CITY OF BRAMPTON

SPRINGBROOK TERTIARY PLAN

FUNCTIONAL SERVICING REPORT

SEPTEMBER 2020

wsp

Appendix E

Appendix E

SPRINGBROOK TERTIARY PLAN

FUNCTIONAL SERVICING REPORT

CITY OF BRAMPTON

FUNCTIONAL SERVICING REPORT

PROJECT NO.: 18M-00046-00
DATE: SEPTEMBER 2020

WSP CANADA GROUP LIMITED
100 COMMERCE VALLEY DRIVE WEST
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Appendix E

SIGNATURES

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APPENDICES

1 INTRODUCTION

1.1 SCOPE OF MUNICIPAL SERVICING

WSP has been retained by the City of Brampton (City) to prepare a Functional Servicing Report to assess the servicing requirements relating to the proposed Springbrook Tertiary Plan (the Site). This Report provides the conceptual framework for water distribution, sanitary sewage and storm drainage for the development of this Site. WSP has also prepared a Stormwater Management (SWM) Report for the Site under separate cover (WSP SWM Report).

WSP staff secured and reviewed the available record drawings and design standards from the City of Brampton and Region of Peel (Region) in conjunction with the following Reports:

- Springbrook Settlement Area Study prepared by the Region of Peel (1);
- Springbrook Tertiary Plan Background, Analysis and Recommendation Report prepared for the City of Brampton by WSP (2); and
- Functional Servicing Report for a proposed townhouse development on 1403 Queen Street West (21T-17012B) (3).

These various reports are referenced within this Report by the numbers shown in parentheses.

1.2 SITE DESCRIPTION

The Site is approximately 30 hectares (ha), which includes properties north and south of Queen Street West, east of Elbern Markell Drive and west of Angelgate Road. The north side of the property is bounded by existing stormwater management blocks, Creditview Road, Fallowfield Road, and Haywood Drive. Refer to **Figure 1** for an illustration of the Site location and **Figure 2** for an illustration of the predevelopment site condition.

The proposed development is generally consistent with the Springbrook Tertiary Plan Report (2). This consists of a proposed 2.16km road network labeled Road A to Road I across 11 blocks (Block A to Block K). The proposed blocks are comprised of low and medium density residential development (single / semi-detached / townhouses), Hamlet residential and mixed use. **Table 1.0** below summarizes the estimated future population breakdown. Refer to **Figure 3** for the Proposed Development Plan.

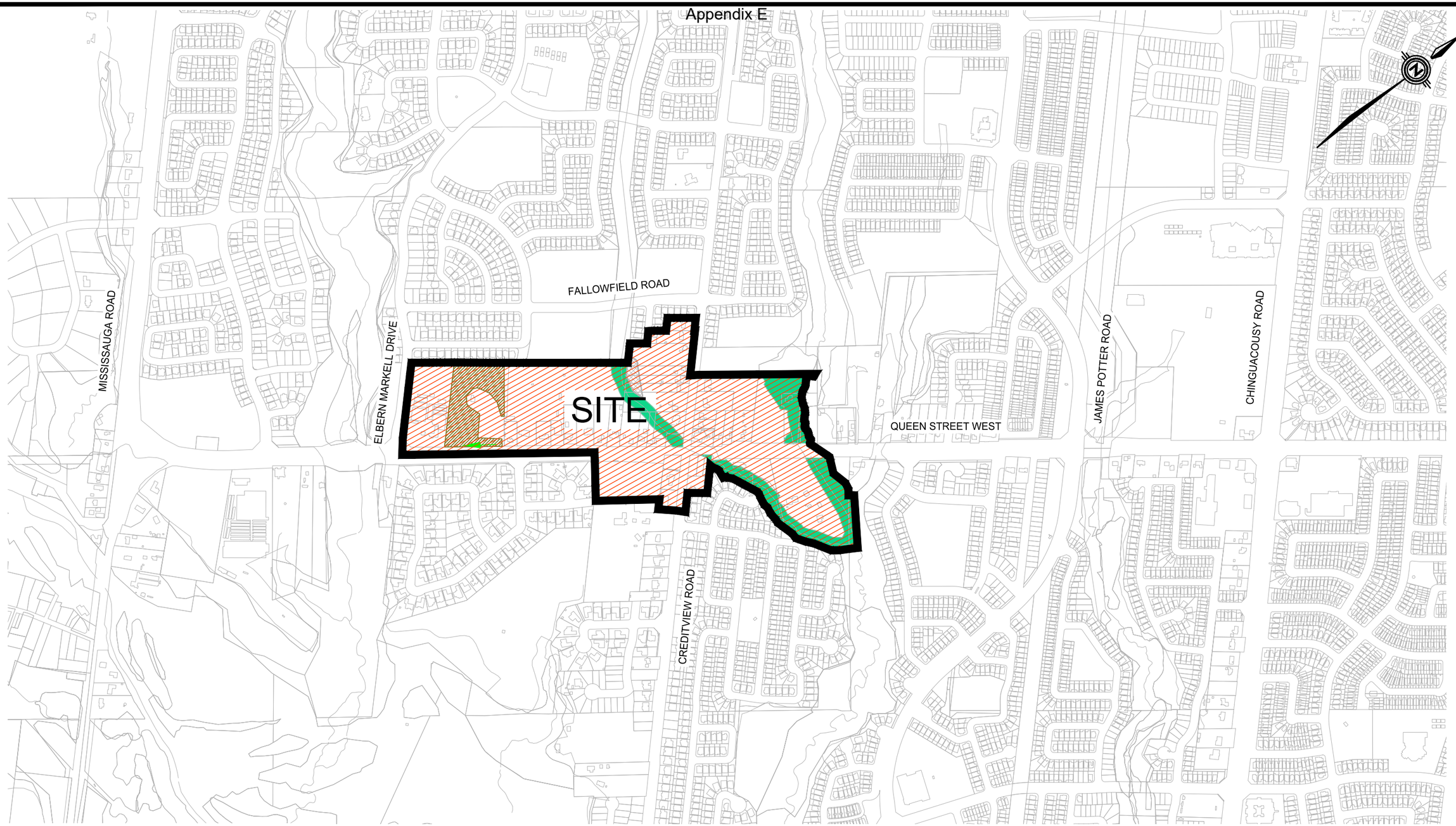
Table 1.0 – Projected population growth for residential and employment

Block	Description	Number of Residential units	Residential Population	Employment Population	Total Population
A	N of Queen St, E of Elbern Markell Dr (SD&TH)	50	175	0	175
B	N of Queen St, E of Elbern Markell Dr (SD)	20	76	0	76
C	N of Queen St, across Links Ln (SD & TH)	90	317	0	317
D	Hamlet Residential, N of Queen St	0	80	10	90
E	N of Queen St, W of Creditview Rd (LDR)	27	103	0	103
F	N of Queen St, E of Creditview Rd (Mixed Use)	0	60	30	90
G	N of Queen St, E of Creditview Rd to limit (MDR)	12	46	0	46
H	Hamlet Residential, S of Queen St (LDR)	25	96	0	96
I	Creditview Rd, S of Queen St (Mixed Use)	0	0	24	24
J	E of Creditview Rd, S of Queen St (Mixed Use)	0	0	20	20
K	E of Creditview Rd, S of Queen St to limit (MDR)	50	175	0	175
Total		**274**	**1138**	**84**	**1212**

Source: Springbrook Settlement Area Study – City of Brampton

1.3 DEVELOPABLE AREA

WSP has reviewed previous reports relevant to the Site and found that development concerns such as future widening of Queen Street West and the potential presence of species at risk, such as the Redside Dace, have been resolved and are no longer a concern. The Queen Street West widening was completed, while the Redside Dace was confirmed to not be a concern in the Springbrook Creek north of Queen Street West. These conclusions left most of the lands within the Site developable except for the woodland / wetland and the establishment of protected channel corridor, which are both subject to further studies. It should be noted that any further detailed review of limits of development due to environmental constraints (flood plain, wetlands, species at risk) have not been completed as part of this Report. The developable area for this study is based on the proposed Tertiary Plan.



CLIENT
CITY OF BRAMPTON

TITLE
SPRINGBROOK TERTIARY PLAN

SITE LOCATION PLAN

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Checked Z.A.	Drawn 10/12 Cad
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Scale NTS	Figure No. 1

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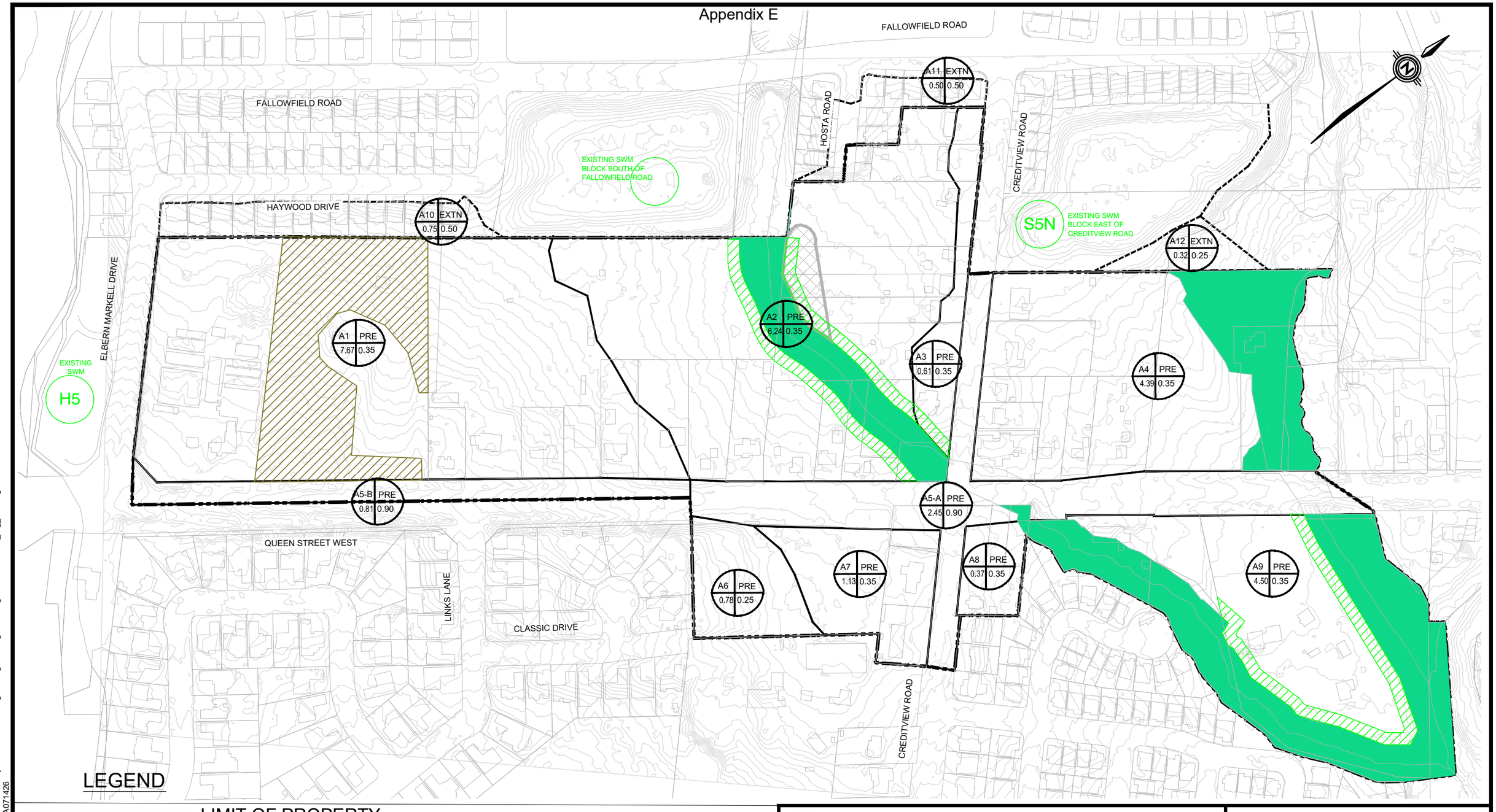

LEGEND

- LIMIT OF PROPERTY
- A1 PRE 0.072 0.50 — RUN-OFF COEFFICIENT AREA IN HECTERS
- DRAINAGE BOUNDARY
- EXTERNAL DRAINAGE BOUNDARY
- WATERCOURSE CORRIDOR
- APPR. 10m BUFFER /SET BACK FROM VALLEYLAND/WATER COURSE CORRIDOR
- WOODLAND
- H5 — EXISTING POND

CLIENT: CITY OF BRAMPTON

TITLE: SPRINGBROOK TERTIARY PLAN

EXISTING CONDITIONS AND DRAINAGE PLAN

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FALLOWFIELD ROAD

FALLOWFIELD ROAD

HOSTA ROAD

CREDITVIEW ROAD

EXISTING SWM BLOCK SOUTH OF FALLOWFIELD ROAD

HAYWOOD DRIVE

BLOCK E

ROAD - F

S5N

EXISTING SWM BLOCK EAST OF CREDITVIEW ROAD

ELBERN MARKELL DRIVE

EXISTING SWM

H5

H6

BLOCK A

ROAD - A

BLOCK B

ROAD - B

ROAD - C

ROAD - D

BLOCK C

ROAD - E

BLOCK D

BLOCK G

ROAD - H

BLOCK F

BLOCK H

ROAD G

BLOCK I

BLOCK J

BLOCK K

ROAD - I

QUEEN STREET WEST

LINKS LANE

CLASSIC DRIVE

CREDITVIEW ROAD

LEGEND

LIMIT OF PROPERTY

WATERCOURSE CORRIDOR

APPR. 10m BUFFER /SET BACK FROM VALLEYLAND/WATER COURSE CORRIDOR

WETLAND

HAMLET RESIDENTIAL

H5 EXISTING POND

PR. POND

MIXED USE

LOW DENSITY RESIDENTIAL

CONCEPTIAL ROAD

WOODLAND

CONCEPTIAL TRAIL OPPORTUNITY

LOW-MEDIUM DENSITY RESIDENTIAL

CLIENT: CITY OF BRAMPTON

TITLE: SPRINGBROOK TERTIARY PLAN

PROPOSED DEVELOPMENT

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2 WATER SUPPLY AND APPURTENANCES

This section provides an analysis of the existing watermain system and proposed water servicing. The existing watermain infrastructure around the Site are summarized below. A review of the Region's Springbrook Settlement Area Study Report (1) indicated that no external improvements are required for full buildout of the proposed development. It also identified the proposed Alloa Reservoir as a source of redundant storage for the area. This Report assumes that all proposed roads are public. It should be noted that all watermain servicing running through the 'potential trails' or other lands outside the right-of-way of the proposed public roads may require easements. Also, any changes in the Springbrook Tertiary Plan and / or the roads (public and private) would impact the servicing and would have to be reviewed. Development of the lands without public roads would likely create less efficient servicing strategies.

2.1 EXISTING CONDITIONS

The boundary between pressure zone 5 and 6 runs north of Fallowfield Road. Based on (1), no future change in the boundary is currently anticipated. Existing municipal watermains that are adjacent to the property are as follows:

- 300 / 400mm and 600mm diameter feedermain on the north side of Queen Street West right-of-way (ROW);
- 150mm diameter watermain on Queen Street West;
- 300mm diameter watermain on the south side of Fallowfield Road ROW;
- 150mm diameter local watermain on Creditview Road from north of Queen Street West to the 300mm watermain at Fallowfied Road;
- 300mm diameter watermain south of Queen Street West;
- 300mm diameter water main on Elbern Markell Drive;
- 200mm diameter watermain on Haywood Drive; and
- 200mm diameter watermain on Hosta Road.

2.2 DESIGN PARAMETERS

The following design criteria have been taken from Region of Peel "Watermain Design Criteria", dated June 2010, but superseded by the values used in (1) where applicable:

- Water demand rate of 270 l/person/day for residential developments;
- Water demand rate of 250 l/person/day for industrial, commercial, or institutional (ICI) developments;
- Peak Hour Factor of Residential and ICI = 3.0;
- Max Day Factor of Residential = 1.8;
- Max Day Factor of ICI = 1.4; and
- Population estimates as listed in **Table 1.0** above.

2.3 DOMESTIC WATER DEMAND

The domestic water demands for the proposed development are calculated using the criteria of the Region of Peel outlined in Section 2.2 above. The resulting domestic demands for the proposed development are summarized in **Table 2.0** below.

Table 2.0 – Projected Domestic Water Demand

Block	Population		Domestic Flow Demand		
			Average Daily	Maximum Daily	Peak Hour
	Residential	Employment	(L/s)		
A	175	0	0.55	0.98	1.64
B	76	0	0.24	0.43	0.71
C	317	0	0.99	1.78	2.97
D	80	10	0.28	0.49	0.84
E	103	0	0.32	0.58	0.97
F	60	30	0.27	0.34	0.82
G	46	0	0.14	0.26	0.43
H	96	0	0.30	0.54	0.90
I	24	0	0.07	0.00	0.21
J	20	0	0.06	0.08	0.17
K	175	0	0.55	0.98	1.64
TOTAL (L/s)			**3.77**	**6.47**	**11.30**
TOTAL (m^3/d)			**326**	**573**	**979**

The average, maximum and peak hour daily domestic water demand for the Site is estimated to be 326, 573, and 979m^3/d, respectively.

2.4 FIRE PROTECTION

Region of Peel engineering standards require a minimum of 300mm diameter watermain servicing high-density residential and industrial / commercial areas for fire protection. Under existing conditions there is a 300mm diameter watermain on Queen Street West, Elbern Markell Drive, and Fallowfield Road. The preliminary watermain design layout provides for an upgrade of the existing 150mm diameter watermain to 300mm diameter on Creditview Road to connect to Queen Street West. This should provide sufficient fire protection for the proposed development. Fire flow demand will be calculated during the development approval process in accordance with the Fire Underwriters Survey (FUS) once exact building footprints are available. In the interim, the Region has assumed a fire flow demand of 180 L/s for the water model.

2.5 PROPOSED WATER SERVICES

The proposed water servicing mainly follows that outlined in the Region's Report (1). However, **Figure 4** shows a preliminary internal watermain pipe layout for each block. Proposed watermains are generally shown within the proposed municipal ROWs or through the trail connections identified in the Tertiary Plan. The servicing strategies are summarized as follows:

- Block A will be serviced via a proposed 300mm diameter watermain along Road A that loops from the existing 300mm diameter watermain on Elbern Markell Drive to the existing 600mm diameter watermain on Queen Street West;
- Block B will be serviced via a proposed 200mm diameter watermain along the trail running from Road A to Road C and proposed 200mm diameter watermain along Road B connecting from the proposed 200mm diameter watermain along the trail to the proposed 200mm diameter watermain along Road C. The proposed 200mm diameter watermain along Road C will connect from the existing 200mm diameter watermain on Haywood Drive to the existing 600mm diameter watermain on Queen Street West;
- Blocks C and D will be serviced via a proposed 200mm diameter watermain connected to the proposed 200mm diameter watermain on Road C and looped around proposed Road D and E back to Road C. The south-eastern portion of Block D will be serviced by a 200mm diameter watermain connecting from Road E and terminating at road end;
- Block E will be serviced by a proposed 200mm diameter watermain connecting from the existing 200mm diameter watermain on Hosta Road to the 300mm diameter (upgraded) watermain on Creditview Road. The south-eastern end of Block E will be serviced by a proposed 200mm diameter watermain extending from the existing 200mm watermain on Hosta Street and looping back to the proposed 300mm diameter (upgraded) watermain on Creditview Road;
- Block F and G will be serviced by a proposed 200mm diameter watermain running along proposed Road H, connecting to the existing 600mm diameter feedermain on Queen Street West and looping back to the 300mm diameter (upgraded) watermain on Creditview Road.
- Block H will connect to existing 600mm watermain on Queen Street West via a proposed 200mm watermain looped around Road G to connect to the 200mm on Classic Drive;
- Block I will be serviced by 200mm stubs connected to the existing 300mm diameter watermain on Creditview Road;
- Block J will be serviced via a 200mm stub proposed to connect to the existing 600mm diameter feedermain on Queen Street West; and
- Block K will be serviced by a proposed 200mm diameter watermain connecting to the existing 600mm diameter feedermain on Queen Street West and terminating at the end of the road.

Table 2.1 below summarizes the proposed watermain. Refer to **Figure 3:** Proposed Watermain Layout and **Appendix A** for Water Demand Calculations.

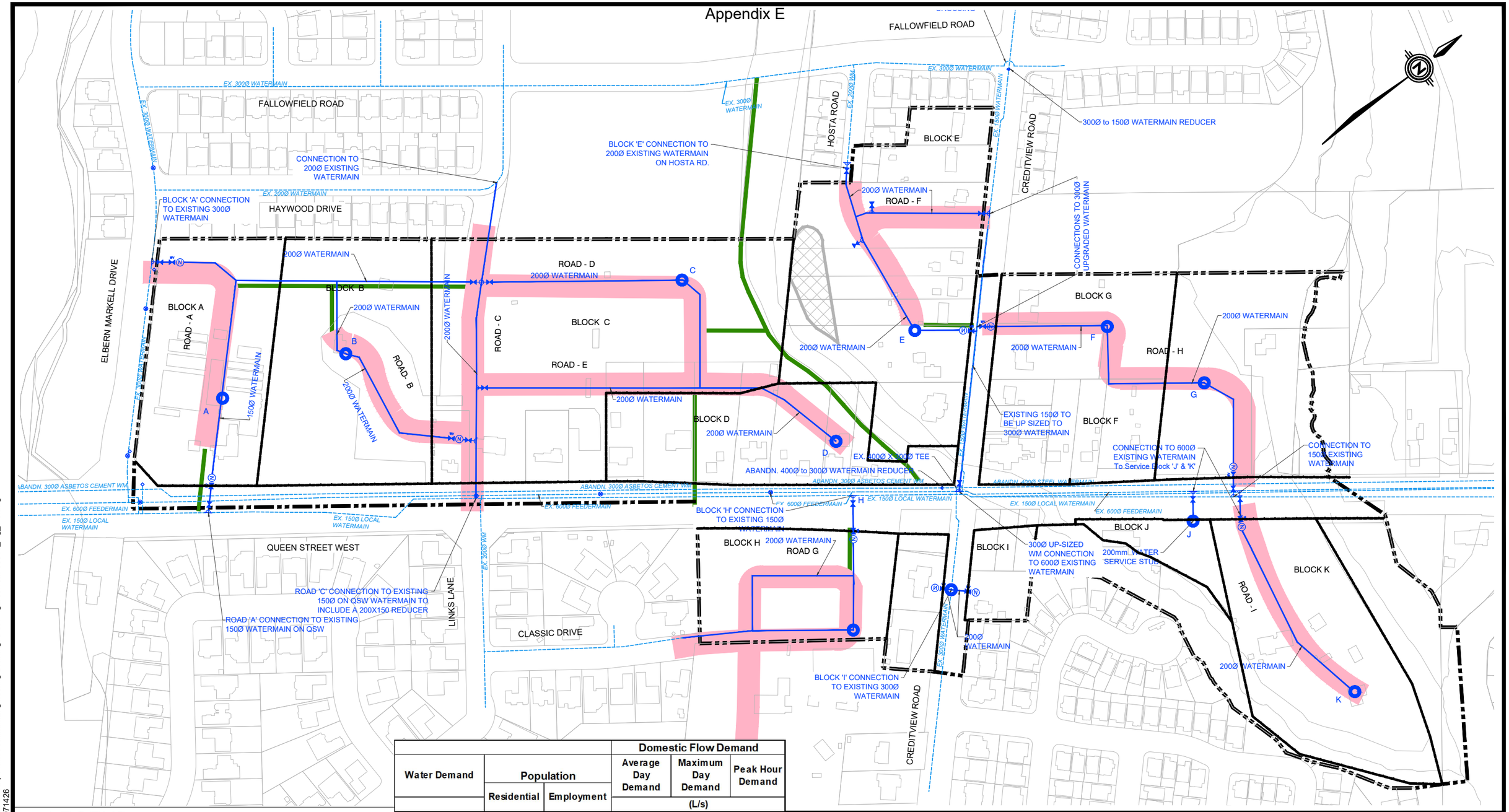
Table 2.1 – Summary of proposed watermain connections

Block	Proposed Watermain Pipe Size (mm)	Connection	
		From	To
A	300	Existing 300mm on Elbern Markell Drive	600mm on Queen Street West
B	200	Proposed 200mm on Road C	Proposed 200mm on Trail A-B
C	200	Proposed 200mm on Road C	Proposed 200mm on Road E
D	200	Proposed 200mm on Road C	Proposed 200mm on Road D / End of Road East
E	200	Existing 200mm on Hosta Road	Proposed 300mm on Creditview Road (CVR)
F	200	Existing 600mm Feedermain on Queen Street West	Proposed 300mm (upgraded) on CVR
G	200		
H	200	Existing 600mm on Queen Street West	Back to Existing 600mm on Queen Street West
I	200	Existing 300mm on CVR	Proposed Stub
J	200	Existing 600mm Feedermain on Queen Street West	Proposed Stub
K	200	Existing 600mm Feedermain on Queen Street West	End of Road

2.6 WATER DISTRIBUTION MODELLING

Water distribution modelling has been completed by the Region of Peel. The results of this modelling show available fire flow demand of 200 to 250 L/s for all blocks except Block B, D, and J with a fire flow demand of 150 to 200 L/s. The modelling results also shows that minimum pressure for all nodes within and around the Site is between 50 to 100 psi and the maximum pipe flow velocity is below 0.5m/s for all pipes within and around the Site.

Refer to **Appendix E** for the Region's modelling figures.



Water Demand	Population		Domestic Flow Demand		
	Residential	Employment	Average Day Demand	Maximum Day Demand	Peak Hour Demand
			(L/s)		
Block A	175	0	0.55	0.98	1.64
Block B	76	0	0.24	0.43	0.71
Block C	317	0	0.99	1.78	2.97
Block D	80	10	0.28	0.45	0.84
Block E	103	0	0.32	0.58	0.97
Block F	60	30	0.27	0.34	0.82
Block G	46	0	0.14	0.26	0.43
Block H	96	0	0.30	0.54	0.90
Block I	0	24	0.07	0.00	0.21
Block J	0	20	0.06	0.00	0.17
Block K	175	0	0.55	0.98	1.64
		TOTAL=	3.77	6.35	11.30

LEGEND

- EX. WATERMAIN
- PROP. WATERMAIN
- LIMIT OF PROPERTY
- LOCATION OF BLOCK DEMAND FOR WATER MODEL

CLIENT: CITY OF BRAMPTON

TITLE: SPRINGBROOK TERTIARY PLAN

PROPOSED WATERMAIN LAYOUT

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3 SANITARY SEWAGE SYSTEM

This section provides a summary of the existing sanitary sewer system and proposed sanitary servicing strategy. Based on the Region's Report (1) no external improvements are required to the sanitary drainage system to accommodate the proposed development of the Springbrook Site. This report assumes that all proposed roads are public. It should be noted that all sanitary servicing running through the 'potential trails' or other lands outside the right-of-way of the proposed public roads may require easements. Also, any changes in the Springbrook Tertiary Plan and / or the roads (public and private) would impact the servicing and would have to be reviewed. Development of the lands without public roads would likely create less efficient servicing strategies.

3.1 EXISTING SEWER SYSTEM

The existing sanitary sewers servicing the Site are as follows:

- 1500mm diameter trunk sanitary sewer along Queen Street West flowing from west to east from Mississauga Road to Creditview Road and then south beyond the limit of the Tertiary Plan;
- 450mm diameter sanitary sewer along Elbern Markell Drive flowing from north to south from Fallowfield Road to Queen Street West and then west beyond the limit of the Tertiary Plan;
- 600mm diameter sanitary sewer on Queen Street West flowing from east to west to connect to the trunk sewer at Creditview Road;
- 250mm diameter sanitary sewer on Creditview Road flowing from north to south to connect to the 600mm diameter sanitary sewer on Queen Street West;
- 250mm diameter sanitary sewer south of Queen Street West and 250mm diameter sanitary sewer on Links Lane all flowing south towards Creditview Road; and
- 150mm forcemain on Queen Street West form Links Lane running east toward Chinguacousy Road but is not connected to any of the Springbrook properties.

3.2 DESIGN PARAMETERS

The following sanitary design criteria have been taken from the Region of Peel Sanitary Sewer Design Criteria, modified March 2017, but superseded by the values used in (1) where applicable:

- 290 L/cap/day average daily domestic flow generation rate for residential development;
- 270 L/cap/day average daily domestic flow generation rate for industrial, commercial, or institutional (ICI) developments;
- Peaking Factor = Harmon Formula; Harmon Peaking Factor = $1+14/(4+p)^{0.5}$, where p = population in thousands;
- Infiltration rate = 0.26 L/ha/s; and
- Population estimates as listed in **Table 1.0** above.

3.3 PROPOSED SEWAGE FLOWS

Using the design criteria noted in Section 3.2, the sanitary flow calculations from the proposed development are summarized for each block in **Table 3.0** below, calculated and interpolated from Region Std. 2-9-2.

Table 3.0 – SANITARY DESIGN FLOWS

Block	Description	Area	Population		Peaking Factor	Average Daily Flow (L/s)	Peak Dry Flow (L/s)	Peak Wet Flow (L/s)
			Residential	Employment				
A	Residential	2.02	175	0	4.17	0.59	2.45	2.97
B	Residential	2.6	76	0	4.27	0.26	1.09	1.77
C	Residential	4.61	317	0	4.07	1.06	4.33	5.53
D	Mixed-Use	1.71	80	10	4.26	0.30	1.28	1.72
E	Residential	3.42	103	0	4.24	0.35	1.47	2.36
F	Mixed-Use	2.39	60	30	4.26	0.30	1.26	1.88
G	Residential	1.98	46	0	4.32	0.15	0.67	1.18
H	Residential	1.41	96	0	4.25	0.32	1.37	1.74
I	Mixed-Use	1.28	24	0	4.37	0.08	0.33	0.66
J	Mixed-Use	0.37	20	0	4.38	0.06	0.27	0.37
K	Residential	2.39	175	0	4.17	0.59	2.45	3.07
	TOTAL		**1172**	**40**	**3.74**	**4.05**	**15.16**	**21.45**

The total flow represents the combined peak discharge from the entire 30 ha site.

3.4 PROPOSED SANITARY SERVICES

The Springbrook Settlement Area Study (1) identified two main wastewater servicing strategies. Both strategies have multiple connections in common. The preferred servicing option will feature six new connections to existing sewers as shown in **Figure 5**. Two of the proposed connection points will be on the existing 600mm diameter sanitary sewer on Queen Street West, another two connections to the existing 250mm diameter sanitary sewer on Creditview Road north of Queen Street West, one connection to the existing 200mm diameter sanitary sewer on Classic Drive, and the last connection to the existing 450mm diameter sanitary sewer on Elbern Markell Drive at Queen Street West.

As illustrated in **Figure 5** the connections will service the Site as follows:

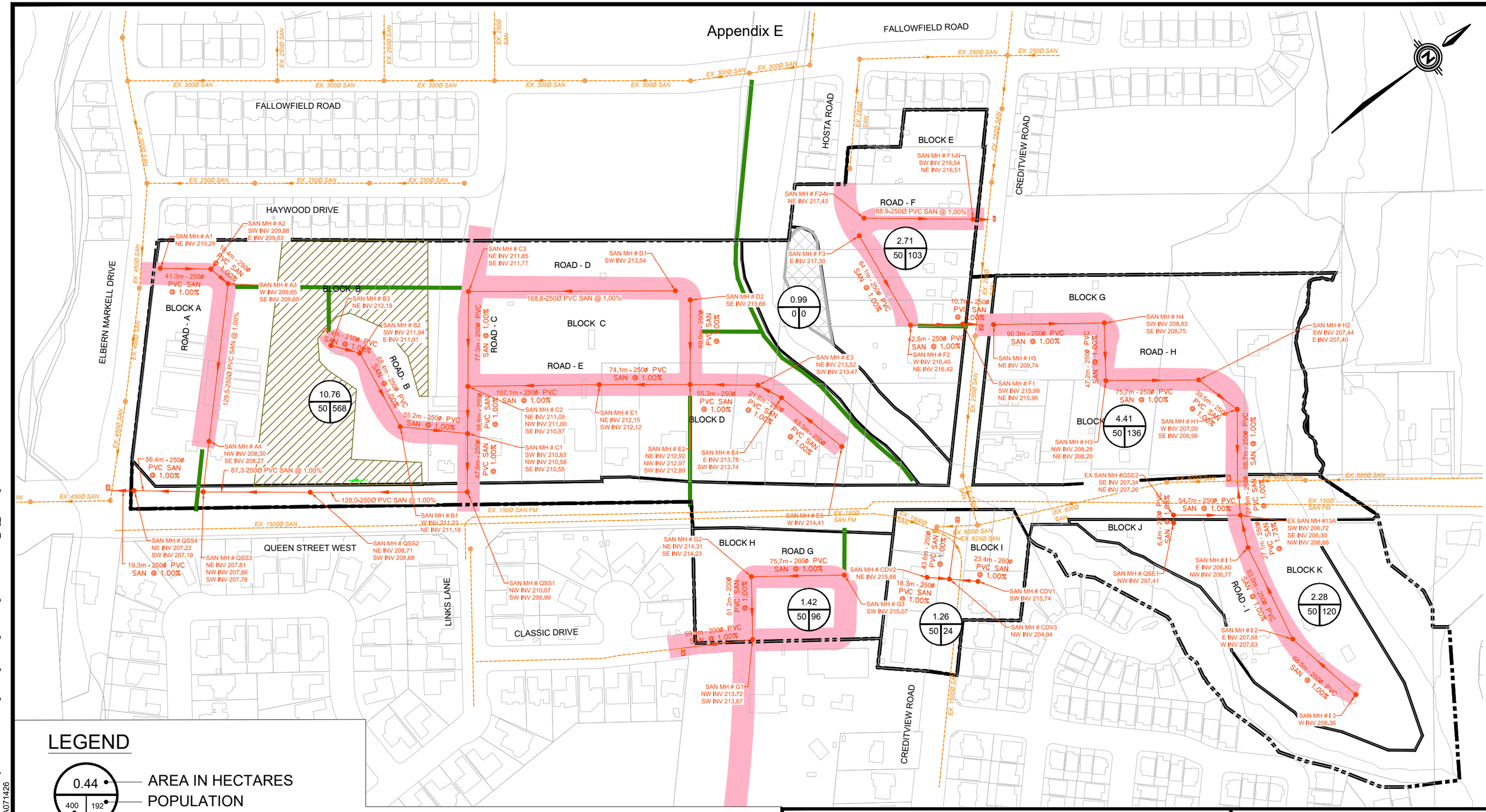
- Connection #1 will be a 250mm diameter sanitary sewer to service the northern potion of Block E;

- Connection #2 will be a 250mm diameter sanitary sewer to service the southern portion of Block E;
- Connection #3 consists of two separate connections north and south of the existing manhole; the north connection will be a 250mm diameter sanitary sewer to service all properties within Blocks G and F while the south connection will be a 250mm diameter sanitary sewer to service Blocks J and K;
- Connection #4 will be a 250mm diameter sanitary sewer to service the properties in Block I east and west of Creditview Road;
- Connection #5 will be a 200mm diameter sanitary sewer to service Block H; and
- Connection #6 will be a 250mm diameter sub-trunk sewer to service Blocks A, B, C and D.

Based on the population statistics furnished in **Table 2.0** of this Report, WSP completed a sanitary sewer analysis to assess the suitability of the preliminary sanitary sewer layout. The maximum full flow capacity recorded for the dry weather conditions is 26% (dry weather plus infiltration rate of 0.26L/s/ha).

Appendix B includes the detailed results of the analysis. Additionally, **Figure 5** of this Report and **Figure SS1** in **Appendix D** illustrate the servicing layout.

Appendix E



LEGEND

- 0.44 / 400 / 192 — AREA IN HECTARES; POPULATION; DENSITY (persons/ha)
- EX. SANITARY
- PROP. SANITARY
- LIMIT OF PROPERTY
- DRAINAGE BOUNDARY
- EXTERNAL DRAINAGE BOUNDARY

CLIENT: CITY OF BRAMPTON

TITLE: SPRINGBROOK TERTIARY PLAN

PROPOSED SANITARY DRAINAGE PLAN

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4 STORM DRAINAGE

This section provides a high-level description of the existing and proposed conditions storm drainage patterns. As noted previously, a detailed Stormwater Management Report has been prepared by WSP separately (WSP SWM Report). The proposed condition is generally consistent with the assumptions from the Springbrook Tertiary Plan Report. This section also follows the recommendations from the City of Brampton 2008 subdivision design manual and the Ministry of Environment & Climate Change (MOECC, now MECP) Manual (April 2017). This Report assumes that all proposed roads are public. It should be noted that all storm sewers running through the 'potential trails' or other lands outside the right-of-way of the proposed public roads may require easements. Also, any changes in the Springbrook Tertiary Plan and / or the roads (public and private) would impact the servicing and would have to be reviewed. Development of the lands without public roads would likely create less efficient servicing strategies.

4.1. EXISTING DRAINAGE

The existing surface water drainage patterns are determined based on the survey data of the subject property obtained from LiDAR provided by the City of Brampton (2019/06/03). The subject property is located within subwatershed 7 and 8a under the jurisdiction of the CVC. The west portion of the Site north of Queen Street West drains to Huttonville Creek, while the rest of the Site drains to Springbrook West Tributary and Springbrook Creek. A runoff coefficient of 0.35 was assumed for the blocks with very few buildings.

The existing storm sewers and ponds around the Site are as follows:

- 375, 450 and 525mm diameter storm sewer lines flowing west of Fallowfield Road to outlet into SWM Pond H5 west of Elbern-Markell Drive;
- 450, 525 and 1350mm diameter storm sewer lines flowing east of Fallowfield Road to outlet into the SWM Pond south-east of Fallowfield Road;
- 250mm diameter FDC storm sewer on Hosta Road flowing north into a 250mm diameter FDC storm sewer on Fallowfield Road flowing east of Hosta Road into the box culvert (refer to **Figure 2**);
- 450mm diameter storm sewer flowing north along Hosta Road to join 450 and 525mm diameter storm sewer on Fallowfield Road flowing beyond the extent of Springbrook;
- 250mm diameter FDC storm sewer flowing south from Fallowfield Road into SWM Pond S5N;
- Roadside ditch on both sides of Creditview Road flowing south into the Springbrook Creek West tributary;
- 375mm diameter storm sewer on Queen Street West of Creditview Road flowing east to outlet into the culvert; and
- 250mm diameter FDC storm sewer on Links Lane and Classic Drive flowing south to outlet into SWM Pond S5.

Refer to **Figure 2** for the existing storm drainage boundaries.

4.2. PROPOSED DEVELOPMENT

The storm drainage strategy for the proposed development is generally the same as that described in the Springbrook Tertiary Plan Report. The Site includes the lands south and north of the Queen Street West located in the Credit Valley Secondary Plan Sub-Areas 2 and 5, respectively. The area south-west of Queen Street West and Creditview Road falls within the Sub-Area 4. The proposed land use includes low density residential, low to medium density residential, hamlet residential and mixed-use. Refer to **Figure 3** for proposed land use plan.

4.3. STORMWATER MANAGEMENT DESIGN CRITERIA

The City of Brampton's Subdivision Design Manual (December 2008), Credit Valley Conservation (CVC) Stormwater Management Criteria (August 2012) and Ontario Ministry of Environment, Conservation and Park's (MOECP) Stormwater Management Planning and Design Manual (March 2003) provide directions on how to manage rainfall and runoff generated on site. The modified Rational Method was used to estimate the runoff quantity. **Table 4.0** summarizes the IDF parameters used. Note the runoff coefficients outlined in the City of Brampton's Subdivision Design Manual were used to calculate a weighted runoff coefficient for the Site. The following assumptions were made:

- Low density residential runoff coefficients (RC) 0.50
- Low to medium density residential RC 0.75
- Hamlet Residential RC 0.50
- Mixed Use RC 0.90

Table 4.0: Summary of IDF parameters

Parameters	10 Year	100 Year
A=	35.1	51.3
B=	-0.695	-0.686

Source: City of Brampton Subdivision Design Manual

Table 4.1: Summary of runoff coefficients

Description	Runoff Coefficients
Townhouse:	0.75
Single Res.	0.50
Roadway	0.90
School	0.75
Park	0.25

Source: City of Brampton Subdivision Design Manual

4.4. MINOR STORM DRAINAGE SYSTEM

The proposed storm sewer layout shown in **Figure 6,** unless otherwise specified, is designed to convey the 10-year storm event to proposed SWM Ponds and storage facilities to conform with the Minimum Standard No.1 of the City of Brampton 2008 Subdivision Design Manual. In general, the preliminary grading in **Appendix D** can be refined at the detailed design stage to minimize the areas not draining to a SWM Pond. It is noted that the City does not permit underground quantity control measures within the City's right-of-way (ROW).

The City has expressed concerns with regards to the maintenance of low impact developments (LIDs) under the City's ROWs. The City states that once any development proposal within the Springbrook Tertiary Plan Area is finalized and the hydrological information is available, further consultation with the City's Operation and Maintenance staff is required before the City can endorse any proposed LIDs within the City's ROWs. Preliminary analysis indicates some ROW catchments may exceed the release rate targets if left uncontrolled, therefore alternative solutions may need to be identified in the detailed design stage to control these flows without the use of storage systems in the ROW. The minor storm drainage scheme is summarized as follows:

- Runoff from drainage area A1 (100-year flows) will be collected and conveyed via a 1050mm (maximum pipe size) storm sewer to proposed SWM Pond H6 which ultimately outlets into existing Pond H5. The proposed wet pond will discharge to existing Pond H5 via a proposed culvert. Flows from proposed Pond H6 to existing Pond H5 are limited per SWM criteria detailed in the WSP SWM Report. Therefore, the capacity of existing Pond H5 is not compromised by the connection of the proposed Pond H6. However, at the detailed design stage, the performance of Pond H5/H6 outlet structure, outlet pipe, outfall and emergency overflow is to be verified based on Pond H5 as-built information and the required modifications should be identified to ensure that adequate flow control is achieved for all storm events and under the ultimate Pond H5/H6 drainage area;
- A storm sewer with a maximum pipe size of 675mm will be required to drain area A2-A to the proposed storage facility between Block C and D and will be treated and discharged into the Springbrook West Tributary at a controlled rate using an orifice device. The outflows from the storage facility are limited per the SWM criteria detailed in the WSP SWM Report. Hence there will be no increase in the flows received by the Springbrook West Tributary;
- Area A2-B is a valley land that remains undisturbed;
- Area A2-C is designed to collect and convey the 100-year flows via a 900mm diameter storm sewer to existing SWM Pond S5N. Catchment A2-C which is excluded from the analysis in the WSP SWM Report drains to the existing SWM Pond S5N to the northeast of the Site. A separate letter prepared on June 21, 2019 by WSP included an independent analysis of the capacity of the existing Pond S5N. The letter indicated that the Candevcon Report demonstrated that the existing SWM Pond S5N had been overdesigned and had capacity to receive an additional 1.86 ha of inflow area. An analysis of the pond will be required in the detailed design stage to ensure all design criteria are met. This will be dependent on the systems and specific site plans proposed in the A2-C catchment, therefore no further analysis can be included as a part of the detailed SWM Report for the development. Refer to **Appendix F** for June 21, 2019 letter referenced above;
- Areas A2-D and A3 will remain as existing, considering that these two lots have been recently developed;
- Area A4-A is entirely private property hence lot level controls consisting of a combination of grass swales, storage facilities, and quality treatment unit is proposed. The release rate from this catchment

is limited per the SWM criteria outlined in the WSP SWM Report prepared by WSP under a separate cover;

- Area A4-B will be collected and conveyed to the proposed storage facility via a storm sewer with a maximum pipe diameter of 675mm, which will then be treated and released at a controlled rate to Springbrook Creek. The release rate from the proposed storage facility will be limited per the SWM criteria detailed in the WSP SWM Report. This will ensure that there is no increase in the flow received by the Springbrook Tributary;
- Area A4-C will remain undisturbed and sheet flow into the Springbrook Creek as per existing conditions;
- Area A9-A is collected and conveyed via a 675mm diameter storm sewer to the proposed storage facility and released at a controlled rate to Springbrook Creek, similar to that proposed by Valdor engineering in the ongoing development application by Coppertrail Estates Inc. (refer to [3]). The storage facility release rate is limited per the SWM criteria detailed in the WSP SWM Report;
- Areas A5-A and A5-B are not accounted for in this Report as they consist of the ROWs of Queen Street West and Creditview Road, which have already been addressed by others;
- Runoff from Area A6 will be captured and treated to provide quantity and quality control. The treated runoff will then be discharged to existing 500mm diameter CSP culvert on Classic Drive at a controlled rate of 0.15m^3/s/ha per existing condition. For further information, refer to as-built storm tributary areas drawing prepared by Schaeffers Consulting Engineers dated January 21, 2000. The above as-built drawing shows that the SWM Pond S5 south of Classic Drive has been designed to support a flow of 0.15m^3/s/ha from existing 1.51ha of area A6;
- Lot level controls will be applied to Areas A7 and A8 and discharged to the road side ditch on Creditview Road at a controlled rate. Refer to the detailed SWM Report prepared for this development for further details; and
- Area A9-B remains undisturbed and sheet flows in to the Springbrook Creek and Springbrook West Tributary per existing conditions.

Post-development flow rates are required to be controlled to the allowable release rates outlined in the WSP SWM Report. For the areas which drain to a city sewer that does not discharge directly to a watercourse, designs should control 100-year post development flows to the allowable design rate of the sewer system. The CVC requires that post to pre control be provided for all storms up to the 100 year event in addition to the Regional storm. Therefore, except for the storage in Catchment A6 that drains to a municipal sewer system, the remaining storage volumes should be sized to meet the criteria from CVC which is more restrictive. Therefore, these catchments should provide flow controls for all storms up to the Regional storm. **Table 4.2** illustrates the allowable release rates for each drainage area, as per the WSP SWM Report. Refer to **Figure 6** for the proposed Storm Drainage Plan and **Appendix C** for storm sewer design sheets.

Table 4.2: Allowable Flow Rates

			RETURN PERIOD / FLOW						
Sub-Catchment	ID	Area (Ha)	2-Year (L/s)	5-Year (L/s)	10-Year (L/s)	25-Year (L/s)	50-Year (L/s)	100-Year (L/s)	Regional (L/s)
A1	1001	7.67	25.9	47.7	56.3	88.4	106.0	124.8	-
A2-A	1002	3.16	15.3	27.0	31.1	46.3	55.4	65.0	146.6

A4-A	10041	1.59	7.1	12.8	14.9	22.8	27.4	31.9	71.9
A4-B	10042	1.75	7.8	14.1	16.4	25.1	30.1	35.1	79.1
A6	1006	0.78	226.5						
A7	1007	1.13	5.1	9.2	10.7	16.3	19.7	23.0	52.2
A8	1008	0.37	1.7	3.0	3.5	5.4	6.4	7.5	17.1
A9-A	1009	2.28	10.2	18.6	21.5	33.0	39.6	46.3	105.3
A10	2010	0.75	2.5	4.7	5.5	8.6	10.4	12.2	28.2
A12	2012	0.32	1.4	2.6	3.0	4.6	5.5	6.4	-

4.5. MAJOR STORM DRAINAGE SYSTEM

Preliminary grading of the roads has been completed to provide for continuous emergency overland flow toward the proposed SWM facilities, boundary roads and receiving creeks. Refer to **Figure 6** and drawing SG1 for overland flow arrows. The quantity and quality requirements for the SWM strategy have been discussed in detail in the WSP SWM Report. The major storm drainage scheme is summarized as follows:

- Proposed Road A, B and C are graded to allow for emergency overland flow towards Queen Street West which ultimately discharges to Huttonville Creek. The proposed storm sewer south of Road C and along Queen Street West is designed to convey the 100-year flow to proposed SWM Pond H6 to prevent overland flow to Queen Street West up to, and including, the 100-year event. Please note that any discharge of emergency overland flow to a Regional Road (i.e. Queen Street West) will require Regional approval. Alternatively, there would also be the option to provide an overland flow path, to convey the Regional storm event to Pond H6. This is to be determined in consultation with the City of Brampton at the detailed design stage;
- Proposed SWM Pond H6 is designed to provide quantity storage up to the 100-year event and discharge controlled flows to existing SWM Pond H5. An emergency spillway will be provided to convey flows above the 100-year event to the adjacent ROW's of Queens Street West and/or Elbern Markell Drive, which would ultimately discharge to Huttonville Creek. As noted above, any discharge of emergency overland flow to a Regional Road (i.e. Queen Street West) will require Regional approval. Alternatively, there would also be the option to pipe the Regional Storm event from Pond H6 to Pond H5 to allow for uncontrolled flow through of the greater storm event. This is to be determined in consultation with the City of Brampton at the detailed design stage;
- A high point exists halfway through Road E and D which allows for emergency overland flow from the west side of Road E and D and Road C to flow towards Queen Street West which ultimately outlets to Huttonville Creek as mentioned above. The east side of Road D and E overflows towards the storage facility which ultimately outlets at a controlled rate to the Springbrook West Tributary. Refer to the WSP SWM Report and preliminary grading drawing **SG1** in **Appendix E** for more details;
- Both the north and south portion of Road F is graded to allow for emergency overland flow onto the Creditview Road to discharge to existing pond S5N. All storm sewers on Road F are designed to convey the 100-year flows to existing SWM Pond S5N as mentioned in Section 4.4 above;
- Areas A2-D and A3 remain unchanged per existing condition;

- Road H is graded to allow for emergency overland flow towards Springbrook Creek Tributary. The proposed storage facility is designed to release to the Springbrook Creek Tributary at a controlled rate per SWM criteria outlined in the WSP SWM Report;
- Road I overland flow is directed to the proposed storage facility to be released at a controlled rate to the Springbrook Creek West Tributary;
- Road G is envisioned to be an extension of Classic Drive and therefore has been graded to ensure continuous overland flow toward Classic Drive. The south portion of this road is outside the Tertiary Plan boundary and is not accounted for in the design of the storm system that the rest of this area will drain to. As such, the drainage from this section of road has not been accounted for and will have to be accommodated for in the drainage infrastructure to the south at the time of development; and
- Lot level controls will be applied to Areas A7 and A8. Treated runoff will discharge to the road side ditch on Creditview Road at a controlled rate per the SWM criteria outlined in the WSP SWM Report. However, due to a high point at the property boundary south of Creditview Road it is not practical to send the emergency overland flow towards existing pond S5 south of Creditview Road. Hence the emergency overland flows are directed towards Queen Street West.

Refer to **Figure 6** for proposed Storm Drainage Plan.

Appendix E

FALLOWFIELD ROAD

HAYWOOD DRIVE

ELBERN MARKELL DRIVE

HOSTA ROAD

CREDITVIEW ROAD

QUEEN STREET WEST

LINKS LANE

CLASSIC DRIVE

CREDITVIEW ROAD

EXISTING SWM BLOCK SOUTH OF FALLOWFIELD ROAD

EXISTING SWM BLOCK EAST OF CREDITVIEW ROAD

S5N

EXISTING SWM

H5

H6

BLOCK A

BLOCK B

BLOCK C

BLOCK D

BLOCK E

BLOCK F

BLOCK G

BLOCK H

BLOCK I

BLOCK J

BLOCK K

ROAD - A

ROAD - B

ROAD - C

ROAD - D

ROAD - E

ROAD - F

ROAD - G

ROAD - H

ROAD - I

ROAD SIDE DITCH

CONNECT TO EXISTING 500mm Ø CSP CULVERT

NOTE:
ALL STORM SEWER SOUTH OF ROAD C HAS BEEN DESIGNED TO CONVEY THE 100-YEAR FLOWS TO POND H 6

LEGEND

- EXISTING STORM
- PROP. STORM
- A1 | PRE | 0.072 | 0.50 — RUN-OFF COEFFICIENT / AREA IN HECTERS
- DRAINAGE BOUNDARY
- EXTERNAL DRAINAGE BOUNDARY
- PROPOSED POND
- OVERLAND FLOW
- EXISTING OVERLAND FLOW
- LIMIT OF PROPERTY
- H5 — EXISTING POND

CLIENT: CITY OF BRAMPTON

TITLE: SPRINGBROOK TERTIARY PLAN

PROPOSED STORM DRAINAGE PLAN

wsp
100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.wsp.com

Checked: Z.A.	Drawn: 10/12 Cad
Date: APRIL 2020	Proj. No.: 18M-00046
Scale: 1: 3000	Figure No.: 6

FILENAME: X:\DIV10\18M-00046 Springbrook Tertiary Plan Area\Mun\Engineering Drawings\FSR-Figures\18M-00046_Fig_1-6.dwg
PLOTDATE: Apr 30, 2020 - 12:12pm, CAZA071426

5 SITE GRADING

The proposed grades around the Site will be set to match into the existing grades at the limit of the property. The grading design was completed to direct minor storm drainage to the on-site collection points so that this drainage is self-contained, and the overland flow patterns are maintained for major storm events. Under existing conditions, the Springbrook Site receives external drainage from the properties to the north fronting Haywood Drive and Fallowfield Road, which has been maintained in the proposed grading. The preliminary grading plan generally follows the existing drainage pattern with exception of a few areas that will be discussed as follows:

- All properties in Block E except for the first two properties from the south have been regraded to redirect runoff partly to the north and south by creating a high-point in the middle. This results in a potential grade difference of approximately 3.0m from existing to proposed grade at the property line. This grading challenge can be resolved at detailed design through consultation with the City;
- Block I has been slightly regraded to the west to increase usable space, resulting in a potential grade difference of approximately 2.0m at the property line. This can be resolved at detailed design through consultation with the City;
- The north-east portion of Block H was regraded to increase usable space, resulting in a potential grade difference of approximately 2.6m at the property line. This can be resolved at detailed design through consultation with the City;
- Block K has been slightly regraded by about 0.3m in south-west portion to direct all runoff to the proposed road which ultimately drains south;
- Block A has been slightly regraded to drain towards Road A and down to the proposed SWM Pond H6;
- Block B was slightly regraded to send runoff to Road B, which ultimately slopes towards Road C; and
- A drainage split similar to existing conditions was maintained in Block C and D. Most of Block D slopes towards a low point 10m from the valley land boundary. The valley land boundary (top of slope for the Springbrook Creek) serves as a high-point which then slopes down 10m at 2% into Area A2. This low point will represent the approximate location of the proposed storage facility. The emergency overland flow route from the storage facility shall be a minimum of 10m wide per City of Brampton Subdivision Design Manual, and to provide an acceptable maximum depth of ponding.

The recommended grading plan implements and supports the conceptual road network included in the Springbrook Tertiary Plan. As such this conceptual road network is a feasible option from a grading and servicing perspective. Refer to **Figure SG1** in **Appendix D** for the Preliminary Grading Plan.

6 CONCLUSIONS

6.1 WATER DISTRIBUTION

New municipal watermains within the proposed roads with 12 new connections to the existing water distribution system are proposed to service the Site. Estimates for domestic water demands generated from the proposed development have been provided to the Region to complete water modelling to confirm the sizes of the proposed watermains. The results of the modelling are included in **Appendix E** of this Report, which confirm the existing distribution system and proposed upgrades have the capacity to accommodate the proposed development.

6.2 SANITARY SERVICING

New gravity sanitary sewers within the proposed roads with six new connection points to existing sanitary sewers are proposed. In addition, a 250mm diameter sanitary sewer is proposed on the north side of Queen Street West. Sanitary drainage plans and design sheets have been prepared to size the new sanitary sewers. The Region previously completed analysis which confirmed the existing sanitary sewers have the capacity to accommodate the proposed development

6.3 STORM DRAINAGE

New minor and major drainage systems will be required within the Site to facilitate the proposed development. The existing drainage patterns on the Site will be maintained to the extent that is feasible. This can be refined at the detailed design stage to minimize the areas not draining to a SWM Pond. The on-site minor storm drainage system consists of gravity storm sewer that have been designed to convey the 1- in 10-year storm event (unless specified otherwise), in accordance with the City of Brampton design guidelines. The major storm drainage system will be designed to convey flows more than the minor system flows by means of overland flow. Where it is not possible to convey overland flow to the appropriate outlet, the storm sewers will be designed to convey the major storm event (100-year storm). Storm drainage plans and design sheets have been prepared to size the new storm sewers. Refer to the Stormwater Management Report prepared by WSP under separate cover for further details.

6.4 SITE GRADING

The proposed grades around the Site will be set to match into the existing grades at the limit of property. Also, external drainage is accommodated onsite. The grading design was completed to direct minor storm drainage to the on-site collection points so that this drainage is self-contained, and the overland flow patterns are maintained for major storm events. Storm and sanitary servicing is feasible without artificially raising the site except for the northern portion of Block E and some fill areas within Block H and I to improve usable area as pointed out in Section 5 above. The recommended grading plan implements and supports the conceptual road network included in the Springbrook Tertiary Plan. As such this conceptual road network is a feasible option from a grading and servicing perspective.

APPENDIX

A WATER DEMAND CALCULATIONS

Springbrook Tertiary Plan
18M-00046

			Domestic Flow Demand		
Water Demand	Population		Average Day Demand	Maximum Day Demand	Peak Hour Demand
	Residential	Employment	(L/s)		
Block A	175	0	0.55	0.98	1.64
Block B	76	0	0.24	0.43	0.71
Block C	317	0	0.99	1.78	2.97
Block D	80	10	0.28	0.45	0.84
Block E	103	0	0.32	0.58	0.97
Block F	60	30	0.27	0.34	0.82
Block G	46	0	0.14	0.26	0.43
Block H	96	0	0.30	0.54	0.90
Block I	24	0	0.07	0.00	0.21
Block J	20	0	0.06	0.00	0.17
Block K	175	0	0.55	0.98	1.64
TOTAL=	**1172**	**40**	**3.77**	**6.35**	**11.30**

Water demand rate of 270 l/person/day for residential developments;
Water demand rate of 250 l/person/day for industrial, commercial, or institutional (ICI) developments;
Peak Hour Factor of Residential and ICI = 3.0;
Max Day Factor of Residential = 1.8;
Max Day Factor of ICI = 1.4;

APPENDIX

B SANITARY STATISTICS AND FLOW CALCULATIONS

Appendix E

Springbrook Tertiary Plan
18M-00046

Block	Description	Area	Population		Peaking Factor	Average Daily Flow (L/s)	Peak Dry Flow (L/s)	Peak Wet Flow (L/s)
			Residential	Employment				
A	Residential	2.02	175	0	4.17	0.59	2.45	2.97
B	Residential	2.6	76	0	4.27	0.26	1.09	1.77
C	Residential	4.61	317	0	4.07	1.06	4.33	5.53
D	Mixed-Use	1.71	80	10	4.26	0.30	1.28	1.72
E	Residential	3.42	103	0	4.24	0.35	1.47	2.36
F	Mixed-Use	2.39	60	30	4.26	0.30	1.26	1.88
G	Residential	1.98	46	0	4.32	0.15	0.67	1.18
H	Residential	1.41	96	0	4.25	0.32	1.37	1.74
I	Mixed-Use	1.28	24	0	4.37	0.08	0.33	0.66
J	Mixed-Use	0.37	20	0	4.38	0.06	0.27	0.37
K	Residential	2.39	175	0	4.17	0.59	2.45	3.07
	TOTAL		**1172**	**40**	**3.74**	**4.05**	**15.16**	**21.45**

$M = 1 + \frac{14}{4+p^{0.5}}$ = PEAKING FACTOR

p = POPULATION /1000

q = 290L /PERSON /DAY or 270L /PERSON /DAY

$Q = \frac{Mqp}{86400}$ = POPULATION FLOW IN m^3/s

Appendix E

M = 1 + 14 / (4+p^0.5) = PEAKING FACTOR

p = POPULATION /1000

q = 365L /PERSON /DAY

Q = Mqp / 86400 = POPULATION FLOW IN m^3/s

INFILTRATION RATE = 0.26L /s /ha Flow/person (L/s) 0.0033565 M= 3.744609006

MANNING'S n = 0.013 p= 1.212 Q= 0.01523

COMMERCIAL FLOW= 180,000L/ha of gross land area/day q= 290 15.2 L/s

SANITARY SEWER DESIGN

CONSULTANT: WSP CANADA GROUP LIMITED
SUBDIVISION:
PROJECT NO.:

LOCATION				SECTION					CUMMULATIVE				M	PEAK	DESIGN	LENGTH	PIPE	TYPE		Flow	FULL FLOW	ACTUAL	
STREET	MANHOLE FROM	MANHOLE TO	BLOCK	TYPE	POP. *	AREA ** ha	AVERAGE DRY WEATHER FLOW L/s	INFIL. L/s	POP.	AREA ha	ADW FLOW L/s	INFIL. L/s		FLOW L/s	FLOW L/s	OF SEWER m	SIZE mm	OF PIPE	SLOPE %	Capacity	VEL. m/s	VELOCITY m/s	Capacity Used %
Road F	F2N	F1N	E	Residential	103	1.22	0.3457	0.3172	103	1.22	0.3457	0.3172	4.240	1.4659	1.7831	**88.9**	250	PVC	**1.00**	0.06	1.21	36.32	3.00%
Road F	F1N	cdv	E	Residential	0	0.00	0.0000	0.0000	103	1.22	0.3457	0.3172	4.240	1.4659	1.7831	**10.7**	250	PVC	**1.00**	0.06	1.21	36.32	3.00%
Road F	F3	F2	E	Residential	103	2.20	0.3457	0.5720	103	2.20	0.3457	0.5720	4.240	1.4659	2.0379	**84.1**	250	PVC	**1.00**	0.06	1.21	41.51	3.43%
Road F	F2	F1	E	Residential	0	0.00	0.0000	0.0000	103	2.20	0.3457	0.5720	4.240	1.4659	2.0379	**42.5**	250	PVC	**1.00**	0.06	1.21	41.51	3.43%
Road F	F1	cdv	E	Residential	0	0.00	0.0000	0.0000	103	2.20	0.3457	0.5720	4.240	1.4659	2.0379	**10.7**	250	PVC	**1.00**	0.06	1.21	41.51	3.43%
Road H	H5	H4	F	Mixed-Use	90	2.39	0.3021	0.6214	90	2.39	0.3021	0.6214	4.256	1.2856	1.9070	**90.3**	250	PVC	**1.00**	0.06	1.21	38.85	3.21%
Road H	H4	H3	F	Mixed-Use	0	0.00	0.0000	0.0000	90	2.39	0.3021	0.6214	4.256	1.2856	1.9070	**47.2**	250	PVC	**1.00**	0.06	1.21	38.85	3.21%
Road H	H3	H2	F	Mixed-Use	0	0.00	0.0000	0.0000	90	2.39	0.3021	0.6214	4.256	1.2856	1.9070	**75.7**	250	PVC	**1.00**	0.06	1.21	38.85	3.21%
Road H	H2	H1	G	Residential	46	1.98	0.1544	0.5148	136	4.37	0.4565	1.1362	4.205	1.9193	3.0555	**39.5**	250	PVC	**1.00**	0.06	1.21	62.25	5.14%
Road H	H1	Ex. MH 13A	G	Residential	0	0.00	0.0000	0.0000	136	4.37	0.4565	1.1362	4.205	1.9193	3.0555	**66.5**	250	PVC	**1.00**	0.06	1.21	62.25	5.14%
Creditview Road	CDV2	CDV3	I	Mixed-Use	12	0.70	0.0403	0.1820	12	0.70	0.0403	0.1820	4.407	0.1775	0.3595	**18.3**	250	PVC	**1.00**	0.06	1.21	7.32	0.60%
Creditview Road	CDV1	CDV3	I	Mixed-Use	12	0.58	0.0403	0.1508	12	0.58	0.0403	0.1508	4.407	0.1775	0.3283	**23.4**	250	PVC	**1.00**	0.06	1.21	6.69	0.55%
Creditview Road	CDV3	cdv	I	Mixed-Use	0	0.00	0.0000	0.0000	24	1.28	0.0806	0.3328	4.369	0.3520	0.6848	**43.6**	250	PVC	**1.00**	0.06	1.21	13.95	1.15%
Road I	I3	I2	K	Residential	175	2.39	0.5874	0.6214	175	2.39	0.5874	0.6214	4.169	2.4486	3.0700	**68.5**	250	PVC	**1.00**	0.06	1.21	62.54	5.16%
Road I	I2	I1	K	Residential	0	0.00	0.0000	0.0000	175	2.39	0.5874	0.6214	4.169	2.4486	3.0700	**83.0**	250	PVC	**1.00**	0.06	1.21	62.54	5.16%
Road I	I1	Ex. MH 13A	K	Residential	0	0.00	0.0000	0.0000	175	2.39	0.5874	0.6214	4.169	2.4486	3.0700	**47.1**	250	PVC	**1.00**	0.06	1.21	62.54	5.16%
Queen Street	QSE1	QSE2	J	Mixed-Use	20	0.37	0.0671	0.0962	20	0.37	0.0671	0.0962	4.380	0.2941	0.3903	**6.4**	250	PVC	**1.00**	0.06	1.21	7.95	0.66%
Queen Street	QSE2	Ex. MH 13A	J	Mixed-Use	0	0.00	0.0000	0.0000	20	0.37	0.0671	0.0962	4.380	0.2941	0.3903	**54.7**	250	PVC	**1.00**	0.06	1.21	7.95	0.66%
Queen Street	Ex. MH 13A	qs	J	Mixed-Use	0	0.00	0.0000	0.0000	331	7.13	1.1110	1.8538	4.060	4.5105	6.3643	**27.9**	250	PVC	**1.00**	0.06	1.21	129.65	10.70%
Road G	G3	G2	H	Residential	96	1.41	0.3222	0.3666	96	1.41	0.3222	0.3666	4.248	1.3689	1.7355	**75.7**	200	PVC	**1.00**	0.03	1.04	55.24	5.29%
Road G	G2	G1	H	Residential	0	0.00	0.0000	0.0000	96	1.41	0.3222	0.3666	4.248	1.3689	1.7355	**51.2**	200	PVC	**1.00**	0.03	1.04	55.24	5.29%
Road G	G1	xx	H	Residential	0	0.00	0.0000	0.0000	96	1.41	0.3222	0.3666	4.248	1.3689	1.7355	**59.3**	200	PVC	**1.00**	0.03	1.04	55.24	5.29%
Road D	D2	E2	C	Residential	317	1.17	1.0640	0.3042	317	1.17	1.0640	0.3042	4.068	4.3285	4.6327	**69.0**	250	PVC	**1.00**	0.06	1.21	94.38	7.79%
Road E	E5	E4	D	Mixed-Use	*90*	*1.71*	0.3021	0.4446	90	1.71	0.3021	0.4446	4.256	1.2856	1.7302	**63.3**	250	PVC	**1.00**	0.06	1.21	35.25	2.91%
Road E	E4	E3	D	Mixed-Use	0	0.00	0.0000	0.0000	90	1.71	0.3021	0.4446	4.256	1.2856	1.7302	**21.8**	250	PVC	**1.00**	0.06	1.21	35.25	2.91%
Road E	E3	E2	D	Mixed-Use	0	0.00	0.0000	0.0000	90	1.71	0.3021	0.4446	4.256	1.2856	1.7302	**55.3**	250	PVC	**1.00**	0.06	1.21	35.25	2.91%
Road E	E2	E1	C	Residential	0	0.00	0.0000	0.0000	407	2.88	1.3661	0.7488	4.019	5.4897	6.2385	**74.1**	250	PVC	**1.00**	0.06	1.21	127.09	10.49%
Road E	E1	C2	C	Residential	0	0.00	0.0000	0.0000	407	2.88	1.3661	0.7488	4.019	5.4897	6.2385	**107.1**	250	PVC	**1.00**	0.06	1.21	127.09	10.49%
Road D	D1	C3	C	Residential	317	3.44	1.0640	0.8944	317	3.44	1.0640	0.8944	4.068	4.3285	5.2229	**168.8**	250	PVC	**1.00**	0.06	1.21	106.40	8.78%
Road C	C3	C2	C	Residential	0	0.00	0.0000	0.0000	317	3.44	1.0640	0.8944	4.068	4.3285	5.2229	**77.3**	250	PVC	**1.00**	0.06	1.21	106.40	8.78%
Road C	C2	C1	C	Residential	0	0.00	0.0000	0.0000	724	6.32	2.4301	1.6432	3.886	9.4435	11.0867	**38.6**	250	PVC	**1.00**	0.06	1.21	225.86	18.64%
Road B	B3	B2	B	Residential	76	2.60	0.2551	0.6760	76	2.60	0.2551	0.6760	4.274	1.0904	1.7664	**24.4**	250	PVC	**1.00**	0.06	1.21	35.98	2.97%
Road B	B2	B1	B	Residential	0	0.00	0.0000	0.0000	76	2.60	0.2551	0.6760	4.274	1.0904	1.7664	**68.4**	250	PVC	**1.00**	0.06	1.21	35.98	2.97%
Road B	B1	C1	B	Residential	0	0.00	0.0000	0.0000	76	2.60	0.2551	0.6760	4.274	1.0904	1.7664	**55.2**	250	PVC	**1.00**	0.06	1.21	35.98	2.97%
Road C	C1	QSS1			0	0.00	0.0000	0.0000	800	8.92	2.6852	2.3192	3.860	10.3659	12.6851	**47.6**	250	PVC	**1.00**	0.06	1.21	258.42	21.33%
Queen Street	QSS1	QSS2			0	0.00	0.0000	0.0000	800	8.92	2.6852	2.3192	3.860	10.3659	12.6851	**128.0**	250	PVC	**1.00**	0.06	1.21	258.42	21.33%
Queen Street	QSS2	QSS3			0	0.00	0.0000	0.0000	800	8.92	2.6852	2.3192	3.860	10.3659	12.6851	**87.3**	250	PVC	**1.00**	0.06	1.21	258.42	21.33%
Road A	A1	A2	A	Residential	175	2.02	0.5874	0.5252	175	2.02	0.5874	0.5252	4.169	2.4486	2.9738	**41.3**	250	PVC	**1.00**	0.06	1.21	60.58	5.00%
Road A	A2	A3	A	Residential	0	0.00	0.0000	0.0000	175	2.02	0.5874	0.5252	4.169	2.4486	2.9738	**18.4**	250	PVC	**1.00**	0.06	1.21	60.58	5.00%
Road A	A3	A4	A	Residential	0	0.00	0.0000	0.0000	175	2.02	0.5874	0.5252	4.169	2.4486	2.9738	**130.1**	250	PVC	**1.00**	0.06	1.21	60.58	5.00%
Road A	A4	QSS3	A	Residential	0	0.00	0.0000	0.0000	175	2.02	0.5874	0.5252	4.169	2.4486	2.9738	**40.9**	250	PVC	**1.00**	0.06	1.21	60.58	5.00%
Queen Street	QSS3	QSS4			0	0.00	0.0000	0.0000	975	10.94	3.2726	2.8444	3.807	12.4589	15.3033	**56.4**	250	PVC	**1.00**	0.06	1.21	311.76	25.73%
Queen Street	QSS4	qs			0	0.00	0.0000	0.0000	975	10.94	3.2726	2.8444	3.807	12.4589	15.3033	**19.3**	250	PVC	**1.00**	0.06	1.21	311.76	25.73%

APPENDIX

C STORM FLOW CALCULATIONS

STORM SEWER DESIGN
WITH
100 Yr. CURVE

Parameters	10 Year	100 Year	Runoff Coefficients	
	A= 35.1	51.3	Townhouse	0.75
	B= -0.695	-0.686	Single Res.	0.60
			Roadway	0.80
			School	0.75
			Park	0.25

Q = KCAi
K = Conversion Factor 0.002778
C = Runoff Coef.
A = Area (ha)
i = Rainfall Int = A (T)^{n}

Minimum Initial Time of Concentration = 10.00 min

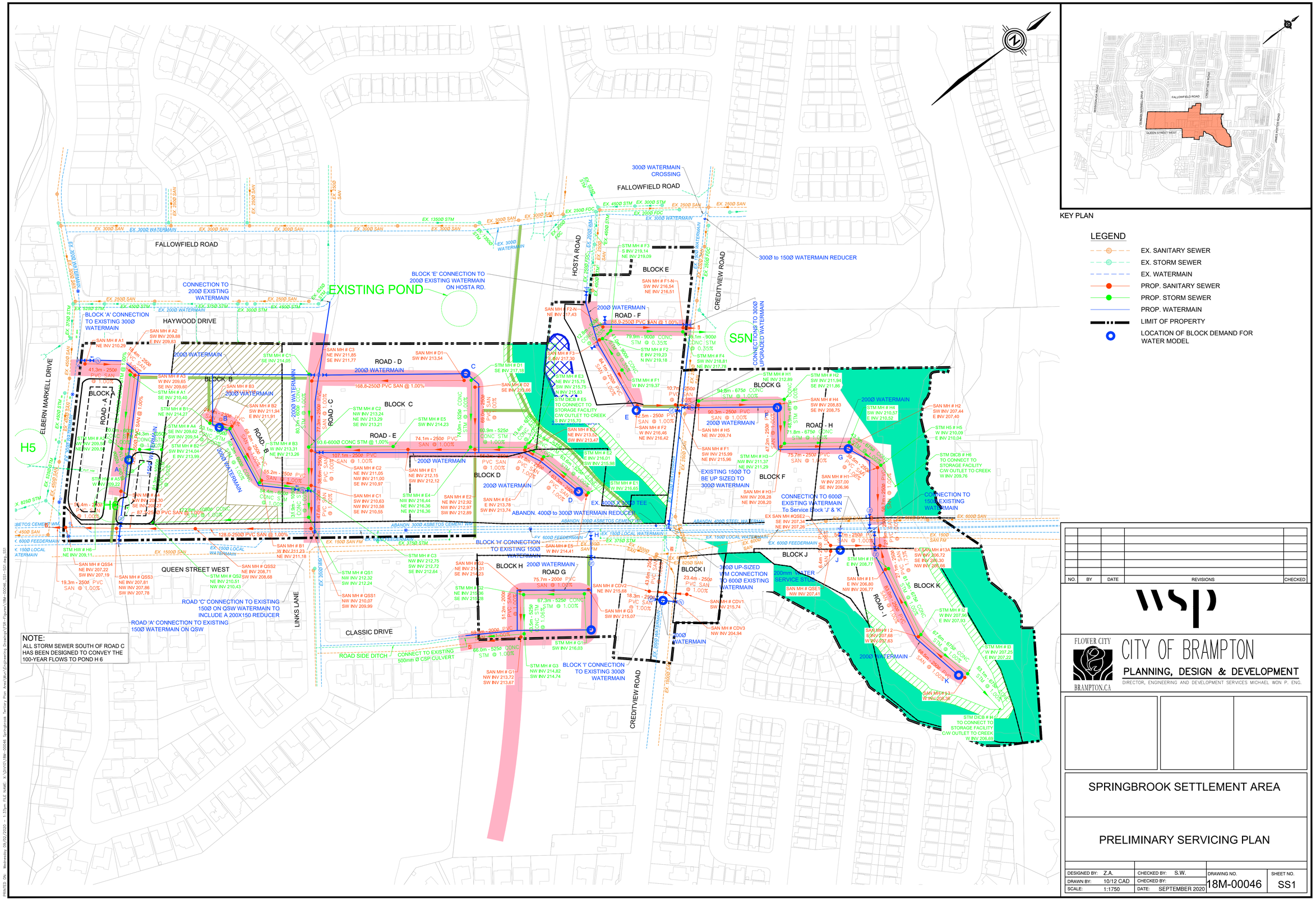
CONSULTANT WSP CANADA GROUP LIMITED
SUBDIVISION Springbrook Tertiary Plan
PROJECT NO. 18M-00046
DESIGNED BY ZA
REVIEWED BY SW

STREET	CATCHMENT # (REFER TO DWG ST1,2)	FROM MH	TO MH	AREA (ha)	CUMUL AREA (ha)	RUN OFF COEF.	CA	CUMUL CA	INT. 10YR (i) (mm/hr)	FLOW 10YR (Q) (cms)	LENGTH (m)	SLOPE (%)	VELOCITY (m/s)	INLET TIME (min)	SECTION TIME (min)	ACCUM TIME (min)	PIPE DIA. (mm)	CAPACITY (cms)	CAPACITY CHECK	DOWNSTREAM INVERT	UPSTREAM INVERT	PIPE CHANGE ANGLE	PIPE DROP IN MH
	A1+A15																						
ROAD A		**MH A1**	**MH A2**	2.09	2.09	0.56	1.17	1.17	121.93	0.396	82.4	**1.00**	2.195	10.00	0.63	10.63	600	0.62	63.89%	*209.58*	*210.40*	---	---
ROAD A		**MH A2**	**MH A3**	0.00	2.09	0.56	0.00	1.17	116.90	0.380	20.0	**1.00**	2.195	10.63	0.15	10.78	600	0.62	61.25%	*209.30*	*209.50*	*90.00*	0.08
ROAD E		**MH E5**	**MH C2**	2.09	2.09	0.56	1.17	1.17	121.93	0.396	93.6	**1.00**	2.195	10.00	0.71	10.71	600	0.62	63.89%	*213.29*	*214.23*	---	---
ROAD C		**MH C1**	**MH C2**	2.09	2.09	0.56	1.17	1.17	121.93	0.396	80.7	**1.00**	2.195	10.00	0.61	10.61	600	0.62	63.89%	*213.24*	*214.05*	---	---
ROAD C		**MH C2**	**MH C3**	0.00	4.18	0.56	0.00	2.34	115.50	0.751	46.0	**1.00**	2.547	10.81	0.30	11.11	750	1.13	66.75%	*212.75*	*213.21*	*90.00*	0.08
ROAD B		**MH B1**	**MH B2**	2.09	2.09	0.56	1.17	1.17	121.93	0.396	23.1	**1.00**	2.195	10.00	0.18	10.18	600	0.62	63.89%	*214.04*	*214.27*	---	---
ROAD B		**MH B2**	**MH B3**	0.00	2.09	0.56	0.00	1.17	120.47	0.392	68.3	**1.00**	2.195	10.18	0.52	10.69	600	0.62	63.12%	*213.31*	*213.99*	*47.00*	0.08
ROAD B		**MH B3**	**MH C3**	0.00	2.09	0.56	0.00	1.17	116.38	0.378	54.4	**1.00**	2.195	10.69	0.41	11.11	600	0.62	60.98%	*212.72*	*213.26*	*55.00*	0.08
ROAD C		**MH C3**	**MH QS1**	0.00	6.27	0.56	0.00	3.51	163.12	1.591	31.9	**1.00**	3.187	11.11	0.17	11.28	1050	2.76	57.65%	*212.32*	*212.64*	*83.00*	0.08
QUEEN STREET		**MH QS1**	**MH QS2**	0.00	6.27	0.56	0.00	3.51	161.46	1.575	172.6	**1.00**	3.187	11.28	0.90	12.18	1050	2.76	57.07%	*210.51*	*212.24*	*90.00*	0.08
QUEEN STREET		**MH QS2**	**MH A4**	0.00	6.27	0.56	0.00	3.51	153.16	1.494	81.3	**1.00**	3.187	12.18	0.43	12.61	1050	2.76	54.13%	*209.62*	*210.43*	*90.00*	0.08
QUEEN STREET		**MH A4**	**MH A3**	0.00	6.27	0.56	0.00	3.51	149.59	1.459	24.3	**1.00**	3.187	12.61	0.13	12.73	1050	2.76	52.87%	*209.30*	*209.54*	*90.00*	0.08
ROAD A		**MH A3**	**HW A3**	0.00	8.36	0.56	0.00	4.68	166.58	2.166	15.0	**1.00**	3.187	10.78	0.08	10.86	1050	2.76	78.50%	*208.92*	*209.07*	*110.00*	0.08
	A2																						
ROAD D		**MH D1**	**MH E4**	1.60	1.60	0.62	0.99	0.99	121.93	0.336	74.0	**1.00**	2.008	10.00	0.61	10.61	525	0.43	77.31%	*216.44*	*217.18*	---	---
ROAD E		**MH E4**	**MH E3**	0.00	1.60	0.62	0.00	0.99	116.98	0.322	60.9	**1.00**	2.008	10.61	0.51	11.12	525	0.43	74.17%	*215.75*	*216.36*	90	0.08
ROAD E		**MH E1**	**MH E2**	1.60	1.60	0.62	0.99	0.99	121.93	0.336	63.6	**1.00**	2.008	10.00	0.53	10.53	525	0.43	77.31%	*216.01*	*216.65*	*11.50*	0.05
ROAD E		**MH E2**	**MH E3**	0.00	1.60	0.62	0.00	0.99	117.65	0.324	22.8	**1.00**	2.008	10.53	0.19	10.72	525	0.43	74.60%	*215.75*	*215.98*	*27.00*	0.05
ROAD E		**MH E3**	**HW E5**	0.00	3.20	0.62	0.00	1.98	116.20	0.640	13.4	**1.00**	2.374	10.72	0.09	10.81	675	0.85	75.39%	*215.70*	*215.83*	*90.00*	0.08
	A4+A16																						
ROAD F		**MH F1**	**MH F2**	2.37	2.37	0.50	1.19	1.19	175.36	0.577	41.0	**0.35**	1.701	10.00	0.40	10.40	900	1.08	53.33%	*219.23*	*219.37*	---	---
ROAD F		**MH F2**	**MH F3**	0.00	2.37	0.50	0.00	1.19	170.69	0.562	12.8	**0.35**	1.701	10.40	0.13	10.53	900	1.08	51.91%	*219.14*	*219.18*	*78.00*	0.08
ROAD F		**MH F3**	**MH F4**	0.00	2.37	0.50	0.00	1.19	169.29	0.557	79.9	**0.35**	1.701	10.53	0.78	11.31	900	1.08	51.49%	*218.81*	*219.09*	*45.00*	0.08
ROAD F		**MH F4**	**CDV**	0.00	2.37	0.50	0.00	1.19	161.16	0.531	36.1	**0.35**	1.701	11.31	0.35	11.66	900	1.08	49.02%	*217.65*	*217.78*	*0.00*	0.02
	A7+A17																						
ROAD H		**MH H1**	**MH H2**	2.08	2.08	0.75	1.56	1.56	111.94	0.485	94.8	**1.00**	2.374	11.31	0.67	11.98	675	0.85	57.10%	*211.94*	*212.89*	---	---
ROAD H		**MH H2**	**MH H3**	0.00	2.08	0.75	0.00	1.56	107.58	0.466	48.9	**1.00**	2.374	11.98	0.34	12.32	675	0.85	54.88%	*211.37*	*211.86*	*90.00*	0.08
ROAD H		**MH H3**	**MH H4**	0.00	2.08	0.75	0.00	1.56	105.48	0.457	71.8	**1.00**	2.374	12.32	0.50	12.82	675	0.85	53.81%	*210.57*	*211.29*	*90.00*	0.08
ROAD H		**MH H4**	**MH H5**	0.00	2.08	0.75	0.00	1.56	102.58	0.445	43.3	**1.00**	2.374	12.82	0.30	13.13	675	0.85	52.33%	*210.09*	*210.52*	*35.00*	0.05
		MH H5	**HW H6**	0.00	2.08	0.75	0.00	1.56	100.93	0.437	28.4	**1.00**	2.374	13.13	0.20	13.33	675	0.85	51.49%	*210.04*	*209.76*	*40.00*	0.05
	A9																						
ROAD I		**MH I1**	**MH I2**	2.27	2.27	0.77	1.75	1.75	121.93	0.592	81.3	**1.00**	2.374	10.00	0.57	10.57	675	0.85	69.69%	*207.96*	*208.77*	---	---
ROAD I		**MH I2**	**MH I3**	0.00	2.27	0.77	0.00	1.75	117.32	0.570	67.6	**1.00**	2.374	10.57	0.47	11.05	675	0.85	67.06%	*207.25*	*207.93*	*24.00*	0.05
ROAD I		**MH I3**	**HW I4**	0.00	2.27	0.77	0.00	1.75	113.79	0.553	53.1	**1.00**	2.374	11.05	0.37	11.42	675	0.85	65.04%	*206.69*	*207.22*	*8.00*	0.05
	A13																						
ROAD G		**MH G1**	**MH G2**	1.42	1.42	0.50	0.71	0.71	121.93	0.240	67.3	**1.00**	2.008	10.00	0.56	10.56	525	0.43	55.33%	*215.36*	*216.03*	---	---
ROAD G		**MH G2**	**MH G3**	0.00	1.42	0.50	0.00	0.71	117.41	0.232	43.5	**1.00**	2.008	10.56	0.36	10.92	525	0.43	53.28%	*214.82*	*215.28*	*90.00*	0.08
ROAD G		**MH G3**	**Ex. STM**	0.00	1.42	0.50	0.00	0.71	114.70	0.226	66.0	**1.00**	2.008	10.92	0.55	11.47	525	0.43	52.05%	*214.08*	*214.74*	*90.00*	0.08

NOTE: The Highlighted portion show the Pipe Segment designed to convey the 100-year event

APPENDIX

D GRADING AND SERVICING PLANS



KEY PLAN

LEGEND

- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. WATERMAIN
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- PROP. WATERMAIN
- LIMIT OF PROPERTY
- LOCATION OF BLOCK DEMAND FOR WATER MODEL

NO.	BY	DATE	REVISIONS	CHECKED

wsp

FLOWER CITY BRAMPTON.CA

CITY OF BRAMPTON

PLANNING, DESIGN & DEVELOPMENT

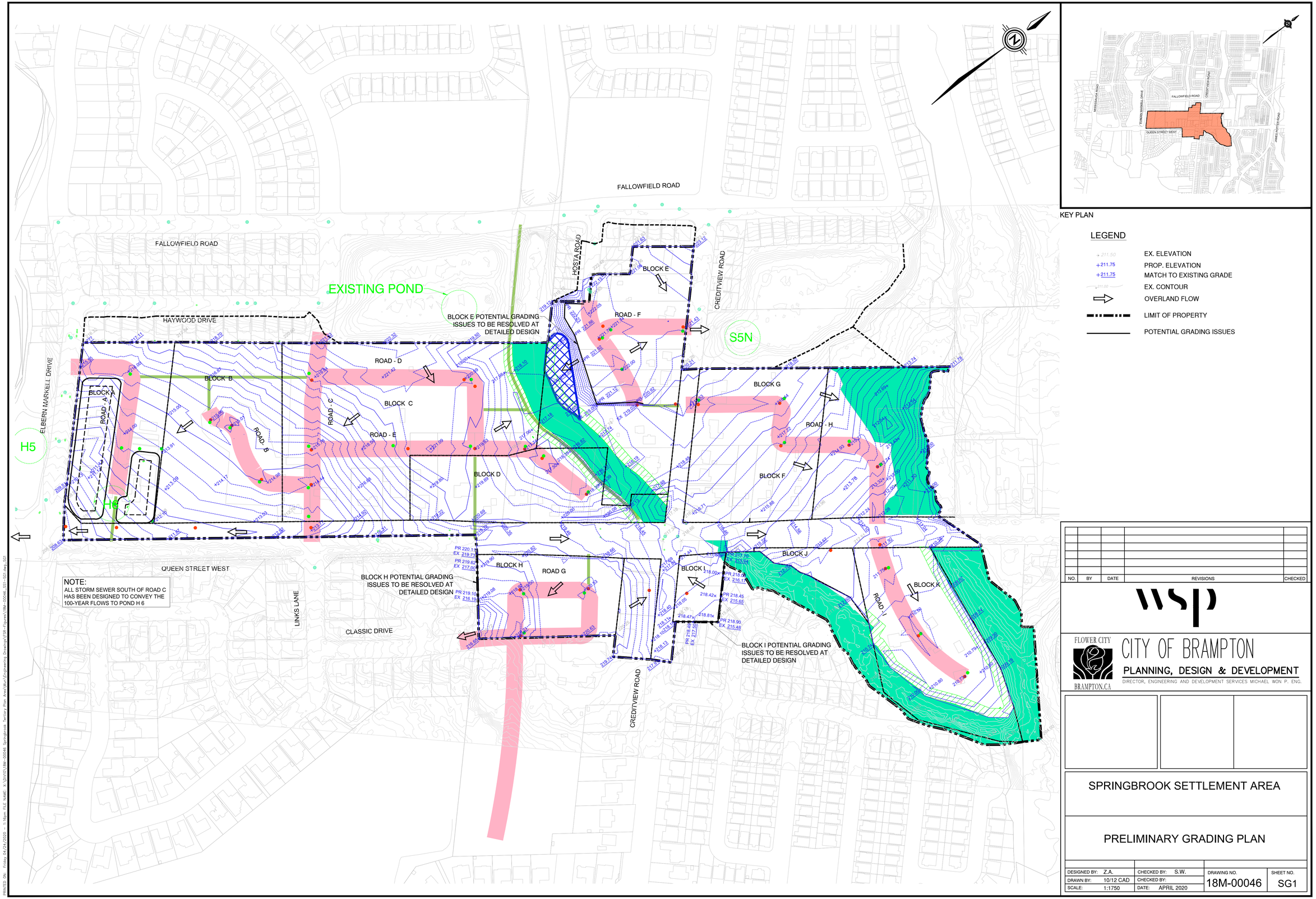
DIRECTOR, ENGINEERING AND DEVELOPMENT SERVICES MICHAEL WON P. ENG.

SPRINGBROOK SETTLEMENT AREA

PRELIMINARY SERVICING PLAN

DESIGNED BY:	Z.A.	CHECKED BY:	S.W.	DRAWING NO.	SHEET NO.
DRAWN BY:	10/12 CAD	CHECKED BY:		18M-00046	SS1
SCALE:	1:1750	DATE:	SEPTEMBER 2020		

PLOTTED ON: Wednesday, 09/30/2020 - 1:37pm FILE NAME: K:\Work\18M-00046 Springbrook Tertiary Plan Area\Work\Engineering Drawings\PSP Figures\18M-00046_SS1_SSP.dwg, SS1



KEY PLAN

LEGEND

- EX. ELEVATION
- PROP. ELEVATION
- MATCH TO EXISTING GRADE
- EX. CONTOUR
- OVERLAND FLOW
- LIMIT OF PROPERTY
- POTENTIAL GRADING ISSUES

NO.	BY	DATE	REVISIONS	CHECKED

wsp

FLOWER CITY BRAMPTON.CA

CITY OF BRAMPTON

PLANNING, DESIGN & DEVELOPMENT

DIRECTOR, ENGINEERING AND DEVELOPMENT SERVICES MICHAEL WON P. ENG.

SPRINGBROOK SETTLEMENT AREA

PRELIMINARY GRADING PLAN

DESIGNED BY: Z.A.	CHECKED BY: S.W.	DRAWING NO.	SHEET NO.
DRAWN BY: 10/12 CAD	CHECKED BY:	18M-00046	SG1
SCALE: 1:1750	DATE: APRIL 2020		

PRINTED ON: Friday, 04/24/2020 - 1:16pm PLT NAME: x:\Drwn\18M-00046 Springbrook Tertiary Plan Area\Mun\Engineering Drawings\Plots & Figures\18M-00046_SG1_GRD_SG1.dwg, SG1

APPENDIX

E FIGURES OF REGION'S MODELLING RESULTS

Appendix E

150mm watermain is sufficient for low to medium density developments

Watermain within Block 'F' and Block 'G' to be connected to prop. 300mm watermain on Creditview Road

Upsize from 150mmØ to 300mmØ as per Region's Springbrook Settlement Area Study dated July 20, 2018
Proposed upsize on Creditview Road from Queen Street to proposed 200mm watermain connection within Block 'E'

Watermain within Block 'F' and Block 'G' to be connected to ex. 150mm watermain on Queen Street

Connection from Road 'A' watermain to ex.150mm watermain on Queen Street

Connection from Road 'C' watermain to include a 200x150 reducer and connected to the ex.150mm watermain on Queen Street

Proposed Block 'H' water connection to the ex.150mm watermain on Queen Street

Block I connection to ex.300mm watermain on Creditview Road

Block 'J' connection to ex 600mm watermain on Queen Street

Block 'K' connection to ex 600mm watermain on Queen Street

Block A
Block B
Block C
Block D
Block E
Block F
Block G
Block H
Block I
Block J
Block K

Fallowfield
Flanders
Franmar
Fort Williams
Hosta
Pathway
Haywood
Elbern Markell
Creditview
Queen
Classic
Champion
Links
Danfield
George Robinson
Vidal
Bellcrest

Legend

Junction

Minimum Pressure (psi)

- less than 20.0
- 20.0 ~ 40.0
- 40.0 ~ 50.0
- 50.0 ~ 100.0
- 100.0 ~ 200.0

Pipe

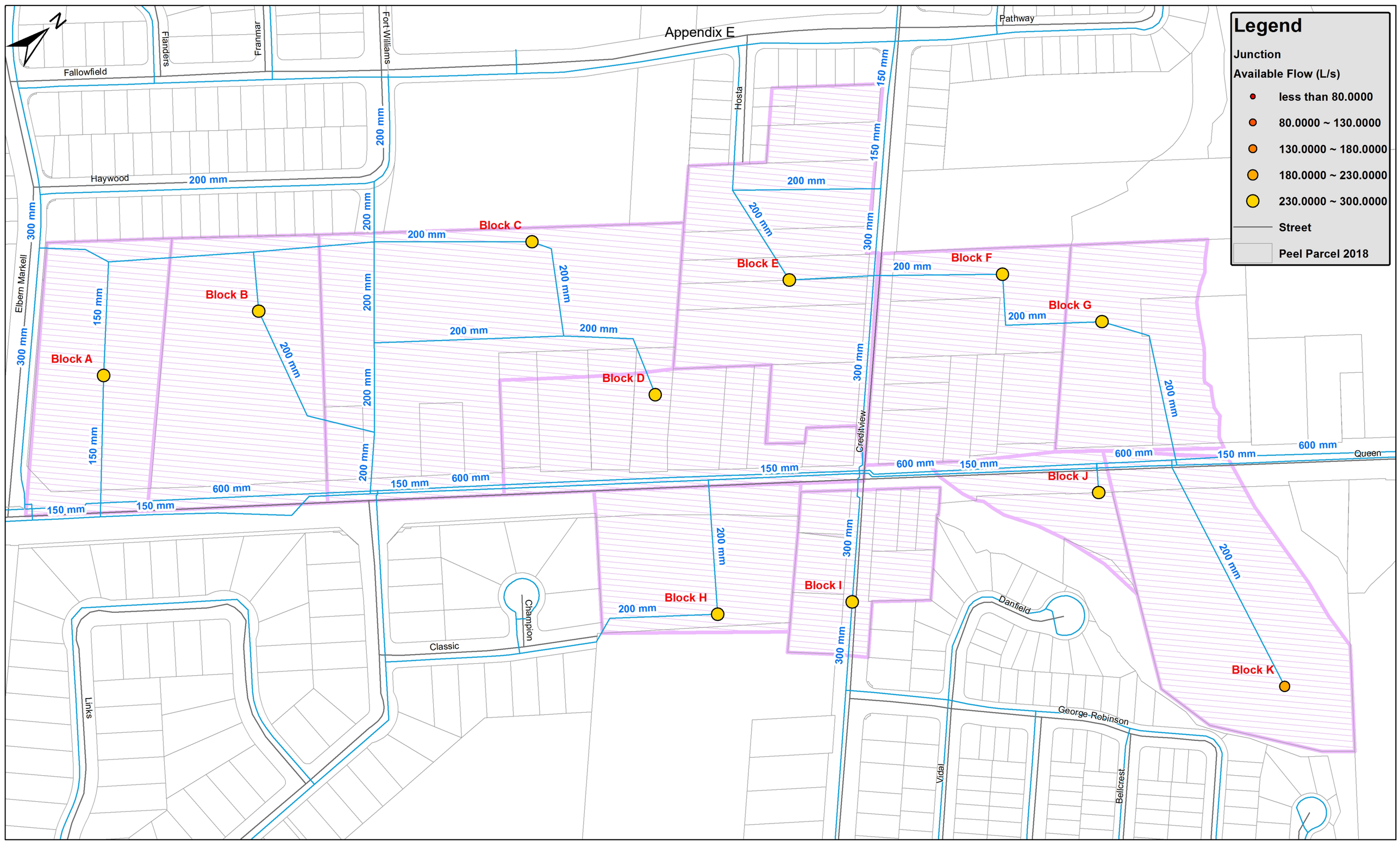
Maximum Velocity (m/s)

- less than 0.5
- 0.5 ~ 1.0
- 1.0 ~ 1.5
- 1.5 ~ 2.0
- 2.0 ~ 22.5
- Street
- Peel Parcel 2018

Region of Peel
working with you

2041 MDD - Springbrook Settlement Area Study

July, 2019
Water & Wastewater Planning, Public Works
Map ID: MODEL-PEEL-2018-11-29
Data Source: Region of Peel
Scale: 1:2,611 | NAD 1983 UTM Zone 17N



Region of Peel
working with you

2041 MDD with Fireflow - Springbrook Settlement Area Study

July, 2019
Water & Wastewater Planning, Public Works
Map ID: MODEL-PEEL-2018-11-29
Data Source: Region of Peel
Scale: 1:2,611 | NAD 1983 UTM Zone 17N

Appendix E

2041 MDD
Normal Condition :

ID	Max.Value (psi)	Max.Time (hrs.)	Min.Value (psi)	Min.Time (hrs.)	Average (psi)	Difference (psi)
A	80.8	26:00:00	70.3	42:00:00	74.2	10.5
B	76.8	26:00:00	66.3	42:00:00	70.2	10.6
C	71.4	26:00:00	60.8	42:00:00	64.8	10.6
D	74.3	26:00:00	63.8	42:00:00	67.7	10.6
E	74.5	26:00:00	63.7	42:00:00	67.7	10.8
F	74.0	26:00:00	63.1	42:00:00	67.2	10.8
G	77.8	26:00:00	67.0	42:00:00	71.1	10.9
H	70.9	26:00:00	60.2	42:00:00	64.3	10.7
I	74.7	26:00:00	63.7	42:00:00	67.8	11.0
J	82.3	26:00:00	71.4	42:00:00	75.5	11.0
K	86.5	26:00:00	75.5	42:00:00	79.7	11.0

2041MDD + Fireflow

ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Available Flow at Hydrant (L/s)	Available Flow Pressure (psi)
A	1.0	74.9	266.5	180.0	41.7	239.8	20.0
B	0.5	70.9	266.4	180.0	60.2	437.6	20.0
C	1.9	65.5	266.4	180.0	51.0	346.1	20.0
D	0.5	68.4	266.4	180.0	37.6	233.0	20.0
E	0.6	68.4	266.4	180.0	59.7	480.1	20.0
F	0.5	67.9	266.4	180.0	52.8	344.6	20.0
G	0.3	71.8	266.4	180.0	50.4	295.9	20.0
H	0.6	65.0	266.4	180.0	46.7	297.9	20.0
I	0.1	68.5	266.4	180.0	64.2	792.1	20.0
J	0.1	76.2	266.4	180.0	54.2	302.8	20.0
K	1.0	80.4	266.4	180.0	31.0	202.2	20.0

APPENDIX

F LPAT LETTER

2019-06-26

18M-000046

Ms. Claudia LaRota
City of Brampton
2 Wellington Street West
Brampton ON, L6Y 4R2

Dear Ms. LaRota,

Subject: **Springbrook Tertiary Plan**
Response to Letter on behalf of Springbrook Estates Inc. dated February 28, 2019
Servicing Peer Review

On behalf of the City of Brampton, we provide this document in response to the letter provided by Glen Schnarr & Associates Inc., dated February 28, 2019 on behalf of Springbrook Estates Inc. appealing a component of the proposed Springbrook Tertiary Plan adjacent to their property located at 9074 & 9084 Creditview Road. Sprinbrook Estates Inc. has a zoning by-law amendment and draft plan of subdivision application with the City (City Files: C04W06.010 and 21T-17004B) which includes a road extension from the south end of Hosta Street to Creditview Road, with proposed single family residential lots fronting either side of the road. The primary concern outlined in the letter is the feasibility of the cul-de-sac extension of existing Hosta Street, to the south of the subject property proposed in the Springbrook Tertiary Plan.

WSP has completed a technical review of the content of the letter prepared by Candevcon Limited dated February 26, 2019, which was appended to the above noted letter. Specifically, WSP has reviewed the municipal servicing (watermain, sanitary sewer and storm sewers), and grading components of the letter. As part of this review, WSP has also reviewed the Functional Servicing Report (FSR), dated November 27, 2018 prepared by Candevcon Limited for the subject property. For clarity, our review excludes any commentary on other aspects of the documents, including, but not limited to, land use planning, environmental, and financial items.

Water Services

It is acknowledged that water servicing for the proposed cul-de-sac extension of existing Hosta Street is not a concern and does not impact the proposed road layout.

Sanitary Services

The Candevcon letter indicates the cul-de-sac extension of existing Hosta Street can be serviced by a new sanitary sewer within the proposed road connection through the subject property, connecting to the existing sanitary sewer on Creditview Road. Based on these assumptions, the sanitary sewer would have an invert of 217.90m at the end of

the cul-de-sac, which would require a finished road grade of 220.65m to provide sufficient cover. In general, we agree with the assumptions that have been made; however, it would also be possible to service the cul-de-sac with a new sanitary sewer through the 'Conceptual Trail Opportunity' shown on the Tertiary Plan between the end of the cul-de-sac and Creditview Road. This sewer would have a lower invert at the connection to the existing sanitary sewer on Creditview Road and would allow for lower road grades on the cul-de-sac. As discussed below, the storm drainage design will likely be the limiting factor with respect to the proposed road elevations, thus the sanitary servicing will not have a significant impact on our assessment.

Storm Drainage

The Candevcon letter indicates the cul-de-sac extension of existing Hosta Street can be serviced by a new storm sewer along the proposed road connection through the subject property, discharging to the existing SWM Pond (Pond S5) east of Creditview Road though a new secondary inlet. Although the Candevcon letter is silent on this matter, the area of the cul-de-sac and extension of Hosta Street was not included in the original inflow area to Pond S5, however it has been demonstrated in the Candevcon draft plan of subdivision application for the subject property that there is excess capacity in Pond S5 to receive additional inflows. Based on the calculations in this report, the design storage volume for the pond was 3,616m^3 based on a contributing area of 19.03ha and a unit storage volume of 190m^3/ha; however, the actual volume provided was 3,970m^3. As such the total additional inflow area added to Pond S5 must not exceed 1.86 ha ([3,970m^3 - 3,616m^3] / 190m^3/ha = 1.86 ha). We would recommend additional analysis of the capacity of Pond S5 to be conducted to ensure quantity control targets for the pond are not exceeded based on the proposed increased inflow area. Should it be determined that the pond does not have capacity for the additional lands, then other options will have to be investigated.

As the proposed new connection to Pond S5 will not enter at the inlet to the forebay, additional water quality measures will be required for the site upstream of the pond connection. These additional quality measures are required to ensure quality targets are met in Pond S5. The Candevcon draft plan of subdivision is proposing an Oil Grit Separator (OGS) in the storm design to address water quality requirements, which is typical and a generally accepted practice for this circumstance. For the cul-de-sac, a separate OGS could be provided or the proposed OGS in the Candevcon draft plan of subdivision could be upsized to accommodate the additional flows.

Based on the assumptions of Candevcon in their letter, the storm sewer would have an obvert of 219.32m at the end of the cul-de-sac, which would require a finished road grade of 220.82m in order to provide sufficient cover. In general, we agree with the assumptions that have been made.

Grading

The Candevcon letter indicates the cul-de-sac could be graded with a high point of 222.42m located at the boundary between 9074 and 9058 Creditview Road (i.e. south limit of the subject site). This would create a split drainage scenario, which would

require the storm sewer system to be designed to capture and convey the 100-year storm event to the pond. In general, we agree with this approach; however, the letter indicates that this configuration would result in a low point of 221.71m at the end of the cul-de-sac, which appears to be based on a 1% road slope from the high point of 222.42m to the end of the cul-de-sac. If the road slope were increased to approximately 2.5%, the low point elevation at the end of the cul-de-sac could be lowered to the grade of 220.82m, which matches the finished road grade required for the Storm Drainage design and thus would be technically feasible.

Conclusion

Based on the above, it is our position that the cul-de-sac extension of Hosta Street could be graded and serviced with a high point of 222.42m at the south limit of the subject site and an elevation of 220.82m at the end of the cul-de-sac. Based on the topographic information provided by the City, the existing grades along the cul-de-sac extension are in the range of 218.5m to 219.0m (not 218.1m as noted in the Candevcon letter), resulting in fill of approximately 2m-4m. It is acknowledged that 3:1 sloping and/or retaining walls would be required in some areas to transition to the existing grades around the perimeter of the development area. This is not dissimilar to the preliminary grading design included in the FSR for the subject site which includes fill up to 4m and a combination of 3:1 sloping and retaining walls along the south limit of the development. As such, it is our position that it is technically feasible to service and grade the area based on the conceptual road layout identified in the Tertiary Plan subject to environmental, planning and transportation requirements. During the draft plan of subdivision and detailed design process, the road/lot configuration and servicing and grading design would be further developed to minimize the impacts associated with the required filling, sloping and retaining walls.

We trust that this provides sufficient information. Should you have questions or concerns, please call me at 647-730-7156 so that we can provide any additional input that you require in a timely manner.

Yours truly,

WSP CANADA GROUP LIMITED

Alex Williams, P.Eng.
Project Manager
Land Development

c: Mr. Bobby Gauthier – WSP Canada Group Limited