY MAK SURVEYING CANNOT BE HELD RESPONSIBLE FOR THE LOCATION AND ACCURACY OF UNDERGROUND SERVICES. THE LOCATION OF ALL SERVICES MUST BE VERIFIED ON SITE. ONLY A SIGNED AND SEALED PAPER COPY OF THIS SURVEY IS AN ORIGINAL COPY. NO DIGITAL VERSION OF THIS PLAN IS TO BE CONSIDERED "ORIGINAL" AND MAY HAVE BEEN ALTERED BY OTHERS.

LEGEND

■	DENOTES	FOUND SURVEY MONUMENT
□	DENOTES	PLANTED SURVEY MONUMENT
SIB	DENOTES	STANDARD IRON BAR
IB	DENOTES	IRON BAR
IP	DENOTES	IRON PIPE
WIT.	DENOTES	WITNESS
(NI)	DENOTES	NOT IDENTIFIABLE
FF	DENOTES	FINISH FLOOR
	DENOTES	MANHOLE
	DENOTES	FIRE HYDRANT
	DENOTES	LIGHT STANDARD
	DENOTES	HYDRO POLE
	DENOTES	CATCH BASIN
–OW–	DENOTES	OVERHEAD UTILITY LINES
(738)	DENOTES	R.C. KIRKPATRICK, O.L.S.
(1546)	DENOTES	RUDY MAK, O.L.S.
(MTO)	DENOTES	MINISTRY OF TRANSPORTATION OF ONTARIO
(P1)	DENOTES	PLAN 51R–26410
(P2)	DENOTES	REGISTERED PLAN 51M–374
(P3)	DENOTES	REGISTERED PLAN 51R–26568
(P4)	DENOTES	REGISTERED PLAN 51R–21591
	DENOTES	FIRE HYDRANT
	DENOTES	CABLE BOX

REVISION	BY	DATE
FIRST ISSUE	AP	07/11/16

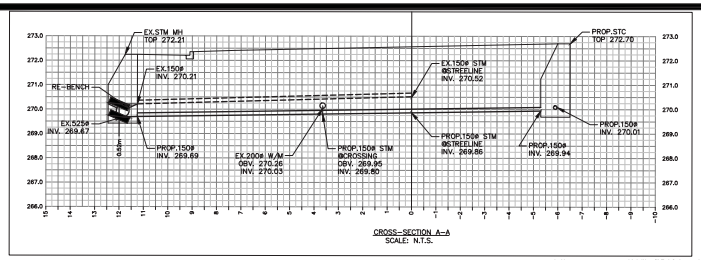
RUDY MAK SURVEYING LTD.
ONTARIO LAND SURVEYORS

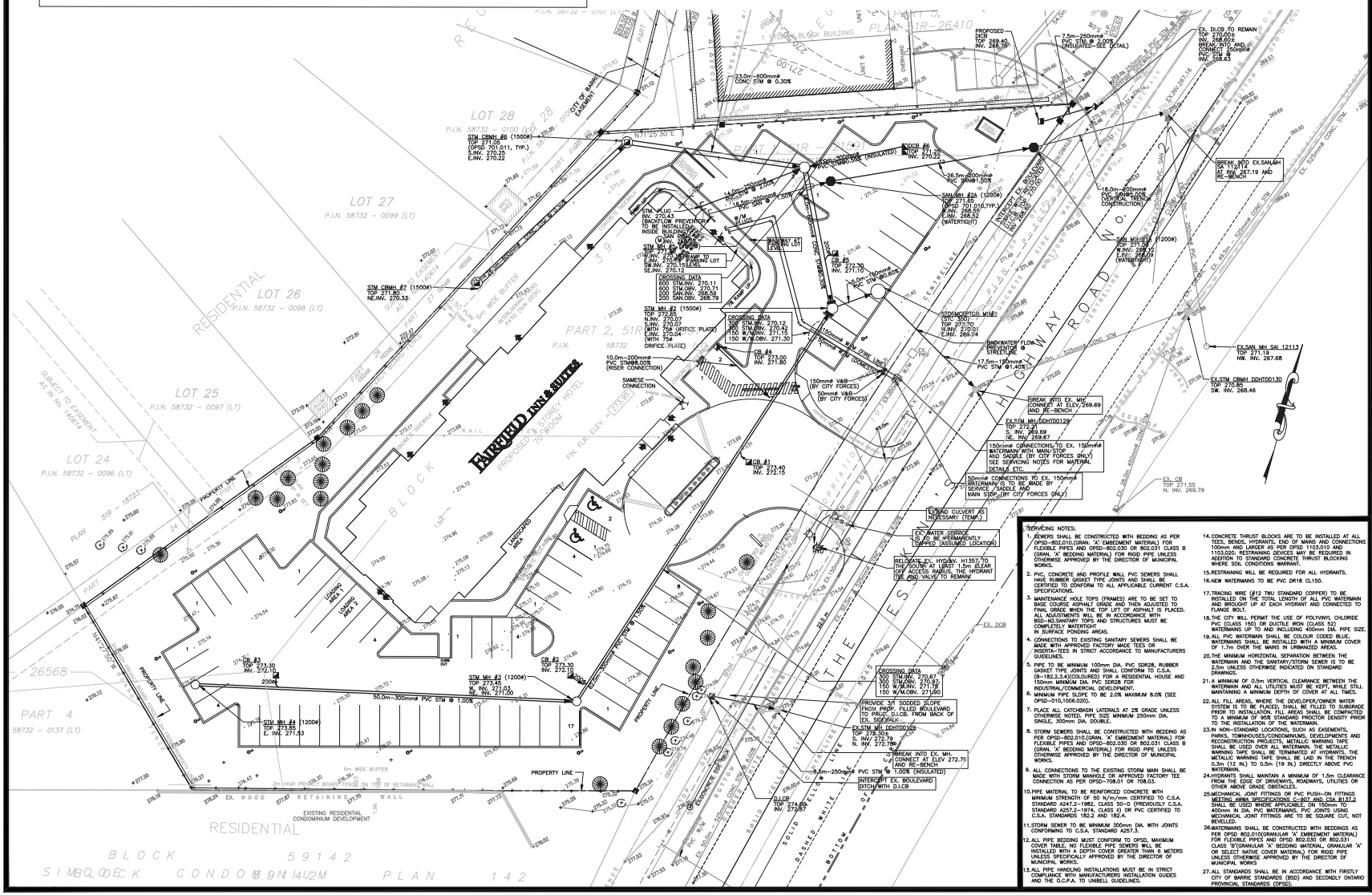
89 BIG BAY POINT ROAD
BARRIE, ONTARIO L4N 8M5 (705) 722–3845
E–MAIL MAIL@MAKSURVEYING.COM

DRAWN BY: AP | CHECK BY: RM | FILE No. 12136

Appendix D

Existing Site Servicing Plan & Site Grading Plan (Dwg. C1 & C2)

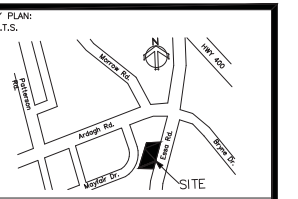




SERVICING NOTES:

1. SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD-802.010,(GRAN. 'A' EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AND OPSD-802.030 OR 802.031 CLASS B (GRAN. 'A' BEDDING MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF MUNICIPAL WORKS.
2. PVC, CONCRETE AND PROFILE WALL PVC SEWERS SHALL HAVE RUBBER GASKET TYPE JOINTS AND SHALL BE CERTIFIED TO CONFORM TO ALL APPLICABLE CURRENT C.S.A. SPECIFICATIONS.
3. MAINTENANCE HOLE TOPS (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. ALL ADJUSTMENTS WILL BE IN ACCORDANCE WITH BSD-N2.SANITARY TOPS AND STRUCTURES MUST BE COMPLETELY WATERTIGHT IN SURFACE PONDING AREAS.
4. CONNECTIONS TO EXISTING SANITARY SEWERS SHALL BE MADE WITH APPROVED FACTORY MADE TEES OR INSERTA-TEES IN STRICT ACCORDANCE TO MANUFACTURERS GUIDELINES.
5. PIPE TO BE MINIMUM 100mm DIA. PVC SDR28, RUBBER GASKET TYPE JOINTS AND SHALL CONFORM TO C.S.A. (B-182.2.3.4)(COLOURED) FOR A RESIDENTIAL HOUSE AND 150mm MINIMUM DIA. PVC SDR28 FOR INDUSTRIAL/COMMERCIAL DEVELOPMENT.
6. MINIMUM PIPE SLOPE TO BE 2.0% MAXIMUM 8.0% (SEE OPSD-410,1006.020).
7. PLACE ALL CATCHBASIN LATERALS AT 2% GRADE UNLESS OTHERWISE NOTED. PIPE SIZE MINIMUM 250mm DIA. SINGLE, 300mm DIA. DOUBLE.
8. STORM SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD-802.010,(GRAN. 'A' EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AND OPSD-802.030 OR 802.031 CLASS B (GRAN. 'A' BEDDING MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF MUNICIPAL WORKS.
9. ALL CONNECTIONS TO THE EXISTING STORM MAIN SHALL BE MADE WITH STORM MANHOLE OR APPROVED FACTORY TEE CONNECTION AS PER OPSD-708.01 OR 708.03.
10. PIPE MATERIAL TO BE REINFORCED CONCRETE WITH MINIMUM STRENGTH OF 50 N/m/mm CERTIFIED TO C.S.A. STANDARD A247.2-1952, CLASS 50-D (PREVIOUSLY C.S.A. STANDARD A257.2-1974, CLASS II) OR PVC CERTIFIED TO C.S.A. STANDARDS 182.2 AND 182.4.
11. STORM SEWER TO BE MINIMUM 300mm DIA. WITH JOINTS CONFORMING TO C.S.A. STANDARD A257.3.
12. ALL PIPE BEDDING MUST CONFORM TO OPSD, MAXIMUM COVER TABLE. NO FLEXIBLE PIPE SEWERS WILL BE INSTALLED WITH A DEPTH COVER GREATER THAN 6 METERS UNLESS SPECIFICALLY APPROVED BY THE DIRECTOR OF MUNICIPAL WORKS.
13. ALL PIPE HANDLING INSTALLATIONS MUST BE IN STRICT COMPLIANCE WITH MANUFACTURERS INSTALLATION GUIDES AND THE O.C.P.A. TO UNIBELL GUIDELINES.
14. CONCRETE THRUST BLOCKS ARE TO BE INSTALLED AT ALL TEES, BENDS, HYDRANTS, END OF MAINS AND CONNECTIONS 100mm AND LARGER AS PER OPSD 1103.010 AND 1103.020. RESTRAINING DEVICES MAY BE REQUIRED IN ADDITION TO STANDARD CONCRETE THRUST BLOCKING WHERE SOIL CONDITIONS WARRANT.
15. RESTRAINING WILL BE REQUIRED FOR ALL HYDRANTS.
16. NEW WATERMAINS TO BE PVC DR18 CL150.
17. TRACING WIRE (#12 TWU STANDARD COPPER) TO BE INSTALLED ON THE TOP CENTRE LENGTH OF ALL PVC WATERMAIN AND BROUGHT UP AT EACH HYDRANT AND CONNECTED TO FLANGE BOLT.
18. THE CITY WILL PERMIT THE USE OF POLYVINYL CHLORIDE PVC (CLASS 150) OR DUCTILE IRON (CLASS 52) WATERMAINS UP TO AND INCLUDING 400mm DIA. PIPE SIZE.
19. ALL PVC WATERMAIN SHALL BE COLOUR CODED BLUE. WATERMAINS SHALL BE INSTALLED WITH A MINIMUM COVER OF 1.7m OVER THE MAINS IN URBANIZED AREAS.
20. THE MINIMUM HORIZONTAL SEPARATION BETWEEN THE WATERMAIN AND THE SANITARY/STORM SEWER IS TO BE 2.5m UNLESS OTHERWISE INDICATED ON STANDARD DRAWINGS.
21. A MINIMUM OF 0.5m VERTICAL CLEARANCE BETWEEN THE WATERMAIN AND ALL UTILITIES MUST BE KEPT, WHILE STILL MAINTAINING A MINIMUM DEPTH OF COVER AT ALL TIMES.
22. ALL FILL AREAS, WHERE THE DEVELOPER/OWNER WATER SYSTEM IS TO BE PLACED, SHALL BE FILLED TO SUBGRADE PRIOR TO INSTALLATION. FILL AREAS SHALL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY PRIOR TO THE INSTALLATION OF THE WATERMAIN.
23. IN NON-STANDARD LOCATIONS, SUCH AS EASEMENTS, PARKS, TOWNHOUSES/CONDOMINIUMS, DEVELOPMENTS AND RECONSTRUCTION PROJECTS, METALLIC WARNING TAPE SHALL BE USED OVER ALL WATERMAIN. THE METALLIC WARNING TAPE SHALL BE TERMINATED AT HYDRANTS. THE METALLIC WARNING TAPE SHALL BE LAID IN THE TRENCH 0.3m (12 IN.) TO 0.5m (19 IN.) DIRECTLY ABOVE PVC WATERMAIN.
24. HYDRANTS SHALL MAINTAIN A MINIMUM OF 1.5m CLEARANCE FROM THE EDGE OF DRIVEWAYS, UTILITIES OR OTHER ABOVE GRADE OBSTACLES.
25. MECHANICAL JOINT FITTINGS OR PVC PUSH-ON FITTINGS MEETING AWWA SPECIFICATIONS C-907 AND CSA B137.2 SHALL BE USED WHERE APPLICABLE ON 150mm TO 400mm IN DIA. PVC WATERMAINS. PVC JOINTS USING MECHANICAL JOINT FITTINGS ARE TO BE SQUARE CUT, NOT BEVELLED.
26. WATERMAINS SHALL BE CONSTRUCTED WITH BEDDINGS AS PER OPSD 802.010(GRANULAR 'A' EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AND OPSD 802.030 OR 802.031 CLASS 'B'(GRANULAR 'A' BEDDING MATERIAL, GRANULAR 'A' OR SELECT NATIVE COVER MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF MUNICIPAL WORKS
27. ALL STANDARDS SHALL BE IN ACCORDANCE WITH FIRSTLY CITY OF BARRIE STANDARDS (BSD) AND SECONDLY ONTARIO PROVINCIAL STANDARDS (OPSD).

KEY PLAN:
N.T.S.



STANDARD NOTES:

1. CONTRACTOR RESPONSIBLE TO RESTORE ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO CITY OF BARRIE STANDARDS.
2. IF FOR UNFORESEEN REASONS THE CONTRACTOR MAY HAVE TO ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT SHALL BE SUBMITTED TO THE ENGINEERING DEPARTMENT PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE CONTRACTOR'S OWN RISK.
3. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION AND INVERTS OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME LIABILITY FOR DAMAGE TO THEM.
4. SITE PLAN INFORMATION OBTAINED FROM:
   CDN LAND SURVEYORS INC.
   89 BIG BAY POINT ROAD at BAYVIEW
   BARRIE, ONTARIO L4N 8M5
   TEL: 705-722-3845

SPECIAL NOTES:

1. WHERE WATERMAIN (SERVICES) CROSSES STORM OR SANITARY MAINS, WATERMAIN SHALL BE BACKFILLED UP TO SPRING LINE OF WATERMAIN WITH NON SHRINKABLE BACKFILL.
2. INSULATION BARRIER SHALL BE INSTALLED AT MANHOLES AND CATCH BASINS WHERE MINIMUM COVERAGE AND SEPARATIONS CANNOT BE ACHIEVED.
3. METERING-SERVICE SIZE SHALL MATCH WATER METER SIZE. AS INDICATED IN BY-LAW 2007-266. A 50mmø METER WILL BE SUPPLIED & INSTALLED BY THE CITY AT A COST OF $1065.00 TO THE DEVELOPER
4. WATER METER BY-PASS SHALL CONFORM TO BSD-58 OR MANUFACTURERS INSTALLATION GUIDELINES.
   NOTE: THE MECHANICAL ROOM MUST BE LARGE ENOUGH TO ACCOMMODATE BY-PASS BSD-58. REFER TO GENERAL SERVICE CHARGES FOR MONTHLY FEES.
5. BEFORE ANY SITE ALTERATION WITHIN THE SUBJECT PROPERTY, THE OWNER AND/OR HIS AGENTS WILL APPLY (IF NECESSARY) FOR A SITE ALTERATION PERMIT, AS DESCRIBED WITHIN BY-LAW 2006-101. PRIOR TO THE COMMENCEMENT OF ANY WORKS WITHIN THE SITE, ALL REQUIREMENTS, OBLIGATIONS, AND CONTROL MEASURES, AS DESCRIBED WITHIN BY-LAW 2006-101, WILL BE IN PLACE AND UNDERTAKEN, TO THE SATISFACTION OF THE CITY OF BARRIE, AND TO THE LAKE SIMCOE REGION CONSERVATION AUTHORITY IN THOSE AREAS WHICH ARE UNDER THEIR JURISDICTIONS.
6. THE WATER DISTRIBUTION,WITHIN THE LIMITS OF THIS SITE PLAN, IS PRIVATELY OWNED AND SHALL BE MAINTAINED BY THE OWNER, AND ANY HYDRANT INSTALLED ON THE SITE SHALL BE DEEMED PRIVATELY OWNED. ALL HYDRANTS HAVE TO BE MAINTAINED AS PER FIRE CODE/INSURANCE REQUIREMENTS.
7. THE OWNER/APPLICANT IS FURTHER RESPONSIBLE FOR ANY WATER SERVICE CHARGES ARISING OUT OF, OR ATTRIBUTABLE TO, THE DEVELOPMENT OF THIS SITE PLAN, INCLUDING TAPPING FEE AND WATER METER PAYMENT.

LEGEND:

L.S.	LIGHT STANDARD
FIN.FLR.	FINISHED FLOOR ELEVATION
	HYDRANT
	VALVE & BOX
T/C	TOP OF CURB
B/C	BOTTOM OF CURB
197.97	PROPOSED GROUND ELEVATION
197.97	EXISTING GROUND ELEVATION
	SANITARY MANHOLE
	STORM MANHOLE
	CATCH BASIN

BENCHMARK (M.T.O. # 97-68)
CONCRETE BRIDGE CARRYING HIGHWAY 400 OVER ESSA ROAD. TABLE IS SET HORIZONTALLY IN WEST FACE OF NORTH CONCRETE ABUTMENT, 3.84m SOUTH OF NORTHWEST CORNER, 24cm BELOW COPING AND 9.0m WEST OF CENTRELINE OF HIGHWAY 400 SOUTHBOUND LANE. ELEV. 252.746m.

CITY FILE: D11-1566

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THIS DRAWING IS NOT TO BE SCALED.
THIS DRAWING IS TO BE USED FOR UNDERGROUND SITE SERVICING INFORMATION ONLY. ALL SITE INFORMATION INCLUDING BUILDING, STRUCTURE LOCATIONS, ROAD, PARKING INFO ARE TO BE OBTAINED FROM THE ARCHITECTS APPROVED SITE PLAN

NO.:	DETAILS:	DATE:
10	REVISED STORM CONNECTION	21-JUL-11
9	RELOCATE WATER SERVICE AND MINOR SITE PLAN UPDATES	16-MAY-11
8	CITY OF BARRIE COMMENTS	19-JAN-11
7	CITY OF BARRIE COMMENTS AND REVISED SITE PLAN	08-DEC-10
6	CITY OF BARRIE COMMENTS AND REVISED SITE PLAN	24-SEP-10
5	SIAMESE CONNECTION ADDED	13-SEP-10
4	CITY OF BARRIE COMMENTS AND REVISED SITE PLAN	24-JUN-10
3	ADD LANE MARKINGS ON ESSA ROAD	26-SEP-08
2	SECOND SUBMISSION	10-JUL-08
1	FIRST SUBMISSION	18-MAR-08

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Email: jta@rogers.com

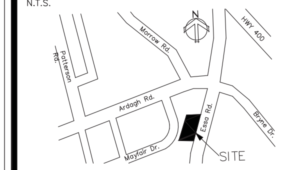
OWNER:
WOODBINE BANQUET & CONVENTION
30 VICE REGENT BLVD.
ETOBICOKE, ON M9W 7A4
TEL.: 416-743-0003
FAX: 416-743-9821

PROJECT:
FAIRFIELD INN & SUITES - MARRIOTT
261 ESSA ROAD
CITY OF BARRIE

DRAWING TITLE:
SITE SERVICING PLAN

ENGINEERS STAMP:
REGISTERED PROFESSIONAL ENGINEER
J. TOWLE
21-JUL-11
PROVINCE OF ONTARIO

SCALE: 1:250	PROJECT NO.: 07290
DRAWN BY: RT	
DESIGNED BY: JTT	DRAWING NO.: C-1
CHECKED BY: JTT	
DATE: 08/01/10	1 OF 5



STANDARD NOTES:

1. CONTRACTOR RESPONSIBLE TO RESTORE ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO CITY OF BARRIE STANDARDS.
2. IF FOR UNFORESEEN REASONS THE CONTRACTOR MAY HAVE TO ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT SHALL BE SUBMITTED TO THE ENGINEERING DEPARTMENT PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE CONTRACTOR'S OWN RISK.
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4. SITE PLAN INFORMATION OBTAINED FROM ARCOPE INC. ARCHITECTS.
5. ALL DISTURBED AREAS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER, AS DETERMINED BY THE CITY MUNICIPAL WORKS DEPARTMENT.
6. ALL SILT CONTROL AND EROSION PROTECTION DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETE AND THE GRASS HAS ESTABLISHED GROWTH, SUBJECT TO APPROVAL BY THE DIRECTOR OF MUNICIPAL WORKS DEPARTMENT.
7. SINGLE STAGE CURB TO COMPLY WITH OPSD-600.011.
8. SIDEWALKS TO COMPLY WITH OPSD – 310.010 AND ARE TO BE 1.5m WIDE. MINIMUM THICKNESS AS FOLLOWS:
   - RESIDENTIAL DRIVEWAY 150mm
   - COMMERCIAL/INDUSTRIAL DRIVEWAY 200mm (REINFORCED AS PER OPSS IF REQUIRED)
   - WHEN NO DRIVEWAY IS PRESENT, 125mm
9. NATIVE SUBGRADE SHALL HAVE A CROSSFALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A SOILS CONSULTANT AND IS SUBJECT TO APPROVAL BY THE DIRECTOR OF MUNICIPAL WORKS.
10. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 95% STANDARD PROTOR MAXIMUM DRY DENSITY AND SHALL BE PROOF ROLLED.
11. GRADE AND CROSSFALL ADJUSTMENT OF MAINTENANCE HOLE AND CATCHBASIN FRAMES WILL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. THE TOP ADJUSTMENT UNIT OF ALL CATCHBASIN AND MAINTENANCE HOLES SHALL BE RUBBER.
12. ALL ROOF DOWNSPOUTS ARE TO DISCHARGE TO THE SURFACE VIA SPLASH PADS.

LEGEND:

Symbol	Description
R/W	RETAINING WALL
T/W	TOP OF CURB
B/W	BOTTOM OF CURB
L.S.	LIGHT STANDARD
⇨	OVERLAND FLOW ROUTE
→	DIRECTION OF SURFACE DRAINAGE
FIN.FLR.	FINISHED FLOOR ELEVATION
	HYDRANT
	VALVE & BOX
T/C	TOP OF CURB
B/C	BOTTOM OF CURB
197.97	EXISTING GROUND ELEVATION
[197.97]	PROPOSED GROUND ELEVATION
●	SANITARY MANHOLE
○	STORM MANHOLE
	CATCH BASIN
H.P.	HIGH POINT
SW	SWALE
	SURFACE PONDING AREA

CITY FILE: D11-1566

BENCHMARK (M.T.O. # 97-68)

CONCRETE BRIDGE CARRYING HIGHWAY 400 OVER ESSA ROAD. TABLE IS SET HORIZONTALLY IN WEST FACE OF NORTH CONCRETE ABUTMENT, 3.84m SOUTH OF NORTHWEST CORNER. 24cm BELOW COPING AND 9.0m WEST OF CENTERLINE OF HIGHWAY 400 SOUTHBOUND LANE. ELEV. 252.746m.

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THIS DRAWING IS NOT TO BE SCALED
THIS DRAWING IS TO BE USED FOR UNDERGROUND SITE SERVICING INFORMATION ONLY
ALL SITE INFORMATION (I.E. BUILDING AND STRUCTURE LOCATIONS, ROAD, PARKING INFO ETC.) TO BE OBTAINED FROM THE ARCHITECTS APPROVED SITE PLAN

NO.:	DETAILS:	DATE:
9	MINOR SITE PLAN UPDATES IE. WALKWAYS	16–MAY–11
8	CITY OF BARRIE COMMENTS	19–JAN–11
7	CITY OF BARRIE COMMENTS AND REVISED SITE PLAN	08–DEC–10
6	CITY OF BARRIE COMMENTS AND REVISED SITE PLAN	24–SEP–10
5	SIAMESE CONNECTION ADDED	13–SEP–10
4	CITY OF BARRIE COMMENTS AND REVISED SITE PLAN	24–JUN–10
3	ADD LANE MARKINGS ON ESSA ROAD	26–SEP–08
2	SECOND SUBMISSION	10–JUL–08
1	FIRST SUBMISSION	18–MAR–08

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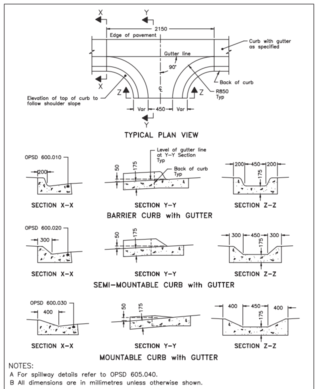
30 VICE REGENT BLVD.
ETOBICOKE, ON M9W 7A4
TEL.: 416-743-0003
FAX.: 416-743-9821

PROJECT:
FAIRFIELD INN & SUITES - MARRIOTT
261 ESSA ROAD
CITY OF BARRIE

DRAWING TITLE:
SITE GRADING PLAN

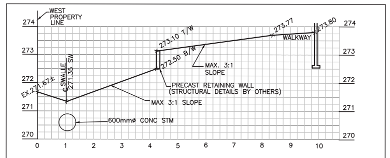
ENGINEERS STAMP: J. T. TOWLE, 16–MAY–11, PROFESSIONAL ENGINEER, PROVINCE OF ONTARIO

SCALE: 1:250	PROJECT NO.: 07290
DRAWN BY: RT	
DESIGNED BY: JTT	DRAWING NO.: C-2
CHECKED BY: JTT	
DATE: 08/01/10	2 OF 5

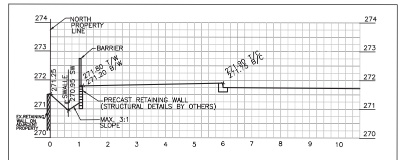


NOTES:
A For spillway details refer to OPSD 605.040.
B All dimensions are in millimetres unless otherwise shown.

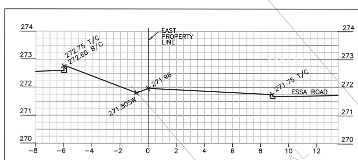
ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2006 — Rev 1
90° CONCRETE OUTLET
FOR CONCRETE CURB WITH GUTTER
OPSD 604.010



SECTION Ⓑ – Ⓑ



SECTION Ⓐ – Ⓐ



SECTION Ⓒ – Ⓒ

STORMWATER STORAGE VOLUME CALCULATIONS
AREA #1:

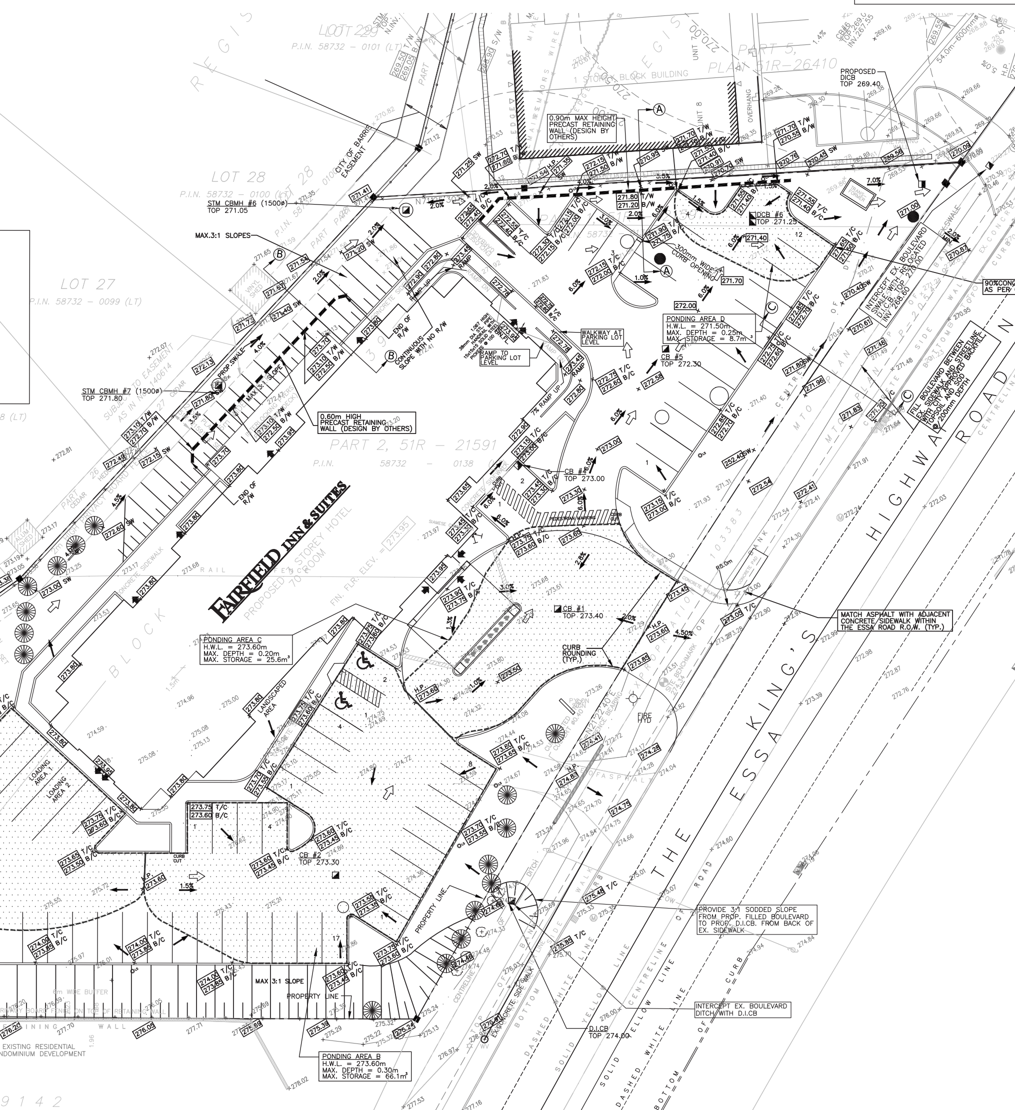
HIGH WATER LINE = 273.60m

SEWERS: 300 mm ø	L= 112.0 m	V= 7.92 m³	SUBTOTAL= 7.92 m³
MANHOLES 1200 mm ø	D=4.60 m	V=5.20 m³	SUBTOTAL=5.20 m³
CATCHBASIN STORAGE: 3 CB's @0.5each		V= 1.50 m³	SUBTOTAL= 1.50 m³
SURFACE STORAGE: PONDING AREA A		V= 40.8 m³	
PONDING AREA B		V= 66.5 m³	
PONDING AREA C		V= 24.6 m³	SUBTOTAL=131.9 m³
TOTAL STORAGE VOLUME DESIGNED			=146.52 m³
TOTAL STORAGE VOLUME REQUIRED			=131.1 m³

STORMWATER STORAGE VOLUME CALCULATIONS
AREA #2:

HIGH WATER LINE = 271.50m

SEWERS: 600 mm ø	L= 67.5 m	V= 19.09 m³	SUBTOTAL= 19.09 m³
MANHOLES 1500 mm ø	D=7.70 m	V=13.61 m³	SUBTOTAL=13.61 m³
CATCHBASIN STORAGE: 2 CB's @0.5each		V= 1.00 m³	SUBTOTAL= 1.00 m³
SURFACE STORAGE: PONDING AREA D		V= 8.7 m³	SUBTOTAL= 8.7 m³
TOTAL STORAGE VOLUME DESIGNED			=42.40 m³
TOTAL STORAGE VOLUME REQUIRED			=34.05 m³



TERRAPROBE LTD. – GEOTECHNICAL INVESTIGATION		
Proposed Motel Structure — Woodbine Banquet & Convention Hall Ltd.	March 6, 2006 — File No. 3-06-2016	
SITE PAVEMENT DESIGN		
Material	Car Parking Only (mm)	Access Routes (mm)
HL 3 (surface course)	40	50
HL 8 (binder course)	40	50
OPSS Granular 'A'	150	150
OPSS Granular 'B'	250	350
Total Thickness	480	600
Granular Base Equivalents	476	585

ESSA ROAD TRENCH RESTORATION

STREET	HL3	HL8	GRANULAR MATERIAL "A"	GRANULAR MATERIAL "B"	TOTAL THICKNESS
ESSA ROAD	40mm	100mm	150mm	450mm	740mm

CONSTRUCTION NOTES:
1. EXISTING ESSA ROAD STREETLINE IS TO BE RAISED APPROX. 500mm ABOVE THE EX. BOULEVARD DITCH INVERT, TOPSOIL AND SODDED TO THE SATISFACTION OF THE CITY OF BARRIE.
2. INSTALL SILT CONTROL FENCE AROUND THE PERIMETER OF THE PROPERTY AS PER BSD-23A (SEE DWG 4 OF 5)
3. ALL RETAINING WALLS OVER 0.9m IN HEIGHT MUST HAVE A VERTICAL GUARD CONSTRUCTED ALONG ITS ENTIRE LENGTH AND REQUIRES A SEPARATE BUILDING PERMIT

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