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PROPOSED RESIDENTIAL TOWNHOUSE DEVELOPMENT
2532 ARGYLE ROAD
CITY OF MISSISSAUGA

PROJECT No. : 18201

FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

Prepared For:

Plazacorp Investments Ltd.

Prepared By:

The Odan/Detech Group Inc.

Original: October 19th, 2018

Revised: May 22nd, 2019

Revised: August 14th, 2019

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1.0 INTRODUCTION

The property under study is a 0.661 Ha (1.6 acre) site located at 2532 Argyle Road in the City of Mississauga. The site is bound by the following:

- Argyle Road to the east
- An existing residential highrise development to the north
- A landscaped area within the adjacent highrise development to the west
- Existing detached houses to the south and on the opposite side of Argyle Road

Refer to the Key Plan in Appendix A for the site's layout and adjacent developments.

The site presently comprises three existing detached houses in three separate lots.

It is proposed to demolish the three existing houses. It is proposed to construct a townhouse development comprising a common one-level below-grade parking structure and four blocks of four-storey stacked townhouses with a total of 101 townhouse units. The stacked townhouses comprise a basement level, three above-ground levels and a mezzanine level above. Refer to the architectural Site Plan in Appendix A.

For detailed topography of the existing site conditions, as of January 15, 2017, refer to the topographic survey prepared by R. Avis Surveying Inc.

This report evaluates the serviceability of the site with respect to sanitary waste water, water and storm water management (SWM) and will implement the City of Mississauga's SWM requirements and criteria.

2.0 SCOPE OF WORK

THE ODAN/DETECH GROUP INC. was retained by **Plazacorp Investments Ltd.** to review the Site, collect data, evaluate the Site for the proposed use and present the findings in a Functional Servicing and Storm Water Management Report in support of a Zoning Bylaw Amendment application. The scope of work in brief involves the following:

a) Collecting existing servicing drawings from the CITY in order to establish availability and feasibility of Site servicing;
b) Meetings/conversations with CITY Engineers and Design Team.
c) Evaluation of the data and presentation of the findings in a FSR and Storm Water Management Design Brief in support of the Zoning Bylaw Amendment application.

3.0 SANITARY SEWERS

i) Existing Infrastructure

There is an existing 250mm sanitary sewer flowing southerly beneath Argyle Road adjacent to the site's east frontage. This sewer continues easterly beneath Dunbar Road and then discharges into a 675mm sanitary sewer – which is assumed to be the trunk sewer – at the intersection of Dunbar Road and Rugby Road.

ii) Proposed Sanitary Servicing

The proposed townhouse development will be serviced for sanitary flows by a proposed 150mm sanitary service connection to the 250mm sanitary sewer beneath Argyle Road.

Sanitary flow calculations are based on the following criteria provided in the Region of Peel's manual: *Public Works Design, Specifications & Procedures Manual – Linear Infrastructure – Sanitary Sewer Design Criteria (Rev. July 2009)*.

- flow rate = 302.8 L/person/day per capita
- Infiltration to be 0.0002m$^{3/}$sec/ha
- for residential areas, population of 3.5 persons per unit is to be used (row dwellings)
- The Harmon formula will be used for the peaking factor

The pre-development sanitary flows are as follows. Refer to the detailed calculation on the following pages.

TABLE 1 – Pre-Development Sanitary Flow

Component	Population (P)	Average Flow (l/s)	Peak Sanitary Flow (l/s)	Inflow & Infiltration (l/s)	Total Flow (l/s)
Ex 3 x DTH	33	0.12	0.50	0.13	0.64

The post-development sanitary flows are as follows. Refer to the detailed calculation on the following pages.

A unit population of 3.5 persons/unit has been adopted in the Post-Development flow calculation, rather than the Region standard of 175 persons/Ha for townhouses, because the Region standard would result in a population of approximately 1.0 person/unit for the proposed development. This is not realistic, therefore a unit population of 3.5 persons/unit has been used as this was used in other similar developments in Mississauga.

TABLE 2 – Post-Development Sanitary Flow

Component	Population (P)	Average Flow (l/s)	Peak Sanitary Flow (l/s)	Inflow & Infiltration (l/s)	Total Flow (l/s)
PROP TH's	354	1.24	5.01	0.13	5.15

The peak sanitary flow from the proposed development is ***5.15 L/s***, as shown above.

RESIDENTIAL SANITARY FLOW CALCULATIONS

Sanitary flow calculations as per Region of Peel Public Works Design Criteria Manual - Sanitary Sewer
PROJECT: 2532 Argyle Road Residential Townhouse Development
SCENARIO: PRE-DEVELOPMENT

COMMERCIAL SITE AREA (ha) =

RESIDENTIAL SITE AREA (ha) = 0.661

TOTAL SITE AREA (ha) = 0.661

LAND USE	NUMBER OF UNITS	SITE AREA, (ha)	GROSS FLOOR AREA, m2	TOTAL POPULATION	TOTAL DAILY FLOW (LITERS)	AVERAGE DAILY FLOW l/sec	PEAKING FACTOR, M	TOTAL FLOW FROM LAND USE, l/sec
Single family (>10m frontage), using 50 person/hectare		0.66		33	10008	0.12	4.35	0.50
Single family (<10m frontage), using 70 persons/hectare				0	0	0.00	4.50	0.00
Semi-Detached, using 70 persons/hectare				0	0	0.00	4.50	0.00
Row Dwellings, using 175 persons/hectare				0	0	0.00	4.50	0.00
Apartments, using 475 persons/hectare				0	0	0.00	4.50	0.00
RESIDENTIAL Townhomes, using 3.5 persons/unit				0	0	0.00	4.50	0.00
TOTAL RESIDENTIAL								0.50
COMMERCIAL, Using 50 persons/ha				0	0	0.00	4.50	0.00
TOTAL COMMERCIAL								**0.00**
	0			0				

TOTAL V1= 10008

Q1= 0.50
Q2= 0.00
Qinfil 0.13
Qtot 0.64

Q = (MqP/86400) + A * I (L/sec)

Q1= total flow from Residential Land Use (L/sec)
Q2= total flow from Commercial Land Use (L/sec)
Qinfil = total flow from infiltration (L/sec)
Qtot = total flow (Land use + infiltration)

V1= Total Volume from Land Use in liters

where : P is population
q = 302.8 L/person/day for proposed residential

A = gross site area
i = 0.20 L/sec/ha (infiltration rate)
Peaking Factor M = 1 + [14 / (4 + (P/1000,1/2))]

RESIDENTIAL SANITARY FLOW CALCULATIONS

Sanitary flow calculations as per Region of Peel Public Works Design Criteria Manual - Sanitary Sewer

PROJECT: 2532 Argyle Road Residential Townhouse Development

SCENARIO: POST-DEVELOPMENT

COMMERCIAL SITE AREA (ha) =

RESIDENTIAL SITE AREA (ha) = 0.661

TOTAL SITE AREA (ha) = 0.661

LAND USE	NUMBER OF UNITS	SITE AREA, (ha)	GROSS FLOOR AREA, m2	TOTAL POPULATION	TOTAL DAILY FLOW (LITERS)	AVERAGE DAILY FLOW l/sec	PEAKING FACTOR, M	TOTAL FLOW FROM LAND USE, l/sec
Single family (>10m frontage), using 50 person/hectare				0	0	0.00	4.50	0.00
Single family (<10m frontage), using 70 persons/hectare				0	0	0.00	4.50	0.00
Semi-Detached, using 70 persons/hectare				0	0	0.00	4.50	0.00
Row Dwellings, using 175 persons/hectare				0	0	0.00	4.50	0.00
Apartments, using 475 persons/hectare				0	0	0.00	4.50	0.00
RESIDENTIAL Townhomes, using 3.5 persons/unit	101			354	107040	1.24	4.05	5.01
TOTAL RESIDENTIAL								5.01
COMMERCIAL, Using 50 persons/ha				0	0	0.00	4.50	0.00
TOTAL COMMERCIAL								**0.00**
	101			0				

TOTAL

V1=	107040	Q1=	5.01
		Q2=	0.00
		Qinfil	0.13
		Qtot	5.15

Q = (MqP/86400) + A * I (L/sec)

Q1= total flow from Residential Land Use (L/sec)
Q2= total flow from Commercial Land Use (L/sec)
Qinfil = total flow from infiltration (L/sec)
Qtot = total flow (Land use + infiltration)

V1= Total Volume from Land Use in liters

where :
P is population
q = 302.8 L/person/day for proposed residential

A = gross site area
i = 0.20 L/sec/ha (infiltration rate)
Peaking Factor M = 1 + [14 / (4 + (P/1000,1/2))]

4.0 WATER DISTRIBUTION

Design Considerations

There is an existing 300mm ductile iron watermain beneath Argyle Road adjacent to the site's east frontage. There is also an abandoned 150mm watermain beneath Argyle Road. Refer to the Functional Servicing Plan for the layout of the existing bordering watermains. They also appear on the following Fire Separation Distance Plan.

It is proposed to connect to the existing 300mm watermain for domestic water and fire protection. Refer to the Functional Servicing Plan for the proposed domestic water and fire services. The proposed incoming fire service is to be connected to the sprinklers provided in the underground parking garage and a proposed private hydrant within the private laneway. Refer to the Functional Servicing Plan. The proposed townhouses will not be sprinklered. They will be served by hydrants as follows.

The proposed townhouse units will be served for fire protection by the existing hydrant on Dunbar Road adjacent to the site's southeast corner. Townhouse Blocks A and C are more than 90m from the existing hydrant and therefore require a new hydrant within the site. A new hydrant is proposed as shown on the Functional Servicing Plan.

The unit rate and peaking factors of water consumption, minimum pipe size and allowable pressure in line were established from the City Design Manual Standards. The pressures and volumes must be sufficient for peak hour conditions and under fire conditions as established by the Ontario Building Code 2006. The minimal residual pressure under fire conditions is 140 kpa. (or 20.3 psi).

The water demand for the proposed townhouse development is as follows. Domestic flow calculation criteria is given Tables 1 and 2 in the Region of Peel's *Public Works Watermain Design Criteria* manual (2009). The criteria is as follows. Table 2 in the Region manual is adopted as the criteria in this development as it is the more stringent criteria intended for new development.

a)	Average Day domestic demand -	using 409L/cap/day (354 persons – Table 2)	1.7 L/sec
b)	Max day demand -	2.0 x daily demand	3.4 L/sec
c)	Peak hour demand -	3.0 x daily demand	5.1 L/sec
d)	Fire flow as per FUS 1999 manual		367 L/sec

TABLE 3 – Total Water Demand

	L/sec	USGM
Max Day Demand	3.4	54
Fire Flow Demand (TH Block D)	367	5812
Total Water Demand	370	5866

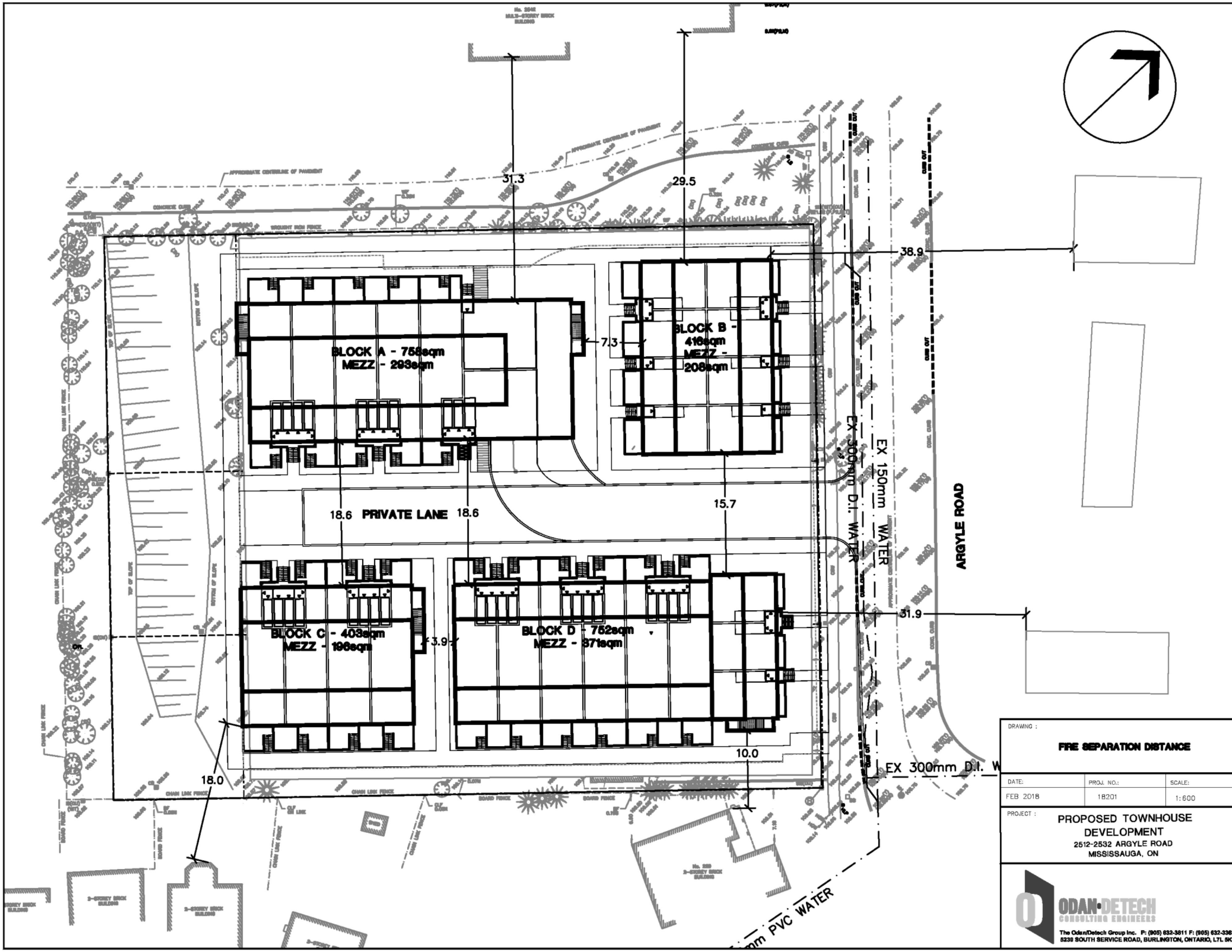
The following assumptions are made in the following Fire Underwriters' Survey fire flow calculation.

- The proposed townhouse blocks (above-grade) are of wood-frame construction
- The Fire Underwriters' Survey calculation considers above-grade floors, not below-grade floors. The above-grade townhouse units are not sprinklered, therefore the FUS calculation is completed accordingly.
- The building's contents (residences) will be non-combustible in nature
- The setbacks from the adjacent buildings are shown on the following Fire Separation Distance Plan
- The townhouse blocks comprise 1 below-grade level (basement) (at least 1.8m or 50% below-grade), which OBC classifies as a basement level. This is separate from the below-grade parking structure. The Fire Underwriters' Survey calculation does not consider basements in floor area (FUS page 17). The following FUS Calculations are therefore based on the four above-grade levels, which comprise three full-size levels with an additional mezzanine level on-top.

Townhouse Block D has the largest fire flow demand and is taken as the development's fire flow demand. Refer to the following FUS calculations.

A hydrant flow test was conducted on the watermain beneath Argyle Road to the NFPA 291 standard. The flow test is provided on the following pages. The flow test shows that there is a flow rate of 6400 USGM available at 20psi.

The maximum development water demand is 5866 USGM, whereas there is a flow rate of 6400 USGM available at a residual pressure of 20 psi. The available flow is greater than the required flow, therefore the existing watermain is adequate to service the proposed development and no watermain infrastructure improvements are required to accommodate the proposed development.



BLOCK A - 758sqm
MEZZ - 293sqm
BLOCK B - 416sqm
MEZZ - 208sqm
BLOCK C - 403sqm
MEZZ - 196sqm
BLOCK D - 752sqm
MEZZ - 371sqm
PRIVATE LANE
ARGYLE ROAD
31.3
29.5
38.9
7.3
18.6
18.6
15.7
3.9
31.9
10.0
18.0
EX 300mm D.I. WATER
EX 150mm WATER
EX 300mm D.I. W
mm PVC WATER
DRAWING :
FIRE SEPARATION DISTANCE
DATE:
FEB 2018
PROJ. NO.:
18201
SCALE:
1:600
PROJECT :
PROPOSED TOWNHOUSE DEVELOPMENT
2512-2532 ARGYLE ROAD
MISSISSAUGA, ON
ODAN-DETECH
CONSULTING ENGINEERS
The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

WATER SUPPLY FOR PUBLIC FIRE PROTECTION , FIRE UNDERWRITERS SURVEY
GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOWS

$F = 220 \times C \times \sqrt{A}$
Where:

F = required fire flow in liters per minute
C= Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements) in the building considered

Coefficient related to type of construction	
1.5	Wood Frame
1	Ordinary
0.8	Non combustible
0.6	Fire Resistive

LOCATION: 2532 Argyle Road - Block A

OBC OCCUPANCY: Residential

BUILDING FOOT PRINT (m2): 758

\# OF STOREYS: 4

PROJECT: 2532 Argyle Road, Mississauga

PROJECT No 18201

Contents	Charge
Non-Combustible	-25%
limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Buring	25%

CONSTRUCTION CLASS: Wood Frame

AUTOMATED SPRINKLER PROTECTION		Credit	Total
NFPA 13 sprinkler standard	no	0%	0%
Standard Water Supply	no	0%	
Fully Supervised System	no	0%	
		0%	

CONTENTS FACTOR: Non Combustible CHARGE: -20%

EXPOSURE 1 (south) TH Block D	Distance to Exposure Building (m) / Length - Height	18.6	15%
EXPOSURE 2 (east) TH Block B	Distance to Exposure Building (m) / Length - Height	7	20%
EXPOSURE 3 (west) NA	Distance to Exposure Building (m) / Length - Height	>45	0%
EXPOSURE 4 (north) EX Apartment Bldg	Distance to Exposure Building (m) / Length - Height	31	5%
		Total:	40%

no more than 75%

Separation	Charge
0-3 m	25%
3.1 -10 m	20%
10.1 - 20 m	15%
20.1 - 30 m	10%
30.1 - 45	5%
> 45 m	0%

ARE BUILDINGS CONTIGUOUS: Yes

FIRE RESISTANT BUILDING Are vertical openings and exterior vertical communications protected with a minimum one (1) h No

CALCULATIONS

C =	1.5		Wood Frame
A =	2567	m2	
F =	16720	L/min	
Round to Nearest 1000 L/min F =	17000	L/min	must be > 2000 L/min

STOREY AREAS m2	
758	Ground
758	2nd
758	3rd
293	Mezz

CORRECTION FACTORS:

OCCUPANCY	-3400	L/min
FIRE FLOW ADJUSTED FOR OCCUPANCY	13600	L/min
REDUCTION FOR SPRINKLER	0	L/min
EXPOSURE CHARGE	5440	L/min

REQUIRED FIRE FLOW

	F =	19040	L/min		
Round to Nearest 1000 L/min	**F =**	19000	L/min	5019	usgm
	F =	317	L/sec		

WATER SUPPLY FOR PUBLIC FIRE PROTECTION , FIRE UNDERWRITERS SURVEY
GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOWS

F = 220 x C x √ A
Where:

F = required fire flow in liters per minute
C= Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements) in the building considered

Coefficient related to type of construction	
1.5	Wood Frame
1	Ordinary
0.8	Non combustible
0.6	Fire Resistive

LOCATION:	2532 Argyle Road - Block B
OBC OCCUPANCY:	Residential
BUILDING FOOT PRINT (m2):	416
# OF STOREYS	4

PROJECT: 2532 Argyle Road, Mississauga

PROJECT No: 18201

Contents	Charge
Non-Combustible	-25%
limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Buring	25%

CONSTRUCTION CLASS: Wood Frame

`

AUTOMATED SPRINKLER PROTECTION		Credit	Total
NFPA 13 sprinkler standard	no	0%	0%
Standard Water Supply	no	0%	
Fully Supervised System	no	0%	
		0%	

CONTENTS FACTOR: Non Combustible CHARGE: -20%

EXPOSURE 1 (south) TH Block D	Distance to Exposure Building (m) Length - Height	15.7	15%
EXPOSURE 2 (east) Ex House	Distance to Exposure Building (m) Length - Height	38.9	5%
EXPOSURE 3 (west) TH Block A	Distance to Exposure Building (m) Length - Height	7.3	20%
EXPOSURE 4 (north) Ex Apartment Bldg	Distance to Exposure Building (m) Length - Height	29.5	10%
		Total:	50%

no more than 75%

Separation	Charge
0-3 m	25%
3.1 -10 m	20%
10.1 - 20 m	15%
20.1 - 30 m	10%
30.1 - 45	5%
> 45 m	0%

ARE BUILDINGS CONTIGUOUS: Yes

FIRE RESISTANT BUILDING Are vertical openings and exterior vertical communications protected with a minimum one (1) h No

CALCULATIONS

	C =	1.5	Wood Frame
	A =	1454	m2
	F =	12583	L/min
Round to Nearest 1000 L/min	F =	13000	L/min must be > 2000 L/min

STOREY AREAS m2	
416	Ground
416	2nd
416	3rd
206	Mezz

CORRECTION FACTORS:

OCCUPANCY	-2600	L/min
FIRE FLOW ADJUSTED FOR OCCUPANCY	10400	L/min
REDUCTION FOR SPRINKLER	0	L/min
EXPOSURE CHARGE	5200	L/min

REQUIRED FIRE FLOW	**F =**	15600	L/min	
Round to Nearest 1000 L/min	**F =**	16000	L/min	4227 usgm
	F =	267	L/sec	

WATER SUPPLY FOR PUBLIC FIRE PROTECTION , FIRE UNDERWRITERS SURVEY
GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOWS

F = 220 x C x √ A
Where:

F = required fire flow in liters per minute
C= Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements) in the building considered

Coefficient related to type of construction	
1.5	Wood Frame
1	Ordinary
0.8	Non combustible
0.6	Fire Resistive

LOCATION: 2532 Argyle Road - Block C
OBC OCCUPANCY: Residential
BUILDING FOOT PRINT (m2): 403
OF STOREYS: 4

PROJECT: 2532 Argyle Road, Mississauga
PROJECT No 18201

Contents	Charge
Non-Combustible	-25%
limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Buring	25%

CONSTRUCTION CLASS: Wood Frame

AUTOMATED SPRINKLER PROTECTION		Credit	Total
NFPA 13 sprinkler standard	no	0%	0%
Standard Water Supply	no	0%	
Fully Supervised System	no	0%	
		0%	

CONTENTS FACTOR: Non Combustible CHARGE: -20%

Exposure		Distance	Charge
EXPOSURE 1 (south) Ex House	Distance to Exposure Building (m) Length - Height	18	15%
EXPOSURE 2 (east) TH Block D	Distance to Exposure Building (m) Length - Height	3.9	20%
EXPOSURE 3 (west) N/A	Distance to Exposure Building (m) Length - Height	>45	0%
EXPOSURE 4 (north) TH Block A	Distance to Exposure Building (m) Length - Height	18.6	15%
		Total:	50%

no more than 75%

Separation	Charge
0-3 m	25%
3.1 -10 m	20%
10.1 - 20 m	15%
20.1 - 30 m	10%
30.1 - 45	5%
> 45 m	0%

ARE BUILDINGS CONTIGUOUS: Yes

FIRE RESISTANT BUILDING Are vertical openings and exterior vertical communications protected with a minimum one (1) h No

CALCULATIONS

	C =	1.5	Wood Frame
	A =	1405	m2
	F =	12369	L/min
Round to Nearest 1000 L/min	F =	12000	L/min must be > 2000 L/min

STOREY AREAS m2	
403	Ground
403	2nd
403	3rd
196	Mezz

CORRECTION FACTORS:

OCCUPANCY	-2400	L/min
FIRE FLOW ADJUSTED FOR OCCUPANCY	9600	L/min
REDUCTION FOR SPRINKLER	0	L/min
EXPOSURE CHARGE	4800	L/min

REQUIRED FIRE FLOW

	F =	14400	L/min		
Round to Nearest 1000 L/min	**F =**	14000	L/min	3698	usgm
	F =	233	L/sec		

WATER SUPPLY FOR PUBLIC FIRE PROTECTION , FIRE UNDERWRITERS SURVEY
GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOWS

F = 220 x C x √ A
Where:

F = required fire flow in liters per minute
C= Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements) in the building considered

Coefficient related to type of construction	
1.5	Wood Frame
1	Ordinary
0.8	Non combustible
0.6	Fire Resistive

LOCATION:	2532 Argyle Road - Block D
OBC OCCUPANCY:	Residential
BUILDING FOOT PRINT (m2):	752
# OF STOREYS	4

PROJECT: 2532 Argyle Road, Mississauga

PROJECT No 18201

Contents	Charge
Non-Combustible	-25%
limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Buring	25%

CONSTRUCTION CLASS: Wood Frame

AUTOMATED SPRINKLER PROTECTION

		Credit	Total
NFPA 13 sprinkler standard	no	0%	0%
Standard Water Supply	no	0%	
Fully Supervised System	no	0%	
		0%	

CONTENTS FACTOR: Non Combustible CHARGE: -20%

EXPOSURE 1 (south) Ex House	Distance to Exposure Building (m) Length - Height	10	20%
EXPOSURE 2 (east) Ex House	Distance to Exposure Building (m) Length - Height	31.9	5%
EXPOSURE 3 (west) TH Block C	Distance to Exposure Building (m) Length - Height	3.9	20%
EXPOSURE 4 (north) TH Block B	Distance to Exposure Building (m) Length - Height	15.7	15%
		Total:	60%

no more than 75%

Separation	Charge
0-3 m	25%
3.1 -10 m	20%
10.1 - 20 m	15%
20.1 - 30 m	10%
30.1 - 45	5%
> 45 m	0%

ARE BUILDINGS CONTIGUOUS: Yes

FIRE RESISTANT BUILDING Are vertical openings and exterior vertical communications protected with a minimum one (1) h No

CALCULATIONS

	C =	1.5		Wood Frame
	A =	2627	m2	
	F =	16914	L/min	
Round to Nearest 1000 L/min	F =	17000	L/min	must be > 2000 L/min

CORRECTION FACTORS:

OCCUPANCY	-3400	L/min
FIRE FLOW ADJUSTED FOR OCCUPANCY	13600	L/min
REDUCTION FOR SPRINKLER	0	L/min
EXPOSURE CHARGE	8160	L/min

STOREY AREAS m2	
752	Ground
752	2nd
752	3rd
371	Mezz

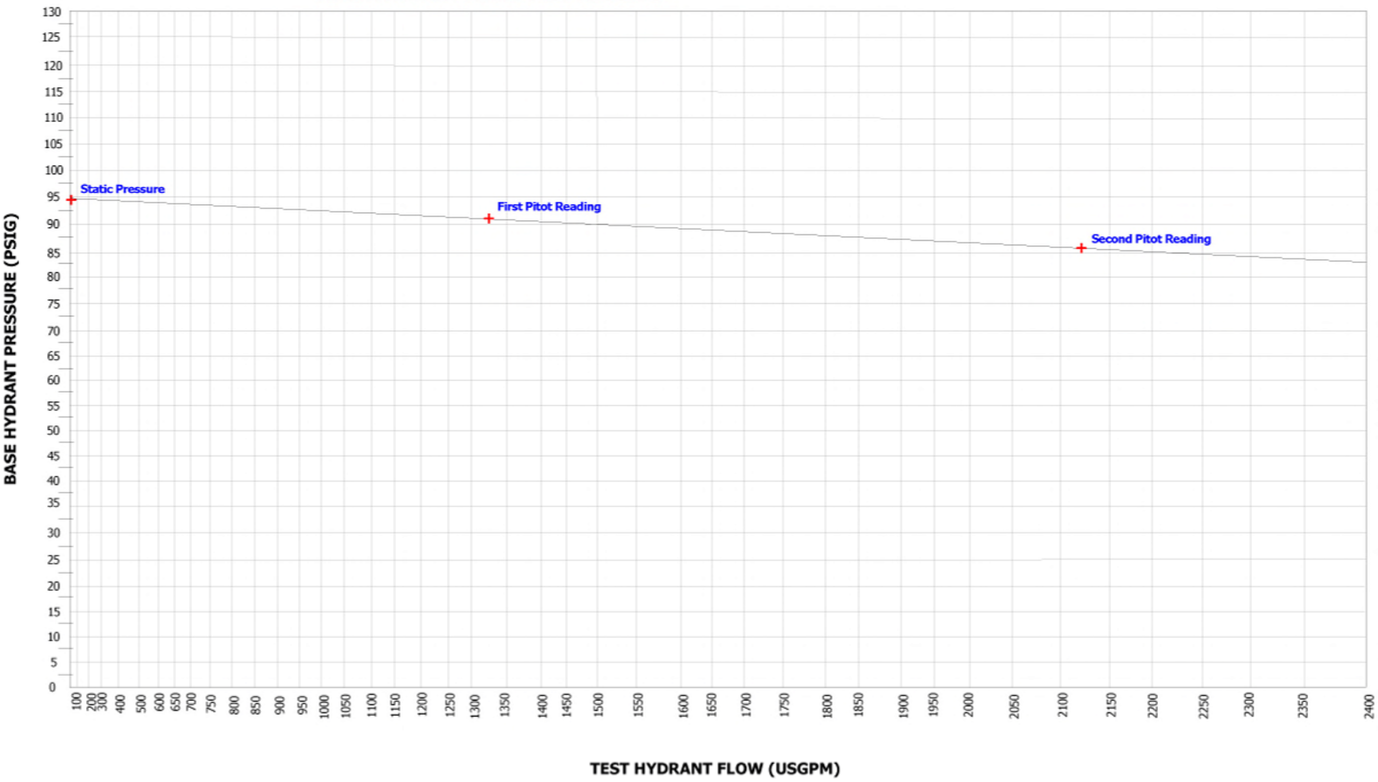
REQUIRED FIRE FLOW

	F =	21760	L/min		
Round to Nearest 1000 L/min	**F =**	22000	L/min	5812	usgm
	F =	367	L/sec		

JACKSON WATERWORKS

Telephone: **905.229.3176**
Toll Free: **800.734.5732**
email: **jww@bellnet.ca**
Website: **www.jacksonwaterworks.ca**

FIRE HYDRANT FLOW TEST RESULTS **TEST #1 of 1**



No. of Ports Open	Port Dia. (in)	Pitot Reading (psig)	Pitot Conversion (usgpm) Conversion Factor = 0	Residual Pressure (psig)
1	2.50	62	1321	91
2	2.50	40/40	2122	86
3	2.50			
4	2.50			
THEORETICAL FLOW @ 20psi			6400	

Test Date	25 April 2019
Test Time	10:00am
Pipe Diameter (in)	8
Static Pressure (psig)	95
Secondary Valve Position	Fully Open

Site Information		
Site Name or Developer Name	Plazacorp	Engineer/Architect: Odan Detech
Site Address/Municipality	2512-2532 Argyle Road, Mississauga	Test Hydrant Make & Model: Mueller B50B-24
Location of Test Hydrant(s)	In Front of 2542 & 2556 Argyle Road	
Location of Base Hydrant	In Front of 203 Dunbar Road	
Comments	Testing has been completed in accordance with NFPA-291 guidelines wherever and whenever possible and practical. Conversion factors for pitot tube readings may have been used depending on hose nozzle internal design and installation profile. Refer to attached cover letter for additional information.	
Verified By	Mark Schmidt	

7104 Canborough Road, Dunnville, ON N1A 2W1

5.0 STORM WATER MANAGEMENT & DRAINAGE PROPOSAL

i) Background Information & Existing Infrastructure

Presently the following existing separated storm sewers are adjacent to the subject site. Refer to the Functional Servicing Plan and the Pre-Development Drainage Plan on the following page for the existing storm sewers adjacent to the subject site and the existing site drainage patterns.

1. There is an existing 2400mm x 3600mm at 2.0% box culvert conveying Mary Fix Creek in an approximately 17m wide easement in the west side of the subject site. This culvert commences at an inlet north of the site and south of Dundas Street. This culvert continues southeast of the subject site, discharging into a ditch farther downstream.

   1.1. There are two existing catchbasins (EX CB1 and EX CB2) draining into this culvert within the subject site, within the easement. Refer to the Functional Servicing Plan for the existing CB structures.

   1.2. A 0.386 Ha portion of the subject site presently (pre-development) drains by overland sheet flow into EX CB1 and EX CB2. This is Catchment Area EX-A in the Pre-Development Drainage Plan (below).

   1.3. Credit Valley Conservation (CVC) is undertaking a hydrologic/hydraulic flood analysis of this culvert and has confirmed that it is flowing within capacity in the design storms presently and that there is no spill or overland flow through the subject site easement. Refer to the email correspondence in Appendix B wherein CVC staff state that no spill will occur through the subject site in the easement arising from Mary Fix Creek.

2. There is an existing 525mm storm sewer flowing southerly beneath Argyle Road, which discharges into the foregoing culvert downstream of the subject site.

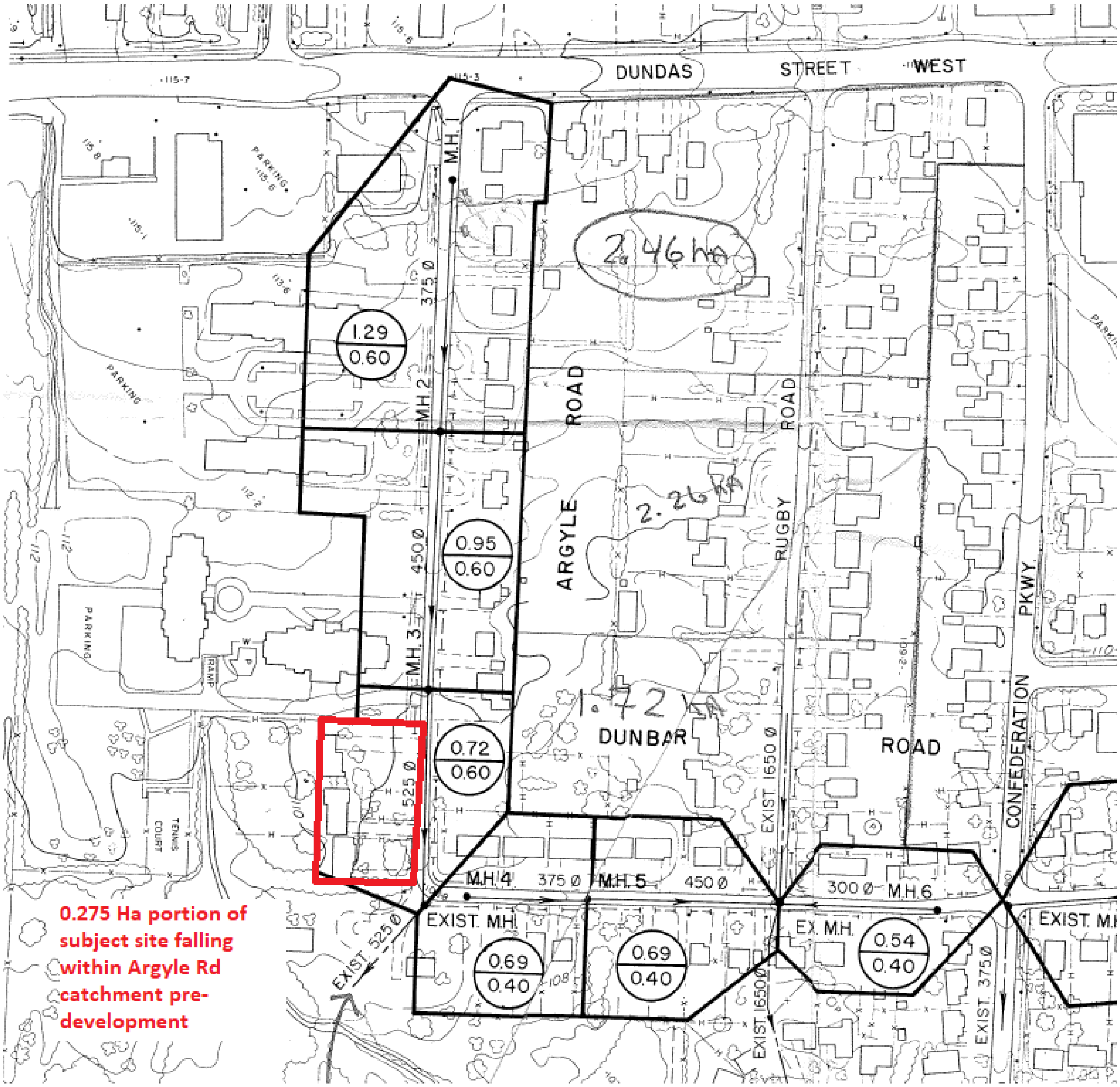
   2.1. This sewer was designed for the 10-year storm with a C-value of 0.60, based on sewer design sheets and catchment plans provided by the City of Mississauga.

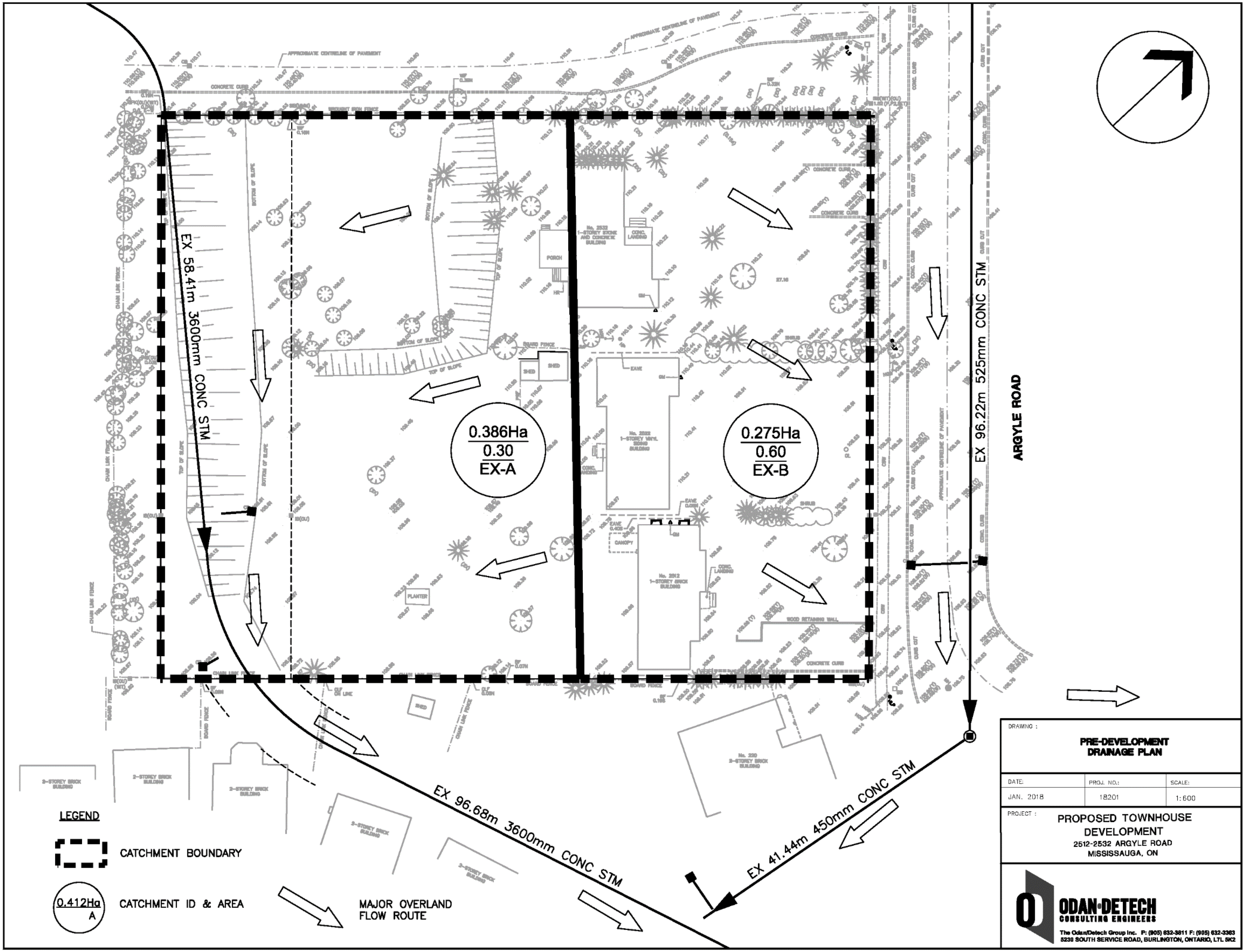
   2.2. A 0.275 Ha portion of the site was allocated to drain into this sewer based on the excerpt from the sewer's drainage plan, shown in Figure 1, below.

   2.3. The downstream leg of this sewer was constructed at 450mm diameter. This pipe segment is within a catwalk south of the site as shown on the Functional Servicing Plan. The slab-on-grade garage of a house on the southeast side of the catwalk was constructed with very little setback from the pipe, as shown on the Functional Servicing Plan, meaning it is infeasible to replace this pipe without undermining the garage structure.

3. Design criteria for storm drainage design based on the foregoing conveyances are discussed below.

Figure 1 - Excerpt from Argyle Road storm drainage plan showing area in site with allocation




EX 58.41m 3600mm CONC STM
0.386Ha
0.30
EX-A
0.275Ha
0.60
EX-B
EX 96.22m 525mm CONC STM
ARGYLE ROAD
EX 96.68m 3600mm CONC STM
EX 41.44m 450mm CONC STM
LEGEND
CATCHMENT BOUNDARY
0.412Ha
A
CATCHMENT ID & AREA
MAJOR OVERLAND FLOW ROUTE
DRAWING :
PRE-DEVELOPMENT DRAINAGE PLAN
DATE: JAN. 2018
PROJ. NO.: 18201
SCALE: 1:600
PROJECT : PROPOSED TOWNHOUSE DEVELOPMENT
2512-2532 ARGYLE ROAD
MISSISSAUGA, ON
ODAN·DETECH CONSULTING ENGINEERS
The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

ii) Design Criteria

The City of Mississauga's *Development Requirements Manual (Effective September 2016)* provides criteria for stormwater management design. Table 2.01.03.03c therein states that developments in the Mary Fix Creek watershed should control 10-year post-development to 2-year pre-development storms. Note 1 on that table states that storm sewer capacity constraints may govern. Note 2 on that table states that pre-development C-value should be no greater than 0.50.

City staff have stated that 5mm rainfall event retention is required and that a best-effort to implement LID should be provided.

City staff have stated that stormwater quality control shall be provided by way of development charges, therefore no quality control measures are specified.

Stormwater management design criteria was discussed with City staff in the meeting on January 25, 2019, culminating in the enclosed correspondence (Appendix B) providing design criteria.

Design storm data for the City of Mississauga 2 year, 10 year and 100 year storms are shown below.

$$i_2 = \frac{610}{(t_c+4.6)^{0.78}}\ ,\ i_{10} = \frac{1010}{(t_c+4.6)^{0.78}},\ i_{100} = \frac{1450}{(t_c+4.9)^{0.78}}$$

where: *i* = intensity (mm/hr)
t = time of concentration (15min)

iii) Proposed Drainage & Allowable Discharge Flow Rate

The proposed development will drain storm flows to two outlets, and the pre-development or allowable discharge to each is established below based on the relevant criteria for each outlet.

1. Existing 3600mm x 2400mm culvert in easement.

    a. The western area of the development (western/rear drive aisle area; area of easement) will drain into this culvert by overland flow into the two existing catchbasins (EX CB1 and EX CB2). The site is designed such that post-development runoff via these inlets is no more than existing, in accordance with the email correspondence in Appendix B. There will be no new storm sewer connection to the culvert in easement; the flows will be maintained by grading design contributing flows to the two existing inlets as discussed below.

2. Existing 525mm Argyle Road storm sewer.

    a. There is allocation in the Argyle Road storm sewer for a portion of the subject site as evidenced in Figure 1. The site will drain into this sewer based on the existing allocation, the sewer's capacity and the criteria for quantity control prescribed by the City of Mississauga and described above. This sewer is shallow, and a conventional gravity orifice with storm tank will not work for this development, therefore a storm tank with sump pump providing controlling flow is proposed to provide stormwater quantity control. This is described in Section v) below.

The site's allowable discharge rate into the two foregoing outlets is as follows in Table 4. The design criteria for the discharge to the 525mm Argyle Road storm sewer is as follows.

1. The 2-year pre-development flow with C=0.50, in accordance with the foregoing City criteria (as per Table 4), as well as:

2. Receiving storm sewer capacity – maintaining the pre-development flow conditions in the receiving 525mm storm sewer beneath Argyle Road (as per the below discussion and sewer design sheets)

TABLE 4 – Allowable Flow Rate

Receiving Outlet	Run-off Coefficient	Rainfall Intensity (mm/hr)	Area (ha)	Site Allowable Discharge (L/s)
Argyle Road 525mm storm sewer	0.50	59.9 mm/hr (2-Y Storm)	0.661 Ha	**55 (2-Y Pre-Dev Storm) –** ***less uncontrolled 10Y flow to Culvert (26 L/s – Table 5) =*** ***29 L/s***
3600mm x 2400mm Mary Fix Creek Culvert	0.30*	59.9 mm/hr (2-Y Storm)	0.386 Ha (Catchment EX-A)*	**19 L/s (2-Y)**
		99.2 mm/hr (10-Y Storm)		**32 L/s (10-Y)**

**Refer to the Pre-Development Catchment Plan on the previous section for Catchment EX-A, the portion of the site which drained into the Mary Fix Creek Culvert pre-development*.

iv) Post Development Flow Analysis – Draining to 3600mm x 2400mm Mary Fix Creek Culvert in Easement

A portion of the proposed development will drain runoff into the 3600mm x 2400mm culvert beneath the west side of the site, as in pre-development.

The site is proposed to be graded such that the flow rate of runoff draining to the culvert is no more than existing, based on the following *C x A* analysis. That is, runoff in all storms contributing flows to the culvert post-development shall be no more than pre-development based on the post-development tributary area and runoff coefficient (C).

The pre-development C x A is:

$$CA_{Pre-Dev} = 0.30 * 0.386Ha = 0.116$$

Post-development, Catchment Areas A, B and C are proposed to drain to the culvert as shown on the Post-Development Drainage Plan and Functional Grading Plan.

The post-development C x A is as follows. Refer to the Post-Development Drainage Plan on the following page for the post-development C-values and catchment areas (A).

$$CA_{Post-Dev} = C_A * A_A + C_B * A_B + C_C * A_C$$

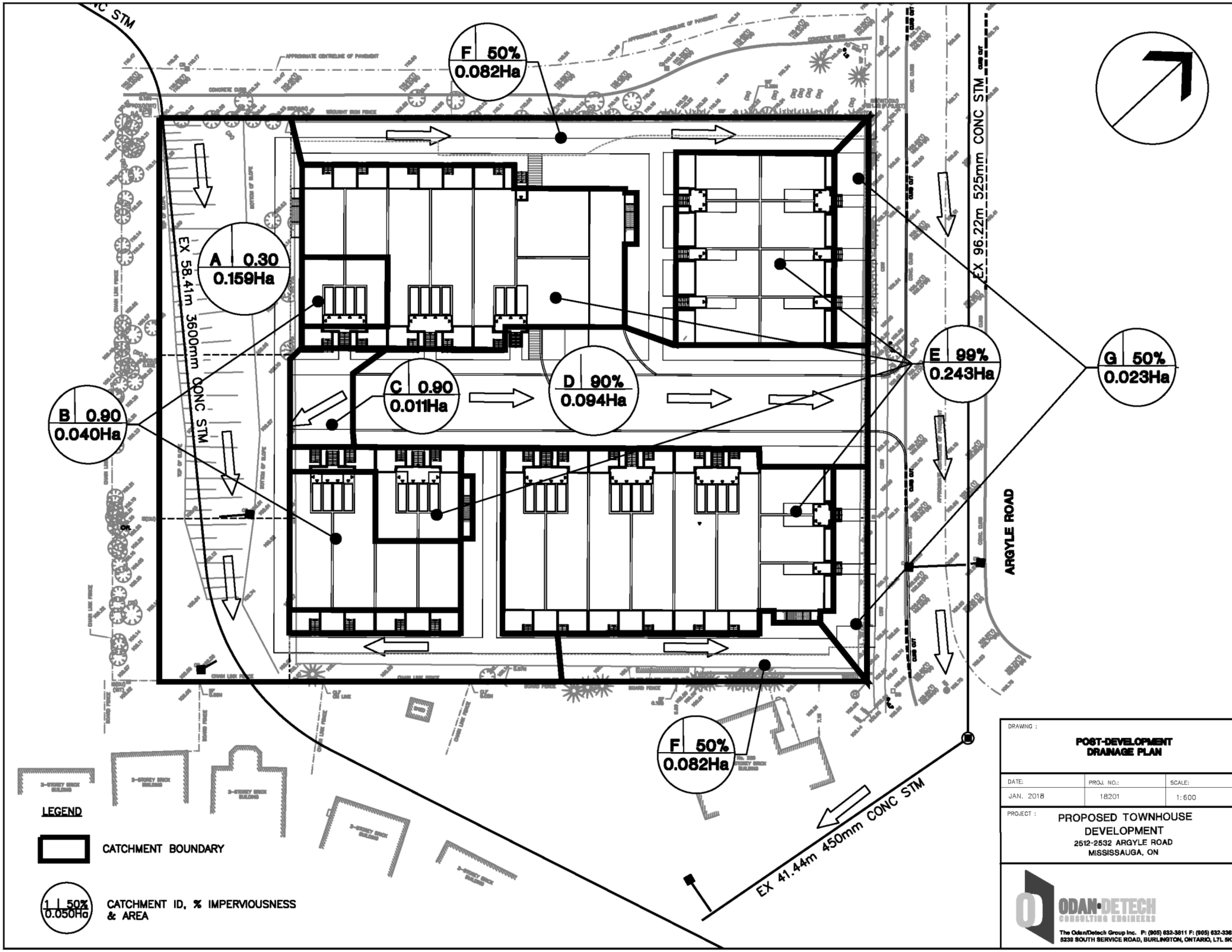
$$CA_{Post-Dev} = 0.3 * 0.159Ha + 0.9 * 0.040Ha + 0.9 * 0.011Ha = 0.094$$

The impact on the existing culvert is no more than pre-development based on the above CxA analysis, therefore it follows that the site drainage design addresses the City's criteria with respect to the area draining to the culvert.

In addition to the CxA analysis, it is shown as follows in Table 5 that the flows draining to the culvert post-development are no more than pre-development. It follows that the proposed drainage design with respect to the culvert complies with City criteria.

TABLE 5 – Pre-Dev vs. Post-Development Flow Rate to Culvert (A x C analysis)

Scenario	Rainfall Intensity (mm/hr)	A x C	Flow Rate (L/s) (Q=2.78CiA)
Post-Development	59.9 mm/hr (2-Y Storm)	0.094 (Catchment A, B, C)	**16 L/s (2-Y)**
	99.2 mm/hr (10-Y Storm)		**26 L/s (10-Y)**
Pre-Development	59.9 mm/hr (2-Y Storm)	0.30 x 0.386 Ha = 0.116 (Catchment EX-A)	**19 L/s (2-Y)**
	99.2 mm/hr (10-Y Storm)		**32 L/s (10-Y)**



DRAWING :

POST-DEVELOPMENT DRAINAGE PLAN

DATE:	PROJ. NO.:	SCALE:
JAN. 2018	18201	1:600

PROJECT : PROPOSED TOWNHOUSE DEVELOPMENT
2512-2532 ARGYLE ROAD
MISSISSAUGA, ON

ODAN•DETECH CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

v) Post Development Flow Analysis – Draining to Argyle Rd. 525mm Storm Sewer

The proposed development will control the post development flows to the allowable flow rate calculated above – Table 4. On-site stormwater storage will be required.

The 525mm Argyle Rd sewer is too shallow to drain to via a gravity orifice and while storing the water upstream of the orifice in a tank on-site. Refer to Section D-D on the Sections Plan – the outgoing sewer connection is at approximately the basement unit's FFE, therefore the tank would not work at that elevation because the pipes would be passing through the not-common-element basement condo units.

It is therefore proposed to provide the tank as a concrete tank beneath the P1 elevation, which will be pumped into the storm control manhole at a flow rate no greater than the allowable flow rate. Refer to Sections D-D and E-E on the Sections Plan. This will allow the mechanical storm drains to pass through the common-element P1 below-grade garage before draining to the storm tank.

Refer to the Post-Development Catchment Plan on the prior page for the post-development catchment areas.

Visual OTTHYMO 2.3.2. will be used to model and determine the detention volume required. For drainage areas with significant imperviousness the calculation of effective rainfall in Visual OTTHYMO is accomplished using the "Standhyd" method. This method is used in urban watersheds to simulate runoff by combining two parallel standard unit hydrographs resulting from the effective rainfall intensity over the pervious and impervious surfaces. For pervious surfaces, losses are calculated using the SCS modified CN method.

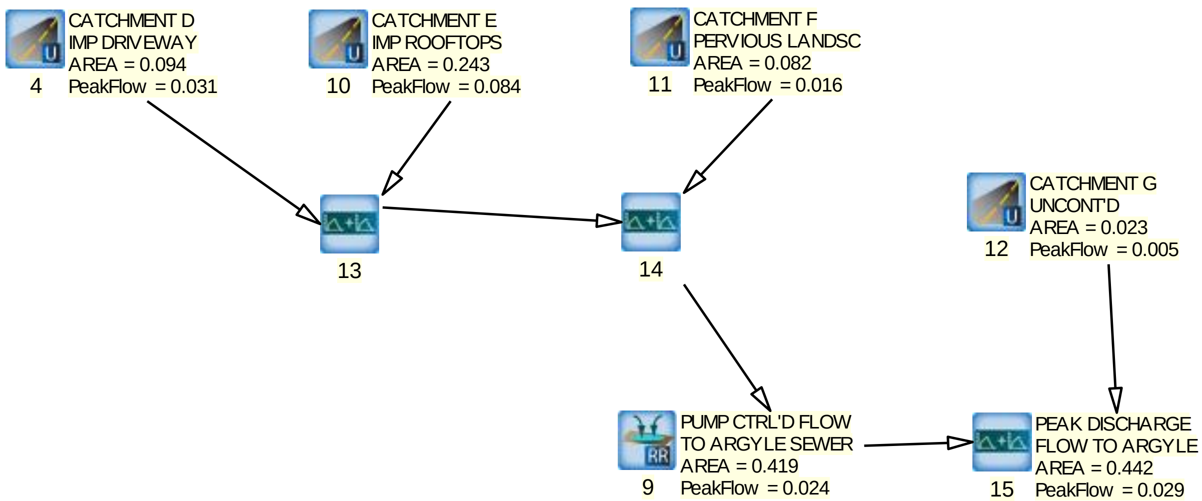
The following parameters were used in Visual OTTHYMO to characterize the post development catchment areas.

TABLE 6 - Catchment Characteristics for the Post-Developed Site

Area I.D.	Area (ha)	Hydrograph Method	% impervious	imperviousness directly connected %	Loss Method for Pervious Area	CN for Pervious Area	Initial Abstraction for Pervious (mm)	Time to peak (T_p)
D – Impervious Driveways	0.094	StandHyd	90	90	SCS	80	1	-
E – Impervious Rooftops	0.243	StandHyd	99	99	SCS	80	1	-
F – Pervious Landscaped Areas	0.082	StandHyd	50	50	SCS	80	1	-
G – Uncontrolled Landscaping	0.023	StandHyd	50	50	SCS	80	1	-

The Visual OTTHYMO Model showing flows in 10-year storms is as follows. Refer to the Visual OTTHYMO output in Appendix B for further details.

Figure 2 - Post-Development Visual OTTHYMO Model (10-Year Storm Flows)



The discharge criteria is thus satisfied as follows.

TABLE 7 - Summary of Stormwater Control & Storage Scenarios

<table>
<tr><th>Discharge Outlet</th><th>Storm</th><th>Allowable Release Rate to Argyle (L/s) (Table 4)</th><th>Proposed Flow Rate to Argyle (L/s)</th><th>Stormwater Storage Volume</th></tr>
<tr><td>Pumped flow to Storm Connection</td><td>10-Year</td><td rowspan="3">29</td><td>24</td><td>77 m³</td></tr>
<tr><td>Overland Flow from Catchment G</td><td>10-Year</td><td>5</td><td>-</td></tr>
<tr><td>Total Peak Flow to 525mm Storm Sewer</td><td>10-Year</td><td>29</td><td>-</td></tr>
</table>

Stormwater falling on Catchment Areas D, E, and F will be controlled by the sump pump to 24 L/s and subsequently 77m^3 of storage will be required in a 10-year storm. Refer to the Visual OTTHYMO Output in Appendix B.

Catchment G will flow uncontrolled onto Argyle Road by overland flow, however the peak flow rate remains no more than the allowable (29 L/s) in the 10-year storm. A stormwater storage tank will be provided accordingly as shown on the Functional Servicing Plan.

vi) Downstream Storm Sewer Analysis

The receiving storm sewer beneath Argyle Road is 525mm in diameter, and flows downstream for one segment before discharging into the foregoing 3600mm x 2400mm Mary Fix Creek Culvert south of the subject site. The downstream segment in this local sewer is 450mm, whereas the upstream pipe into which the site will discharge is 525mm.

Refer to the storm sewer design sheets on the following pages showing the pre-development and post-development impact on the receiving storm sewer in 10-year storms. The storm sewer was originally designed to convey the 10-year storm based on the storm sewer design sheet, provided here in Appendix B.

By the foregoing controlled release rate criteria, whereby the site's impact on the 525mm Argyle Road sewer is controlled to 29 L/s, the proposed development causes ***a reduction in impact*** on the receiving Argyle Road storm sewers relative to pre-development conditions.

As shown in the following storm sewer design sheets, pre-development, the critical 450mm segment is flowing at 120% of capacity pre-development, whereas by the proposed SWM control it is flowing at 116% of capacity post-development.

It is not feasible to retrofit the existing deficient 450mm storm sewer because doing so would undermine the foundations of the slab-on-grade garage of the existing house directly to the east of the pipe. Refer to the Functional Servicing Plan.

Thus, by the proposed stormwater management controls, the proposed development is in compliance with the release rate criteria to Argyle Road and provides a reduction in impact on the Argyle Road storm sewer.

PRE-DEVELOPMENT STORM SEWER DESIGN SHEET - Existing Argyle Road Storm Sewer

Site location: Argyle Road, Mississauga

Ref# PN 18201

ODAN·DETECH CONSULTING ENGINEERS

Location				Segment Tributary Area	Accumulative Tributary Area	Time of Concentration	10-year Rainfall Intensity	Segment Catchment Area C-Value	Segment A x C	Accumulative A x C	Accumulative 10-Year Storm Flow	Pipe Length	Size	Slope	Shape	Full Flow Capacity	Full Flow Velocity	% Full
Segment Storm Trib ID	Street Name	US Node	DS Node	(Ha)	(Ha)	(minutes)	(mm/hr)		(Ha)	(Ha)	(L/s)	L (m)	D (mm)	S (%)		Qcap (L/s)	V (m/s)	Q(d)/Qcap
	External Downstream Storm Sewers																	
	Argyle Rd	MH1	MH2	1.29	1.29	15.000	99	0.60	0.77	0.77	213	116.00	375	1.60	circle	221.78	2.01	96.21%
	Argyle Rd	MH2	MH3	0.95	2.24	15.963	96	0.60	0.57	1.34	357	118.00	450	1.60	circle	360.63	2.27	98.97%
	Argyle Rd	MH3	EX MH	0.72	2.96	16.830	92	0.60	0.43	1.78	457	96.00	525	1.60	circle	543.99	2.51	83.95%
	Argyle Rd	EX MH	Culvert	-	-	17.467	90	0.60	0.00	1.78	446	41.40	450	1.69	circle	370.64	2.33	120.43%

Flow Calculation Criteria

Q=2.78CiA

Mississauga 10-Year Storm IDF data:

$I10 = 1010.00 / (4.60 + t)^{0.78}$

n = 0.013

Note: Tributary Area and C-value as given in City of Mississauga Drawing: Argyle Rd. - Dunbar Rd. Storm Drainage Areas, May 1991

POST-DEVELOPMENT STORM SEWER DESIGN SHEET - Existing Argyle Road Storm Sewer

Site location: Argyle Road, Mississauga

Ref# PN 18201

Location				Segment Tributary Area	Accumulative Tributary Area	Time of Concentration	10-year Rainfall Intensity	Segment Catchment Area C-Value	Segment A x C	Accumulative A x C	Accumulative 10-Year Storm Flow	Pipe Length	Size	Slope	Shape	Full Flow Capacity	Full Flow Velocity	% Full
Segment Storm Trib ID	Street Name	US Node	DS Node	(Ha)	(Ha)	(minutes)	(mm/hr)		(Ha)	(Ha)	(L/s)	L (m)	D (mm)	S (%)		Qcap (L/s)	V (m/s)	Q(d)/Qcap
	External Downstream Storm Sewers																	
	Argyle Rd	MH1	MH2	1.29	1.29	15.000	99	0.60	0.77	0.77	213	116.00	375	1.60	circle	221.78	2.01	96.21%
	Argyle Rd	MH2	MH3	0.95	2.24	15.963	96	0.60	0.57	1.34	357	118.00	450	1.60	circle	360.63	2.27	98.97%
Subject Site Trib*	Argyle Rd	MH3	EX MH	0.44	0.44						29							
Argyle Rd Trib				0.42	2.66	16.830	92	0.60	0.25	1.60	439	96.00	525	1.60	circle	543.99	2.51	80.77%
	Argyle Rd	EX MH	Culvert	-	-	17.467	90	0.60	0.00	1.60	430	41.40	450	1.69	circle	370.64	2.33	116.05%

Flow Calculation Criteria

Q=2.78CiA

*Note: Subject site 10-year storm flow rate is controlled as per SWM Report to 23 L/s

Mississauga 10-Year Storm IDF data:

$I10 = 1010.00 / (4.60 + t)^{0.78}$

n = 0.013

Note: Tributary Area and C-value as given in City of Mississauga Drawing: Argyle Rd. - Dunbar Rd. Storm Drainage Areas, May 1991

vii) Water Balance

City staff have stated that the criteria for this site is to retain 5mm rainfall events on the site. This will be accomplished by retention of small (5mm) rainfall events on-site in a retention cistern, and reuse for irrigation of landscaped surfaces.

The required cistern volume is determined as follows to be 19.9m^3. The cistern will be located adjacent to the 10-year storm tank as shown on the Servicing Plan. Runoff from 5mm storms will drain by mechanical storm drains into the cistern. In the days following such storm events, a sump pump located in the cistern will draw water out of the cistern and pump it into the irrigation system, dispersing it onto the site's planting.

In storm events larger than 5mm, wherein the cistern is filled, the cistern will spill into the larger adjacent 10-year storm tank via a weir and therefore drain by the stormwater controls to the Argyle Road storm sewer. Refer to the Functional Servicing Plan for the cistern's functional location.

	Retention Criteria (mm)	Area (m^2)	Volume (m^3)
5mm Volume over Impervious Surfaces	5	400+110+950+2510 = 3970	19.9
Required Cistern (Retention) Volume			***19.9***

A cistern of 20m^3 volume will accordingly be provided. Refer to the Functional Servicing Plan for the cistern's location and configuration.

Stormwater stored in the cistern will be reused on-site by irrigating the landscaped surfaces.

viii) Water Quality

City staff have stated that stormwater quality may be addressed by development charges.

6.0 CONCLUSIONS

From the foregoing investigation, the site is serviceable utilizing existing sanitary, storm and watermain infrastructure within and adjacent to the site. Storm water management can be accommodated with on-site storage as described in this report.

The following table summarizes the SWM and Servicing components of the proposed development.

TABLE 8 - Summary

	Proposed Development
Peak Sanitary Discharge (L/s)	5.15
Proposed Sanitary Service	150mm @ 2.0%
Receiving Sanitary Sewer	250mm sanitary sewer – Argyle Road
Development Water Demand (Fire + Domestic)	5866 USGM
Available Flow Rate	6400 USGM
Proposed Fire Service	150mm
Proposed Domestic Service	Branch 100mm
Allowable (10-Y) release rate from site to Argyle Rd 525mm Storm Sewer	29 L/s
Proposed (10-Y) Discharge to Argyle Rd 525mm Storm Sewer	29 L/s
Stormwater Quality	Not applicable
Quantity Control	Storm Sump Pump sized @ 24 L/s

7.0 REFERENCES

1. Region of Peel **"Public Works Design Criteria Manual – Sanitary Sewer"**, 2009.

2. Region of Peel **"Public Works Design Criteria Manual – Watermain"**, 2009.

3. Storm water Management Planning and Design Manual, Ontario Ministry of the Environment, March 2003.

4. New Jersey Storm Water Best Management Practices Manual, April 2004.

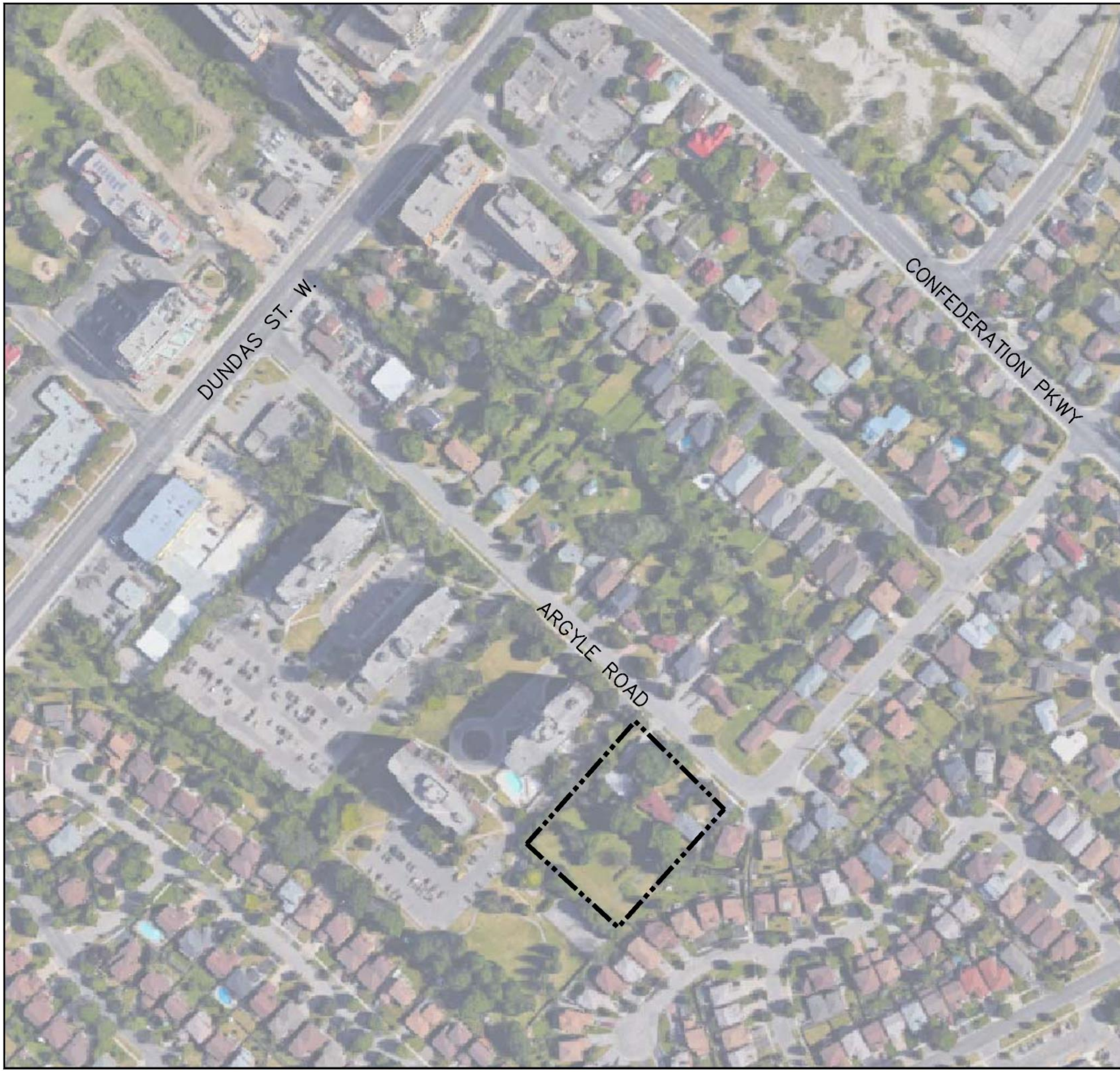
5. Visual OTTHYMO v2.0 Reference Manual, July 2002

Respectfully Submitted;
The Odan Detech Group Inc.

____
Daniel Bancroft, P.Eng.

APPENDIX A

Existing Site	Aerial view of Site and surrounding area
Site Plan & Statistics	by architectureunfolded



LEGEND

PROPERTY LINE

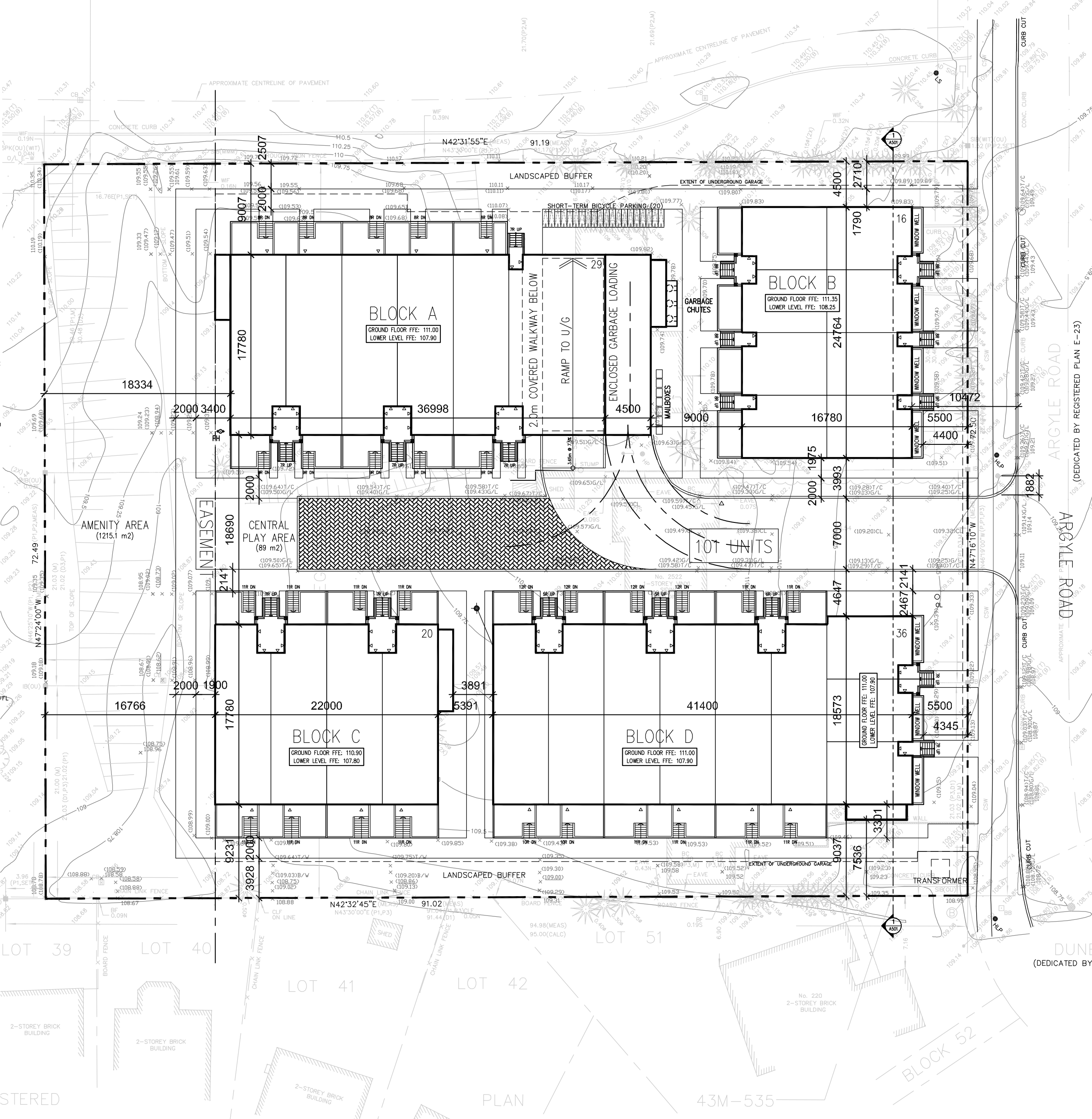
DRAWING :		
KEY PLAN		
DATE:	PROJ. NO.:	SCALE:
JAN. 2018	18201	N.T.S.

PROJECT :

PROPOSED TOWNHOUSE DEVELOPMENT
2532 ARGYLE ROAD
MISSISSAUGA, ON

ODAN·DETECH
CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2



GENERAL NOTES

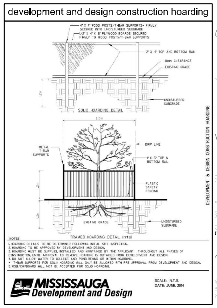
1. ALL SURFACE DRAINAGE WILL BE SELF-CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
2 THE CITY OF MISSISSAUGA REQUIRES THAT ALL WORKING DRAWINGS BE SUBMITTED TO THE BUILDING DIVISION AS A PART OF AN APPLICATION OF THE ISSUANCE OF A BUILDING PERMIT, SHALL BE CERTIFIED BY THE ARCHITECT OR ENGINEER AS BEING IN CONFORMITY WITH THE SITE DEVELOPMENT PLAN AS APPROVED BY THE CITY OF MISSISSAUGA.
3. ALL EXTERIOR LIGHTING WILL BE DIRECTED ONTO THE SITE AND WILL NOT INFRINGE UPON THE ADJACENT PROPERTIES.
4. ALL ROOF TOP MECHANICAL UNITS SHALL BE SCREENED FROM VIEW BY THE APPLICANT.
5. AT THE ENTRANCES TO THE SITE, MUNICIPAL SIDEWALK AND CURBS WILL BE CONTINUOUS THROUGH THE DRIVEWAY. THE DRIVEWAY GRADE WILL BE COMPATIBLE WITH THE EXISTING OR FUTURE SIDEWALK AND CURB DEPRESSION WILL BE PROVIDED FOR EACH ENTRANCE.
6. ON SITE WASTE COLLECTION IS TO BE ARRANGED THROUGH A PRIVATE CONTRACTOR.
7. THE PORTIONS OF THE DRIVEWAYS WITHIN THE MUNICIPAL BOULEVARDS IS TO BE PAVED BY THE APPLICANT.
8. DRIVEWAYS ON THE MUNICIPAL RIGHT-OF-WAY SHALL BE PAVED BY THE APPLICANT.
9. FIRE AND EMERGENCY SERVICES ACCESS ROUTES SHALL BE DESIGNATED AS PER BY-LAW1036-81, AS AMENDED, PRIOR TO OCCUPANCY OF THE BUILDING. ALL FIRE AND EMERGENCY SERVICES ACCESS ROUTES SHALL BE CONSTRUCTED OF HARD SURFACE MATERIAL SUCH AS ASPHALT, CONCRETE OR LOCKSTONE AND DESIGNED TO SUPPORT A LOAD OF NOT LESS THAN 11,363 kg PER AXLE AND HAVE A CHANGE IN GRADIENT OF NOT MORE THAN 1 IN 12.5 OVER MINIMUM DISTANCE OF 15m.
10. THE TOPS OF ANY CURBS BORDERING DRIVEWAYS WITHIN THE MUNICIPAL BOULEVARD WILL BE FLUSH WITH THE MUNICIPAL SIDEWALK AND ROAD CURB.
11. PARKING SPACES RESERVED FOR PEOPLE WITH DISABILITIES MUST BE IDENTIFIED BY A SIGN INSTALLED AT THE APPLICANT'S EXPENSE, IN ACCORDANCE WITH THE DESIGN SPECIFICATIONS OF SCHEDULE 2 & 3 OF BY-LAW 10-2016.
12. GRADES WILL BE MET WITHIN A 33% MAXIMUM SLOPE AT THE PROPERTY LINES AND WITHIN THE SITE.
13. ALL DAMAGED AREAS ARE TO BE REINSTATED WITH TOPSOIL AND SOD PRIOR TO THE RELEASE OF SECURITIES.
14. SIGNAGE SHOWN ON THE DEVELOPMENT PLANS IS FOR INFORMATION PURPOSES ONLY. ALL SIGNS WILL BE SUBJECT TO THE PROVISIONS OF SIGN BY-LAW0054-2002, AS AMENDED, AND A SEPARATE SIGN APPLICATION WILL BE REQUIRED THROUGH THE BUILDING DIVISION.
15. ALL SIGNAGE IS SUBJECT TO FURTHER REVIEW AND APPROVALS BY THE PLANNING AND BUILDING DEPARTMENT WHICH MAY INCLUDE A STAFF REVIEW THROUGH THE SIGN PERMIT PROCESS.
16. THE APPLICANT WILL BE RESPONSIBLE FOR ENSURING THAT ALL PLANS CONFORM TO TRANSPORT CANADA'S RESTRICTION.
17. THE APPLICANT IS RESPONSIBLE FOR ENSURING THAT TREE PROTECTION HOARDING IS MAINTAINED THROUGHOUT ALL PHASE OF DEMOLITION AND CONSTRUCTION, IN THE LOCATION AND CONDITION AS APPROVED BY THE PLANNING AND BUILDING DEPARTMENT. NO MATERIALS (BUILDING MATERIALS, SOIL, ETC.) MAY BE STOCKPILED WITHIN THE AREA OF HOARDING. FAILURE TO MAINTAIN THE HOARDING AS ORIGINALLY APPROVED FOR THE STORAGE OF MATERIALS WITHIN THE HOARDING WILL BE THE CAUSE FOR THE TREE PRESERVATION 'LETTER OF CREDIT' TO BE HELD FOR TWO (2) YEARS FOLLOWING COMPLETION OF ALL SITE WORKS.

SIGNED BY PROPERTY OWNER .... DATED:...............

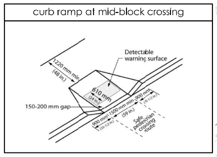
18. PLEASE BE ADVISED THAT THE DETAILED GRADING FOR THIS APPLICATION WILL BE FINALIZED AND APPROVED BY THE DEVELOPMENT SECTION OF THE TRANSPORTATION AND WORKS DEPARTMENT AS A REQUIREMENT FOR THE ISSUANCE OF A BUILDING PERMIT.
19. THE APPLICANT SHALL BE RESPONSIBLE FOR THE COST OF AN UTILITY RELOCATIONS NECESSITATED BY THE SITE PLAN.
20. THE STRUCTURAL DESIGN OF AN RETAINING WALL OVER 0.6m IN HEIGHT OR AN RETAINING WALL LOCATED ON A PROPERTY LINE IS TO BE SHOWN ON THE SITE GRADING PLAN FOR THIS PROJECT AND TO BE APPROVED BY THE CONSULTING ENGINEER FOR THE PROJECT.
21. SITE GRADING PLAN AND SITE SERVICING PLAN ARE TO BE ASSOCIATED WITH THE SITE PLAN.
22. I HEREBY CERTIFY THAT THIS DRAWING CONFORMS IN ALL RESPECTS TO THE SITE DEVELOPMENT PLANS AS APPROVED BY THE CITY OF MISSISSAUGA UNDER FILE NUMBER ....
23. ALL PROPOSED CURBING WITHIN THE MUNICIPAL BOULEVARD AREA FOR THE SITE IS TO SUIT AS FOLLOWS: a) FOR ALL SINGLE FAMILY RESIDENTIAL PROPERTIES INCLUDING ON STREET TOWNHOUSES, ALL CURBING IS TO STOP AT THE PROPERTY LIMIT OR THE BACK OF THE MUNICIPAL SIDEWALK, WHICHEVER IS APPLICABLE, OR b) FOR ALL OTHER PROPOSALS INCLUDING INDUSTRIAL, COMMERCIAL AND CONDOMINIUM DEVELOPMENTS, ALL ENTRANCES TO THE SITE ARE TO BE IN ACCORDANCE WITH O.P.S.D. 350.010.
24. PRIOR TO ANY CONSTRUCTION TAKING PLACE,STRUCTURALLY CERTIFIED OVERHEAD HOARDING WITHIN THE RIGHT-OF-WAY AS SHOWN ON THE SITE PLAN (AS APPLICABLE), HOARDING ADJACENT TO EXISTING PROPERTIES TO PROTECT FROM CONSTRUCTION ACTIVITY,AND ALL REQUIRED HOARDING IN ACCORDANCE WITH THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS MUST BE ERECTED AND MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION.
25. IF THE FINAL COURSE OF ASPHALT PAVING IS DELAYED,INSTALL A TEMPORARY LIFT OF ASPHALT AT RAMPS OR CURB CUTS TO BARRIER-FREE ACCESS.
26. ANY FENCING ADJACENT TO MUNICIPAL LANDS IS TO BE LOCATED 15cm (6.0in.) INSIDE THE PROPERTY LINE.
27 WE AGREE TO IMPLEMENT THE APPROVED SITE AND LANDSCAPED PLANS WITHIN 18 MONTHS AFTER THE EXECUTION OF THE SITE PLAN UNDERTAKING AND WILL RETAIN THE LANDSCAPE ARCHITECT TO MAKE PERIODIC INSPECTIONS. UPON COMPLETION OF THE WORKS WE WILL FORWARD TO THE CITY OF MISSISSAUGAA COPY OF THE COMPLETION CERTIFICATE FROM THE LANDSCAPE ARCHITECT AND THE APPLICABLE APPLICATION FEE THE LANDSCAPE ARCHITECT AND OR CONSULTING ENGINEER WILL ALSO PROVIDE CERTIFICATION TO INDICATE THAT THE BIOSWALE IN PARKING LOT. SWALE WITH OVERLAND FLOW AND RAINWATER HARVESTING SYSTEMS HAVE BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED SITE PLAN DRAWINGS. ANY REVISIONS TO THE SITE AND LANDSCAPE PLANS WILL BE SUBMITTED TO THE PLANNING AND BUILDING DEPARTMENT, CITY OF MISSISSAUGA FOR REVIEW AND APPROVAL. PRIOR TO THE COMMENCEMENT OF WORKS. WE HEREBY AUTHORIZE THE CITY. ITS AUTHORIZED AGENTS, SERVANTS OR EMPLOYEES TO ENTER UPON OUR LAND TO CARRY OUT INSPECTIONS FROM TIME TO TIME AND AGREE TO INDEMNIFY THE CITY, ITS AUTHORIZED AGENTS, SERVANTS OR EMPLOYEES TO ENTER UPON OUR LAND TO CARRY OUT INSPECTION FROM TIME TO TIME AND AGREE TO INDEMNIFY THE CITY,ITS AUTHORIZED AGENTS AND SAVE THEM HARMLESS FROM ANY AND ALL ACTIONS ARISING OUT OF THE EXCERSISE BY THE CITY, ITS AUTHORIZED AGENTS, SERVANTS OR EMPLOYEES OF THE RIGHTS HEREBY GIVEN THEM. WE UNDERTAKE TO NOTIFY THE CITY FORTHWITH OF ANY CHANGE OF OWNERSHIP OF THE SAID LANDS.

SIGNED BY PROPERTY OWNER .... DATED:...............

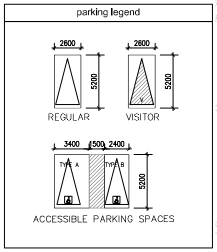
development and design construction hoarding



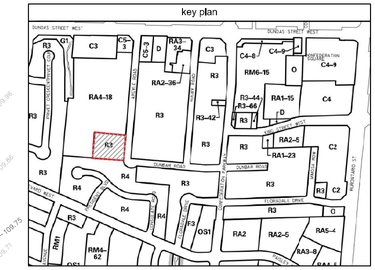
curb ramp at mid-block crossing



parking legend



key plan



architectureunfolded

STATISTICS - 17-43 ARGYLE						
ZONING	CURRENT: R3; RM9-xx					
SITE AREA	6,483.5m2 / 1.6 acres					
UNIT AREAS		AREA		QUANTITY	TOTAL AREA	
		m2	ft2		m2	ft2
	LOWER 1A	46.96	505.5	15	704.40	7,582.1
	LOWER 1B	45.03	484.7	15	675.45	7,270.5
	UPPER 1A	82.50	888.0	1	82.50	888.0
	UPPER 1B	77.41	833.2	1	77.41	833.2
	LOWER 2A	83.72	901.2	15	1,255.80	13,517.3
	LOWER 2B	94.94	1,021.9	11	1,044.34	11,241.2
	UPPER 2A	127.31	1,370.4	30	3,819.30	41,110.6
	UPPER 2B	134.98	1,452.9	11	1,484.78	15,982.0
	3A	193.32	2,080.9	2	386.64	4,161.8
	GRAND TOTAL				9,530.62	102,586.6
FSI	PERMITTED:	1.5		PROPOSED:	1.47	

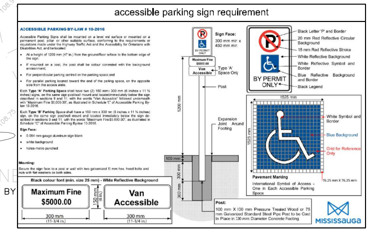
UNITS	UINTS BY DESIGNATION		UNITS BY TYPE	
	LOWER 1A (1 Bedroom)	15	1 BEDROOM	32
	LOWER 1B (1 Bedroom)	15		
	UPPER 1A (1 Bedroom)	1		
	UPPER 1B (1 Bedroom)	1		
	LOWER 2A (2 Bedroom)	15	2 BEDROOM	67
	LOWER 2B (2 Bedroom)	11		
	UPPER 2A (2 Bedroom)	30		
	UPPER 2B (2 Bedroom)	11		
	3A (3 Bedroom)	2	3 BEDROOM	2
	GRAND TOTAL			101

UNITS BY BLOCK		1B	2B	3B	TOTAL
	BLOCK A	12	15	2	29
	BLOCK B	0	16	0	16
	BLOCK C	8	12	0	20
	BLOCK D	12	24	0	36
	TOTAL	32	67	2	101

BUILDING HEIGHT	PERMITTED:	15.0m	
	PROPOSED:	BLOCK A	14.40m
		BLOCK B	14.20m
		BLOCK C	14.20m
		BLOCK D	14.50m
AVERAGE GRADE	PROPOSED:	BLOCK A	108.900
		BLOCK B	109.240
		BLOCK C	109.710
		BLOCK D	109.260

PARKING	REQUIRED - res=1.1sp/1B=35.2; 1.5sp/2B=100.5; 1.75sp/3B=3.5; vis=0.25/unit=25.3		164.5
	PROPOSED		153
PUBLIC AMENITY	GUIDELINE AMENITY = 648.4m2		
	1,304.10m2 OF WHICH 1,304.10m2 IS CONTIGUOUS (20% OF SITE; 12.9m2/UNIT)		
PRIVATE AMENITY	AVG/UNIT = 14.5m2; TOTAL = 1,464.30m2		
LANDSCAPED AREA	REQUIRED: 55%		
	PROPOSED: 3,681.03m2 / 56.8% OF SITE		
	SOFT: 2,256.83m2 / 34.8%		
	HARD: 1,424.20m2 / 22.0%		
BICYCLE PARKING	REQUIRED - N/A		
	PROPOSED LONG-TERM	42	62
	PROPOSED SHORT-TERM	20	

accessible parking sign requirement



survey information

BOUNDARY AND TOPOGRAPHIC SURVEY OF
PART OF BLOCK A
REGISTERED PLAN E-23
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL
(FORMERLY TOWNSHIP OF TORONTO, COUNTY OF PEEL)

R. AVIS SURVEYING INC.
SUITE 203
235 YORKLAND BOULEVARD, TORONTO, ONTARIO, M2J 4Y8
PHONE: 416.490.8352
FAX: 416.491.6206
WWW.RAVISSURVEYING.COM
PROJECT NO.: 3167-0
FILE NAME: 3167-0T.DWG

notes:

2 issued to client for review 05.17.2019
2 issued to city for review 04.09.2019
1 issued for rezoning 10.26.2018
revisions:

architectural team :
mark zwicker

planning:
design plan services inc
structural:
-
electrical:
-
mechanical:
-
landscape:
bsq landscape architects
site services:
odan-detech
owner:
plazacorp

project:
2512-2532 argyle rd
mississauga, ontario

concept plan & statistics

may.17.2019	date:
1:200	scale:
17-43	project:
mf	drawn by:

drawing number:
A100

architectureunfolded
219 dufferin street, suite 201b, toronto on. M6K 3J1 tel: (416)601-5416 info@unfolded.ca

APPENDIX B

Argyle Road Storm Sewer design sheet
Email Correspondence with City Staff regarding Design Criteria
Email Correspondence from Credit Valley Conservation staff regarding Mary Fix Creek
Visual OTTHYMO Model Output (2-Year & 10-Year storms)

SUBDIVISION ARGYLE RD & DUNBAR RD
CONSULTANT
MAJOR DRAINAGE AREA

CITY OF MISSISSAUGA

STORM DRAINAGE DESIGN CHART FOR CIRCULAR DRAINS FLOWING FULL

SHEET No. 1 OF 1 DATE APR 1991
PROJECT No. 90-124
DESIGNED BY J.C.M.

LOCATION OF SECTION	FROM UPSTREAM	TO DOWNSTREAM	ADJACENT CONTRIBUTARY AREA	RUNOFF COEFFICIENT		ACCUMULATIVE AREA DRAINED BY SECTION	ACCUMULATIVE AREA TIMES RUNOFF COEFFICIENT FOR SECTION	FLOW TIME TO SECTION (FROM EXTREME UPSTREAM INLET)	INITIAL TIME OF CONCENTRATION AT EXTREME UPSTREAM INLET	TIME OF CONCENTRATION AT UPSTEAM END OF SECTION	INTENSITY OF RAINFALL	QUANTITY OF FLOW TO BE ACCOMMODATED IN SECTION	TYPE OF PIPE	MANNINGS ROUGHNESS COEFFICIENT	SLOPE	DIAMETER	LENGTH OF SECTION	VELOCITY OF FLOW WITH PIPE FLOWING FULL	CAPACITY OF PIPE FLOWING FULL	PIPE INVERT AT UPSTREAM M.H.	PIPE INVERT AT DOWNSTREAM MH	TIME OF FLOW IN SECTION
	MH#	MH#	A_A	C_A	$A_A x C_A$	$A = \Sigma A_A$	$A x C = \Sigma A_A x C_A$	t_{cf}	t_{ci}	$t_c = t_{cf} + t_{ci}$	I	$Q = \frac{IAC}{360}$		n	S	D	L	V	Q			$t = \frac{L}{V \times 60}$
			(ha)			(ha)		(min)	(min)	min	mm/hr	m³/sec			%	mm	m	m/sec	m³/sec	m	m	min
ARGYLE RD	1	2	1.29	0.60	0.77	1.29	0.77	—	15	15	99	.213	CONC.	.013	1.60	375	116	2.03	.231	112.05	110.19	0.95
"	2	3	0.95	0.60	0.57	2.24	1.34	0.95	15	15.95	96	.357	"	"	1.60	450	118	2.29	.376	110.11	108.22	0.86
"	3	EXIST.	0.72	0.60	0.43	2.96	1.77	0.86	15.95	16.81	92	.452	"	"	1.60	525	96	2.54	.568	108.14	106.60	0.63
DUNBAR RD	4	5	0.69	0.40	0.28	0.69	0.28	—	15	15	99	.077	CONC.	.013	0.5	375	55	1.13	.129	106.83	106.55	0.81
"	5	EXIST.	0.69	0.40	0.28	1.38	0.56	0.81	15	15.81	96	.149	"	"	0.5	450	90	1.28	.210	106.47	106.02	1.17
"	6	EXIST.	0.54	0.40	0.22	0.54	0.22	—	15	15	99	.061	CONC.	.013	0.5	300	75	0.98	.071	106.76	106.38	1.28
"	7	EXIST.	1.15	0.40	0.46	1.15	0.46	—	15	15	99	.127	CONC.	.013	0.5	375	110	1.13	.129	107.36	106.81	1.62

NO 2-1-5

Email Correspondence with City Staff regarding Design Criteria

From: Ghazwan Yousif [mailto:Ghazwan.Yousif@mississauga.ca]
Sent: Thursday, January 31, 2019 9:16 AM
To: daniel@odandetech.com
Subject: RE: 2532 Argyle - stormwater management

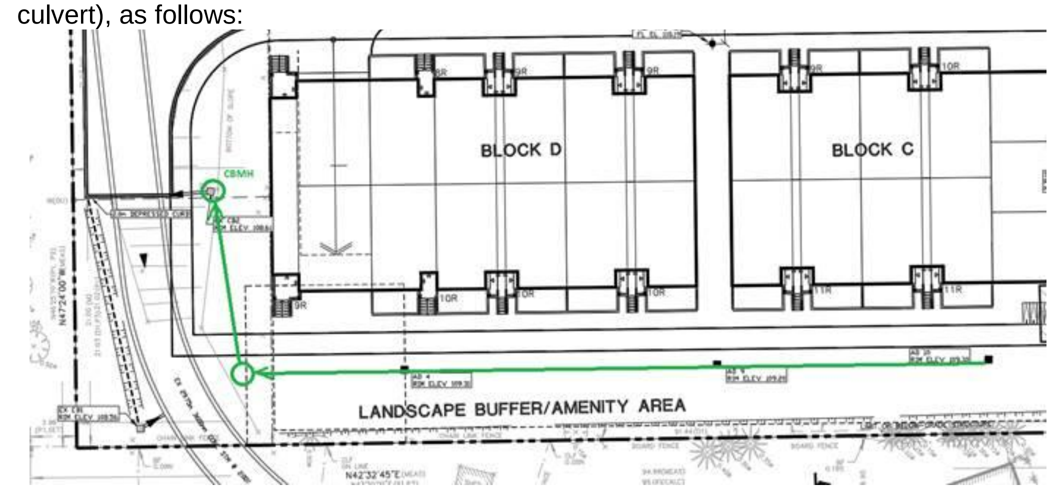
Good morning Daniel,
We do agree with what you said, for fire department the person who replace Greg Phelps is Gerry Daley (extension 5912).

Regards,
Ghazwan

From: Daniel Bancroft - Odan Detech Group [mailto:daniel@odandetech.com]
Sent: Friday, January 25, 2019 11:55 AM
To: Ghazwan Yousif
Cc: jkrpan@odandetech.com; 'Yoav Bohbot'; 'Jonathan Marmer'; 'Steven Heller'
Subject: 2532 Argyle - stormwater management

Hi Ghazwan,

Thanks for the meeting this morning. Here are the points we discussed – let me know any comments/revisions. Appreciate it if you could cc Karina.

1) Storm drainage outlet to Mary Fix Creek Culvert
   a. Given that CVC has confirmed the culvert is flowing <100% capacity, City is accepting draining subject site (via grading & existing CB's) to the Culvert such that Q(post) <= Q(pre).
   b. If the subject site landscape trib area to the culvert needs to be piped into the Culvert such that Q(post)<=Q(pre), City would accept something like converting the existing culvert CB to a MHCB to connect to the culvert (rather than a new connection to the culvert), as follows:
   c. 

2) Storm drainage outlet to Argyle Rd 525mm storm sewer

a. Given infeasibility of replacing the downstream 450mm storm pipe in easement because of proximity to existing house etc., City will accept connection to the Argyle 525mm sewer provided:

i. We provide a statement that the proposed flow will not cause any additional risk to adjacent properties

ii. We mitigate existing surcharge condition in post-dev 10-Y storm to reduce existing 120% surcharge to say 110% as feasible by overcontrolling site storm discharge etc.

3) Culvert easement – You mentioned City easement for culvert is such that no structures are permitted – which may include curbs, asphalt etc. – are permitted within the easement. To be addressed by site owner, architect etc.

Regards,
Daniel

ODAN·DETECH
CONSULTING ENGINEERS

Daniel Bancroft, P.Eng.
The Odan/Detech Group Inc.

P : (905) 632-3811 ext.133 | **F :** (905) 632-3363
5230, SOUTH SERVICE ROAD, UNIT 107 | BURLINGTON, ONTARIO | L7L 5K2
www.odandetech.com | daniel@odandetech.com

Email Correspondence from Credit Valley Conservation staff regarding Mary Fix Creek

From: Marinas, Maricris [mailto:Maricris.Marinas@cvc.ca]
Sent: Tuesday, January 22, 2019 3:14 PM
To: daniel@odandetech.com
Cc: 'Yoav Bohbot' <Ybohbot@plazacorp.com>; 'Steven Heller' <sheller@plazacorp.com>; jkrpan@odandetech.com; Haq, Rizwan <Rizwan.Haq@cvc.ca>
Subject: RE: 2532 Argyle Rd - CVC Zoning Comments

Hi Daniel,

Please see CVC's response in grey below.

Please note that all CVC comments/notes (1 to 10) have been updated to reflect the discussions below and submitted to the City. As such, there are no outstanding CVC comments/notes.

I trust that this is sufficient for your purposes. If you have any questions, please feel free to contact me.

Regards,
Maricris

Maricris Marinas, M.Sc.
Planner, Planning and Development Services | Credit Valley Conservation

From: Daniel Bancroft - Odan Detech Group [mailto:daniel@odandetech.com]
Sent: January 21, 2019 3:07 PM
To: Marinas, Maricris
Cc: 'Yoav Bohbot'; 'Steven Heller'; jkrpan@odandetech.com; Haq, Rizwan
Subject: RE: 2532 Argyle Rd - CVC Zoning Comments

Hi Maricris,

Thanks for your comments – we concur with your below revisions to my original email of Jan. 18.

As per our phone conversation this morning, regarding comments 7, 9 and 10 from your draft ZBA comments:

1) Comment 7 – Water balance – We understand as the property is not regulated CVC defers review of the 5mm stormwater balance/reuse requirement to the City such that the review is not duplicated
2) Comments 9 & 10 – Stormwater Quality & ESC Plan – These were advisory comments and ~~CVC will not comment on these items given that no CVC permit is required.~~ have been acknowledged by the applicant. As such, no further action (regarding these notes) is required for ZBA approval.

Kindly confirm the above.

Thanks,
Daniel

ODAN·DETECH
CONSULTING ENGINEERS
Daniel Bancroft, P.Eng.

The Odan/Detech Group Inc.

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5230, SOUTH SERVICE ROAD, UNIT 107 | BURLINGTON, ONTARIO | L7L 5K2
www.odandetech.com | daniel@odandetech.com

From: Marinas, Maricris [mailto:Maricris.Marinas@cvc.ca]
Sent: Friday, January 18, 2019 1:08 PM
To: daniel@odandetech.com
Cc: 'Yoav Bohbot' <Ybohbot@plazacorp.com>; 'Steven Heller' <sheller@plazacorp.com>; jkrpan@odandetech.com; Haq, Rizwan <Rizwan.Haq@cvc.ca>
Subject: RE: 2532 Argyle Rd - CVC Zoning Comments

Hi Daniel,

Please see CVC's responses in blue below.

If you have any questions, please feel free to contact me.

Regards,
Maricris

Maricris Marinas, M.Sc.
Planner, Planning and Development Services | Credit Valley Conservation

From: Daniel Bancroft - Odan Detech Group [mailto:daniel@odandetech.com]
Sent: January 18, 2019 8:04 AM
To: Marinas, Maricris; Haq, Rizwan
Cc: 'Yoav Bohbot'; 'Steven Heller'; jkrpan@odandetech.com
Subject: 2532 Argyle Rd - CVC Zoning Comments

Hi Maricris and Rizwan,

Thanks for the phone call this Tuesday. Appreciate it if you'd review and confirm our understanding as follows;

1) Presently CVC has undertaken hydraulic and hydrology analysis of Mary Fix Creek including considering the existing pond north of Dundas and the subject culvert which passes through the subject site in easement. This has been confirmed ~~with the CVC Director of Watershed Management who developed the~~ by CVC's most current hydraulic/hydrologic models.
2) The updated hydraulic/hydrologic model shows that the existing storm pond north of Dundas provides attenuation for the ~~critical~~ 100-year storm such that the culvert which commences south of Dundas and passes through the subject site conveys the attenuated 100-year storm within the culvert's capacity. – Correct as long as the culvert is maintained as it has the capacity to convey the attenuated 100-year storm flows.
3) ~~CVC has confirmed that MNRF will permit the reliance on the pond north of Dundas as providing attenuation of the critical 100-year storm and CVC will rely on this in developing flood/spill regulation area arising from the attenuation of 100-year storm by the pond.~~ – As previously confirmed, the hydraulic and hydrology modeling for Mary Fix Creek developed by CVC will use the attenuation (100-year storm) provided by the SWM pond located north of Dundas St. Please note that although the Regional storm will not be attenuated in the pond, based on the recent hydraulic analysis, the pipe has the capacity to convey both the attenuated 100-year storm and un-attenuated Regional storm flows (i.e. Regulated flows). As such, the site will not be subject to Mary Fix Creek.
4) Given the foregoing, comments 1, 2, 3, 4, 5, 6 and 8 in the attached (draft) version of the CVC ZBA comments no longer apply. – Correct.

5) CVC ~~requires~~ suggests a statement in the FSR (to be approved through the ZBA process) stating that the City is responsible for maintaining the inlet to the subject Mary Fix Creek culvert such that it is not obstructed. Thus, consideration is not required for the culvert inlet being 50% obstructed and a spill thus occurring. – Correct, the above as well as any other recommendations (if necessary) made as part of the floodplain study.
6) Comments 7, 9, 10 in the attached draft CVC ZBA comments continue to apply and will be addressed in the course of ZBA approvals. – Clarification, Comment 10 is a note to be acknowledged – the ESC component is to be addressed at the detailed design stage (Site Plan) not as part of ZBA approvals.
    a. Comment 9: Stormwater quality: We understand that CVC recommends but does not require provision of stormwater quality controls for the subject site provided all other required permits from the City and MECP as necessary are obtained without stormwater quality control. – Correct.
7) Given the above, the site will not be subject to flood/spill ~~regulation,~~ therefore is not within a CVC regulated area (no CVC permit is required) ~~for development within a regulated area~~, and there will be no further commenting pertaining to flood regulation in development approvals of the subject properties.

Thanks,
Daniel

ODAN·DETECH
CONSULTING ENGINEERS

Daniel Bancroft, P.Eng.
The Odan/Detech Group Inc.

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www.odandetech.com | daniel@odandetech.com

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Visual OTTHYMO Output (2-year & 10-year storm)

```
=====================================================================================================

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO

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                   *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: P:\2018\18201\Visual OTTHYMO\Rev3\18201 site swm\post dev.out
  Summary filename: P:\2018\18201\Visual OTTHYMO\Rev3\18201 site swm\post dev.sum


DATE: 8/9/2019                            TIME: 4:16:58 PM

USER:



COMMENTS: ____________________________________________________________

-----------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 610.000
| Ptotal= 33.44 mm |                          B=   4.600
--------------------                          C=    .780
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =   .33

                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .17    2.24 |  1.17   16.92 |  2.17    5.18 |  3.17    2.65
                  .33    2.56 |  1.33   75.36 |  2.33    4.43 |  3.33    2.47
                  .50    3.00 |  1.50   22.14 |  2.50    3.88 |  3.50    2.31
                  .67    3.67 |  1.67   11.74 |  2.67    3.46 |  3.67    2.17
                  .83    4.80 |  1.83    8.14 |  2.83    3.14 |  3.83    2.05
                 1.00    7.21 |  2.00    6.30 |  3.00    2.87 |  4.00    1.95


-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=    .02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .01          .01
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      12.40        40.00
     Mannings n          =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
```

```
               .083    2.24 | 1.083   16.92 | 2.083    5.18 |  3.08    2.65
               .167    2.24 | 1.167   16.92 | 2.167    5.18 |  3.17    2.65
               .250    2.56 | 1.250   75.36 | 2.250    4.43 |  3.25    2.47
               .333    2.56 | 1.333   75.36 | 2.333    4.43 |  3.33    2.47
               .417    3.00 | 1.417   22.14 | 2.417    3.88 |  3.42    2.31
               .500    3.00 | 1.500   22.14 | 2.500    3.88 |  3.50    2.31
               .583    3.67 | 1.583   11.74 | 2.583    3.46 |  3.58    2.17
               .667    3.67 | 1.667   11.74 | 2.667    3.46 |  3.67    2.17
               .750    4.80 | 1.750    8.14 | 2.750    3.14 |  3.75    2.05
               .833    4.80 | 1.833    8.14 | 2.833    3.14 |  3.83    2.05
               .917    7.21 | 1.917    6.30 | 2.917    2.87 |  3.92    1.95
              1.000    7.21 | 2.000    6.30 | 3.000    2.87 |  4.00    1.95

     Max.Eff.Inten.(mm/hr)=      75.36        17.50
                over (min)        5.00        15.00
     Storage Coeff.  (min)=        .82 (ii)   14.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .34          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .00          .00          .003 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50          1.33
     RUNOFF VOLUME    (mm)=      32.44        10.97         21.53
     TOTAL RAINFALL   (mm)=      33.44        33.44         33.44
     RUNOFF COEFFICIENT   =        .97          .33           .64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD  (0011) |   Area    (ha)=    .08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .04          .04
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      75.36        17.50
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       1.20 (ii)   15.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .33          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .01          .00          .009 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58          1.33
     RUNOFF VOLUME    (mm)=      32.44        10.97         21.58
     TOTAL RAINFALL   (mm)=      33.44        33.44         33.44
     RUNOFF COEFFICIENT   =        .97          .33           .65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD  (0010) |   Area    (ha)=    .24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .24          .00
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.20        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      75.36       542.47
```

```
              over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.66 (ii)    2.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=        .32          .28
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .05          .00           .050 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      32.44        10.97          32.22
     TOTAL RAINFALL   (mm)=      33.44        33.44          33.44
     RUNOFF COEFFICIENT   =        .97          .33            .96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0004) |   Area    (ha)=    .09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .08          .01
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      25.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      75.36        27.12
              over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.25 (ii)    4.53 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=        .33          .23
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .02          .00           .018 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      32.44        10.97          30.28
     TOTAL RAINFALL   (mm)=      33.44        33.44          33.44
     RUNOFF COEFFICIENT   =        .97          .33            .91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0013) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0010):      .24    .050     1.33    32.22
        + ID2= 2 (0004):      .09    .018     1.33    30.28
          ==================================================
          ID = 3 (0013):      .34    .069     1.33    31.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0011):      .08    .009     1.33    21.58
        + ID2= 2 (0013):      .34    .069     1.33    31.68
          ==================================================
          ID = 3 (0014):      .42    .078     1.33    29.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```

```
| RESERVOIR (0009) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .0241       .0100
                           .0240      .0001   |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0014)       .419       .078        1.33       29.70
     OUTFLOW: ID= 1 (0009)       .419       .024        1.50       29.71

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 30.92
                   TIME SHIFT OF PEAK FLOW         (min)= 10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0033

-------------------------------------------------------------------------------

--------------------
| ADD HYD   (0015) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0012):      .02    .003     1.33    21.53
        + ID2= 2 (0009):      .42    .024     1.50    29.71
          ===============================================
          ID = 3 (0015):      .44    .027     1.33    29.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1010.000
| Ptotal= 55.37 mm |                          B=   4.600
--------------------                          C=    .780
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =   .33

                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .17    3.71 |  1.17   28.02 |  2.17    8.58 |  3.17    4.39
                  .33    4.23 |  1.33  124.77 |  2.33    7.33 |  3.33    4.08
                  .50    4.97 |  1.50   36.65 |  2.50    6.42 |  3.50    3.82
                  .67    6.07 |  1.67   19.43 |  2.67    5.74 |  3.67    3.60
                  .83    7.95 |  1.83   13.47 |  2.83    5.19 |  3.83    3.40
                 1.00   11.94 |  2.00   10.43 |  3.00    4.75 |  4.00    3.22


-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=    .02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .01          .01
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      12.40        40.00
     Mannings n          =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .083    3.71 | 1.083   28.02 | 2.083    8.58 |  3.08    4.39
                 .167    3.71 | 1.167   28.02 | 2.167    8.58 |  3.17    4.39
                 .250    4.23 | 1.250  124.77 | 2.250    7.33 |  3.25    4.08
                 .333    4.23 | 1.333  124.77 | 2.333    7.33 |  3.33    4.08
                 .417    4.97 | 1.417   36.65 | 2.417    6.42 |  3.42    3.82
                 .500    4.97 | 1.500   36.65 | 2.500    6.42 |  3.50    3.82
                 .583    6.07 | 1.583   19.43 | 2.583    5.74 |  3.58    3.60
```

```
               .667    6.07 | 1.667   19.43 | 2.667    5.74 |  3.67    3.60
               .750    7.95 | 1.750   13.47 | 2.750    5.19 |  3.75    3.40
               .833    7.95 | 1.833   13.47 | 2.833    5.19 |  3.83    3.40
               .917   11.94 | 1.917   10.43 | 2.917    4.75 |  3.92    3.22
              1.000   11.94 | 2.000   10.43 | 3.000    4.75 |  4.00    3.22

     Max.Eff.Inten.(mm/hr)=     124.77        52.44
                over (min)        5.00        10.00
     Storage Coeff.  (min)=        .67 (ii)    9.81 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .34          .11
                                                           *TOTALS*
     PEAK FLOW       (cms)=        .00          .00           .005 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      54.37        25.08          39.52
     TOTAL RAINFALL   (mm)=      55.37        55.37          55.37
     RUNOFF COEFFICIENT   =        .98          .45            .71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0011) |   Area    (ha)=    .08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .04          .04
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=     124.77        52.44
                over (min)        5.00        15.00
     Storage Coeff.  (min)=        .98 (ii)   10.12 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .34          .10
                                                           *TOTALS*
     PEAK FLOW       (cms)=        .01          .00           .016 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50           1.33
     RUNOFF VOLUME    (mm)=      54.37        25.08          39.65
     TOTAL RAINFALL   (mm)=      55.37        55.37          55.37
     RUNOFF COEFFICIENT   =        .98          .45            .72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0010) |   Area    (ha)=    .24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .24          .00
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.20        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=     124.77      1311.04
                over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.35 (ii)    2.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=        .33          .30
                                                           *TOTALS*
     PEAK FLOW       (cms)=        .08          .00           .084 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
```

```
     RUNOFF VOLUME    (mm)=      54.37        25.08          54.07
     TOTAL RAINFALL   (mm)=      55.37        55.37          55.37
     RUNOFF COEFFICIENT   =        .98          .45            .98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0004) |   Area    (ha)=    .09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .08          .01
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      25.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=     124.77        65.55
                over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.02 (ii)    3.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=        .34          .25
                                                            *TOTALS*
     PEAK FLOW       (cms)=        .03          .00            .031 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      54.37        25.08          51.43
     TOTAL RAINFALL   (mm)=      55.37        55.37          55.37
     RUNOFF COEFFICIENT   =        .98          .45            .93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0013) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0010):      .24    .084     1.33    54.07
        + ID2= 2 (0004):      .09    .031     1.33    51.43
          ===============================================
          ID = 3 (0013):      .34    .114     1.33    53.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0011):      .08    .016     1.33    39.65
        + ID2= 2 (0013):      .34    .114     1.33    53.33
          ===============================================
          ID = 3 (0014):      .42    .131     1.33    50.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0009) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .0241       .0100
                          .0240      .0001    |    .0000       .0000
```

```
                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0014)      .419       .131        1.33       50.65
     OUTFLOW: ID= 1 (0009)      .419       .024        1.58       50.89

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 18.43
                   TIME SHIFT OF PEAK FLOW         (min)= 15.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0077

-------------------------------------------------------------------------------

--------------------
| ADD HYD   (0015) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0012):      .02    .005     1.33    39.52
        + ID2= 2 (0009):      .42    .024     1.58    50.89
          ==================================================
          ID = 3 (0015):      .44    .029     1.33    50.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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```
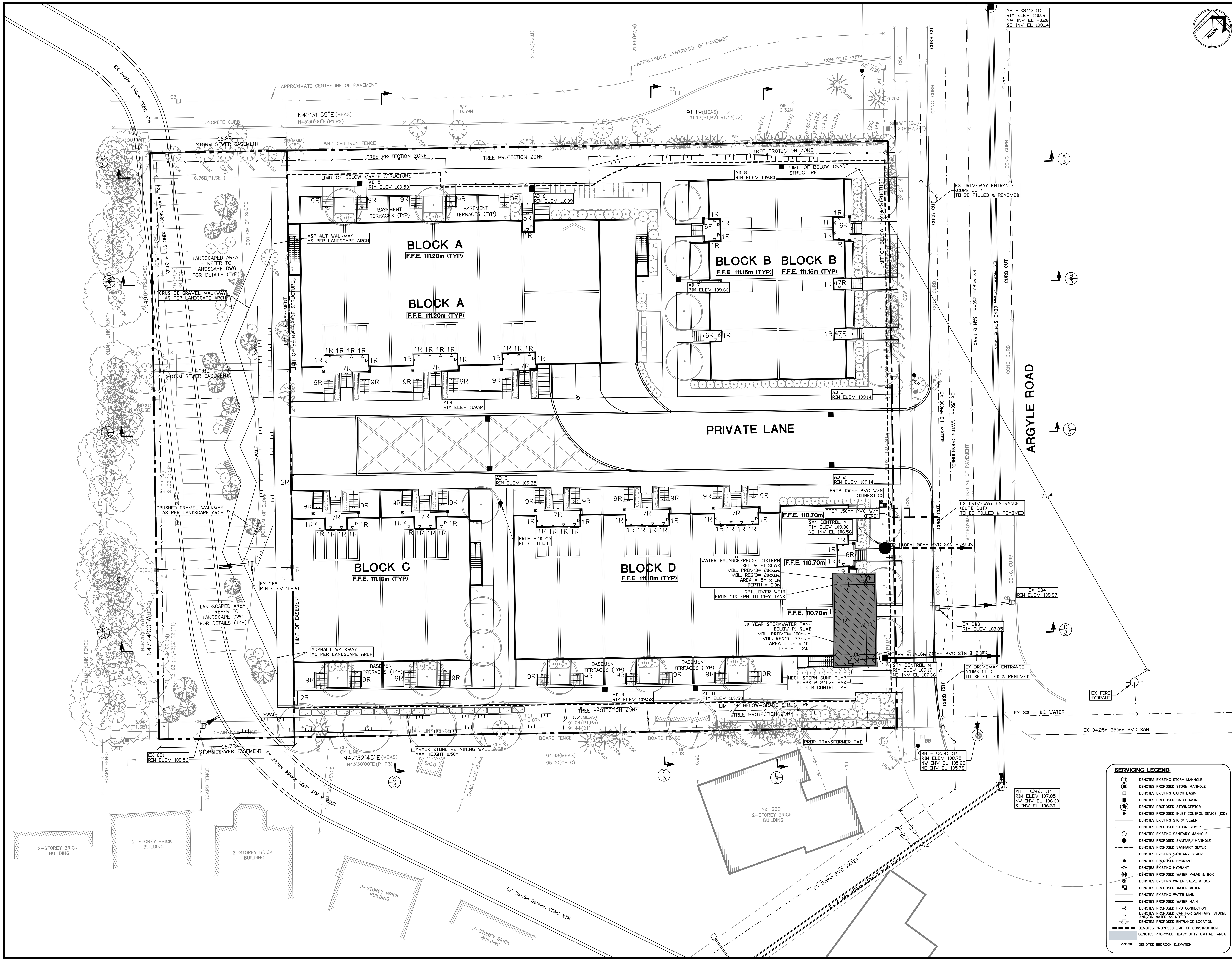
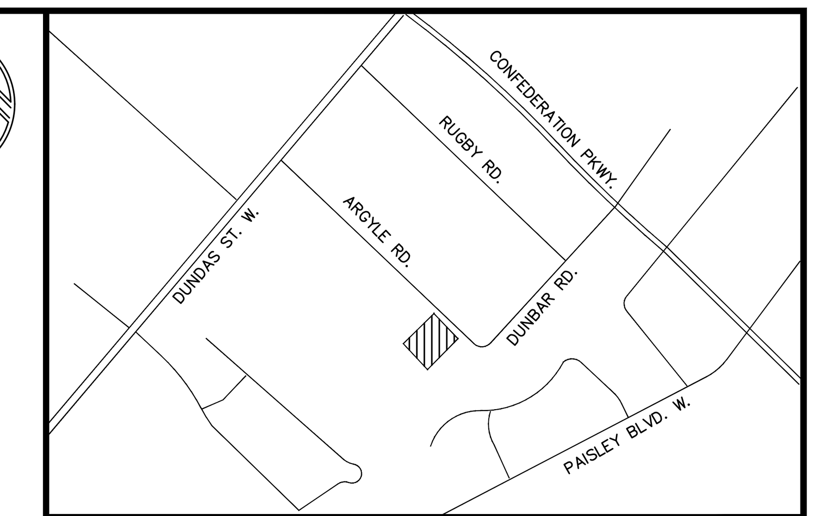

APPENDIX C

Functional Servicing Plan
Functional Grading Plan
Functional Sections Plan





KEY PLAN
Scale : N.T.S.

SUBJECT LANDS

NOTE :

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND UNDERGROUND AND ABOVE GROUND UTILITIES 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 THE WORK THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCY TO THE ARCHITECTS/ENGINEERS BEFORE PROCEEDING WITH THE WORKS.

ALL DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF SERVICE AND THE PROPERTY OF THE ENGINEER WHICH MUST BE RETURNED AT THE COMPLETION OF WORK.

THIS DRAWING IS NOT TO BE SCALED. CONTRACTOR TO USE DIGITAL FILES FOR LAYOUT PROVIDED BY ENGINEER.

THIS PLAN MUST NOT BE USED TO SITE THE PROPOSED BUILDINGS.

THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNER'S CONTRACTOR FROM OBTAINING, BUT NOT LIMITED TO THE FOLLOWING PERMITS: ROAD CUT, SEWER PERMITS, RELOCATION OF SERVICES, ENCROACHMENT AGREEMENTS, APPROACH APPROVAL PERMITS, ETC...

EXISTING TOPOGRAPHICAL INFORMATION SUPPLIED BY R. AVIS SURVEYING INC. IN THEIR BOUNDARY AND TOPOGRAPHIC SURVEY OF JANUARY 15, 2017.

BENCH MARK:
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF MISSISSAUGA BENCH MARK No. 1060, HAVING AN ELEVATION = 115.956 metres.

BEARING NOTE:
BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF ARGYLE ROAD AS SHOWN ON REGISTERED PLAN E-23 HAVING A BEARING OF N46°19'00"W.

METRIC NOTE:
DISTANCES AND ELEVATIONS ON THIS PLAN ARE TYPICALLY SHOWN IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NO.	REVISIONS	DATE	BY
3.	ISSUED FOR ZONING RESUBMISSION	AUG 14/19	D.B.
2.	ISSUED FOR ZONING RESUBMISSION	MAY 22/19	D.B.
1.	ISSUED FOR ZONING SUBMISSION	OCT 19/18	D.B.

SCALE : 0 5 10 20

DRAWING :
FUNCTIONAL SERVICING PLAN

CLIENT :
PLAZACORP INVESTMENTS LTD.
10 WANLESS AVENUE, SUITE 201
TORONTO, ON

PROJECT :
PROPOSED RESIDENTIAL TOWNHOUSE DEVELOPMENT
2512-2532 ARGYLE ROAD
MISSISSAUGA, ONTARIO

SERVICING LEGEND:
- DENOTES EXISTING STORM MANHOLE
- DENOTES PROPOSED STORM MANHOLE
- DENOTES EXISTING CATCH BASIN
- DENOTES PROPOSED CATCHBASIN
- DENOTES PROPOSED STORMCEPTOR
- DENOTES PROPOSED INLET CONTROL DEVICE (ICD)
- DENOTES EXISTING STORM SEWER
- DENOTES PROPOSED STORM SEWER
- DENOTES EXISTING SANITARY MANHOLE
- DENOTES PROPOSED SANITARY MANHOLE
- DENOTES PROPOSED SANITARY SEWER
- DENOTES EXISTING SANITARY SEWER
- DENOTES PROPOSED HYDRANT
- DENOTES EXISTING HYDRANT
- DENOTES PROPOSED WATER VALVE & BOX
- DENOTES EXISTING WATER VALVE & BOX
- DENOTES PROPOSED WATER METER
- DENOTES EXISTING WATER MAIN
- DENOTES PROPOSED WATER MAIN
- DENOTES PROPOSED F/D CONNECTION
- DENOTES PROPOSED CAP FOR SANITARY, STORM, AND/OR WATER AS NOTED
- DENOTES PROPOSED ENTRANCE LOCATION
- DENOTES PROPOSED LIMIT OF CONSTRUCTION
- DENOTES PROPOSED HEAVY DUTY ASPHALT AREA
- 209.12BR DENOTES BEDROCK ELEVATION

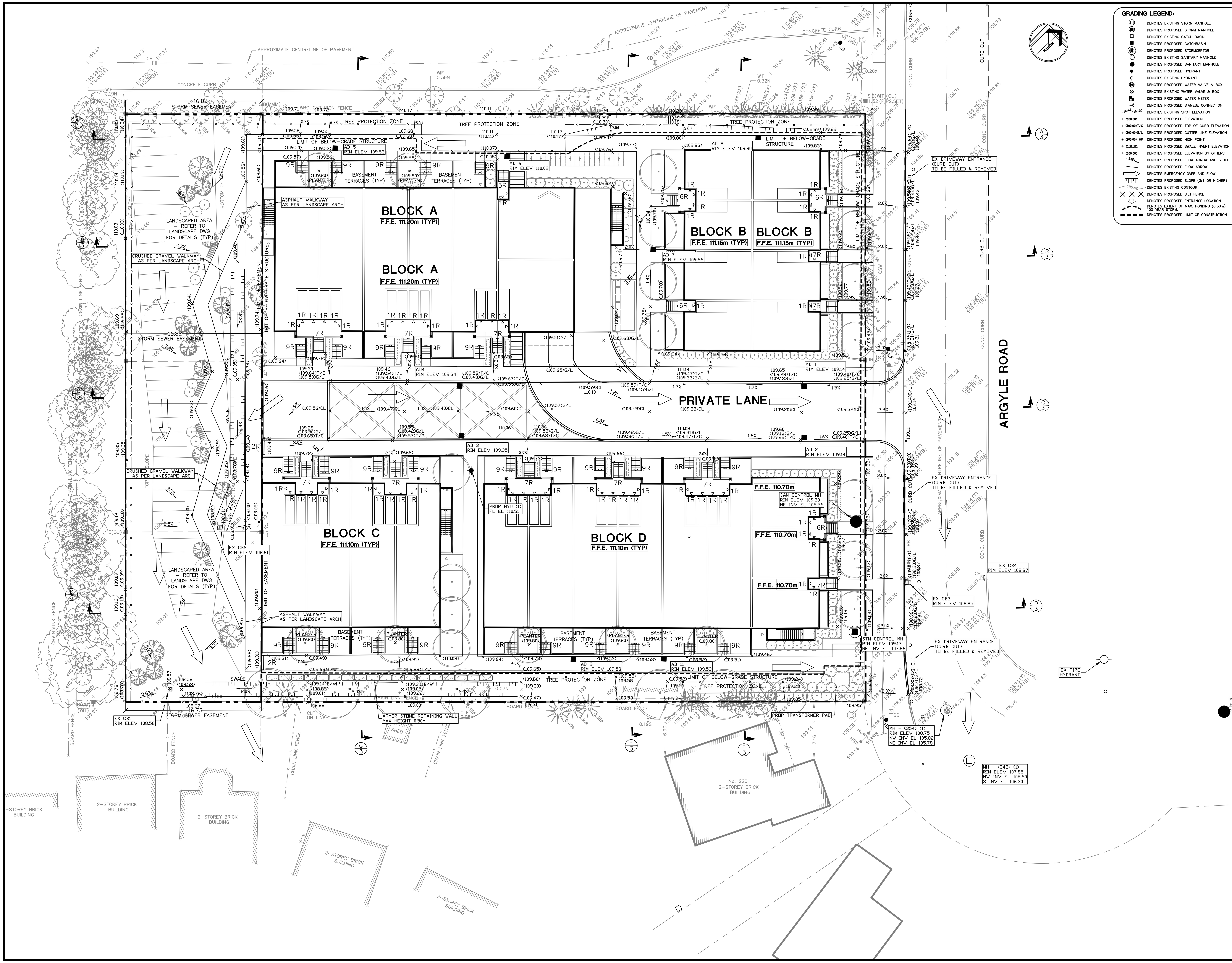
ODAN·DETECH
CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

SCALE :	PROJ. NO.:	DATE STARTED:	DESIGN BY:
1:200	18201	JAN 2018	D.B.
18201-1F.dwg			DRAWN BY: D.B.
			CHECKED BY: J.K.
			APPROVED BY: J.K.
			DRWG. NO.: 1 OF 3

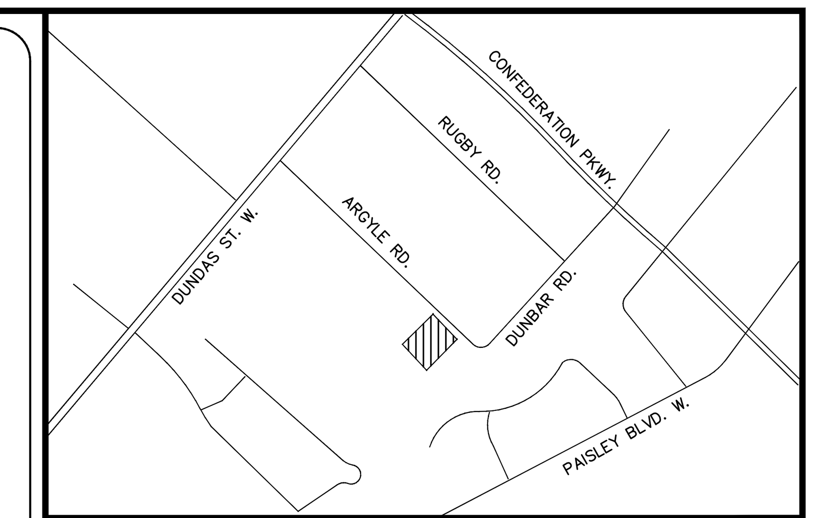
LICENSED PROFESSIONAL ENGINEER
AUG 14/19
D. T. BANCROFT
100200672
PROVINCE OF ONTARIO

ENGINEER



GRADING LEGEND:

- DENOTES EXISTING STORM MANHOLE
- DENOTES PROPOSED STORM MANHOLE
- DENOTES EXISTING CATCH BASIN
- DENOTES PROPOSED CATCHBASIN
- DENOTES PROPOSED STORMCEPTOR
- DENOTES EXISTING SANITARY MANHOLE
- DENOTES PROPOSED SANITARY MANHOLE
- DENOTES PROPOSED HYDRANT
- DENOTES EXISTING HYDRANT
- DENOTES PROPOSED WATER VALVE & BOX
- DENOTES EXISTING WATER VALVE & BOX
- DENOTES PROPOSED WATER METER
- DENOTES PROPOSED SIAMESE CONNECTION
- • 113.62 +100.00 DENOTES EXISTING SPOT ELEVATION
- + (100.00) DENOTES PROPOSED ELEVATION
- + (100.00)T/C DENOTES PROPOSED TOP OF CURB ELEVATION
- + (100.00)G/L DENOTES PROPOSED GUTTER LINE ELEVATION
- + (100.00) HP DENOTES PROPOSED HIGH POINT
- + (100.00) DENOTES PROPOSED SWALE INVERT ELEVATION
- + [100.00] DENOTES PROPOSED ELEVATION BY OTHERS
- 1.0% DENOTES PROPOSED FLOW ARROW AND SLOPE
- DENOTES PROPOSED FLOW ARROW
- DENOTES EMERGENCY OVERLAND FLOW
- DENOTES PROPOSED SLOPE (3:1 OR HIGHER)
- 195.50 DENOTES EXISTING CONTOUR
- DENOTES PROPOSED SILT FENCE
- DENOTES PROPOSED ENTRANCE LOCATION
- DENOTES EXTENT OF MAX. PONDING (0.30m) 100 YEAR STORM.
- DENOTES PROPOSED LIMIT OF CONSTRUCTION



KEY PLAN
Scale : N.T.S.

SUBJECT LANDS

NOTE :

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EXISTING TOPOGRAPHICAL INFORMATION SUPPLIED BY R. AVIS SURVEYING INC. IN THEIR BOUNDARY AND TOPOGRAPHIC SURVEY OF JANUARY 15, 2017.

BENCH MARK:

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF MISSISSAUGA BENCH MARK No. 1060, HAVING AN ELEVATION = 115.956 metres.

BEARING NOTE:

BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF ARGYLE ROAD AS SHOWN ON REGISTERED PLAN E-23 HAVING A BEARING OF N46°19'00"W.

METRIC NOTE:

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

NO.	REVISIONS	DATE	BY
3.	ISSUED FOR ZONING RESUBMISSION	AUG 14/19	D.B.
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1.	ISSUED FOR ZONING SUBMISSION	OCT 19/18	D.B.

SCALE : 0 5 10 20

DRAWING :

FUNCTIONAL GRADING PLAN

CLIENT :

PLAZACORP INVESTMENTS LTD.
10 WANLESS AVENUE, SUITE 201
TORONTO, ON

PROJECT :

PROPOSED RESIDENTIAL TOWNHOUSE DEVELOPMENT
2512-2532 ARGYLE ROAD
MISSISSAUGA, ONTARIO

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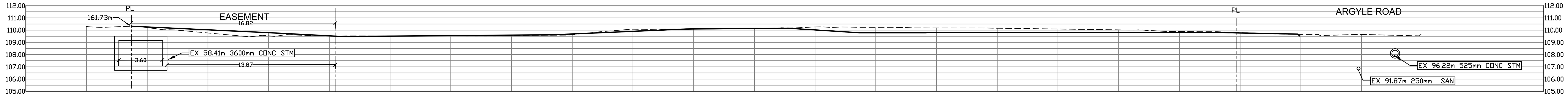
APPROVED BY: J.K.

18201–2F.dwg

LICENSED PROFESSIONAL ENGINEER AUG 14/19 D. T. BANCROFT 100200672 PROVINCE OF ONTARIO

ENGINEER

DRWG. NO.: 2 OF 3



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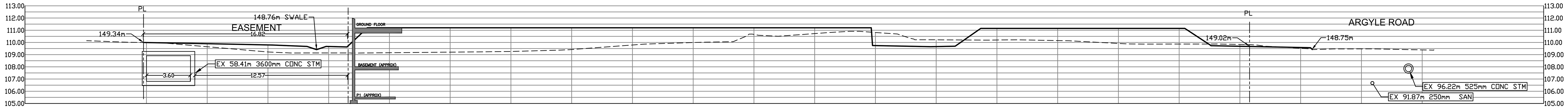

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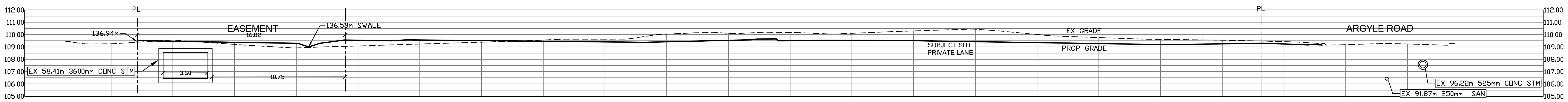

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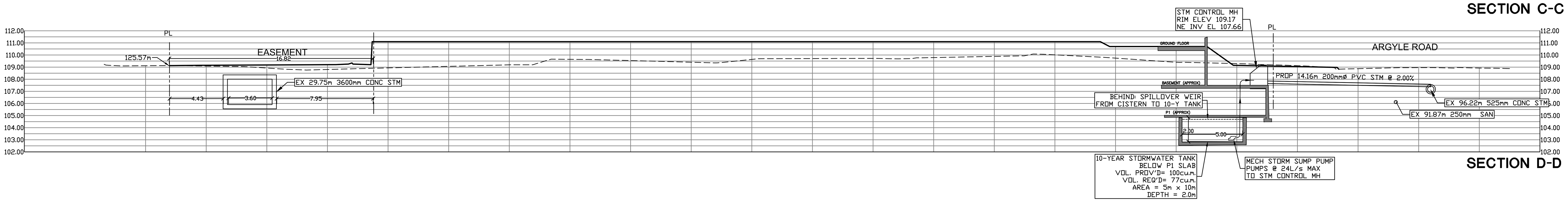

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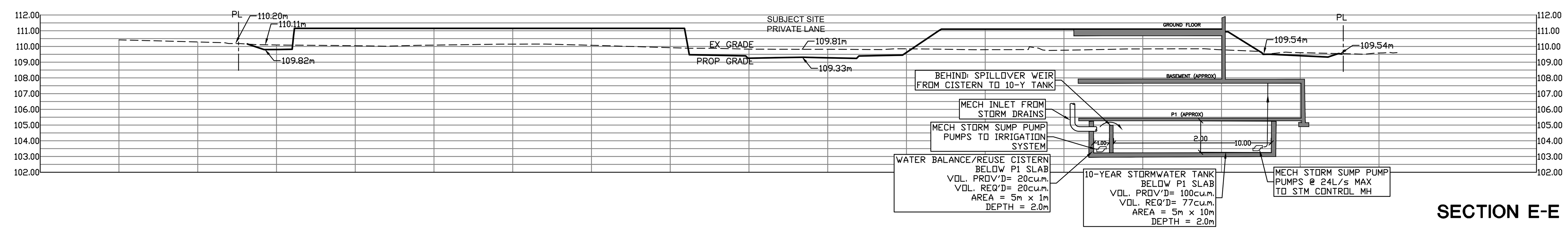

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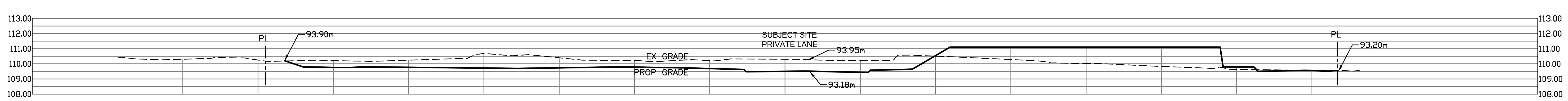
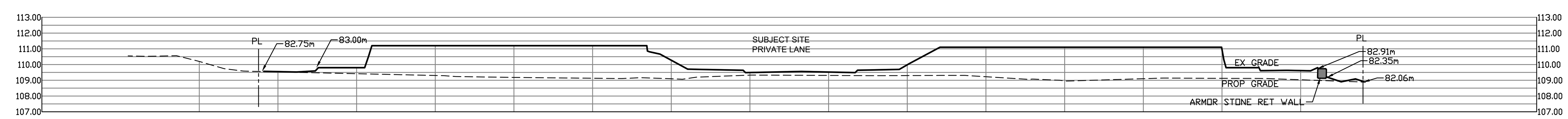
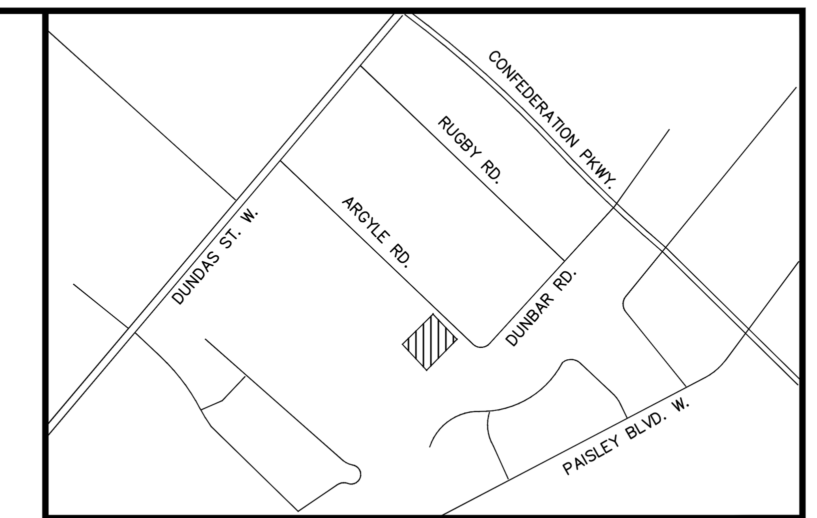


SECTION F-F



SECTION G-G



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SCALE :

DRAWING :

FUNCTIONAL SECTIONS

CLIENT :

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LICENSED PROFESSIONAL ENGINEER
AUG 14/19
D. E. BANCROFT
100200672
PROVINCE OF ONTARIO

ENGINEER