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**FUNCTIONAL SERVICING BRIEF**

**1240 BRITANNIA ROAD  
RESIDENTIAL DEVELOPMENT**

City of Mississauga

Prepared for

National Homes (1240 Britannia) Inc.

Project #: 20-249

March 2020



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## Table of Contents

<b>1. INTRODUCTION.....</b>	<b>4</b>
1.1. PURPOSE.....	4
<b>2. EXISTING CONDITIONS .....</b>	<b>5</b>
2.1. LAND USE.....	5
2.2. GRADING AND DRAINAGE.....	5
2.3. CIVIL INFRASTRUCTURE.....	6
<b>3. PROPOSED CONDITIONS.....</b>	<b>7</b>
3.1. LAND USE.....	7
3.2. GRADING AND DRAINAGE.....	7
<b>4. STORM DRAINAGE AND STORMWATER MANAGEMENT.....</b>	<b>8</b>
4.1. STORM SEWER DESIGN .....	8
4.2. SWM QUANTITY CONTROL .....	8
4.3. SWM QUALITY CONTROL .....	10
4.4. WATER BALANCE AND LOW IMPACT DEVELOPMENT.....	10
<b>5. SANITARY SERVICING .....</b>	<b>12</b>
<b>6. WATER SERVICING .....</b>	<b>13</b>
<b>7. EROSION AND SEDIMENT CONTROL .....</b>	<b>14</b>
<b>8. CONCLUSIONS.....</b>	<b>15</b>

## List of Tables

Table 1: Pre-Development Drainage Pattern .....	5
Table 2: Post Development Drainage Pattern .....	8
Table 3: Release Rates and Required Storage .....	9
Table 4: Preliminary Oil / Grit Separator Sizing for Water Quality .....	10

## Appendices

### Appendix A – Storm Servicing Calculations

- City of Mississauga Drawing C-37271 *Storm Drainage Areas*
- Storm Sewer Design Sheet
- SWM Calculations, Allowable Offsite Flow Rate
- SWM Design Calculations, Cistern and Orifice Design
- SWM Design Calculations, Modified Rational 10-Year Post Development
- SWM Design Calculations, Water Balance
- Brief Stormceptor Sizing Reports

### Figures and Drawings

<b>Figure 1</b>	–	<b>Site Location Plan</b>
<b>Drawing GR-1</b>	–	<b>Preliminary Grading Plan</b>
<b>Drawing STM-1</b>	–	<b>Preliminary Storm Drainage Plan</b>
<b>Drawing SAN-1</b>	–	<b>Preliminary Sanitary Drainage Plan</b>
<b>Drawing SP-1</b>	–	<b>Preliminary Servicing Plan</b>



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## 1. INTRODUCTION

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Urbantech has been retained as consulting engineers by National Homes (1240 Britannia) Inc. and directed to complete a Functional Servicing Brief in support of a proposed residential development at municipal address 1240 Britannia Road in the City of Mississauga in support of zoning by-law amendment site plan applications. The legal description of the site is Part of Lot 5, Concession 3, west of Hurontario Street.

The location of the subject site is shown in **Figure 1**. The 2.15 ha site is located south of Britannia Road and north of Galesway Boulevard between Cabrera Crescent and Candlebrook Court. The site is bounded by:

- Britannia Road to the north
- Galesway Boulevard to the south
- To the east by lots along the west side of Candlebrook Court
- To the west by lots along the east side of Cabrera Crescent

This report provides an assessment of the impact of the current site plan concept on existing infrastructure. The concepts presented in this report are in general conformance with the latest standards and criteria prepared by the City of Mississauga (roads, grading and storm drainage) and Peel Region (water distribution and sanitary drainage).

### 1.1. Purpose

The purpose of this report is as follows:

- Discuss the optimal site grading strategy for the site;
- Identify site specific stormwater management (SWM) requirements to ensure that the development project is in conformance with City standards;
- Evaluate various SWM practices that meet the requirements of the City and recommend a preferred strategy;
- Provide documentation of the proposed SWM strategy along with the technical information necessary for the sizing of the proposed SWM practices.
- For stormwater quality control, Level 1 Protection (Enhanced – 80% Average Annual Removal of Total Suspended Solids) for all developments is required.
- Determine an appropriate storm sewer system outlet which will work in accordance with the site's SWM strategy;
- Determine the site's sanitary sewage strategy and an appropriate outlet point, and;
- Determine an appropriate water service connection for the proposed development.



## 2. EXISTING CONDITIONS

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### 2.1. Land Use

The subject site contains an existing one storey brick and vinyl siding dwelling (No. 1240) with a wood shed and an inground pool and a one storey aluminium siding dwelling (No. 1310).

### 2.2. Grading and Drainage

The pre-development drainage pattern was determined from *Plan of Survey Showing Topographic Information of Part of Lot 5, Concession 3, West of Hurontario Street ... Registered Plan 43M-1563, City of Mississauga, Regional Municipality of Peel*, by J.D. Barnes Limited, dated January 14, 2020.

The general drainage direction is split between a northwesterly flow toward Britannia Road West (0.53 ha) and a westerly flow toward an existing interceptor swale draining southward to Galesway Boulevard near the west property line (1.40 ha). Additionally, a small portion drains southwesterly toward Galesway Boulevard via sheet flow (0.22 ha).

Prior to construction of the interceptor swale and development to the west, the majority of site drainage was conveyed northwesterly toward Britannia Road West. An inset shown on City of Mississauga Drawing C-37271 *Storm Drainage Areas* (included in Appendix A) shows that, historically, an area of 2.30 ha, with a runoff coefficient of 0.30, drained to Britannia Road West of which the property contained approximately 1.75 ha.

The existing grade within the site is typically 2.0%.

Table 1 provides the pre-development drainage pattern:

**Table 1: Pre-Development Drainage Pattern**

Drainage Direction	Historical	Current Existing
Toward Britannia Road	1.75 <sup>1</sup>	0.53
To Galesway Boulevard via Inceptor Swale and DICB	N/A	1.40 <sup>1</sup>
To Galesway Boulevard	0.40	0.22
Total to Galesway Boulevard	0.40	1.62
TOTAL	2.15	2.15

<sup>1</sup> Includes 0.04 ha lot area of proposed custom detached unit.



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### 2.3. Civil Infrastructure

Based on the City of Mississauga plan and profile drawings, the existing municipal infrastructure surrounding the site are as follows:

- Galesway Boulevard
  - 375 mm storm sewer, stub to Galesway Boulevard
  - 450 mm storm sewer on Galesway, downstream of stub connection, flows westerly
  - 250 mm PVC sanitary sewer, flows westerly
  - 300 mm PVC watermain
  
- Britannia Road West
  - 1050 mm concrete storm sewer, flows westerly
  - 250 mm PVC sanitary sewer, flows westerly
  
- Cabrera Crescent
  - 300 mm concrete storm sewer, flows westerly
  - 150 mm PVC watermain

The storm, sanitary, and watermain sewers along Galesway Boulevard and Britannia Road West will service the proposed development.



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## 3. PROPOSED CONDITIONS

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### 3.1. Land Use

The proposed development will consist of sixty (60) 3-storey standard townhouses, forty-eight (48) dual-front townhouses, one (1) 2-storey custom detached unit, internal private laneways (7.0 m in width), and at-grade visitor parking spaces. Vehicular access is provided by one (1) private driveway off Galesway Boulevard.

### 3.2. Grading and Drainage

The proposed grading design for the site is generally influenced by boundary conditions and will match existing grades along all property lines. The site grading design takes into consideration the following requirements and constraints:

- Conform to the City of Mississauga's design criteria;
- Minimize cut and fill operations and work towards a balanced site;
- Match existing boundary conditions;
- Provide overland flow conveyance for major storm conditions;
- Reduce or eliminate (where possible) the need for retaining walls;
- Maximize the self-contained portion of the site conveying runoff to the storm sewer system(s);
- Provide suitable cover on proposed servicing; and
- Achieve SWM and environmental objectives required for development of the site.

Generally, the internal roads are graded with slopes falling within the range of 0.5% – 2.0%. Minor storm drainage flows are self-contained within the site boundaries into proposed catchbasins and rear-lot catchbasins. During major storm events, some drainage will be directed overland from the site to Galesway Boulevard via the proposed driveways. The proposed grading design matches existing property line grades on all sides of the property. The relatively small rear lot areas facing Britannia Road West and Galesway Boulevard will drain uncontrolled to the right-of-ways (ROWS) of those streets. The Brief accounts for this uncontrolled drainage.

Refer to **Drawing GR-1** and **Drawing STM-1** for details.



## 4. STORM DRAINAGE AND STORMWATER MANAGEMENT

### 4.1. Storm Sewer Design

Storm servicing infrastructure for the site has been designed in accordance with the latest City of Mississauga standards and specifications and will consist of storm sewers of 300 mm – 450 mm diameter and catchbasin leads of 250 mm diameter having slopes ranging from 0.5% – 0.8%. Two proposed storm connections are proposed, as follows:

- To Galesway Boulevard via a proposed 450 mm diameter concrete sewer at 0.8% slope to a proposed maintenance hole on the existing 450 mm diameter concrete storm sewer. This connection is proposed in place of the existing plug and 375 mm connection;
- To Britannia Road West, through the Cabrera Crescent ROW, via a proposed 450 mm diameter concrete storm sewer at 0.5% slope to a proposed maintenance hole on the existing 1050 mm diameter concrete storm sewer.

Drainage from the lot of the proposed custom detached unit will drain to the existing storm drainage system on Cabrera Crescent.

Refer to the included **Storm Sewer Design Sheet** and to **Drawing STM-1** for details.

Table 2 provides the post-development drainage pattern:

**Table 2: Post Development Drainage Pattern**

Discharge Location	Controlled Area to Storm Sewer (ha)	Uncontrolled Area (Rear Lot Drainage) (ha)	Total Drainage Area to Discharge Location (ha)
Galesway Boulevard	1.17	0.14	1.31
Britannia Road West	0.66	0.14	0.80
Cabrera Crescent	0.04	0	0.04
Total	1.87	0.28	2.15

### 4.2. SWM Quantity Control

The Modified Rational Method was used to determine the amount of storage required to control the release rate at the discharge locations. The target release rates at the proposed discharge locations were determined as follows:

- To Galesway Boulevard, the target release rate is 0.112 m<sup>3</sup>/s, the capacity of the existing 375mm diameter stub connection from the property, as determined from





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City of Mississauga Storm Sewer Design Calculations for the Mattamy Country Club North, Phase 3 Subdivision, File No. T-M98012-PH3;

- To Britannia Road West, the target release rate is 0.141 m<sup>3</sup>/s, estimated to be the pre-development flow rate of the portion of the subject property draining to Britannia Road West, prior to development located to the west and the construction of the interceptor swale along the western edge of the property. The area of this portion is 1.71 ha out of the historic area of 2.30 ha, as determined from the references discussed in Section 2.2. The area of the lot containing the proposed custom detached unit has been excluded, since its drainage will not contribute to the Britannia Road West discharge location.

The Modified Rational Method methodology is consistent with the City of Mississauga Development Requirements Manual, Section 8 – Storm Drainage Design Requirements (January 2020) including the following:

- 10-year design storm event with rainfall intensity calculated from City of Mississauga Intensity-Duration-Frequency (IDF) parameters;
- Initial Time of Concentration of 15 minutes; and
- Runoff coefficient of 0.65 for “compact or dense housing (e.g. townhouses)”.

The uncontrolled runoff flow rate from rear lot areas was subtracted from the target release rate to determine the maximum orifice release rate. Beginning with the initial time of concentration, a suitable range of storm durations were analyzed to determine the required storage volume to achieve the maximum orifice release rate component of the target release rate. Table 3 provides a summary of the runoff rates, release rates and required storage volumes for each discharge location.

**Table 3: Release Rates and Required Storage**

Discharge Location	Max. Post Dev. Runoff Rate (m <sup>3</sup> /s)	Target Release Rate (m <sup>3</sup> /s)	Uncontrolled Runoff Rate (Rear Lots) (m <sup>3</sup> /s)	Max. Orifice Release Rate (m <sup>3</sup> /s)	Required Storage (m <sup>3</sup> )
Galesway Boulevard	0.209	0.112	0.025	0.087	114
Britannia Road West	0.118	0.141	0.026	0.116	4

The required storage to achieve the target release rates is 118 m<sup>3</sup>. The required volume will be stored within the active storage component of an underground cistern to be located within the proposed 607 m<sup>2</sup> outdoor amenity area. The active storage within the cistern



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would have a depth of approximately one metre and an area of 122 m<sup>2</sup>. Design details of the proposed cistern including its connections to the storm sewer system will be confirmed at a later design stage. Refer to **Drawing STM-1** for the conceptual location of the proposed cistern.

Refer to the following included calculations:

- **SWM Calculations, Allowable Offsite Flow Rate;**
- **SWM Design Calculations, Cistern and Orifice Design;** and
- **SWM Design Calculations, Modified Rational 10-Year Post Development** for each of the proposed discharge locations.

### 4.3. SWM Quality Control

Enhanced (Level 1) water quality protection through the removal of 80% of total suspended solids (TSS) will be provided by an oil / grit separator to be located at each proposed discharge location. Proposed sizing for the oil / grit separators has been performed using the PCSWMM for Stormceptor Sizing Tool created by Imbrium Systems. The sizing is considered preliminary and the recommended oil / grit separator may be a Stormceptor model or approved equivalent.

Table 4 provides the preliminary oil / grit separator sizing:

**Table 4: Preliminary Oil / Grit Separator Sizing for Water Quality**

Discharge Location	Oil / Grit Separator Model	Provided TSS Removal
Galesway Boulevard	Stormceptor STC 3000	80%
Britannia Road West	Stormceptor STC 750	82%

Refer to the included **Brief Stormceptor Sizing Reports** for each discharge location.

### 4.4. Water Balance and Low Impact Development

For this site, the minimum on-site runoff retention will require the proposed development to retain all runoff from the first 5 mm of rainfall through infiltration, evapotranspiration or rainwater reuse, per CVC SWM Criteria (Section 4.2).

The 5 mm rainfall volume for the proposed development is 107 m<sup>3</sup>. Allowance has been made for an initial abstraction of 5 mm for pervious surfaces and 1 mm for impervious surfaces. Based on converting the runoff coefficient of 0.65 to an imperviousness of 64%, the initial abstraction volume is 52 m<sup>3</sup>. The remaining storage requirement of 55 m<sup>3</sup> is proposed to be retained on-site through one or more of the following techniques:



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- sump storage within the underground cistern proposed in Section 4.2;
- infiltration galleries located within the proposed outdoor amenity area; or
- a sub-surface infiltration trench located under the proposed parking along the east side of Street 'A'.

Low impact development measures being considered for the proposed development include:

- the infiltration galleries and / or trenches at the above noted locations are also proposed to reduce stormwater runoff flowing to the storm sewer system;
- rain barrels for uses such as washing and irrigation; and
- roof leaders disconnected from the storm sewer system and instead discharging to pervious areas.

Design details of the proposed infiltration measures will be confirmed at a later design stage.

Refer to **SWM Design Calculations, Water Balance** for the determination of the 5 mm retention volume. The sump storage within an underground cistern is included in **SWM Design Calculations, Cistern and Orifice Design**.



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## 5. SANITARY SERVICING

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Sanitary servicing infrastructure for the site has been designed in accordance with the latest Region of Peel standards and specifications and will consist of 250 mm PVC sanitary sewers with slopes ranging from 0.5% – 1.0%. The sanitary connection for the site will be a 250 mm PVC sewer at a 1.0% slope to the existing 250 mm PVC sanitary sewer, via a proposed 1200 mm diameter maintenance hole, along Galesway Boulevard at the intersection with proposed Street 'A'. Refer to **Drawing SAN-1** for details.

Based upon the latest standards and criteria prepared by Peel Region, the current site plan concept projects a population of 369 and peak residential flow of 5.7 L/s, using a population density of 175 persons/ha and an infiltration allowance of 0.2 L/s/ha. The existing sanitary sewers surrounding the site were designed with the development of this site considered, therefore there are no anticipated concerns related to capacity.



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## **6. WATER SERVICING**

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Water servicing infrastructure for the site has been designed in accordance with the latest Region of Peel standards and specifications. To supply water demands to the site, 200 mm PVC watermains are proposed internally. These watermain service will connect to the existing 300 mm PVC watermain along Galesway Boulevard at the intersection with proposed Street 'A' and to the existing 150 mm PVC watermain on Cabrera Crescent. Refer to **Drawing SP-1** for details.

There are two (2) existing fire hydrants along the north side of Galesway Boulevard. A sufficient number of fire hydrants will be located within the site that will service the development with spacing that is within the Region of Peel's maximum hydrant spacing for a residential development area.

The existing watermains surrounding the site were designed with the development of this site considered, therefore there are no anticipated concerns related to capacity. It is recommended that a water distribution analysis be undertaken to confirm that the development can be serviced by the existing municipal infrastructure.



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## **7. EROSION AND SEDIMENT CONTROL**

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Erosion and sediment controls will be implemented for all construction activities undertaken during site works including topsoil stripping, bulk earthworks, foundation excavation and stockpiling of materials, conforming to ESC guidelines (2006). These measures will include:

- Installation of heavy-duty silt control fencing along the perimeter of the site at strategic locations.
- Provision of a temporary mud mat at the construction site entrance
- Preventing silt or sediment laden water from entering existing inlets on the adjacent ROWs (catchbasins/catchbasin maintenance holes) by wrapping their tops with filter fabric and using silt sacks.
- Maintaining sediment and erosion control structures in good repair until such time as the Engineer or the City approves their removal.

If required, site-specific measures will be determined during the detailed design / site alteration application stage.



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## 8. CONCLUSIONS

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This report has demonstrated that:

- The proposed site can be graded to match into existing grades at all property lines while adhering to City of Burlington grading standards and specifications.
- Suitable storm sewer system outlets for the proposed development can be provided by connecting to the existing storm sewers along Galesway Boulevard and Britannia Road West.
- Water Quantity – the SWM pond downstream of the proposed development will provide adequate quantity controls.
- Water Quality – the SWM pond downstream of the proposed development will provide adequate quality controls.
- A suitable sanitary sewer system outlet for the proposed development can be provided by connecting to the existing sanitary sewer along Galesway Boulevard.
- A suitable water service connection can be provided for the proposed development by connecting to the existing watermains along Galesway Boulevard and Cabrera Crescent.
- Erosion Control – Measures and controls will be implemented for all construction activities undertaken during site works.

Report Prepared by:



Brad Kargus, P. Eng.  
*Associate, Water Resources*

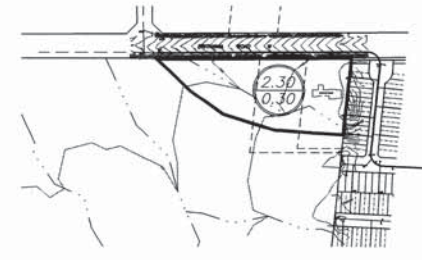
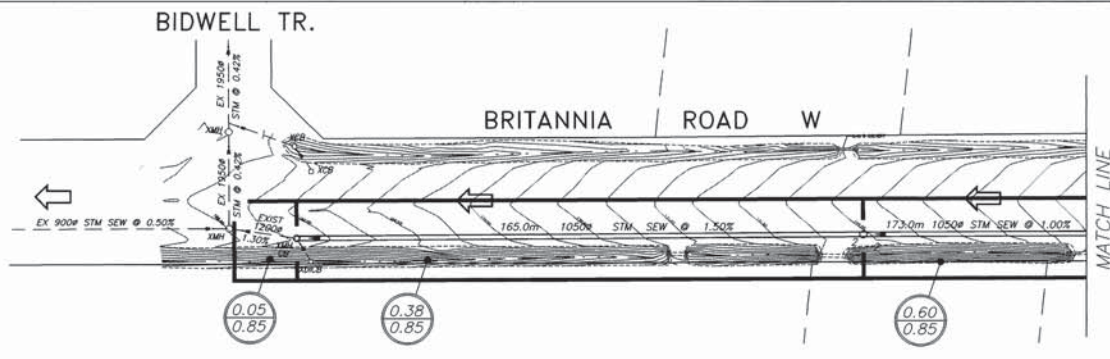
Rob Merwin, P. Eng.  
*Senior Associate, Land Development*



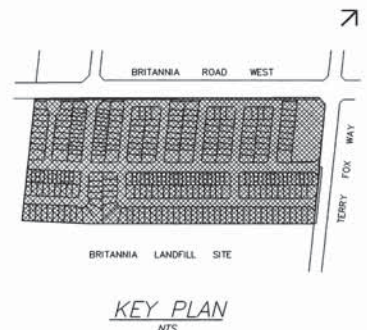
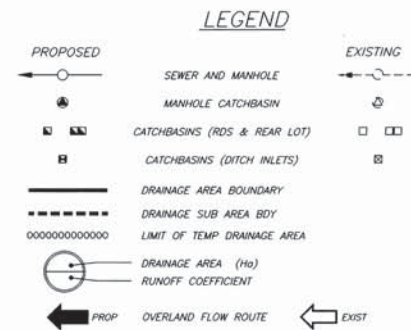
## **APPENDIX A**

### **Storm Servicing Calculations**

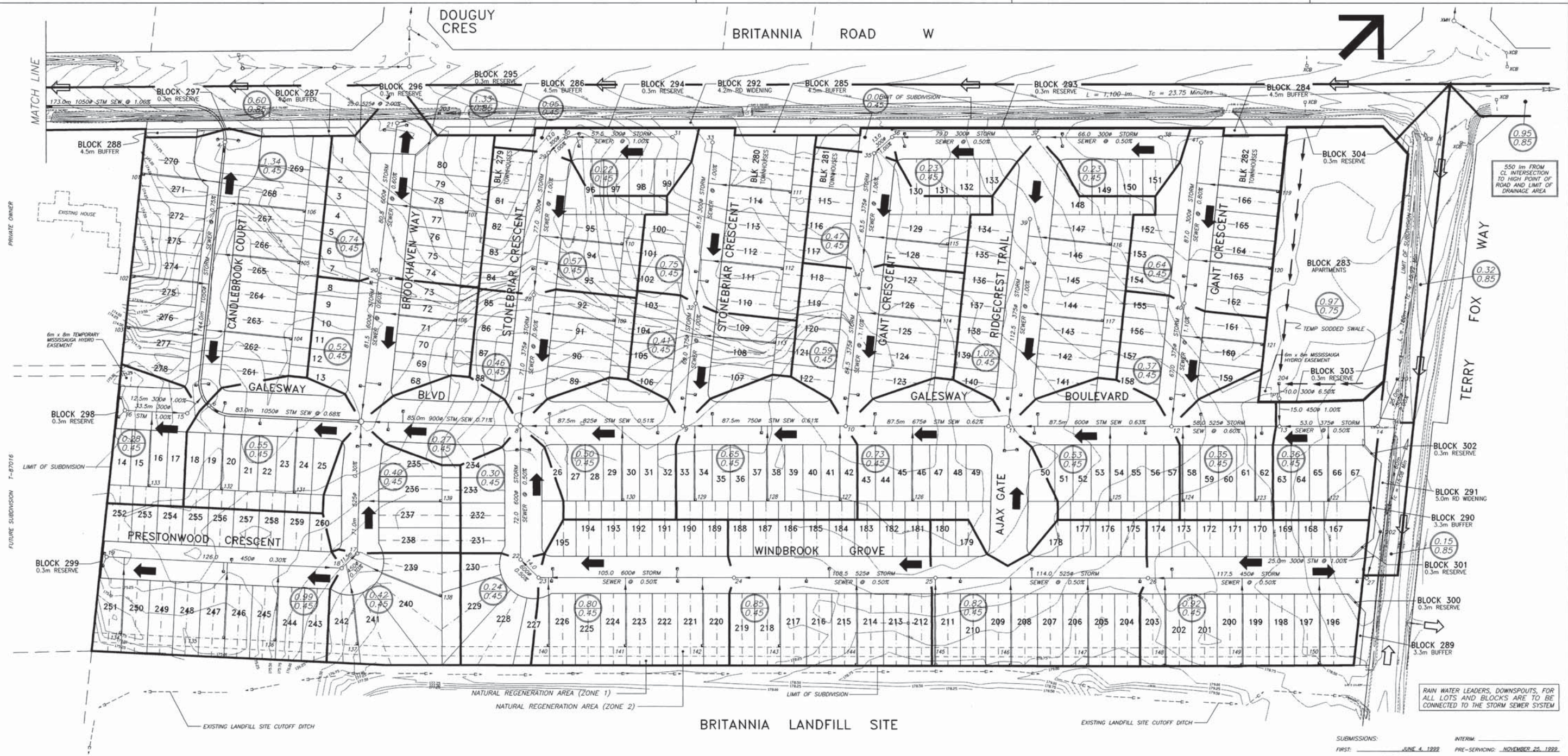




INTERIM DRAINAGE TO EXISTING SEWER AT BIDWELL DRIVE  
SCALE 1:5000



KEY PLAN  
NTS



SUBMISSIONS: FIRST: JUNE 4, 1999 SECOND: SEPTEMBER 24, 1999 INTERIM: PRE-SERVING: NOVEMBER 25, 1999 FINAL: APRIL 28, 2000

**CITY OF MISSISSAUGA**  
Transportation and Works

Scale: 1:1000  
Date: JANUARY 1999  
Area: 2.38 E

Designed By: ALJ  
Drawn By: CAD  
Checked By: ALJ

City/Region File: T-94032

Project 98-06 Sheet ST 1



**Adamson Lawson Surbray Associates Limited**  
Town Planners Engineering Consultants Project Managers  
57 Village Centre Place Mississauga, Ontario L4Z 1V9

**GRAYLIGHT PROPERTIES LTD.**  
(T-94032)  
**STORM DRAINAGE AREAS**

REVISIONS		
Date	Details	Initial



**OUTPUT DATA:**

<b>STORM SEWER DESIGN SHEET</b> <b>10-YEAR STORM EVENT</b> <b>NATIONAL HOMES (1240 BRITANNIA) INC.</b> City of Mississauga
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<b>PROJECT DETAILS</b> Project No: 20-249 Date: 24-Mar-20 Designed by: B.K. Checked by: M.M.
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<b>DESIGN CRITERIA</b>			
Min. Diameter =	300	mm	Rainfall Intensity = $\frac{A}{(Tc+B)^c}$
Mannings 'n' =	0.013		A = 1010
Starting Tc =	15	min	B = 4.6
Factor of Safety =	20	%	c = 0.78
<b>NOMINAL PIPE SIZE USED</b>			

STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
<i>EXISTING DEVELOPMENT</i>																				
Whitehorn Avenue	EX 31	EX 32	0.12	0.45	0.05	11.65	73.83	2.390			2.390	34.0	0.72	1050	2.317	2.68	24.01	0.21	24.22	103%
Whitehorn Avenue	EX 32	EX		0.45		11.65	73.41	2.376			2.376	7.0	0.90	1050	2.591	2.99	24.22	0.04	24.26	92%
Cabrera Crescent	EX MH 6	EX MH 5	0.25	0.45	0.11	0.25	99.17	0.069			0.069	65.0	1.55	300	0.120	1.70	15.00	0.64	15.64	57%
Cabrera Crescent	EX MH 5	EX MH 4	0.03	0.45	0.01	0.26	96.73	0.071			0.071	12.5	1.00	300	0.097	1.37	15.64	0.15	15.79	73%
Cabrera Crescent	EX MH 4	EX MH 3	0.29	0.45	0.13	0.39	96.16	0.105			0.105	40.0	0.50	450	0.202	1.27	15.79	0.53	16.31	52%
Cabrera Crescent	EX MH 3	EX MH 2	1.06	0.45	0.48	0.87	94.27	0.228			0.228	97.0	0.50	525	0.304	1.40	16.31	1.15	17.47	75%
Galesway Boulevard	EX MH 8	EX MH 7	0.74	0.45	0.33	0.33	95.68	0.089			0.089	112.0	2.95	300	0.166	2.35	15.92	0.79	16.71	53%
<i>PROPOSED DEVELOPMENT</i>																				
Street 'D'	RLCB 6	MH 1	0.078	0.65	0.05	0.05	99.17	0.014			0.014	8.3	0.50	250	0.042	0.86	15.00	0.16	15.16	33%
Street 'D'	MH 1	MH 2				0.05	98.53	0.014			0.014	24.5	0.50	300	0.068	0.97	15.16	0.42	15.58	20%
Street 'C'	MH 12	MH 2	0.047	0.65	0.03	0.03	99.17	0.008			0.008	41.4	0.50	300	0.068	0.97	15.00	0.71	15.71	12%
Street 'D'	MH 2	MH 3	0.340	0.65	0.22	0.30	96.44	0.081			0.081	102.0	0.50	375	0.124	1.12	15.71	1.51	17.23	65%
Street 'A'	MH 6	MH 9	0.047	0.65	0.03	0.03	99.17	0.008			0.008	23.4	0.50	300	0.068	0.97	15.00	0.40	15.40	12%
Street 'D' Unit 85	RLCB 3	CBMH 4	0.081	0.65	0.05	0.05	99.17	0.015			0.015	15.8	0.50	250	0.042	0.86	15.00	0.31	15.31	34%
Amenity Area	CBMH 4	CBMH 3	0.065	0.65	0.04	0.09	97.97	0.026			0.026	38.9	0.50	300	0.068	0.97	15.31	0.67	15.98	38%
Amenity Area	CBMH 3	MH 9	0.151	0.65	0.10	0.19	95.47	0.051			0.051	10.4	0.50	300	0.068	0.97	15.98	0.18	16.16	75%
Street 'A' Unit 12	RLCB 4	CBMH 5	0.052	0.65	0.03	0.03	99.17	0.009			0.009	18.9	0.50	250	0.042	0.86	15.00	0.37	15.37	22%
Street 'A' Unit 5	RLCB 5	CBMH 5	0.052	0.65	0.03	0.03	99.17	0.009			0.009	18.9	0.50	250	0.042	0.86	15.00	0.37	15.37	22%
Street 'A' Unit 8	CBMH 5	MH 9	0.020	0.65	0.01	0.08	97.74	0.022			0.022	31.3	0.50	300	0.068	0.97	15.37	0.54	15.91	32%
Street 'A'	MH 9	MH 3	0.165	0.65	0.11	0.41	94.83	0.108			0.108	62.4	0.50	450	0.202	1.27	16.16	0.82	16.98	54%
Street 'A'	MH 3	MH 10	0.096	0.65	0.06	0.78	91.18	0.197			0.197	29.1	0.80	450	0.255	1.60	17.23	0.30	17.53	77%
Galesway Boulevard	MH 10	MH 11		0.65		0.78	90.21	0.194			0.194	13.5	0.80	450	0.255	1.60	17.53	0.14	17.67	76%
<i>Flow rate to Galesway to be controlled to capacity of existing STUB - MH 7 connection (0.112 m3/s).</i>																				
Street 'C' Unit 47	RLCB 1	CBMH 1	0.051	0.65	0.03	0.03	99.17	0.009			0.009	14.4	0.50	250	0.042	0.86	15.00	0.28	15.28	22%
Street 'C' Unit 40	RLCB 2	CBMH 1	0.027	0.65	0.02	0.02	99.17	0.005			0.005	21.4	0.50	250	0.042	0.86	15.00	0.42	15.42	11%
Street 'B'	CBMH 1	MH 12				0.05	97.55	0.014			0.014	31.3	0.50	300	0.068	0.97	15.42	0.54	15.96	20%
Street 'C'	MH 12	MH 5	0.189	0.65	0.12	0.17	99.17	0.048			0.048	35.6	0.50	300	0.068	0.97	15.00	0.61	15.61	70%
Street 'B'	CBMH 2	MH 5	0.093	0.65	0.06	0.06	99.17	0.017			0.017	31.5	0.50	300	0.068	0.97	15.00	0.54	15.54	24%
Street 'B'	MH 5	MH 6	0.299	0.65	0.19	0.43	96.81	0.115			0.115	84.2	0.50	450	0.202	1.27	15.61	1.11	16.72	57%
Street 'B'	MH 6	MH 7		0.65		0.43	92.87	0.110			0.110	9.7	0.50	450	0.202	1.27	16.72	0.13	16.85	55%
Cabrera Crescent	MH 7	MH 8		0.65		0.43	92.44	0.110			0.110	37.7	0.50	450	0.202	1.27	16.85	0.50	17.34	55%



EXISTING DEVELOPMENT																				
Cabrera Crescent	STUB	MH 7	0.90	0.45	0.41	0.41	99.17	0.112	0.000	0.000	0.112	18.0	0.50	375	0.124	1.12	15.00	0.27	15.27	90%
<i>To be abandoned. Prop. development to connect by MH 10 - MH 11 as above. Flow to be controlled to ex. STUB - MH 7 capacity of 0.112 m3/s.</i>																				
Galesway Boulevard	MH 7	MH 2	0.71	0.45	0.32	1.15	92.44	0.296			0.296	87.0	1.40	450	0.337	2.12	16.85	0.68	17.53	88%
Galesway Boulevard	MH 2	MH 1	0.39	0.45	0.18	1.41	90.20	0.353			0.353	57.5	0.95	600	0.598	2.12	17.53	0.45	17.98	59%
	MH 1	EX	0.12	0.45	0.05	1.51	88.79	0.373			0.373	33.0	0.95	600	0.598	2.12	17.98	0.26	18.24	62%
Whitehorn Avenue	EX	EX 34	0.27	0.45	0.12	13.29	73.33	2.707			2.707	77.0	0.90	1050	2.591	2.99	24.26	0.43	24.69	104%
Whitehorn Avenue	EX 34	EX 35	0.43	0.45	0.19	13.48	72.49	2.715			2.715	62.5	1.20	1050	2.991	3.45	24.69	0.30	24.99	91%
Condo Townhomes		EX 35	2.87	0.60	1.72	1.72														
Whitehorn Avenue	EX 35	EX	0.09	0.45	0.04	15.25	71.91	3.046			3.046	32.5	1.50	1050	3.344	3.86	24.99	0.14	25.13	91%



## SWM CALCULATIONS ALLOWABLE OFFSITE FLOW RATE

<b>Project Name:</b> National Homes (1240 Britannia) Inc. <b>Municipality:</b> City of Mississauga <b>Project No.:</b> 20-249W	<b>Prepared by:</b> BK <b>Checked by:</b> RBTM <b>Date:</b> 24-Mar-20
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### Summary of Proposed Discharge Locations

Proposed Discharge Point	Ex. Pipe Cap. (m <sup>3</sup> /s)	Description
Galesway Boulevard	0.112	Control to capacity of existing stub (ex. 18m - 375mm pipe at 0.5%)
Britannia Road West	0.141	Control to 10-year runoff flow rate of existing property discharge to Britannia Road West, equivalent to 1.82 ha of the the 2.30 ha area shown on inset on City of Mississauga Drawing C-37271 Storm Drainage Areas at a runoff coefficient of 0.30.

### Method of Determining Runoff: Rational Method, $Q = 0.00278CIA$

Where: Q = Peak flow rate (litres/second)  
 C = Runoff coefficient  
 I = Rainfall intensity (mm/hour)  
 A = Catchment area (hectares)

### Estimated Existing Discharge to Britannia Road West

	A	C*
Site (m <sup>2</sup> )	17,100	0.30
Total Catchment Area (ha)	1.71	0.30

\*Inset drawing on City of Mississauga Drawing C-37271 "Storm Drainage Areas" indicates the majority of the National Homes property has a pre-development runoff coefficient of 0.30 within a larger area of 2.30 ha draining to Britannia Road West.

Rainfall intensity per City of Mississauga Development Requirements (Section 8),  $I = A/(T+B)^C$ :

Where: A, B and C = Parameters defined in Mississauga Development Requirements Section 8.1  
 I = Rainfall intensity (mm/hour)  
 T = Time of concentration (hours)

Return Period (Years)	10
A	1,010
B	4.6
C	0.78
T (min) **	15
I (mm/hr)	99.2
Q (m <sup>3</sup> /s)	0.141

\*\* The minimum initial time of concentration is 15 minutes.

**The offsite allowable flow rate to the Galesway Boulevard storm sewer system is 0.112 L/s.**  
**The offsite allowable flow rate to the Britannia Road West storm sewer system is 0.141 L/s.**



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## SWM DESIGN CALCULATIONS CISTERN AND ORIFICE DESIGN

**Project Name:** National Homes (1240 Britannia) Inc.  
**Municipality:** City of Mississauga  
**Project No.:** 20-249W

**Prepared by:** BK  
**Checked by:** RBTM  
**Last Revised:** 24-Mar-20

### Orifice Control to Galesway Boulevard

Peak Discharge rate at maximum head,  $Q = C_d A (2g H)^{0.5}$

Orifice Tube Diameter = 170 mm  
 $C_d = 0.82$   
 $A = 0.0227$  m  
 $g = 9.81$  m<sup>2</sup>/s  
 $H = 1.00$  m  
 $Q = 0.082$  m<sup>3</sup>/s

Target release rate = 0.112 m<sup>3</sup>/s  
Uncontrolled Release Rate = 0.025 m<sup>3</sup>/s  
Max. Allowable Orifice Release Rate = 0.087 m<sup>3</sup>/s

The peak discharge at maximum head is lower than the allowable municipal release rate (0.112 m<sup>3</sup>/s). The flow rate to the municipal storm sewer system is 0.082 m<sup>3</sup>/s.

### Orifice Control to Britannia Road West

Peak Discharge rate at maximum head,  $Q = C_d A (2g H)^{0.5}$

Orifice Tube Diameter = 200 mm  
 $C_d = 0.82$   
 $A = 0.0314$  m  
 $g = 9.81$  m<sup>2</sup>/s  
 $H = 1.00$  m  
 $Q = 0.114$  m<sup>3</sup>/s

Target release rate = 0.141 m<sup>3</sup>/s  
Uncontrolled Release Rate = 0.026 m<sup>3</sup>/s  
Max. Allowable Orifice Release Rate = 0.116 m<sup>3</sup>/s

The peak discharge at maximum head is lower than the allowable municipal release rate (0.141 m<sup>3</sup>/s). The flow rate to the municipal storm sewer system is 0.114 m<sup>3</sup>/s.

### Minimum Cistern Sizing

Sump Storage = 55.2 m<sup>3</sup>  
Active Storage Req'd for Discharge to Galesway Blvd. = 113.8 m<sup>3</sup>  
Active Storage Req'd for Discharge to Britannia Rd. W. = 3.6 m<sup>3</sup>  
Total Active Storage Required = 117.4 m<sup>3</sup>



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## SWM DESIGN CALCULATIONS MODIFIED RATIONAL 10-Year Post Development

**Project Name:** National Homes (1240 Britannia) Inc.  
**Municipality:** City of Mississauga  
**Project No.:** 20-249W

**Prepared by:** BK  
**Checked by:** RBTM  
**Last Revised:** 24-Mar-20

Target Release Rate	
Galesway Boulevard	0.112 m <sup>3</sup> /s

Post Development Condition:	Area (m <sup>2</sup> )	C
Controlled	1.166	0.65
Uncontrolled	0.139	0.65

IDF	A	B	C
10-Year	1,010	4.60	0.78

### Uncontrolled Flow

Time (min)	10 Year (Post-Development)		
	Intensity 10 year (mm/hr)	Storm Runoff (m <sup>3</sup> /s)	Runoff Volume (m <sup>3</sup> )
15	99.17	0.025	22.42

**Maximum Orifice Release Rate = 0.082 m<sup>3</sup>/s**

**Total Release Rate = 0.107 m<sup>3</sup>/s**

Time (min)	Intensity 10-year (mm/hr)	Storm Runoff (m <sup>3</sup> /s)	Orifice Release Rate (m <sup>3</sup> /s)	Storage Accum. Rate (m <sup>3</sup> /s)	Required Storage Volume (m <sup>3</sup> )
15	99.17	0.209	0.082	0.126	113.85
16	95.39	0.201	0.082	0.119	113.80
17	91.93	0.194	0.082	0.111	113.47
18	88.74	0.187	0.082	0.105	112.89
19	85.79	0.181	0.082	0.098	112.08
20	83.06	0.175	0.082	0.093	111.07
21	80.52	0.170	0.082	0.087	109.88
22	78.15	0.165	0.082	0.082	108.52
23	75.93	0.160	0.082	0.078	107.00
24	73.85	0.156	0.082	0.073	105.35
25	71.90	0.151	0.082	0.069	103.56
26	70.06	0.148	0.082	0.065	101.66
27	68.32	0.144	0.082	0.062	99.65
28	66.68	0.140	0.082	0.058	97.53
29	65.13	0.137	0.082	0.055	95.32
30	63.66	0.134	0.082	0.052	93.02
15					<b>113.85</b>



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west

## SWM DESIGN CALCULATIONS MODIFIED RATIONAL 10-Year Post Development

**Project Name:** National Homes (1240 Britannia) Inc.  
**Municipality:** City of Mississauga  
**Project No.:** 20-249W

**Prepared by:** BK  
**Checked by:** RBTM  
**Last Revised:** 24-Mar-20

Target Release Rate	
Britannia Road West	0.141 m <sup>3</sup> /s

Post Development Condition:	Area (m <sup>2</sup> )	C
Controlled	0.659	0.65
Uncontrolled	0.144	0.65

IDF	A	B	C
10-Year	1,010	4.60	0.78

### Uncontrolled Flow

Time (min)	10 Year (Post-Development)		
	Intensity 10 year (mm/hr)	Storm Runoff (m <sup>3</sup> /s)	Runoff Volume (m <sup>3</sup> )
15	99.17	0.026	23.22

**Maximum Orifice Release Rate = 0.114 m<sup>3</sup>/s**  
**Total Release Rate = 0.140 m<sup>3</sup>/s**

Time (min)	Intensity 10-year (mm/hr)	Storm Runoff (m <sup>3</sup> /s)	Orifice Release Rate (m <sup>3</sup> /s)	Storage Accum. Rate (m <sup>3</sup> /s)	Required Storage Volume (m <sup>3</sup> )
15	99.17	0.118	0.114	0.004	3.58
16	95.39	0.114	0.114		0
17	91.93	0.109	0.114		0
18	88.74	0.106	0.114		0
19	85.79	0.102	0.114		0
20	83.06	0.099	0.114		0
21	80.52	0.096	0.114		0
22	78.15	0.093	0.114		0
23	75.93	0.090	0.114		0
24	73.85	0.088	0.114		0
25	71.90	0.086	0.114		0
26	70.06	0.083	0.114		0
27	68.32	0.081	0.114		0
28	66.68	0.079	0.114		0
29	65.13	0.078	0.114		0
30	63.66	0.076	0.114		0
15					<b>3.58</b>



# SWM DESIGN CALCULATIONS WATER BALANCE

<b>Project Name:</b> National Homes (1240 Britannia) Inc.	<b>Prepared by:</b> BK
<b>Municipality:</b> City of Mississauga	<b>Checked by:</b> RBTM
<b>Project No.:</b> 20-249W	<b>Last Revised:</b> 24-Mar-20

For this site, the minimum on-site runoff retention will require the site to retain all runoff from the first 5 mm of rainfall through infiltration, evapotranspiration or rainwater reuse, per CVC SWM Criteria (Section 4.2).

Site Area =	21475	m <sup>2</sup>
Required Water Balance Volume =	107.4	m <sup>3</sup>
Runoff Coefficient <sup>1</sup> =	0.65	
Equivalent Imperviousness =	64%	(based on $I = (C - 0.2) / 0.7$ )

<sup>1</sup> Runoff Coefficient for Compact or dense housing (eg. Townhouses)  
City of Mississauga, *Development Requirements Manual, Section 8*

Proposed Site Area Breakdown			
Cover	A (m <sup>2</sup> )	IA (mm)	IA Volume (m <sup>3</sup> )
Impervious	13,805	1	13.8
Pervious	7,669	5	38.3
<b>Total</b>	<b>21,475</b>		<b>52.2</b>

Total Initial Abstraction Volume = 52.2 m<sup>3</sup>

Required Reuse Volume = SWM Tank Sump Volume  
= 55.2 m<sup>3</sup>



## Brief Stormceptor Sizing Report - Galesway

Project Information & Location			
<b>Project Name</b>	Britannia	<b>Project Number</b>	21717
<b>City</b>	Mississauga	<b>State/ Province</b>	Ontario
<b>Country</b>	Canada	<b>Date</b>	3/20/2020
Designer Information		EOR Information (optional)	
<b>Name</b>	Brad Kargus	<b>Name</b>	
<b>Company</b>	Urbantech Consulting	<b>Company</b>	
<b>Phone #</b>	905-829-8818	<b>Phone #</b>	
<b>Email</b>	bkargus@urbantech.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	Galesway
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	80
<b>Recommended Stormceptor Model</b>	STC 3000

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	64
STC 750	74
STC 1000	75
STC 1500	75
STC 2000	79
STC 3000	80
STC 4000	84
STC 5000	85
STC 6000	87
STC 9000	91
STC 10000	91
STC 14000	93
StormceptorMAX	Custom

Sizing Details			
Drainage Area		Water Quality Objective	
Total Area (ha)	1.22	TSS Removal (%)	80.0
Imperviousness %	64.00	Runoff Volume Capture (%)	
Rainfall		Oil Spill Capture Volume (L)	
Station Name	TORONTO PEARSON AP	Peak Conveyed Flow Rate (L/s)	
State/Province	Ontario	Water Quality Flow Rate (L/s)	
Station ID #	8733	Up Stream Storage	
Years of Records	44	Storage (ha-m)	Discharge (cms)
Latitude	43°41'N	0.000	0.000
Longitude	79°38'W	Up Stream Flow Diversion	
		Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

**For Stormceptor Specifications and Drawings Please Visit:**  
<http://www.imbriumsystems.com/technical-specifications>

## Brief Stormceptor Sizing Report - Britannia

Project Information & Location			
<b>Project Name</b>	Britannia	<b>Project Number</b>	21717
<b>City</b>	Mississauga	<b>State/ Province</b>	Ontario
<b>Country</b>	Canada	<b>Date</b>	3/20/2020
Designer Information		EOR Information (optional)	
<b>Name</b>	Brad Kargus	<b>Name</b>	
<b>Company</b>	Urbantech Consulting	<b>Company</b>	
<b>Phone #</b>	905-829-8818	<b>Phone #</b>	
<b>Email</b>	bkargus@urbantech.com	<b>Email</b>	

### Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

<b>Site Name</b>	Britannia
<b>Target TSS Removal (%)</b>	80
<b>TSS Removal (%) Provided</b>	82
<b>Recommended Stormceptor Model</b>	STC 750

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	73
STC 750	82
STC 1000	83
STC 1500	83
STC 2000	86
STC 3000	88
STC 4000	90
STC 5000	91
STC 6000	92
STC 9000	94
STC 10000	94
STC 14000	96
StormceptorMAX	Custom

Sizing Details			
Drainage Area		Water Quality Objective	
Total Area (ha)	0.61	TSS Removal (%)	80.0
Imperviousness %	64.00	Runoff Volume Capture (%)	
Rainfall		Oil Spill Capture Volume (L)	
Station Name	TORONTO PEARSON AP	Peak Conveyed Flow Rate (L/s)	
State/Province	Ontario	Water Quality Flow Rate (L/s)	
Station ID #	8733	Up Stream Storage	
Years of Records	44	Storage (ha-m)	Discharge (cms)
Latitude	43°41'N	0.000	0.000
Longitude	79°38'W	Up Stream Flow Diversion	
		Max. Flow to Stormceptor (cms)	

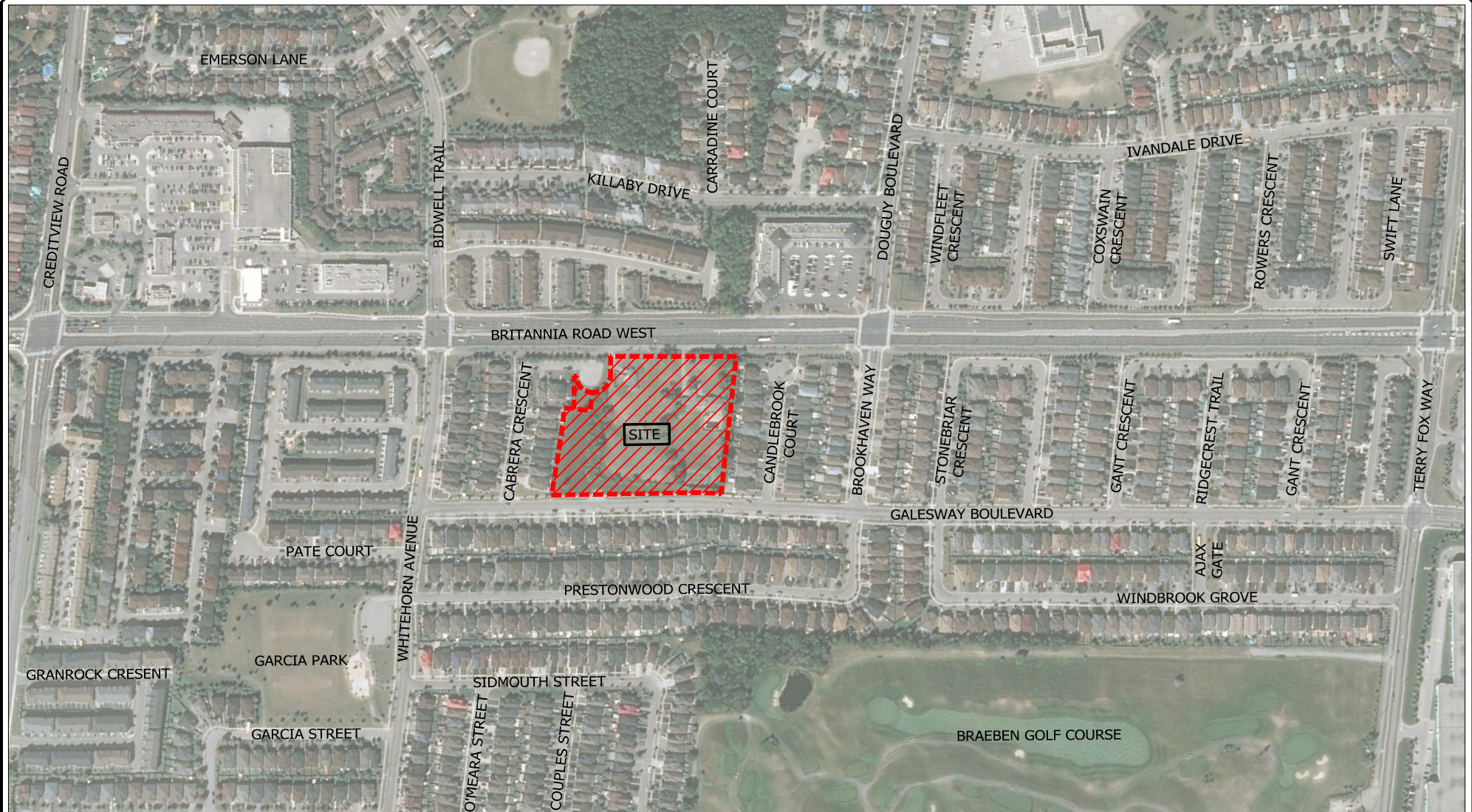
Particle Size Distribution (PSD) The selected PSD defines TSS removal		
Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes
<ul style="list-style-type: none"> <li>Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.</li> <li>Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.</li> <li>For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.</li> </ul>

**For Stormceptor Specifications and Drawings Please Visit:**  
<http://www.imbriumsystems.com/technical-specifications>



## FIGURES AND DRAWINGS



**NATIONAL HOMES  
BRITANNIA**

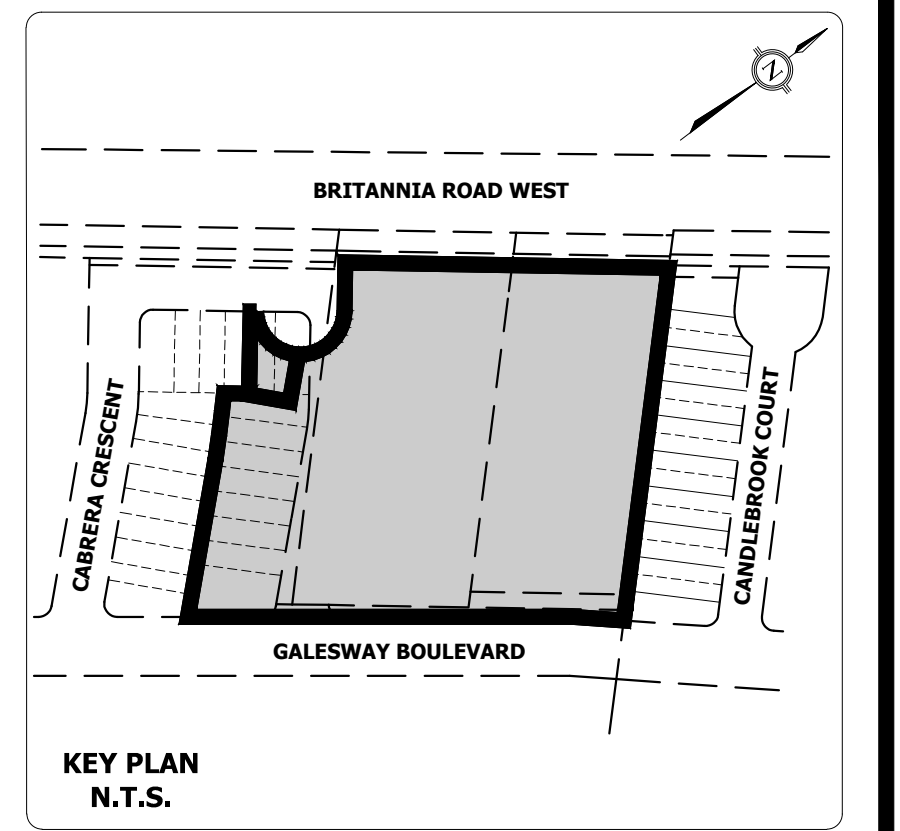
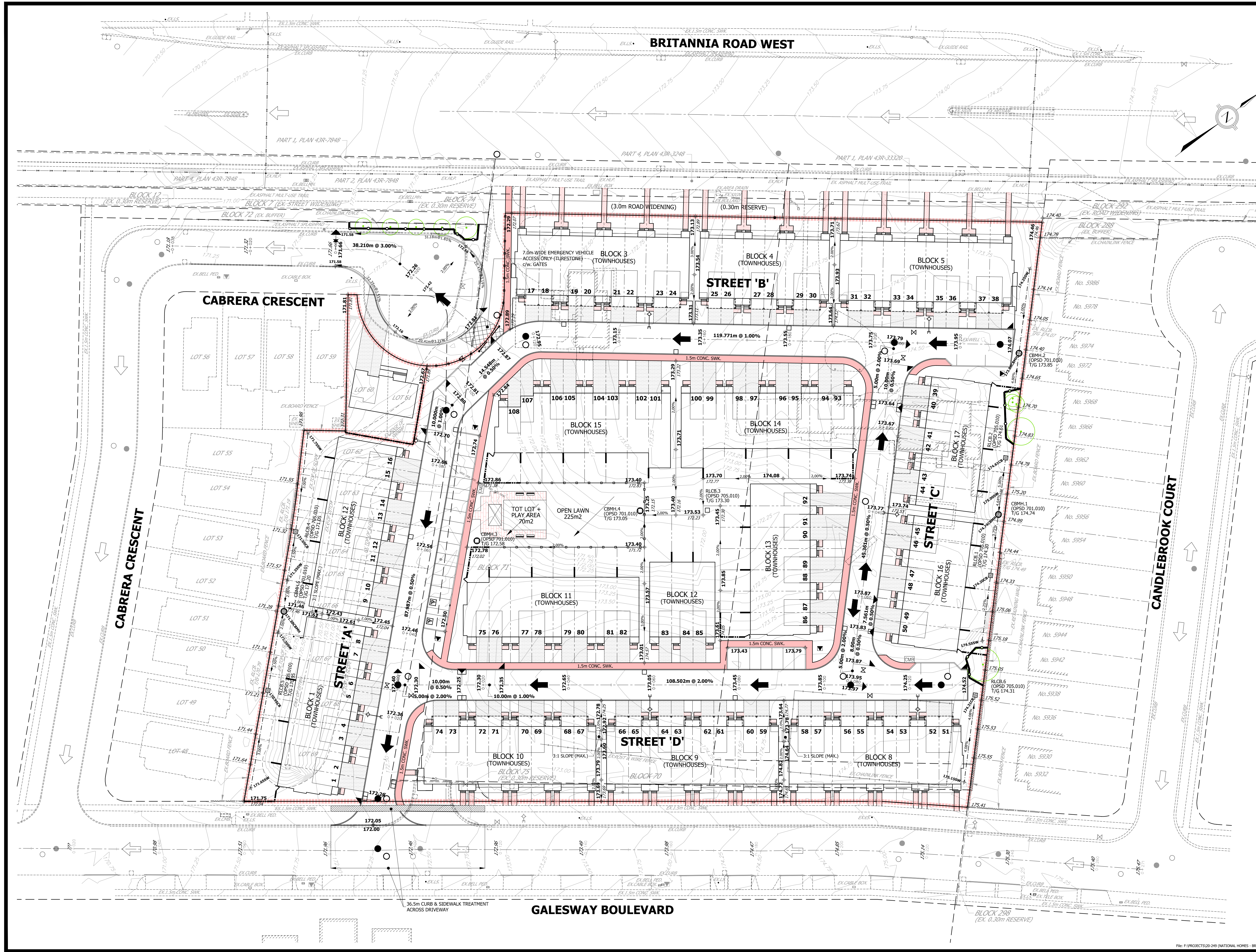


**urbantech  
west**

Urbantech West, A Division of Leighton-Zec West Ltd.  
2030 Bristol Circle, Suite 201 Oakville, Ontario L6H 0H2  
tel: 905.829.8818 fax: 905.829.4804  
www.urbantech.com

**FIGURE 1  
SITE LOCATION PLAN**

PROJECT No.:	20-249	DATE:	MARCH 2020	SCALE:	N.T.S.
--------------	--------	-------	------------	--------	--------



- LEGEND**
- PROPOSED STORM MANHOLE
  - PROPOSED SANITARY MANHOLE
  - EXISTING STORM MANHOLE
  - EXISTING SANITARY MANHOLE
  - SINGLE CATCHBASIN
  - DOUBLE CATCHBASIN
  - ⊕ HYDRANT & VALVE
  - ⊕ VALVE & BOX
  - ⊕ TRANSFORMER
  - CMB COMMUNITY MAILBOX
  - DRIVEWAY
  - MAXIMUM 3:1 (UNLESS OTHERWISE NOTED)
  - EXISTING CONTOUR AND ELEVATION
  - ↕ PROPOSED ELEVATION
  - ↕ EXISTING ELEVATION
  - ↕ SWALE ELEVATION
  - ➔ OVERLAND FLOW ROUTE
  - ➔ EXISTING OVERLAND FLOW ROUTE
  - WOOD PRIVACY FENCE
  - DECORATIVE METAL FENCE
  - TREE PROTECTION HOARDING FENCE
  - EXISTING OVERHEAD HYDRO
  - LIMIT OF PROPERTY
  - EXISTING TREE

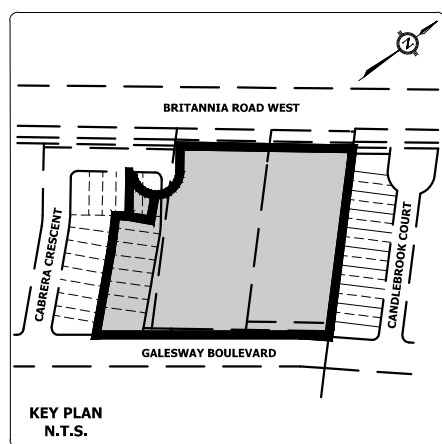
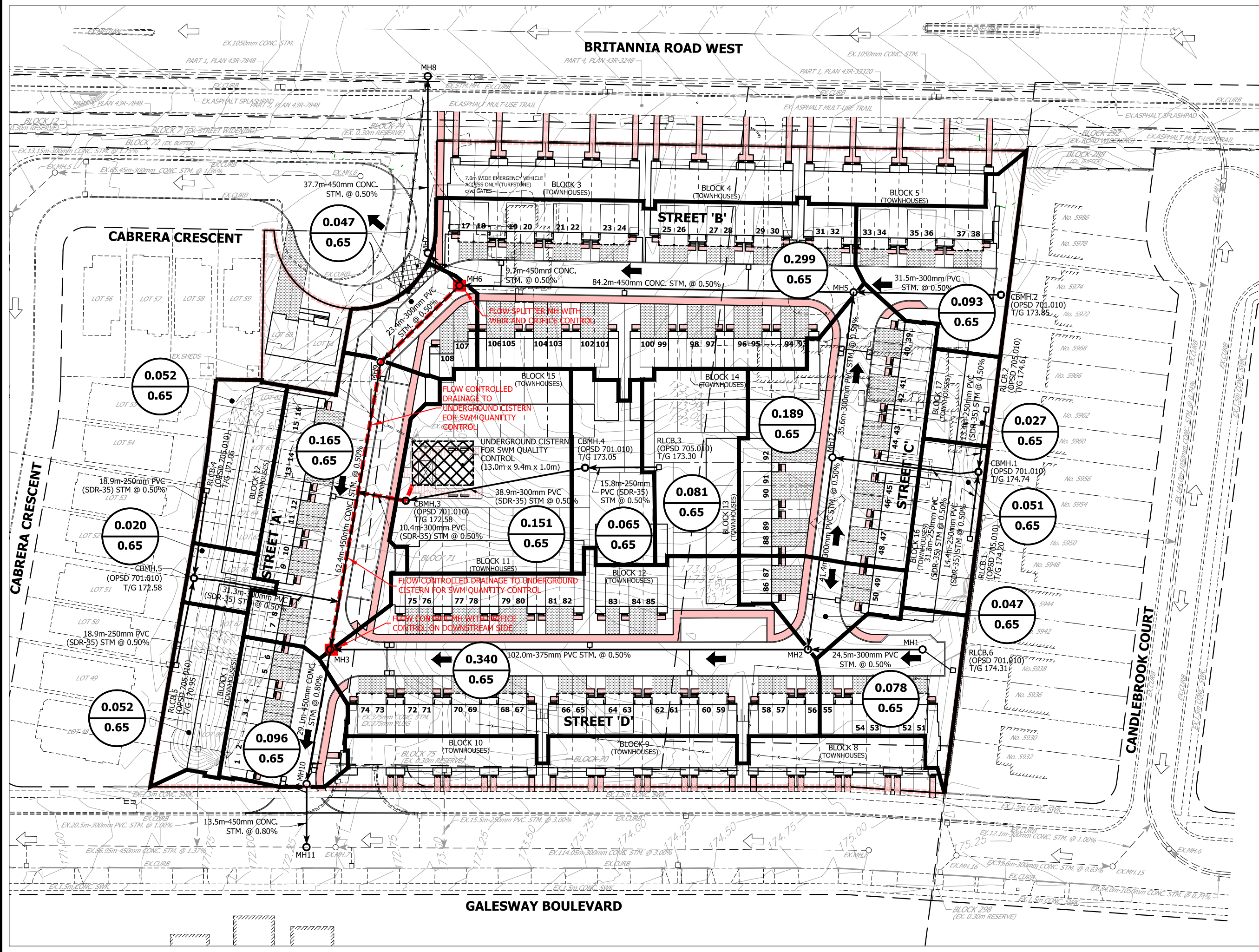
**BENCHMARK**  
 ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF MISSISSAUGA BENCH MARK NO. 1077, HAVING AN ELEVATION OF 178.866 METRES.



**NATIONAL HOMES (BRITANNIA)  
 CITY OF MISSISSAUGA**

**PRELIMINARY  
 GRADING PLAN**

PROJECT No.	DATE	SCALE	DWG No.
20-249	MAR. 2020	1:400	GR-1



- KEY PLAN**  
N.T.S.
- LEGEND**
- PROPOSED STORM MANHOLE
  - EXISTING STORM MANHOLE
  - STORM DRAINAGE AREA
  - PROPOSED OVERLAND FLOW
  - EXISTING OVERLAND FLOW
  - AREA ha
  - RUNOFF COEFFICIENT
  - LIMIT OF PROPERTY



**NATIONAL HOMES (BRITANNIA)**  
CITY OF MISSISSAUGA

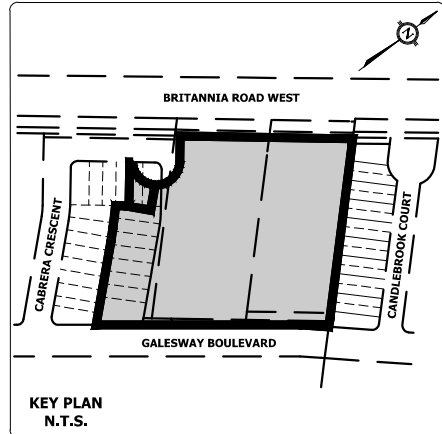
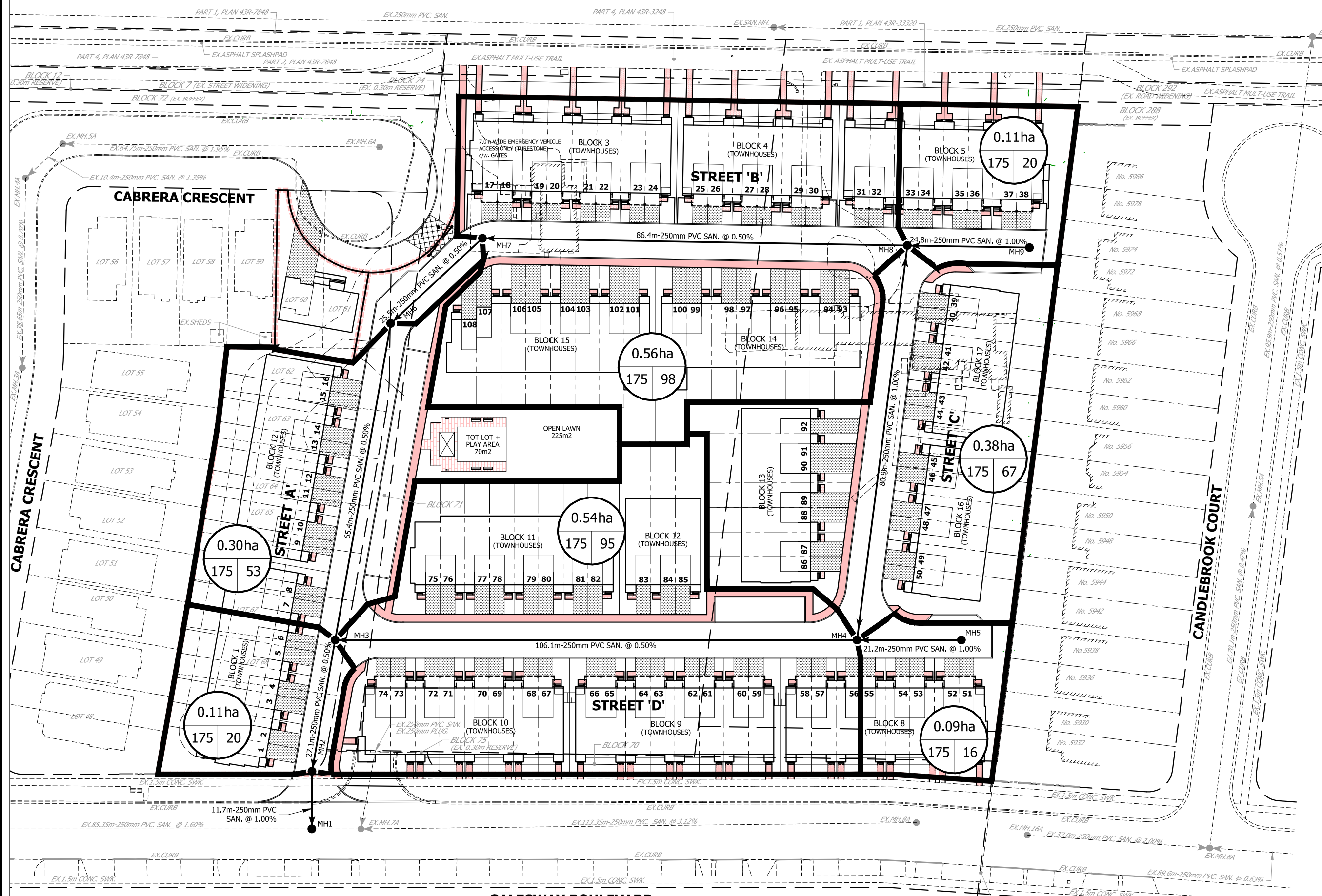
**PRELIMINARY STORM DRAINAGE PLAN**

PROJECT No.	DATE	SCALE	DWG No.
20-249	MAR. 2020	1:750	STM-1

PROJECT: 20-249 NATIONAL HOMES - BRITANNIA (DRAINAGE) - PRELIMINARY STORM DRAINAGE PLAN



BRITANNIA ROAD WEST



- LEGEND**
- PROPOSED SANITARY MANHOLE
  - EXISTING SANITARY MANHOLE
  - SANITARY DRAINAGE AREA
  - AREA ha
  - POPULATION
  - POPULATION DENSITY
  - LIMIT OF PROPERTY

**urbantech west**  
urbantech Consulting, A Division of Leighton-Zec West Ltd.  
2030 Broad Circle, Suite 105, Oakville, Ontario L6H 0A2  
tel: 905.825.8818 fax: 905.825.4804  
www.urbantech.com

**NATIONAL HOMES (BRITANNIA)**  
CITY OF MISSISSAUGA

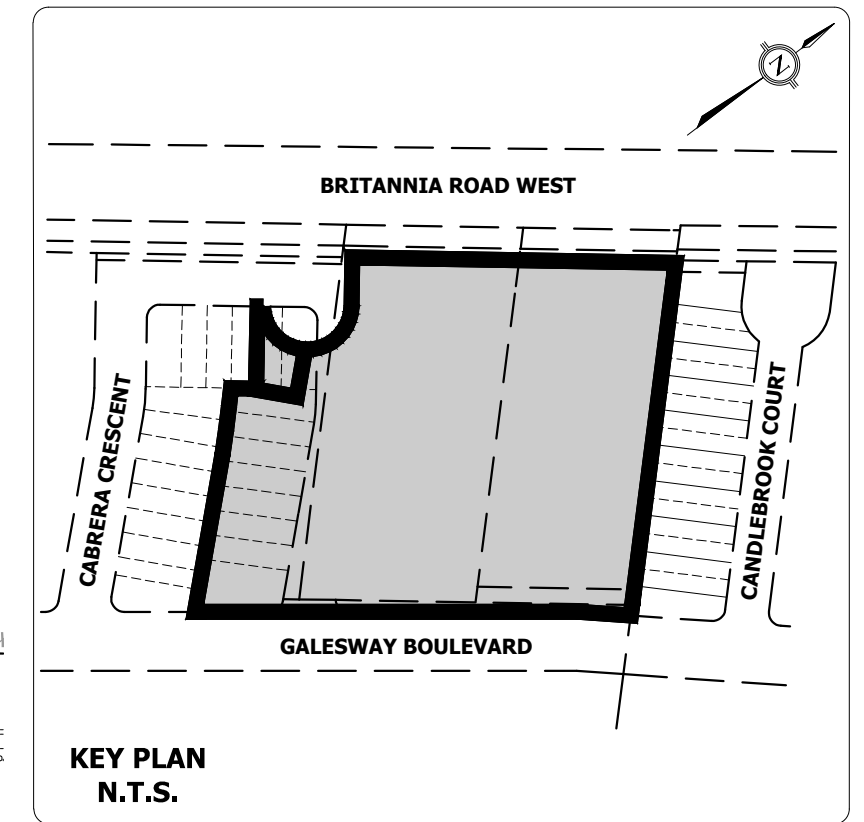
**PRELIMINARY SANITARY DRAINAGE PLAN**

PROJECT No.	DATE	SCALE	DWG No.
20-249	MAR. 2020	1:750	SAN-1

PROJECT No.	DATE	SCALE	DWG No.
20-249	MAR. 2020	1:750	SAN-1

P:\PROJECTS\20-249 NATIONAL HOMES - BRITANNIA\DRAWINGS\FIGURES\20-249 - PRELIMINARY DRAINAGE PLAN.DWG

**BRITANNIA ROAD WEST**



**LEGEND**

- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- DOUBLE CATCHBASIN
- ⊕ HYDRANT & VALVE
- ⊕ VALVE & BOX
- ⊕ TRANSFORMER
- ⊕ COMMUNITY MAILBOX
- ▭ DRIVEWAY
- ▭ MAXIMUM 3:1 (UNLESS OTHERWISE NOTED)
- WOOD PRIVACY FENCE
- DECORATIVE METAL FENCE
- EXISTING OVERHEAD HYDRO
- EXISTING GASMAIN
- EXISTING CABLE LINE
- EXISTING TELEPHONE LINE
- EXISTING UNDERGROUND HYDRO
- LIMIT OF PROPERTY

**BENCHMARK**

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF MISSISSAUGA BENCH MARK No. 1077, HAVING AN ELEVATION OF 178.866 METRES.



**NATIONAL HOMES (BRITANNIA)**  
**CITY OF MISSISSAUGA**

**PRELIMINARY**  
**SERVICING PLAN**

PROJECT No.	DATE	SCALE	DWG No.
20-249	MAR. 2020	1:400	SP-1

