PINESTONE ENGINEERING LTD.

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www.pel.ca | pinestone@pel.ca

August 26th, 2019 P.N. 18-11393B

Innovative Planning Solutions
150 Dunlop Street East
Suite 201
Barrie, Ontario
L4M 1B1

Reference: 910 Veterans Drive, City of Barrie
53 Unit Back to Back Townhouse Development
Functional Servicing & Storm Water Management Brief

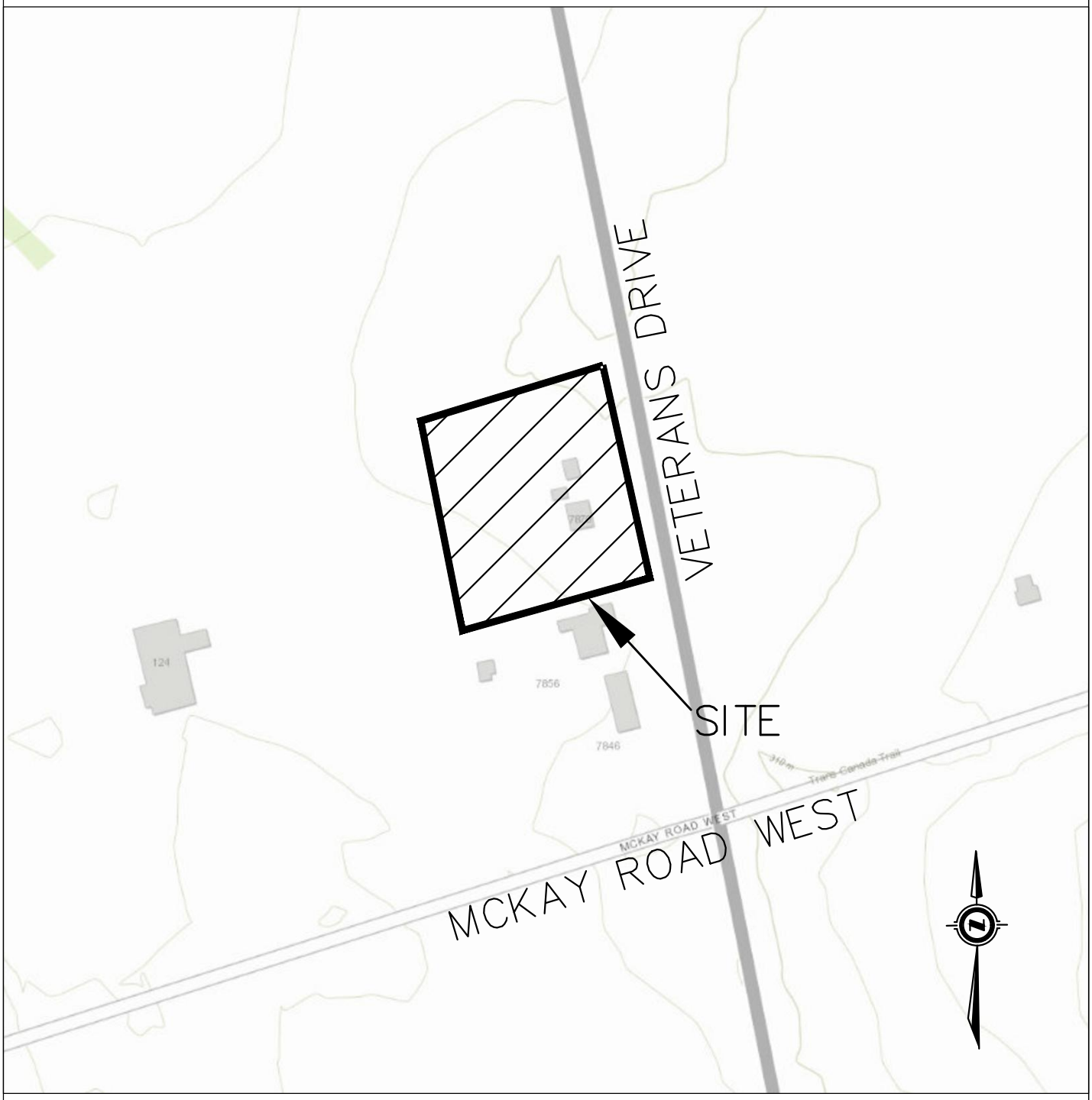
1.0 INTRODUCTION & BACKGROUND

The subject site is approximately 0.74 hectares in area and was incorporated into the City of Barrie boundary by the Barrie-Innisfil Boundary Adjustment Act, 2009. It is a part of the proposed Salem neighbourhood within the Annexed Lands and is currently occupied by a single residential home. Existing access to the property is provided from Veterans Drive. The site is currently bounded by existing agricultural land to the north and west, Veterans Drive to the east and existing residential to the south. The location of the subject site is further illustrated on Figure 1.

The proposed development concept includes 53 back to back townhouse / townhouse units. As part of the proposed secondary plan, medium and low-density residential development will be developed to the north and west of the site, and potentially high density residential to the south. Access to the proposed development will be provided via an 12m wide municipal lane connecting from Street ‘E’ to Lane ‘T’ constructed through the plan of subdivision by H&H Group Ltd.

The proposed development concept prepared by Innovative Planning Solutions is included as Figure 2 and further illustrates the development concept and future surrounding uses.

The purpose of this brief is to describe the existing servicing infrastructure in the vicinity of the site, and provide recommendations for the provision of sanitary drainage, water distribution and stormwater management in accordance with City of Barrie criteria in support of Draft Plan Approval.



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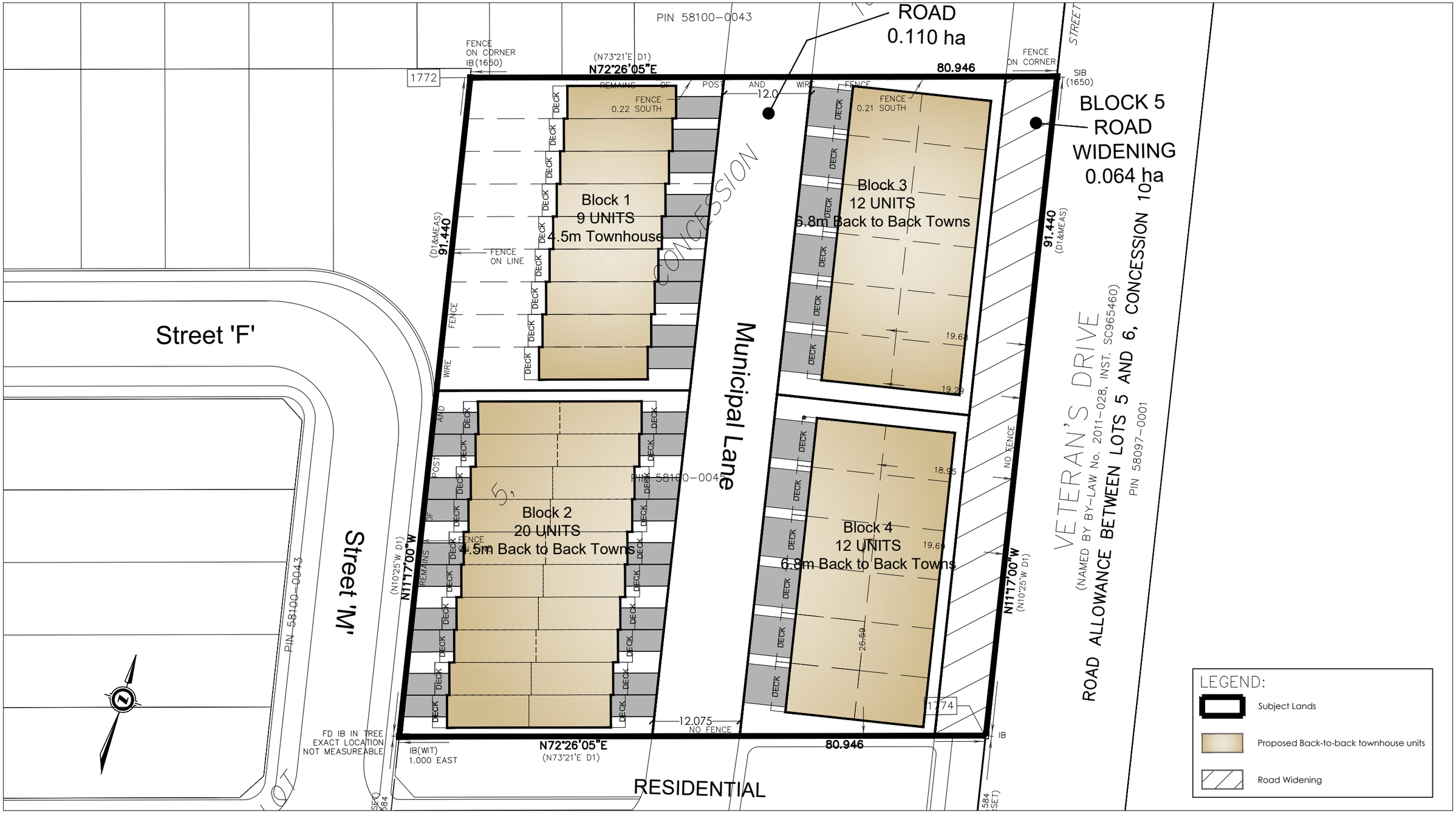
910 VETERANS DRIVE

LOCATION PLAN

DATE:	SCALE:	PROJECT No.	FIGURE No.
JAN. 2019	1:2500	18-11393B	FIGURE 1



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910 VETERANS DRIVE

CONCEPTUAL SITE PLAN

PROJECT NO. 18-11393-B

SCALE: 1:500

DATE: AUG. 2019

DRAWING NO.

FIGURE 2

2.0 SANITARY SERVICING

2.1 Existing Sanitary Servicing

No municipal sanitary servicing is readily available for connection. Upon review of the *Wastewater Collection Master Plan* by amec sewage flows from the site will be directed south through the proposed residential subdivision and towards the McKay Road trunk sewer. Sewer design grades within the proposed subdivision south and west of the subject are unknown at this time.

2.2 Proposed Sanitary Flows

Contributing sanitary flows from the proposed development were calculated using City of Barrie design criteria as follows:

- A residential average sewage flow of 225 litres/capita/day
- A residential population density of 2.34 persons/unit
- An extraneous flow rate of 0.1 litres/sec/ha
- A peaking factor based on Harmon's equation

With a total residential count of 124 persons and incorporating extraneous flows, the combined peak sewage flow generated by the proposed development is calculated to be approximately 1.4 L/sec. Detailed sanitary calculations are appended.

2.3 Proposed Sanitary Servicing

Based on our review of servicing strategy for the adjacent subdivision (H&H Capital Group Ltd.), gravity sanitary servicing will be constructed along Street 'E'. Assuming a connection invert of approximately 3m lower than the proposed road grade, it is anticipated that gravity servicing can be achieved for the proposed site with sanitary flows being conveyed to the south and towards the Street 'E' sanitary sewer. It is understood that the town home units will not have basements which may allow for shallower sanitary depths within the laneway. Sanitary pumping of basement sewage may be required if basements are constructed.

The subject development will be serviced from the extension of a gravity main from Street 'E'. Each unit will be serviced with individual gravity sanitary services from the municipal laneway. Servicing details will conform to City of Barrie standards and the exact size and location of the service lateral will be determined during detailed design to the support the Site Plan Application.

Cost sharing may be required to utilize the sanitary sewer located on Street 'E' within the H&H Capital Group Ltd. subdivision. Coordination with the adjacent land owner will be required to ensure compatibility between sanitary inverts at the detailed design stage.

A conceptual servicing layout is provided in Appendix B.

3.0 WATER SERVICING

3.1 Existing Water Servicing

No municipal water servicing is readily available for connection. Upon review of the *Water Storage and Distribution Master Plan* by amec a 500mm diameter watermain is planned to be constructed adjacent to the subject site along Veteran's Drive from Salem Road to McKay Road West.

3.2 Proposed Water Demands

The domestic water demands for the proposed development are listed in Table 1 below:

Table 1: Domestic Water Demand

Population	Per Capita Flow (L/day)	Peaking Factors (based on MOECC Guidelines)		Flows (L/sec)	
		Peak Hour	Maximum Day	Peak Hour	Maximum Day
124	225	2.25	1.5	0.79	0.52

Fire demands for the proposed development will be calculated in accordance with the Fire Underwriters Survey (FUS) at the detailed design stage. Based on our experience with similar back to back developments, fire flows typically range in the 100-120 l/sec range. Fire flow rates are dependent on construction type and if sprinklers will be installed which are both unknown at this time.

3.3 Proposed Water Servicing

Based on our review of servicing strategy for the adjacent subdivision (H&H Capital Group Ltd.), water servicing will be constructed along Street 'E' and along Lane 'T'. It is anticipated that the final watermain configuration will consist of a looped connection from Street 'E' to Lane 'T' through the proposed development. Based on the proposed watermain sizes, it is expected that sufficient water supply will be available to service the proposed development for both domestic and fire flow purposes.

Each unit will be serviced with individual water services from the municipal laneway. Servicing details will conform to City of Barrie standards and the exact size and location of the service lateral will be determined during detailed design to the support the Site Plan Application.

Cost sharing may be required to utilize the watermain located on Street 'E' within the H&H Capital Group Ltd. subdivision. Coordination with the adjacent land owner will be required to ensure compatibility between watermain inverts at the detailed design stage.

A conceptual servicing layout is provided in Appendix B.

4.0 STORM DRAINAGE

4.1 Existing Storm Drainage

Currently no storm infrastructure exists on the property or along Veterans Drive. Topography through the site is generally flat and site drainage is conveyed to the north and south in the form of overland sheet flow to adjacent properties with no quality or quantity control.

4.2 NVCA & LSRCA Drainage Boundary Adjustment

A slight modification of the boundary is required to direct post development flows from the subject site to proposed SWMF E2. It is understood from the FSR prepared by Crozier for the adjacent subdivision lands that they also proposed a modification from the approved SIS to the boundary. The adjustment to the boundary for 910 Veterans Drive requires approximately 0.6 ha of land to be directed to the NVCA watershed. The boundary adjustment is required in order to conform with the conceptual grading design included in the Crozier FSR prepared Feb. 2018 for the H&H Subdivision. The conceptual grading design included in Appendix B respects the concept grading provided in the Crozier Report.

4.3 Storm Water Management Review

Based on our review of the overall grading concept for the proposed H&H Capital Group Ltd. subdivision, storm drainage from Street 'E' will be directed to the proposed SWMF E2 constructed at the southwest limit of the H&H Capital Group Ltd. property. Pond E2 is proposed to be a wet pond facility which will provide pre- to post- peak flow (quantity control) and enhanced protection (quality control) for Catchment 201 (16.98ha) in the H&H Subdivision. The owner of 910 Veterans Drive is required to enter a cost sharing arrangement with the landowners group to ensure the downstream SWMF E2 is sized to accommodate the additional drainage and imperviousness from the subject site. The additional area directed to proposed Pond E2 is approximately 0.6 ha or 3.5% of the Catchment 201 area draining to the pond. The additional runoff directed to the proposed Pond E2 from the subject site is considered negligible in comparison to the total catchment area draining to the pond. It is anticipated that runoff rates / the final pond design and configuration will not be significantly impacted by the addition of the subject site area to the Pond E2 catchment area.

The use of Low Impact Development (LID) measures such as permeable pavers and infiltration will be examined at the detailed design stage. LID measures could also potentially be incorporated into the municipal laneway if acceptable by the City.

4.3 Phosphorus & Water Balance Review

Detailed phosphorus and water balance calculations will be provided at the detailed design stage once the design details for downstream SWMF E2 are understood. It is anticipated that the downstream pond will provide some aspect of phosphorus removal and water balance benefit. Soak away pits per City Standard BSD-1406 will also be incorporated into the lot design for Block#1 where there is sufficient rear yard space. The design of the soak away pits will be detailed at the site plan stage once the characteristics of the import soil are known and the architectural/foundation design is known.

A preliminary water balance was completed for the subject area by Crozier as part of the H&H Subdivision. An excerpt from their report is included in Appendix A and indicates the first 7mm of rainfall depth is required to be captured and infiltrated on-site to maintain annual pre-development infiltration across the site. The completed water balance is preliminary in nature and will be updated to reflect specific geotechnical and hydrogeological studies at the detailed design stage.

A preliminary phosphorus budget was completed for the subject site. The MOE's P-Tool was utilized to determine pre and post development phosphorus loadings. Low intensity area was used in modelling the phosphorus loadings from the site for the pre-development condition. For the post development condition, high intensity residential development was used to estimate phosphorus loadings. Based on a comparison of pre-development and post development loads, an increase of 1785% is expected as a result of the proposed development. Phosphorus budget calculations and phosphorus catchment figures are included in Appendix A.

Based on our review of the H&H Capital FSR completed by Crozier, downstream phosphorus removal will be provided using both the wet pond (63%) and filter strips (65%). As stated in this report, 80% removal efficiency will be provided within the catchment area discharging to proposed SWMF Pond E2 (see excerpt included in Appendix A). Further information pertaining to phosphorus removal will be provided at the detailed design stage.

5.0 GRADING & ROAD STANDARD

The grading concept for the development lands will require extensive fill based on the surrounding concept grades provided in the FSR prepared for the H&H Capital Group Ltd. development. It is anticipated that these concept grades will be refined as detailed design of the subdivision moves forward. Grading on the subject lands is dependent on the final grades determined along the north and west boundaries. In general, the proposed laneway will slope moderately from the north to the south towards Street 'E'.

Coordination will be required to ensure the grades at the connection point with Lane 'T' match. Based on the concept grading plan prepared for the H&H Capital Group Ltd. development, this area may require slight adjustment to create a highpoint and drainage divide at the lot line. This will be further examined at the detailed design stage once the subdivision grading has been examined. Retaining structures will likely be required along the east limit adjacent to Veterans Drive. It is also recommended that the City review the proposed Veterans Drive grading design. Based on the proposed grading design developed by H&H Capital Group Ltd., the proposed subdivision at Street 'E' will be approximately 4m above Veterans Drive. The design of the proposed townhouse units should include a walk-out style grading design along Veterans Drive to reduce grade change between the proposed development and Veterans Drive right of way.

Currently the subject site is accessed via an asphalt driveway from Veterans Drive. Veterans Drive is currently a 2-lane rural road cross-section. A Municipal Class EA Schedule C was prepared by Stantec Consulting Ltd. to provide alternatives to address transportation improvements in the Salem Secondary Plan area. The preferred alternative provided in the EA proposed to expand Veterans Drive to a 34m right of way along from Salem to McKay and along the frontage of the subject site. Existing and proposed road elevations are further illustrated on an excerpt from the EA included in Appendix A.

The draft plan proposes a 12.0m road allowance per City of Barrie road allowance standard BSD-314. A

preliminary grading design for the proposed street is provided on the attached engineering plans. The final grading design is contingent on the grading design developed for the H&H Capital Group Ltd. subdivision.

7.0 UTILITIES

The Salem Secondary Plan (OPA No. 38) indicates the following with reference to utility design:

a) Prior to approval of development within the Salem Secondary Plan Area, all interested telecommunications providers and required utilities providers shall work with the landowner(s) and the City to confirm their plans for services to support the proposed development. The City shall work with the providers to determine appropriate locations for large equipment or cluster sites.

b) All telecommunications services and utilities should be located within an initial common trench, whenever possible, to avoid unnecessary digging and disruption on municipal rights of way.

c) Consideration shall be given to the location of telecommunication facilities and utilities within public rights of way as well as on private property. Utilities and telecommunications facilities shall be grouped/clustered or combined where possible and feasible to maximize the use of land and, where applicable, to minimize visual impact. Utilities and telecommunications facilities shall be placed in such a manner so as to not visually detract from the streetscape. The City shall encourage utility and telecommunications providers to consider innovative methods to make these facilities less noticeable including containing such services on or within streetscape features such as gateways, light standards, bulk water meters and transit shelters where it is feasible.

Hydro, gas and cable are proposed to be available to service the subject site. Coordination with local utilities companies will be required to obtain utility servicing drawings at the detailed design stage.

8.0 CONCLUSION

Based on the above findings, it is anticipated that the proposed development will be serviced from future servicing to be constructed along Street ‘E’. Storm water from the site will be directed to Street ‘E’ and discharge to the proposed SWMF E2 located within the H&H Capital Group Ltd. Lands. Grading on the subject site is largely impacted by the final grading determined through the detailed design of the subdivision along the north and west boundaries. Grading will need to be coordinated at the detailed design stage to ensure compatibility. The developer will be responsible to ensure necessary cost sharing arrangements are in place to utilize the servicing on Street ‘E’.

We trust this is satisfactory and should you have any questions, please call. All of which is respectfully submitted by:

Joe Voisin, P.Eng., C.E.T.
Senior Engineer, Partner

APPENDIX A

Preliminary Design Calculations and Background Information

PINESTONE ENGINEERING LTD.

9.0 WATER BALANCE

Current LSRCA and NVCA policy states that pre-development annual infiltration volumes are to be maintained under proposed post-development conditions to ensure that the natural groundwater recharge characteristics are preserved.

A preliminary water balance assessment was completed for the Subject Development using the Thornwaite Method. Climactic data was retrieved from the Environment Canada Climate Normals data for the Barrie Water Pollution Control Centre (Station no. 6110557) for the period of 1981-2010. The water balance assessment calculated the pre-development and post-development annual precipitation based on the proposed Draft Plan.

The water balance assessment was completed to determine the post-development infiltration targets for the Subject Development. **Table 13** summarizes the results of the water balance assessment for the Subject Lands.

Table 13: Water Balance Assessment

Parameter	Subject Site
Soil Type	Sandy Loam
Pre-development Infiltration (mm/year)	165
Post-development Infiltration – no mitigation (mm/year)	67
Post-development Runoff-coefficient	0.65
Design Precipitation (mm/year)	246
Design storm capture – infiltration LIDs (mm)	**7**
Post-development Infiltration – with mitigation (mm/year)	168

Based on the preliminary water balance assessment, the first 7mm of rainfall is required to be captured and infiltrated on-site to maintain annual pre-development infiltration across the site. Water balance calculations are included in **Appendix H**. The water balance assessment will be updated in detailed design in light of site specific geotechnical and hydrogeological study of the Subject Lands.

The design of infiltration based LIDs will be completed at the detailed design phase following site specific hydrogeological and geotechnical investigations.

Table 11: Pre and Post-Development Phosphorus Loading (Schaeffers, 2017)

Catchment	201 (Pond E2)	202 (Pond F)
Salem SIS Total Catchment Area (ha)	22.66	33.99
Internal Catchment Area (ha)	16.98	17.53
Scaling Factor	0.75	0.52
Pre-development P Loading (kg/year)	5.31[1]	3.99[1]
Post-development P Loading (kg/year) – no mitigation	11.57[1]	17.50[1]
Primary mitigation measure (reduction)	Wet Pond (63%)	Wet Pond (63%)
Secondary mitigation measure	Filter Strips (65%)	N/A
Post-development P Loading (kg/year) – with mitigation	**1.50**[1]	**6.47**[1]

[1]Values scaled based on internal (site) catchment area

As indicated in **Table 11**, the treatment train approach proposed for Pond E2 provides sufficient post-to-pre phosphorus removal per NVCA guidelines. The phosphorus loading of Catchment 201 is 6.47 kg/year which exceeds current LSRCA policy. It is noted that no secondary mitigation measure was proposed for Pond F by Schaeffers in the Salem SIS (December, 2017). The Subject Development may employ addition mitigation measures in a treatment-train approach to further reduce phosphorus export from the site. It is noted that these additional mitigation measures could serve a double purpose that satisfies Water Balance (Section 9.0) and/or Volume Control (Section 8.11) criteria.

8.11 Volume Control

Per the Lake Simcoe Region Conservation Authority (LSRCA) Technical Guidelines for Stormwater Management Submissions (2016), the Subject Development will be subject to a requirement to retain or treat 25mm of rainfall from the total impervious area on the site. Based on the Water Balance assessment for the Subject Development (Section 9.0), 10mm of rainfall will be captured and infiltrated to maintain pre-development infiltration volumes. Thus, the remining 15mm of rainfall will need to be captured and treated on-site to achieve volume control requirements.

Table 12 below provides a summary of volume requirements for catchment 202, lying completely within the LSRCA jurdiction.

Table 12: Volume Control LID Considerations

Catchment	201 (LSRCA)
Area (ha)	17.53
Imperviousness (%)	63
25mm runoff volume (m^3)	2760
7mm runoff volume – infiltrated for water balance (Section 9.0)	773
18mm runoff volume (balance)	**1987**

Based on available soil mapping, the site is underlain with sandy loam soils which are suitable for infiltration based LID technologies. Further geotechnical and hydrogeological analysis will be completed at the detailed design stages to confirm hydraulic conductivity values and soil conditions when sizing the LID measures.

Ontario

MINISTRY OF THE ENVIRONMENT

Database Version: V 2.0 Release Update
Update Date: 30-Mar-12

Project DEVELOPMENT Summary

DEVELOPMENT: 910 Veterans Drive
Subwatershed: Lovers Creek

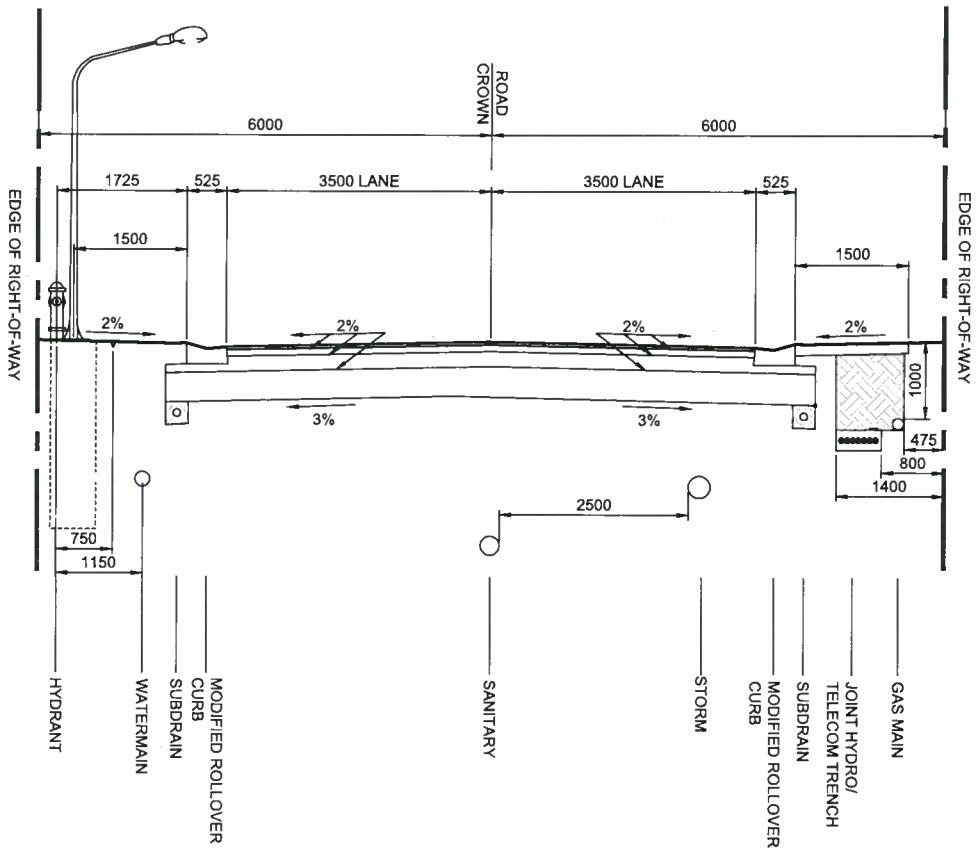
Total Pre-Development Area (ha):	**0.7400**	Total Pre-Development Phosphorus Load (kg/yr):	**0.05**

Pre-Development Land Use	Area (ha)	P coeff. (kg/ha)	P Load (kg/yr)
Low Intensity Development	0.74	0.07	0.05

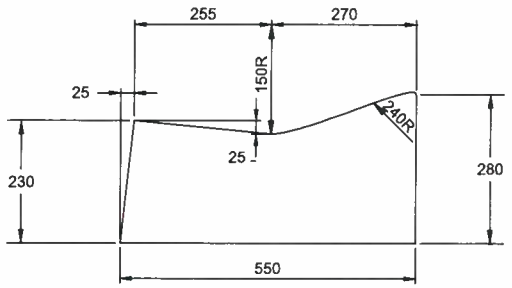
POST-DEVELOPMENT LOAD

Post-Development Land Use	Area (ha)	P coeff. (kg/ha)	Best Management Practice applied with P Removal Efficiency		P Load (kg/yr)
High Intensity - Residential	0.74	1.32	NONE	0%	0.98

		P Load (kg/yr)
Post-Development Area Altered:	**0.74**	
Total Pre-Development Area:	**0.74**	
Unaffected Area:	**0**	
Pre-Development:		**0.05**
Post-Development:		**0.98**
Change (Pre - Post):		**-0.93**
1786% Net Increase in Load		
Post-Development (with BMPs):		**0.98**
Change (Pre - Post):		**-0.93**
1785.71% Net Increase in Load		



MODIFIED ROLLOVER CURB DETAIL



MODIFIED ROLLOVER CURB NOTES:

1. TOP EDGES OF CURB AND GUTTER TO BE ROUNDED USING AN APPROVED EDGING TOOL.
2. ALL CONCRETE WORK TO CONFORM TO ONTARIO PROVINCIAL SPECIFICATIONS & STANDARDS (OPSS).
3. CLASS OF CONCRETE: 30MPa
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
5. ALL DRIVEWAY & SIDEWALK RAMPS TO BE DESIGNED AND CONSTRUCTED TO APPLICABLE ONTARIO PROVINCIAL STANDARDS AND CITY OF BARRIE STANDARDS.

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. WASTEWATER SYSTEMS, STORMWATER SYSTEMS, AND WATER DISTRIBUTION AND TRANSMISSION SYSTEMS TO BE DESIGNED IN ACCORDANCE WITH CITY OF BARRIE ENGINEERING GUIDELINES AND STANDARDS.
3. REFER TO THE CITY OF BARRIE ROADWAY ILLUMINATION POLICIES AND DESIGN GUIDELINES AND ASSOCIATED BSD'S FOR LIGHT STANDARD AND POLE BASE LOCATION AND DEPTH.
4. REFER TO TRANSPORTATION DESIGN MANUAL FOR PAVEMENT DESIGN METHODOLOGY.
5. TREE/LANDSCAPING ARE TO BE ACCOMMODATED WHEREVER POSSIBLE IN LOCATIONS APPROVED BY THE PARKS, PLANNING, AND DEVELOPMENT BRANCH AND IN ACCORDANCE WITH CITY OF BARRIE GUIDELINES.
6. TYPICAL MINIMUM DEPTH FOR UTILITY CROSSINGS SHALL BE 1.0m (TO CLEAR SUBDRAINS).

Barrie

STANDARD DETAIL

12.0 m LANEWAY
ROAD ALLOWANCE
7.0 m ASPHALT

REV No.	DATE: OCT 2017
1	SCALE: N.T.S.

BSD-314

APPROVED

DATE . . Oct. 28/17.

. . . . . .

DIRECTOR OF ENGINEERING

910 Veterans Drive

City of Barrie

SANITARY SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Project Number: 17-11313B
Date: March 1, 2019
Design By: LPB
Checked By: JHV
File: \\pinestoneserver\company\Project Documents\11393B 910 Veterans Drive FSR\FSR\FSR\Sanitary Sewer Design Sheet.xls

Drainage Area Plan No: N/A

Design Parameters

Average Daily Flow
Residential 0.0026 L/s/c
Commercial 0.326 L/s/ha

Mannings "*n*" 0.0130
Min. Velocity 0.75 m/sec
Max. Velocity 3.0 m/sec
Residential Harmon Peaking Factor (F)
Infiltration 0.10 L/s/ha

PINESTONE ENGINEERING LTD.

LOCATION				RESIDENTIAL AREAS and POPULATION						SCHOOL, INSTITUTIONAL			COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN							
										HECTARES AND FLOW OF EACH ZONING																			
										0.00 *L/s/ha*			0.326 *L/s/ha*			0.00 *L/s/ha*												
STREET	AREA NO.	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA	UNITS	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"	PEAK RES. FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	TOTALS-C-I FLOW	AREA	CUMUL AREA	INFIL FLOW	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY
				ha		*1000s*	*1000s*		*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*m*	*%*	*mm*	*L/sec.*	*m/s*	*m/s*
Proposed Development (53 Townhouse Units)				0.74	53.00	0.124	0.124	4	1.2919											0.74	0.74	0.0740	1.3659						

Soils Map

Legend

Parcels
- Assessment Parcel
- Farm Tax Rated Parcels - Current Year
- Farm Tax Rated Parcels - Previous Year

Live Data

Administrative
- Conservation Authority
- Geographic Township
- Lots
- Ontario Public Sector Region

Municipality
- Lower or Single Tier Municipality
- Upper Tier or District Municipality

Crown Land Primary Land Use Area
- Conservation Reserve
- Enhanced Management Area
- Forest Reserve
- General Use Area
- Protected Area - Far North
- Provincial Park
- Provincial Wildlife Area
- Recommended Conservation Reserve
- Recommended Provincial Park
- Wilderness Area

Environment/Base
- Drain Connection
- ANSI
- NTS 50K Grid
- Quaternary Watersheds
- Tertiary Watersheds
- Secondary Watersheds
- Soils - Outline

Agricultural Tile Drainage - System Type
- Random
- Systematic

Constructed Drain Type
- Closed/Tiled
- Open or Unknown

Controlled Drainage Class
- Fair
- Good
- Poor

Drain Classification - DFO Class Authorization Type
- A
- B
- C
- D
- E
- F

Soils - CLI
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Class 6
- Class 7
- Organic Soil
- Unclassified
- Water

Soils - Drainage
- Not Applicable
- Imperfectly Drained
- Moderately Well Drained
- Poorly Drained
- Rapidly Drained
- Variable
- Very Poorly Drained
- Very Rapidly Drained
- Well Drained
- Water

Soils - Hydrologic Soil Group
- A
- B
- C
- D

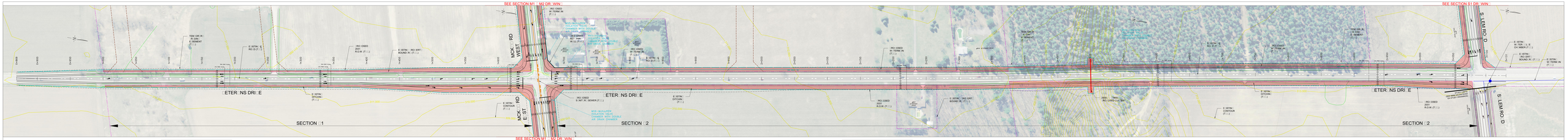
N

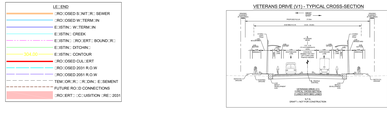
0 0.7 km

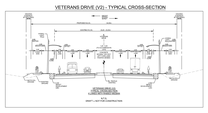
Ontario

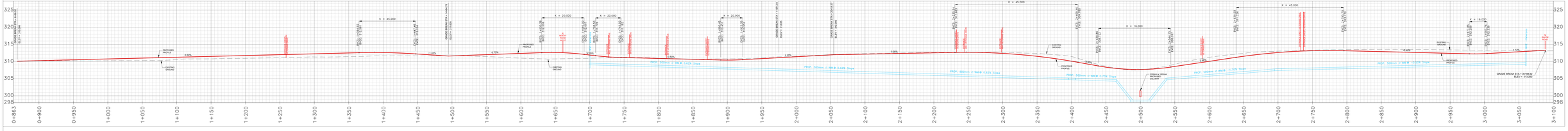
Map Created: November 14, 2017

Map Center: 44.31344 N, -79.6956 W









SECTION 1

SECTION 2

SECTION 2

The City of BARRIE

Stantec

Stantec Consulting Ltd.
300-675 Cochrane Drive West Tower
Markham ON Canada
L3R 0B8
Tel. 905.944.7777
Fax. 905.474.9889
www.stantec.com

APPENDIX B

Preliminary Engineering Drawings

PEL
PINESTONE ENGINEERING LTD.

Filename: R:\BARRIE ACAD FILES\18-11393B 910 VETERANS DRIVE\01-CIVIL\SHEETS\18-11393B EX-1.DWG
Plot Date: 2019-03-27

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The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them

Drawings shall not be used for construction unless sealed and signed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.

KEY MAP

NOTES

1. TOPOGRAPHIC SURVEY PROVIDED BY JOE TOPO LTD. COMPLETED AUG. 1, 2018

BENCHMARK

BM#1 TOP OF STANDARD IRON BAR (SIB), NORTH-EAST CORNER OF SITE BOUNDARY, ELEV. 309.96 masl

NO.	YY.MM.DD	REVISION	BY

SEAL

NORTH ARROW

DESIGN BY:	---
DRAWN BY:	A.L.
CHECKED BY:	J.V.
DATE:	Mar. 27, 2019
SCALE:	1:250

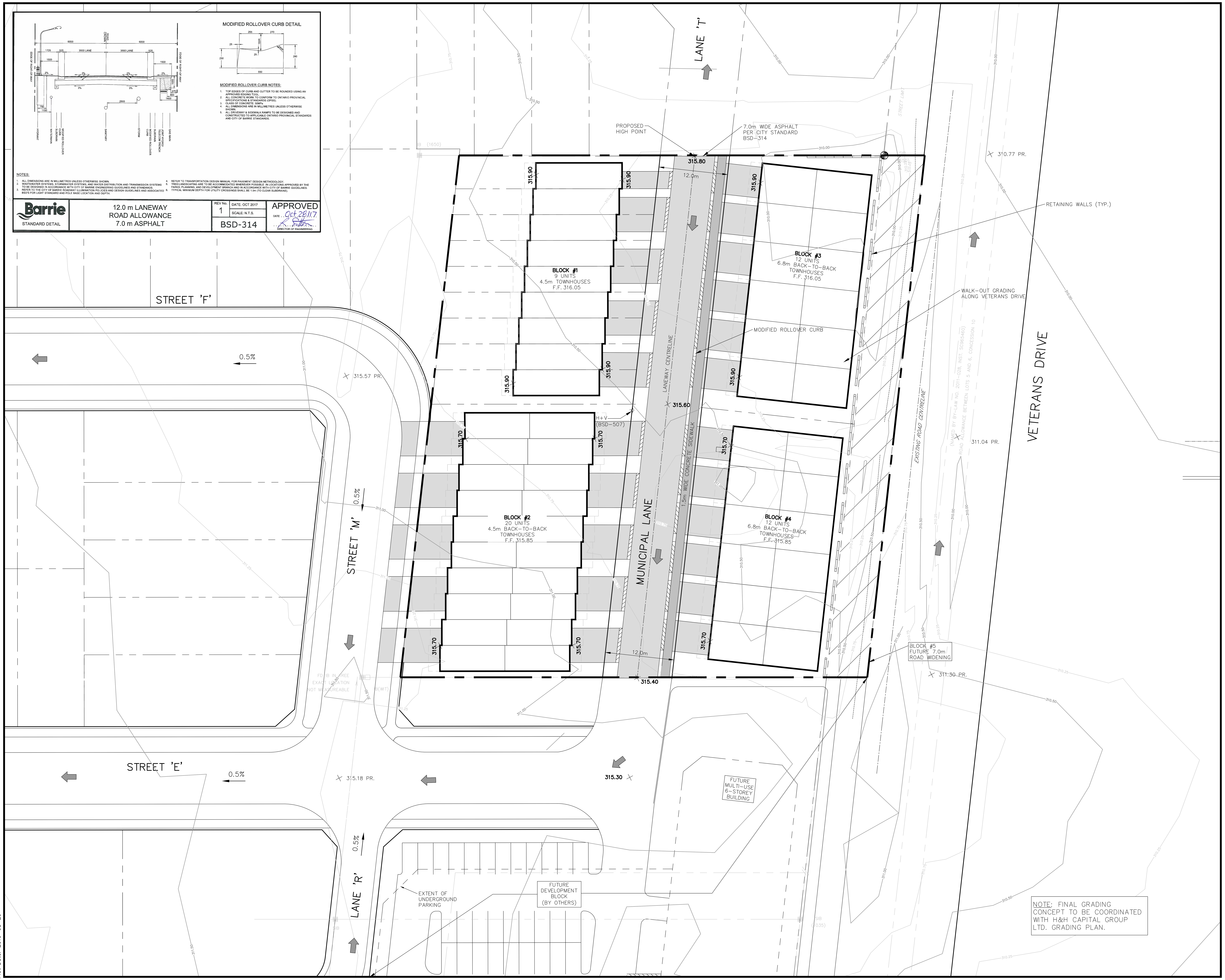
CLIENT/PROJECT

910 VETERANS DRIVE TOWNHOUSE DEVELOPMENT

DRAWING TITLE

EXISTING CONDITIONS PLAN

PROJECT NO.	DRAWING NO.	REVISION
18-11393-B	EX-1	0



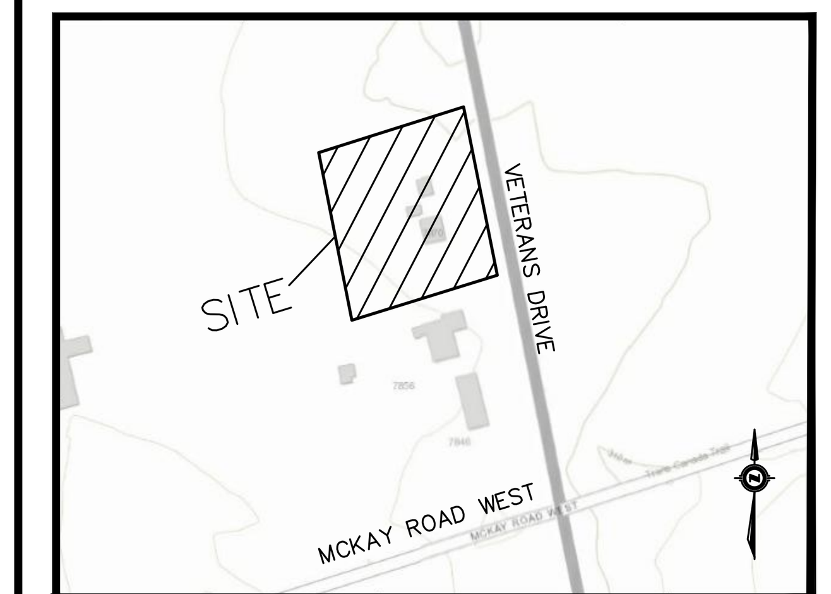
Filename: R:\BARRIE ACAD FILES\18-11393B 910 VETERANS DRIVE\01-CIVIL\SHEETS\18-11393B FIG-4-CONCEPTUAL GRADING.DWG
Plot Date: 2019-08-26

PINESTONE ENGINEERING LIMITED | www.pel.ca

The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them

Drawings shall not be used for construction unless sealed and signed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.



KEY MAP

NOTES

1. TOPOGRAPHIC SURVEY PROVIDED BY JOE TOPO LTD. COMPLETED AUG. 1, 2018

2. SITE PLAN AND LEGAL INFORMATION PROVIDED BY INNOVATIVE PLANNING SOLUTIONS LTD. AUGUST, 2019.

LEGEND

(arrow)	DIRECTION OF MAJOR OVERLAND FLOW
×300.00	PROPOSED GRADE POINT ELEVATION
× 300.00 PR.	PROPOSED GRADE POINT ELEVATION FROM H&H CAPITAL GROUP LTD. CONCEPT GRADING PLAN

BENCHMARK

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NO.	YY.MM.DD	REVISION	BY

SEAL

NORTH ARROW

DESIGN BY:	J.V.
DRAWN BY:	A.L.
CHECKED BY:	J.V.
DATE:	Aug. 26, 2019
SCALE:	1:300

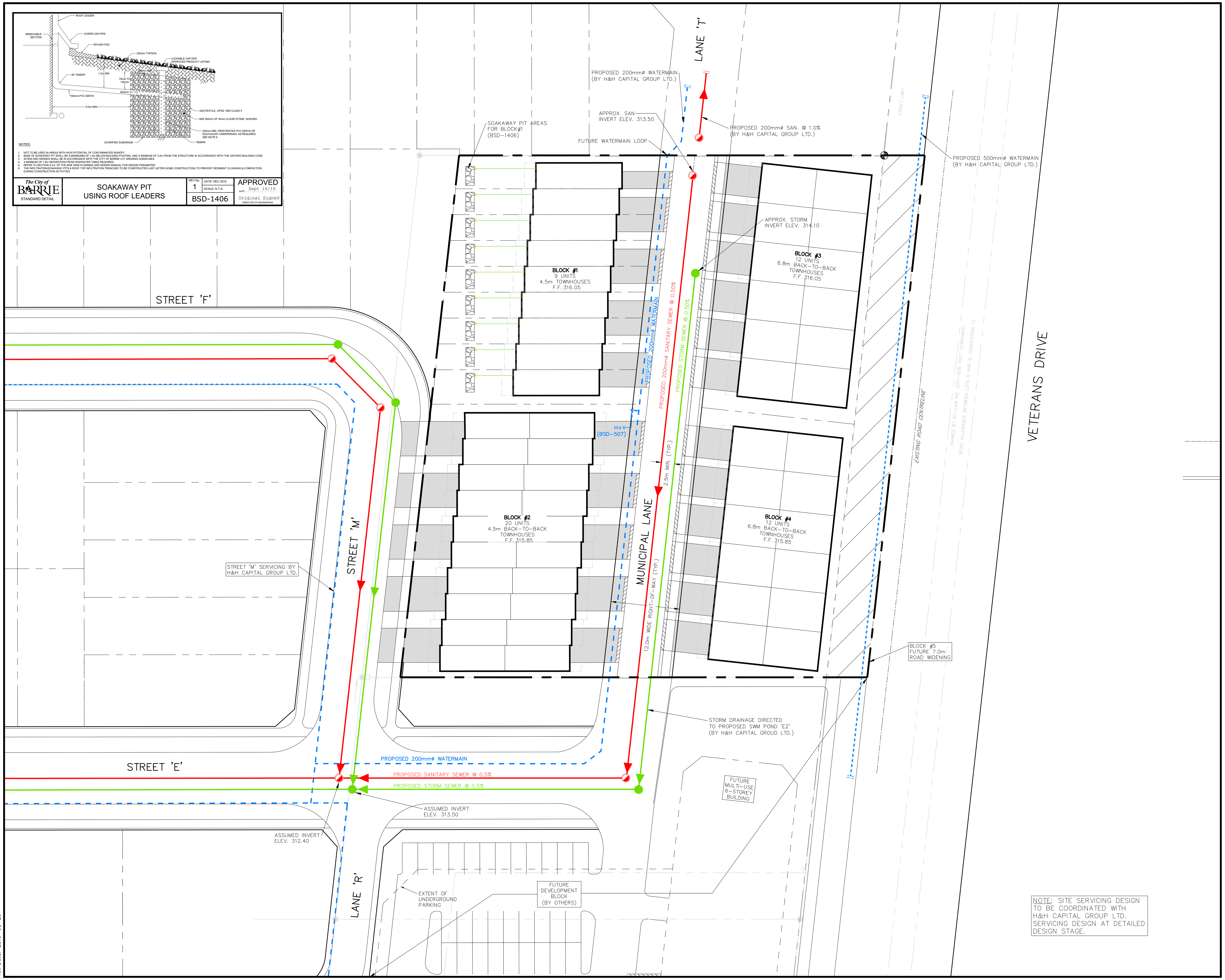
CLIENT/PROJECT

910 VETERANS DRIVE TOWNHOUSE DEVELOPMENT

DRAWING TITLE

CONCEPTUAL GRADING PLAN

PROJECT NO.	DRAWING NO.	REVISION
18-11393-B	GP-1	0



Filename: R:\BARRIE ACAD FILES\18-11393B 910 VETERANS DRIVE\01-CIVIL\SHEETS\18-11393B CONCEPTUAL SERVICING.DWG
Plot Date: 2019-08-26

PEL
PINESTONE ENGINEERING LIMITED | www.pel.ca

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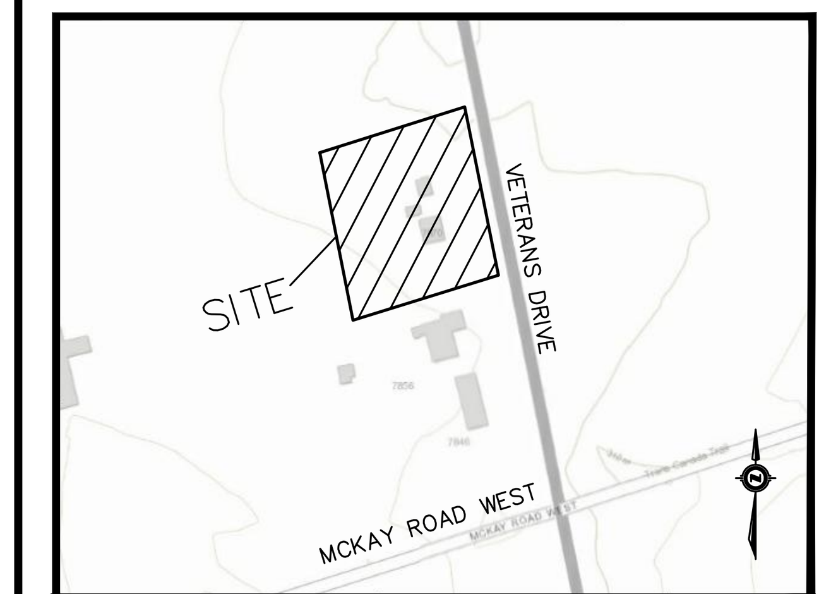

KEY MAP

NOTES

1. TOPOGRAPHIC SURVEY PROVIDED BY JOE TOPO LTD. COMPLETED AUG. 1, 2018
2. SITE PLAN AND LEGAL INFORMATION PROVIDED BY INNOVATIVE PLANNING SOLUTIONS LTD. AUGUST, 2019.

LEGEND

- PROPOSED STORM MANHOLE
- PROPOSED 200mmø STORM SEWER
- PROPOSED SANITARY MANHOLE
- PROPOSED 200mmø SANITARY SEWER
- PROPOSED HYDRANT AND VALVE
- PROPOSED 200mmø WATERMAIN
- PROPOSED 100mmø ROOF LEADER

BENCHMARK

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DESIGN BY:	J.V.
DRAWN BY:	A.L.
CHECKED BY:	J.V.
DATE:	Aug. 26, 2019
SCALE:	1:250

CLIENT/PROJECT

910 VETERANS DRIVE TOWNHOUSE DEVELOPMENT

DRAWING TITLE

CONCEPTUAL SERVICING PLAN

PROJECT NO.	DRAWING NO.	REVISION
18-11393-B	SERV-1	----