

# Stormwater Management Report For 691 Fanshawe Park Road East

## Prepared by:

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### PROTOTECK ENGINEERING ASSOCIATES INC.

90 Albert Street London, Ontario N6A 1L8

File No.: 24-1011

**Date:** October 09, 2024



### Introduction:

This report is submitted to support the rezoning and development of the property at 691 Fanshawe Park Road East in the City of London. Its primary purpose is to address stormwater management for the proposed development. We aim to ensure that all information is presented in a clear and accessible format, adhering to accessibility guidelines to accommodate all readers.

### **Property Overview**

The subject property is located on the south side of **Fanshawe Park Road East** and is surrounded by **Single-Family Residential Development**. The total lot area is approximately **1369.33 m**<sup>2</sup> (see Appendix **A** for the existing site layout).

The proposed development consists of two stacked townhouse buildings:

- One 4-unit stacked townhouse
- One 6-unit stacked townhouse
   There will also be 11 parking spaces situated between the two townhouse buildings to meet parking requirements (see architectural site plan in Appendix A).

### **Existing Site Conditions**

### **Quantity Control**

Currently, the site drains generally towards the south, flowing towards the southern property line. The **elevation drop** from the northern property line to the southwestern corner of the site is approximately **0.29 meters**, with an average slope of **0.54%**.

The site's drainage is divided into two distinct catchments:

- Catchment 101 directs flows overland towards Fanshawe Park Road.
- Catchment 102 conveys drainage towards the southwest corner and also captures overland flows from external lands to the east.



### **Catchment Summary:**

Catchment Area	Area (m²)	Runoff Coefficient (C)
101 (Towards Fanshawe Rd)	785.98	0.37
102 (Towards Southwest)	583.35	0.37

### **Post-Development Conditions**

## **Quantity Control**

After development, the existing home, including the asphalt driveway, sidewalks, patio, porch, and shed, will be removed. The site will be redeveloped with the two stacked townhouse buildings and the 11 parking spaces. The total area for both townhouse buildings is approximately **349.85 m**<sup>2</sup>.

The stormwater runoff coefficient for the site, as per the **City of London's Stormwater Management Plan (Drawing 27101)**, is **C=0.75**. This site is tributary to an existing **825mm storm sewer** (see Appendix **B**). Therefore, the peak runoff (Qall) for this area is estimated to be **15.7** I/s.

Post-development catchments are summarized below:

### **Catchment Summary (Post-Development):**

Catchment Area	Area (m²)	Runoff Coefficient (C)
U1 (Uncontrolled)	99.64	0.33
201 (Controlled)	1000.07	0.85
U2 (Uncontrolled)	269.62	0.20

Catchment **U2** will remain uncontrolled to convey overland flows from the adjacent lands to the east. This catchment has been reduced from the existing **Catchment 102** condition, so additional stormwater management is not required.



### **Stormwater Management Storage Requirements**

The following table summarizes the required storage volumes for the 2-year, 5-year, and 100-year storm events. The storage will be provided on the surface of the parking lot, and will be controlled through an orifice plate in a catch basin.

Storm Event	Required Storage Volume
2-Year Storm	3.33 m³
5-Year Storm	6.48 m³
100-Year Storm	18.8 m³

Please refer to Appendix **A** for detailed SWM calculations and to Appendix **B** for the concept SWM plan.

### **Quality Control**

In accordance with the City of London Design Specifications & Requirements Manual (Section 6.2.1.3, point a), water quality control is required for developments with 30 or more parking spaces. Since the proposed development includes 11 parking spaces, water quality control is not required for this project.

We trust this report meets your requirements. Should you have any questions or need further clarification, please feel free to contact us.

**Prototeck Engineering Associates Inc.** 

Nick Aroutzidis, M.A.Sc., P.Eng.

Principal Consulting Engineer





### Notes on Accessibility:

- To ensure compliance with AODA, this report is presented in a clear, structured format with headings, bullet points, and tables for easy navigation.
- If any part of the document requires further assistance or if additional accessibility accommodations are needed, please contact us, and we will be happy to assist.



APPENDIX "A"



DATE:September 03, 2024 PROJECT #: 24-1011 CLIENT: Creative Structure ADDRESS: 691 Fanshawe Park R

LOCATION: London, ON. CATCHMENT 101

DRF-	DEVEL	OPMENT	

	Area (m²)	С	A*C
Total Area:	1036.38		
Building Area:	137.12	0.9	123.41
Driveway	121.93	0.9	109.74
Sidewalk	31.48	0.9	28.33
Front Portch	7.75	0.9	6.98
Patio	22.12	0.9	19.91
Shed	12.55	0.9	11.30
Landscape/Open:	1036.38	0.2	207.28
Totals:	1369.33		506.93
$C_{eq} = Sum(A^*C)/Sum(A) =$	0.37		

#### PRE-DEVELOPMENT 100-YEAR EVENT STORM FLOW

C=	0.37	
Time to concentration tc=	19	min
Intensity, i (@ t <sub>c</sub> ) =	131.4840359	mm/hr
P1 Pre Development Flow, Qr=2.78*C*i*A=	18.52	I/s
THE ALLOWABLE FLOW FROM THIS SITE IS =	37.5	4 l/s
PRE-DEVELOPMENT 2-YEAR EVENT STORM FLOW		
C=	0.37	
Time to concentration tc=	19	min
Intensity, i (@ $t_c$ ) =	55.60	mm/hr
P1 Pre Development Flow, Qr=2.78*C*i*A=	7.84	<b>4</b> l/s
THE ALLOWABLE FLOW FROM THIS SITE IS =	15.8	7 l/s
A=0.089 Ha, C=0.75, Tc=19		

#### POST-DEVELOPMENT

Asphalt Parking Lot

Landscape/Open:

Sidewalks

Total Area:	1369.33		
Building Area:	349.85	0.9	314.87
Asphalt Parking Lot	464.60	0.9	418.14
Landscape/Open:	422.75	0.2	84.55
Sidewalks	132.13	0.9	118.92
		0	0.00
		0	0.00
Totals:	1369.33		936.47
C <sub>eq</sub> = Sum(A*C)/Sum(A) =	0.68		
	<u> </u>		
POST-DEVELOPMENT CATCHMENT 201			
	Area (m²)	С	A*C
Total Area:	1000.07		
Building Area:	349.85	0.9	314.87
-			

Area (m²)

464.60

72.13

113.49

0.9

0.2

0.9

#### AES PARAMETERS FOR INTENSITY DURATION FREQUENCY CURVES

	A, B, C, PARAMETERS				
RETURN PERIOD	Α	A В С			
2	754.36	6.011	0.81		
5	1183.74	7.641	0.838		
10	1574.38	9.025	0.86		
25	2019.37	9.824	0.875		
50	2270.67	9.984	0.876		
100	2619.36	10.5	0.884		
250	3048.22	10.03	0.888		

<sup>\*</sup>Intensity i=A/(t+B)^C (mm/ł

#### POST-DEVELOPMENT CATCHMENT U1+U2

	Area (m²)	С	A*C
Total Area:	396.26		
Building Area:	0.00	0.9	0.00
Concrete Sidewalks/Ent	tra 18.64	0.9	16.78
Landscape/Open:	350.62	0.2	70.12

418.14

14.43

102.14

A\*C

<sup>\*</sup> Refer to the City of London Design Specification & Requirments Manual (DS&RM), Section

Totals:	1000.0	77	849.57	Totals:	369.26	86.90
$C_{eq} = Sum(A^*C)/Sum(A) =$	0.85			$C_{eq} = Sum(A*C)/Sum(A) =$	0.24	
POST-DEVELOPMENT 100-YEAR EVENT STORM FLOW				POST-DEVELOPMENT 100-YEA	AR EVENT STORK FLOW	
C=	0.85			C=	0.24	
Time to concentration tc=	12.5	min		Time to concentration tc=	<b>19</b> min	
Intensity, i (@ t <sub>c</sub> ) =	163.8431472	mm/hr		intensity, i (@ t <sub>c</sub> ) =	131.484 mm/hr	
A1 Post Developmet Flow, Qr=2.78*C*i*A=	38.70	I/s	U1 Pos	t Development Flow, Qr=2.78*C	<b>3.41</b> I/s	
POST-DEVELOPMENT 2-YEAR EVENT STORM FLOW				POST-DEVELOPMENT 2-YEAR	EVENT STORK FLOW	
C=	0.85			C=	0.24	
Time to concentration tc=	12.5	min		Time to concentration tc=	<b>19</b> min	
Intensity, i (@ t <sub>c</sub> ) =	70.95	mm/hr		Intensity, i (@ t <sub>c</sub> ) =	<b>55.60</b> mm/hr	
A1 Post Developmet Flow, Qr=2.78*C*i*A=	16.76	I/s	U1 Pos	t Developmet Flow, Qr=2.78*C*i	<b>1.44</b> l/s	
THE ALLOWABLE FLOW FROM THIS SITE IS = $A=0.89$ Ha, $C=0.75$ , $Tc=11.75$						

RETURN PERIOD OF STORM	PREDEVELOPMENT (201) (I/s)	UNCONTROLLED	ALLOWABLE POST-
		POST	DEVELOPMENT FLOWS (201-
		DEVELOPMENT	(U1+U2))
		ELOW (111±112)	
100 YEAR	37.54	3.41	34.13
2 YEAR	15.87	1.44	14.43

#### FLOW RESTRICTOR CALCULATIONS

Orifice diameter is based on Bernoulli's equation, Q=Cd\*A\*(2gH)^0.5 Rearranging, A= Q/[Cd\*(2gH)^0.5], where:

Restricted Flow Rate, Q = 14.43 I/s Orifice Coefficient, C<sub>d</sub> = 0.63 Gravitational Acceleration, g = 9.81 m/s^2 Top of Flooding = N/A Invert at Orifice = N/A Hydraulic Head on Orifice, H \*= M 18.6283 1.2 Required Cross-sectional Area, A= 0.004720294 Required Diameter, d=((4\*A)/pi)^0.5= 0.077524518 Minimum Orifice diameter= **76** mm MIN ALLOWABLE FLOW DUE TO ORIFICE = 12.06 L/S Therefore use Orfice Restrictor Diameter = **78** mm

#### AES PARAMETERS FOR INTENSITY DURATION FREQUENCY CURVES

	A, B, C, PARAMETERS		
RETURN PERIOD	Α	В	С
2	754.36	6.011	0.81
5	1183.74	7.641	0.838
10	1574.38	9.025	0.86
25	2019.37	9.824	0.875
50	2270.67	9.984	0.876
100	2619.36	10.5	0.884
250	3048.22	10.03	0.888

<sup>\*</sup>Intensity i=A/(t+B)^C (mm/hr)

#### 2 YR STORM EVENT

DURATION	INTENSITY "I"
(MIN)	(mm/hr)
5	108.07
10	79.80
15	64.03
30	41.39
60	25.33
120	15.01
180	10.95

#### **5 YR STORM EVENT**

NTENSITY "I"
141.24
106.82
86.67
56.60
34.64
20.34
14.73

#### 100 YR STORM EVENT

DURATION	INTENSITY "I"
(MIN)	(mm/hr)
5	232.24
10	181.39
15	149.56
30	99.36
60	60.87
120	35.32
180	25.28

#### 2 YR STORM EVENT

#### STORAGE CALCULATIONS

A1 INFLOW, Qi	Volume in	Design Outflow Qo	Surface Outflow	Volume OUT	Difference /
2.78*C*i*A ( I/s)	Qi*t*60/1000	(I/s)	Qo (I/s)	Qo*t*60/1000	Storage m^3
				m^3	
25.52	7.66	14.43	0	4.329	3.33
18.85	11.31	14.43	0	8.658	2.65
15.12	13.61	14.43	0	12.987	0.62
9.77	17.59	14.43	0	25.974	-8.38
5.98	21.54	14.43	0	51.948	-30.41
3.54	25.52	14.43	0	103.896	-78.38
2.59	27.92	14.43	0	155.844	-127.92

#### 5 YR STORM EVENT

#### Maximum Storage Volume (m^3)=

#### 3.33

#### Post Development Required Storage

#### STORAGE CALCULATIONS

A1 INFLOW, Qi	Volume in	Design Outflow Qo	Surface Outflow	Volume OUT	Difference /
2.78*C*i*A ( I/s)	Qi*t*60/1000	(I/s)	Qo (I/s)	Qo*t*60/1000	Storage m^3
33.36	10.01	14.43	0	4.329	5.68
25.23	15.14	14.43	0	8.658	6.48
20.47	18.42	14.43	0	12.987	5.44
13.37	24.06	14.43	0	25.974	-1.91
8.18	29.45	14.43	0	51.948	-22.50
4.80	34.60	14.43	0	103.896	-69.30
3.48	37.57	14.43	0	155.844	-118.27
		•	Maximum Stor	rage Volume (m^3)=	6.48

#### Maximum Storage Volume (m^3)=

#### Post Development Required Storage

#### 100 YR STORM EVEI STORAGE CALCULATIONS

5.97

64.48

A1 INFLOW, Qi	Volume in	Design Outflow Qo	Surface Outflow	Volume OUT	Difference /
2.78*C*i*A ( I/s)	Qi*t*60/1000	(I/s)	Qo (I/s)	Qo*t*60/1000	Storage m^3
				m^3	
54.85	16.46	14.43	0	4.329	12.13
42.84	25.70	14.43	0	8.658	17.05
35.32	31.79	14.43	0	12.987	18.80
23.47	42.24	14.43	0	25.974	16.27
14.38	51.75	14.43	0	51.948	-0.19
8.34	60.06	14.43	0	103.896	-43.84

14.43

Maximum Storage Volume (m^3)=

155.844

18.80

-91.36

**Post Development Required Storage** 

<sup>\*</sup> Refer to the City of London Design Specification & Requirments Manual (DS&RM), Section



DATE:September 03, 2024
PROJECT #: 24-1011
CLIENT: Creative Structure
ADDRESS: 691 Fanshawe Park Road, London
LOCATION: London, ON.

CATCHMENT 101

#### PRE-DEVELOPMENT

	Area (m²)	С	A*C
Total Area:	785.98		
Building Area:	137.12	0.9	123.41
Driveway	0	0.9	0.00
Sidewalk	17.49	0.9	15.74
Front Portch	0	0.9	0.00
Patio	22.12	0.9	19.91
Shed	12.55	0.9	11.30
Landscape/Open:	596.7	0.2	119.34
Totals:	785.98		289.69
$C_{eq} = Sum(A*C)/Sum(A) =$	0.37		

#### PRE-DEVELOPMENT 100-YEAR EVENT STORM FLOW

#### PRE-DEVELOPMENT 2-YEAR EVENT STORM FLOW

 C=
 0.37

 Time to concentration tc=
 19
 min

 Intensity, i (@ t<sub>c</sub>) =
 55.60
 mm/hr

 P1 Pre Development Flow, Qr=2.78\*C\*i\*A=
 4.48
 |/s

#### AES PARAMETERS FOR INTENSITY DURATION FREQUENCY CURVES

	A, B, C, PARAMETERS			
RETURN PERIOD	Α	В	С	
2	754.36	6.011	0.81	
5	1183.74	7.641	0.838	
10	1574.38	9.025	0.86	
25	2019.37	9.824	0.875	
50	2270.67	9.984	0.876	
100	2619.36	10.5	0.884	
250	3048.22	10.03	0.888	

<sup>\*</sup>Intensity i=A/(t+B)^C (mm/h

<sup>\*</sup> Refer to the City of London Design Specification & Requirments Manual (DS&RM), Section



DATE:September 03, 2024 PROJECT #: 24-1011 CLIENT: Creative Structure

ADDRESS: 691 Fanshawe Park Road, London

LOCATION: London, ON. CATCHMENT 102

#### PRE-DEVELOPMENT

	Area (m²)	С	A*C
Total Area:	583.35		
Duilding Assoc	0	0.0	0.00
Building Area:	U	0.9	0.00
Driveway	121.93	0.9	109.74
Sidewalk	13.99	0.9	12.59
Front Portch	7.75	0.9	6.98
Patio	0	0.9	0.00
Shed	0	0.9	0.00
Landscape/Open:	439.68	0.2	87.94
Totals:	583.35		217.24
$C_{eq} = Sum(A*C)/Sum(A) =$	0.37		

### PRE-DEVELOPMENT 100-YEAR EVENT STORM FLOW

C= 0.37
Time to concentration tc= 19 min
Intensity, i (@ t<sub>c</sub>) = 131.4840359 mm/hr
P1 Pre Development Flow, Qr=2.78\*C\*i\*A= 7.94 |/s

#### PRE-DEVELOPMENT 2-YEAR EVENT STORM FLOW

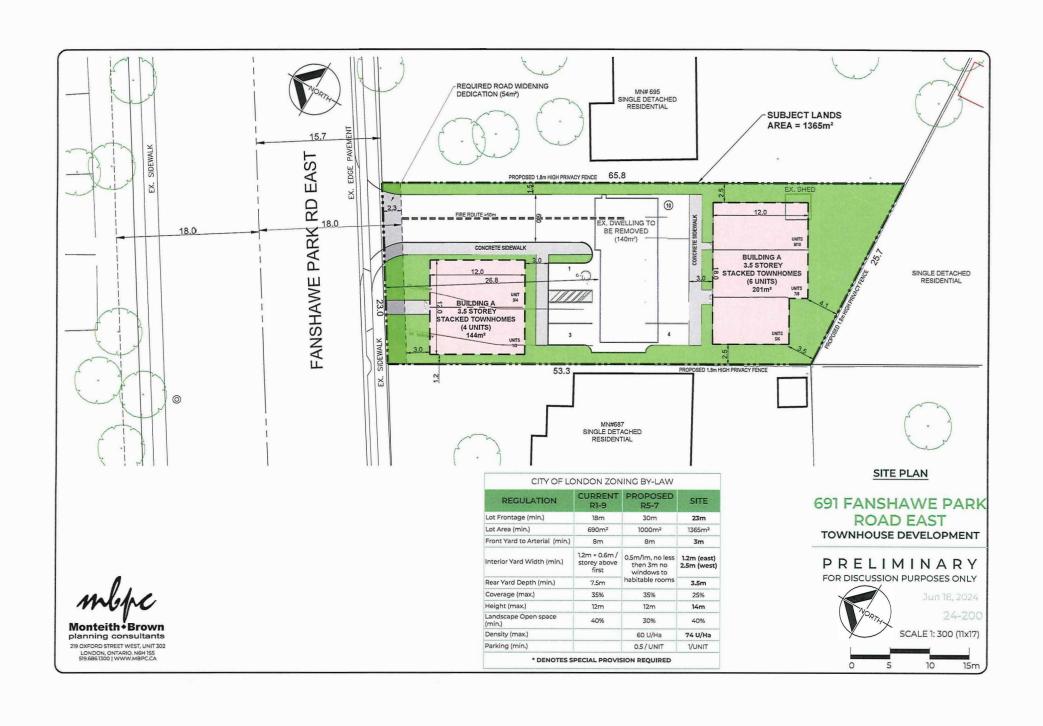
C= 0.37
Time to concentration tc= 19 min
Intensity, i (@ t<sub>c</sub>) = 55.60 mm/hr
P1 Pre Development Flow, Qr=2.78\*C\*i\*A= 3.36 //s

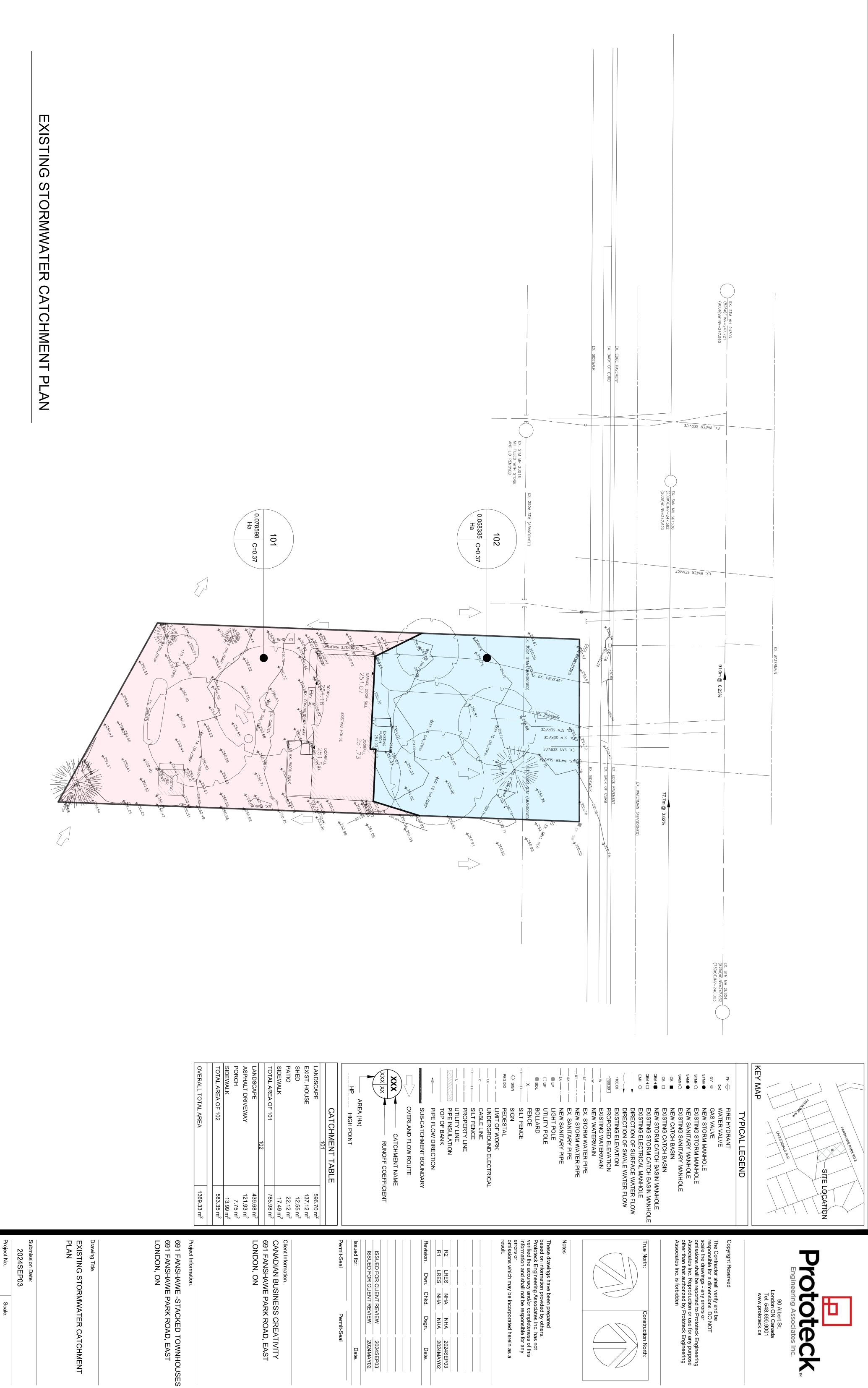
#### AES PARAMETERS FOR INTENSITY DURATION FREQUENCY CURVES

	A, B, C, PARAMETERS				
RETURN PERIOD	Α	В	С		
2	754.36	6.011	0.81		
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100	2619.36	10.5	0.884		
250	3048.22	10.03	0.888		

<sup>\*</sup>Intensity i=A/(t+B)^C (mm/f

<sup>\*</sup> Refer to the City of London Design Specification & Requirments Manual (DS&RM), Section





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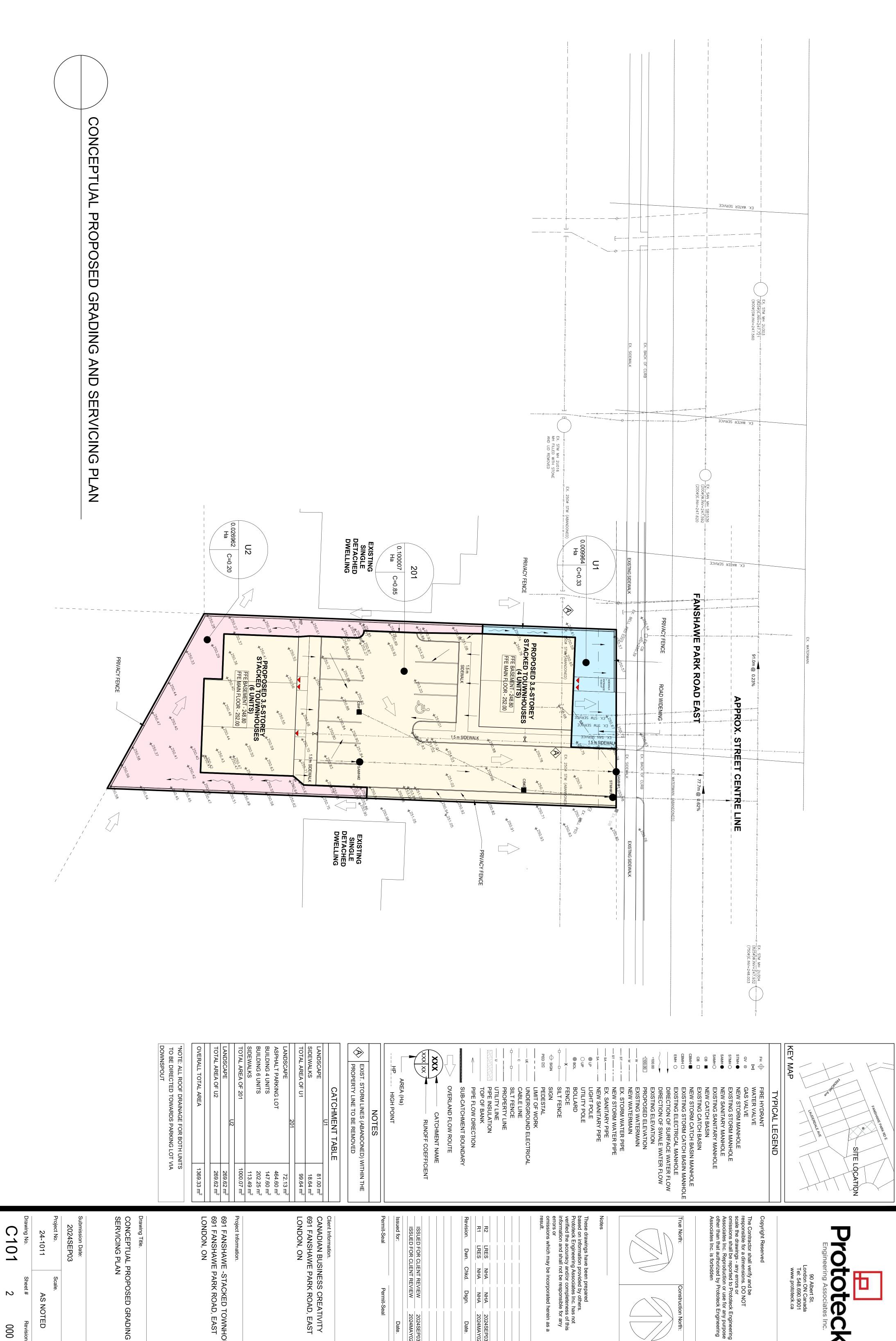
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Date

Permit-Seal

Date.

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