URBANTECH®

FUNCTIONAL SERVICING &
STORMWATER MANAGEMENT REPORT

Avenia Construction Inc.
Lisgar Drive

CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

PREPARED FOR

AVENIA CONSTRUCTION INC.

Urbantech File No.: 23-748

March 2024

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946-9461
urbantech.com

TABLE OF CONTENTS

APPENDIX A: Storm and Sanitary Sewer Design Sheets

APPENDIX B: Stormwater Management & LID Calculations & Hydrological Model Validation

APPENDIX C: Drawings

- Draft Plan of Subdivision
- DWG 4 – Existing Storm Drainage Plan
- DWG 5A – Proposed Storm Drainage Plan
- DWG 5B – Major System Capture Plan
- DWG 5C – Proposed LID Plan
- DWG 6 – Sanitary Drainage Plan
- DWG 7 – Water Servicing Plan
- DWG 8 – Typical ROW Cross Sections
- DWG 9A-B – Grading Plans
- DWG 9C – Cross Sections
- DWG 10 – Construction Management Plan
- Plan & Profiles
  - PP1 – Street A
  - PP2 to 3 – Street B
  - PP4 to 5 – Street C
  - PP6 – Street D
  - PP7 – Storm Servicing Block
- Stormwater Tank Details
- As-built Drawings for Lisgar Drive

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461

urbantech.com

1 INTRODUCTION

Urbantech Consulting has been retained by Avenia Construction Inc. to prepare a functional servicing report (FSR) for the proposed residential subdivision, located in City of Mississauga, Region of Peel, hereafter referred to as the Subject Lands.

As shown on the proposed *Draft Plan of Subdivision*, the Subject Lands are anticipated to become a low-density residential development bounded by the Lisgar Fields Community Park and Sixteen Mile Creek to the east, Lisgar Middle School to the north, Lisgar Drive to the west, and an existing condominium complex to the south.

This study presents the recommended stormwater management and municipal servicing scheme for the development of the Subject Lands. This report is also applicable for any future revisions to the Draft Plan, assuming the revisions are minor and in general conformance with the concepts outlined herein.

The design information presented in this report considers the following guidelines:

- City of Mississauga T&W Development Requirements
- Region of Peel Public Works Design, Specifications & Procedures Manual
- Conservation Halton Authority Stormwater Management Criteria Document
- Draft Ministry of the Environment and Climate Change LID SWM Guidance Manual
- Stormwater Management Planning and Design Manual by the Ministry of Environment and Climate Change

2 BACKGROUND INFORMATION

The development concepts contained in this report are an extension of the information contained within the following reports:

- Residential Development Assessment of Peel District School Board Land on Lisgar Drive, Mississauga by IBI Group (2013)
- Ninth Line Lands Scoped Subwatershed Study by Wood (2018)
- Geotechnical Investigation by Soil Engineers Ltd. (2023)
- Hydrogeological Analysis by R.J. Burnside & Associates Ltd. (2023)

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461

urbantech.com

3 PROPOSED DEVELOPMENT

The proposed Draft Plan of Subdivision (refer to **Appendix D**) features 124 detached residential units, a park block, stormwater servicing blocks and associated public rights-of-way (17m).

4 EXISTING CONDITIONS

The Subject Lands are bounded by the Lisgar Fields Community Park and Sixteen Mile Creek to the east, Lisgar Middle School to the north, Lisgar Drive to the west, and an existing condominium complex to the south.

The Subject Lands have been previously cleared and pregraded for development as an anticipated school block. The Lands generally slope from west to east, towards the existing Lisgar Fields and Sixteen Mile Creek. A small portion of the drainage from this block flows overland towards Lisgar Drive; however, most of the block drains east and is captured by a series of existing storm sewers located within the Lisgar Fields, discharging to the east at Sixteen Mile Creek at two headwall locations. This reach of Sixteen Mile Creek drains to the Osprey Marsh at Ninth Line.

There is an existing servicing easement within the Subject Lands, identified as Part 3, Plan 43R-19245, Inst. No. LT1354992. This easement previously provided a servicing corridor for storm, sanitary and foundation drain collector sewers from Lisgar Drive to Sixteen Mile Creek. Based on a review of the available as-constructed information, the sanitary and FDC systems have been abandoned. The storm drainage is proposed to be diverted around the subject lands and the easement will no longer be required. Please refer to as-built record drawings in **Appendix C** for details of the services on Lisgar Drive.

Refer to **Drawing 4**, "*Existing Storm Drainage Plan,"* in **Appendix C** for additional details.

For detailed geotechnical and hydrogeological information and recommendations for the site, please refer to the following reports by others:

- Geotechnical Investigation, Soil Engineers Ltd (2023)
- Hydrogeological Assessment, R.J. Burnside & Associates Ltd. (2023)

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461

urbantech.com

5 STORMWATER MANAGEMENT PLAN

5.1 STORM DRAINAGE DESIGN CRITERIA AND REQUIREMENTS

The following storm drainage criteria have been adopted for the stormwater conveyance system within the proposed development:

- The minor drainage system shall be designed for the 10-year storm event using the Rational Method and City of Mississauga IDF curves, plus major system capture where required due to site grading constraints.

- The major system shall be designed to accommodate runoff exceeding the capacity of the minor system for flows up to and including the 100-year storm event. The major system should be contained within road allowances and designated easements without over-flowing onto the arterial roads. Where required, 100-year capture into the minor system will be accommodated in the minor system sizing / grate sizing.

- For residential lots, runoff from roof leaders should be directed towards underground facility where possible.

- Storm sewers should be installed at nominal depth; however, basement connections will not be provided due to relatively high HGL and groundwater conditions. Sump pumps discharging to grade will be provided for all proposed units.

- On-site retention of the first 5 mm of runoff from the entire impervious surface area by way of infiltration, evapotranspiration or re-use is required, whereas the subject site only apply the first 5 mm of runoff from the hard surfaces such as roads, driveways, etc. Where soil conditions do not permit infiltration, the first 5 mm of runoff should be filtered instead. Various Low Impact Development (LID) practices will be considered to provide the on-site runoff retention. This may include but is not limited to rear-yard infiltration trenches and front-yard soakaway pits.

The City confirmed that the following SWM criteria should apply specifically to the site:

- 27mm capture from the roof areas on all lots (similar to how nearby / recent sites were managed).
- post-to-pre for quantity control for the entire site.
- 5mm retention on the rest of the hard surfaces on site (roads, driveways, etc).
- It is assumed that the proposed 27mm and 5mm retention will satisfy erosion control.
- quality control to 80% TSS removal

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461
urbantech.com

5.2 PROPOSED STORM DRAINAGE PLAN

The storm drainage concept for the site has been designed to maintain flows and contributing drainage areas to the existing outlets on the site where possible and meet the existing targets established in the preceding section. Storm sewers for the subject lands have been sized according to the City of Mississauga sewer design criteria (10-year storm).

Due to anticipated high groundwater and HGL on the site, sump pumps will be required for all units. It is proposed that the sump pumps will discharge to the surface grade.

Several major system capture points are required throughout the development where overland flow cannot be maintained to the proposed outlet due to grading constraints. Inlet sizing / grate capacity to be evaluated at detailed design and the pipes will be sized to handle the 100-year flow in these cases.

Refer to the Storm Sewer Design Sheets and Constant Flow Calculations in **Appendix A.**

Refer to **Drawing 5A**, "*Storm Drainage Plan*," and **Drawing 5B, "***Major System Capture,"* in **Appendix C.**

5.3 LOW IMPACT DEVELOPMENT PRACTICES

As per the City of Mississauga requirements, the first 5mm of runoff from the hard surface (roads, driveway etc.) of the proposed development must be retained on site. The City has also acknowledged the on-going discussion with the Province regarding the CLI-ECA (Consolidated Linear Infrastructure Environmental Compliance Approval) program that is associated with conditions for pre-approval and stormwater management requirements. In a worst-case scenario, the 27 mm runoff event would need to be addressed through a hierarchical approach (i.e., infiltration, filtration, retention, detention, best efforts, etc.). On-site runoff retention will be achieved using the following measures.

- Roof leaders along the front of the house will be directed into the proposed **front-yard soakaway pits.** The soakaway pits will be equipped with an overflow pipe connected to the municipal storm sewer within the ROW
- **Infiltration trenches** within the rear yards of each unit beneath the proposed rear-yard swales. The rear roof leader will be disconnected, allowing roof flows to drain overland to the rear yard swales to provide increased opportunities for infiltration

Refer to **Drawing 5C**, "*Proposed LID Plan*," in **Appendix C.**

5.4 UNDERGROUND STORAGE TANKS

The minor and major system flows from the subject lands will be conveyed to the underground tank located within the southeastern portion of the development. The detailed design of the facility will be conducted in conjunction with the proposed grading and servicing design for the proposed development. Some sample products are provided in **Appendix C**.

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461
urbantech.com

The proposed SWM facility will consist of the following components:

- **Quality and Erosion Control** - 5mm retention on the rest of the hard surfaces on site (roads, driveways, etc) cannot be infiltrated by the underground storage tank due to high groundwater table within the southeastern limit of the development. Refer to the groundwater depth in the hydrogeological report in **Appendix B**. The product of the first 5mm runoff read from the VO6 model output and proposed drainage area requires 140 m^3 storage. Although the tank cannot provide infiltration, the provided OGS acts as a filter and the tank volume is sized to detain and release the 5mm runoff. Based on a treatment train approach, effective TSS removal for the combination of OGS and SWM Tank would exceed the enhanced requirement of 80%. Refer to details in **Appendix B**.

- **Quantity Control -** Providing post-to-pre development quantity control can discharge 2-year up to 100-year controlled flows into the existing storm sewers within the Lisgar Fields, draining to the adjacent watercourse

- **Emergency Overland Flow Inlet Spillway** – a 6m wide block is provided for conveying the emergency overland flow. Major system flows will be captured into the storm system at this location within the ROW

- **Outfall** – The storm outfalls drain to the existing watercourse adjacent to the site. The outlet pipe size under orifice tube conditions has been confirmed to safely convey the 100-year outflows from the SWM tank. The proposed outlet pipe with 675 mm diameter provides allowable release rate at 1.867 m^3/s, which is sufficient to handle the 100-year flow at 1.070 m^3/s.

Post-to-pre development water quantity control was simulated using VISUAL OTTHYMO 6.0 for all storm events up to and including the Regional Storm (Hurricane Hazel). Since the pre and post-development Regional flows is smaller than the 100-year design storm target, Regional storm control is not required. Based on the proposed drainage area and imperviousness, **Table 5-1** summarizes the required and provided discharge targets and storage volume for the underground tank:

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461
urbantech.com

Table 5-1: Discharge Targets and Storage Volumes Summary

Design Storm	Discharge Target (m^3/s)			Required Volume (m^3)	Provided Volume (m^3)
	Pre	Post	Control Post- to Pre-		
5 mm	-	-	0	140	1096
2-year	0.256	0.702	0.446	143	
5-year	0.435	1.001	0.566	439	
100-year	1.070	2.015	1.070	985	
Regional*	0.817	0.894	-	-	

*Note: 100-yr Post minus Pre = 0.954 < 100-yr Pre, so 100-yr control flow is based on pre- flow; Regional control not required (post = pre < 100-year storm)

Refer to underground storage tank calculations in **Appendix B**.

5.5 HYDROLOGICAL MODEL VALIDATION

A hydrological model validation is provided to document conformity to the Scoped SWS. Since the subject site is controlled post-to-pre, the original model scenarios from the Ninth Line SWS by Wood (2022) and the Existing Condition scenarios have been updated as follows:

- 4-B_SWS-Existing_Reg Control-AMC III_Urbantech_Updated Oct 2023
- 4-C_SWS-Existing_All SWM-AMC II_Urbantech_Updated Oct 2023
- 7-B_SWS-Existing_Reg Control-AMC III_Urbantech_Updated Oct 2023
- 7-C_SWS-Existing_All SWM-AMC II_Urbantech_Updated Oct 2023

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461
urbantech.com

Table 5-2: Updated Information for VO Model Validation

Original Scenario for Existing from Ninth Line SWS (Wood, 2022)	Updated Scenario (4B & 4C) for Area and Imperviousness (Urbantech, Oct 2023)	Proposed Scenario (7B & 7C) for Area and Imperviousness (Urbantech, Oct 2023)
• VO ID 56, Catchment area is 45 ha with 50% TIMP and 36% XIMP • VO ID 64, Catchment area is 44 ha with 57% TIMP and 39% XIMP	• VO ID 56, Catchment area is 41.42 ha with 54% TIMP and 36% XIMP • VO ID 64, Catchment area is 40.92 ha with 61% TIMP and 39% XIMP • Proposed site areas are modelled as NASHYD	• VO ID 56, Catchment area is 41.42 ha with 54% TIMP and 36% XIMP • VO ID 64, Catchment area is 40.92 ha with 61% TIMP and 39% XIMP • From VO ID 401 to ID 413, the catchments are the proposed site and SWM measures. • 6.41 ha of the site connects with updated catchment (VO ID 56) to the outlet downstream (VO ID 57). • 0.25 ha of the site connects with updated catchment (VO ID 64) to the downstream of Lisgar Drive (VO ID 414).

As a confirmation, the total flows at downstream of the site's east outlet (VO ID 57), downstream of Lisgar Drive (VO ID 414), conjunction at Sixteen Mille Creek (VO ID 68), Sixteen Mille Creek East (VO ID 74) and Sixteen Mille Creek East and West (VO ID 104) were evaluated for the Regional and 2 to 100-year storm events to ensure targets are not exceeding the updated peak flows for the entire study area. The peak flows at these specified locations are compared between updated and proposed scenarios for existing condition, also including between updated and proposed scenarios for existing condition. Refer to the flow comparison tables and VO6 Model Schematic for flow locations in **Appendix B**.

The proposed values are at most 0.200 m^3/s higher than the updated existing VO model at downstream of the site's east outlet (VO ID 57), but the proposed values are lower for the 100-year design storm. The proposed values are at most 0.036 m^3/s higher than the updated existing VO model at downstream of Lisgar Drive (VO ID 414), but the proposed values are lower for the 5-year design storm, refer to **Table 5-3** and **Table 5-4** for details.

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461
urbantech.com

Table 5-3: VO Flow Comparison at Downstream of Site's East Outlet (VO ID 57)

VO ID 57 (Downstream of Site's East Outlet)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				8.261	8.214	-0.047
5-YR				12.330	12.530	0.200
10-YR				17.241	17.306	0.065
25-YR				20.993	21.033	0.040
50-YR				24.894	24.884	-0.010
100-YR				29.761	29.726	-0.035
REGIONAL	73.208	73.230	0.022	68.828	68.874	0.046

Table 5-4: VO Flow Comparison at Downstream of Lisgar Drive (VO ID 414)

VO ID 414 (Downstream of Lisgar Drive)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				1.930	1.920	-0.010
5-YR				2.791	2.775	-0.016
10-YR				3.619	3.647	0.028
25-YR				4.329	4.361	0.032
50-YR				5.047	5.082	0.035
100-YR				5.867	5.906	0.039
REGIONAL	4.773	4.772	-0.001	4.539	4.537	-0.002

The required pond volume for the Regional storm event at the Lisgar Detention Facility (VO ID 9666) is greater than the required Regional pond volume of the updated scenario, refer to **Table 5-5.** The outflow at the for the Regional storm event at the Lisgar Detention Facility (VO ID 9666) is greater than the required Regional pond outflow of the updated scenario. Refer to Scenario updated 4-C and 7-C of the VO6 model provided in **Appendix B**.

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946-9461
urbantech.com

Table 5-5: VO Flow and Storage Comparison at Lisgar Detention Facility (VO ID 9666)

VO ID 9666 (Lisgar Detention Facility)	VO Flow Results [m3/s]			VO Required Volume Results [m3/s]		
	Existing SWM All ExSWM AMC II			Existing SWM All ExSWM AMC II		
	4C	7C	7C - 4C	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
REGIONAL	69.823	69.881	0.058	42.926	42.957	0.031

These modifications were primarily driven by alterations in the original catchments (VO ID 56 and 64) and their adaptation with the proposed site catchments. This adjustment resulted in changes in the shorter time to peak for these locations and associated areas within the model, ultimately leading to increased peak flows and inconsistent changes. The changes in peak flows at these locations were minimal in comparison to the overall peak flows.

Based on the preceding results, the SWM underground storage tanks and LIDs have provided sufficient quality, erosion and quantity control volume to accommodate the proposed drainage area and land use.

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461
urbantech.com

6 WASTEWATER SERVICING PLAN

6.1 EXISTING WASTEWATER SERVICING

The Region of Peel's mapping data indicates that sanitary sewers are in proximity to the subject property as follows:

- Existing 300mm sewer on Lisgar Drive draining from north to south. This sewer will serve as the outlet for the subject lands. Sanitary drainage plans from the Region indicate that the sewer was sized for a future school population on the Subject Lands of 990 (which exceeds the proposed population estimate)

- An abandoned 300mm sanitary sewer within the existing servicing easement bisecting the site. The flows from this sewer were previously diverted south on Lisgar Drive. Following diversion of the storm flows from the adjacent park, all abandoned / unused services within the existing easement will be removed, including the sanitary infrastructure.

6.2 PROPOSED WASTEWATER SERVICING

Proposed sanitary sewers to service the development will be designed in accordance with the Region of Peel standards.

Two connections to the existing Lisgar Drive sewer are proposed to provide servicing flexibility for the site and avoid crossing conflicts with shallow services within the site. One sanitary connection will be provided at each intersection location. Each unit will be provided with a sanitary lateral at typical depth for gravity drainage per the Region standards.

For the proposed units fronting onto Lisgar Drive, individual sanitary laterals will be provided directly from the existing sanitary main on Lisgar Drive. This work may require a significant disturbance to the existing right-of-way and will be investigated further through detailed design.

Population densities have been assigned per Region standards (50 people per hectare for single detached units). Based on the anticipated low density, the allowance in the downstream sewer design of 990 people will be substantially greater than the actual population and no capacity constraints are anticipated.

Refer to the Sanitary Sewer Design Sheet in **Appendix A.**

Refer to **Drawing 6**, "*Sanitary Drainage Plan*," in **Appendix C.**

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461

urbantech.com

7 WATER SUPPLY AND DISTRIBUTION PLAN

7.1 EXISTING WATER SERVICING

The Region of Peel's watermain infrastructure maps indicate that the following services are in the vicinity to the subject lands.

- Existing 300mm watermain on the east side of Lisgar Drive, including several fire hydrants in the east boulevard of Lisgar Drive (Pressure Zone 5A)

7.2 PROPOSED WATER SERVICING

Proposed water servicing within the development will be designed in accordance with the Region of Peel standards. The following proposed connection points will service the development:

- Two connections to 300 mm diameter watermain on Lisgar Drive (PZ-5A)

The watermain network will be looped within public lands and all proposed units will be provided with individual water service laterals per Region standards. Fire hydrants will be provided along the municipal right-of-way in accordance with the Region spacing requirements for single-detached housing.

For the proposed units fronting onto Lisgar Drive, individual water laterals will be provided directly from the existing watermain on Lisgar Drive. This work may require a significant disturbance to the existing right-of-way and will be investigated further through detailed design.

It is recommended that hydrant flow testing and water modeling be completed separately to confirm the adequate capacity of the existing system.

Refer to **Drawing 7.1**, "*Water Servicing*," in **Appendix C** for further details.

8 ROADS & UTILITIES

The following road cross sections are proposed for the public rights-of-way throughout the development:

- Minor Local Residential – 8m Road within 17m ROW (City Std. 2211.060)

Geometric design for all roads will comply with the City of Mississauga standards.

All services (water, sanitary and storm) and utilities (hydro, gas, telecom) within the public rights-of-way will be designed in standard locations per the approved cross sections.

Refer to the Draft Plan of Subdivision or **Drawing 8,** "*Typical ROW Cross Sections*," in **Appendix C** for proposed ROW details and dimensions.

9 GRADING

The site grading design considers the following objectives and constraints:

- Conform to City of Mississauga grading criteria
- Match existing boundary conditions
- Minimize cut and fill operations and work towards a balanced site
- Provide overland flow conveyance for major storm conditions
- Provide minimum cover on proposed servicing

Refer to **Drawings 9A & B**, "*Grading Plans,"* in **Appendix C** for additional details.

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461

urbantech.com

10 EROSION AND SEDIMENT CONTROL

Rigorous erosion and sediment control measures will be designed, implemented and maintained throughout the construction period. At detailed design, an Erosion and Sediment Control Plan will be prepared in conformance with the City and Conservation Authority guidelines. Erosion and sediment control will be implemented for all construction activities including topsoil stripping, earthworks, foundation excavation and stockpiling of materials and will remain in place and functional until bare surfaces are stabilized.

The following erosion and sediment control measures should be considered for use during construction:

- Sediment control fence and snow fence will be placed prior to earthworks;
- Rock check-dams and cut-off swales will be provided, where required, in order to control, slow down and direct runoff to sediment basins;
- Sediment traps & ponds will be provided at low points;
- Gravel mud mats will be installed at construction vehicle access points to minimize off-site tracking of sediments;
- All temporary erosion and sediment control measures will be routinely inspected monitored and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable;
- Where underground services are located below the water table, the use of trench collars are recommended to provide barriers to flow to prevent groundwater flow along granular bedding material.

Reference will be made to the *Guidelines for Erosion and Sediment Control for Urban Construction Sites* prepared by the Greater Golden Horseshoe Area Conservation Authorities (2006) when preparing Erosion and Sediment Control Plans.

Refer to **Drawing 10**, "*Construction Management Plan,"* in **Appendix C** for additional preliminary construction details. Further information will be provided through the future permitting processes.

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 · Markham · ON · L3R 3T7 | 905.946-9461

urbantech.com

11 CONCLUSION

The proposed Lisgar Drive development can be adequately serviced through a combination of existing and proposed municipal infrastructure. In summary:

- Stormwater quantity and quality control will be provided by the proposed underground tank within the dedicated block.
- Water balance will be achieved through various LID practises, including soakaway pits and infiltration trenches.
- Wastewater servicing will be provided by the existing 300mm sanitary sewer on Lisgar Drive. The abandoned sanitary sewers within the site will be removed.
- Water servicing for domestic supply from the existing 300mm watermain on Lisgar Drive.

Report Prepared by:

Scott Riemer, P.Eng.
Associate, Design

Urbantech® Consulting, A Division of Leighton-Zec Ltd. | 3760 14th Avenue, Suite 301 • Markham • ON • L3R 3T7 | 905.946-9461

urbantech.com

APPENDIX A

STORM AND SANITARY SEWER DESIGN SHEETS

URBANTECH

SANITARY SEWER DESIGN SHEET

AVENIA CONSTRUCTION INC.

REGION OF PEEL

PROJECT DETAILS

Project No: 23-748-FSR
Date: 7-Sep-23
Designed by: YP
Checked by: SR

DESIGN CRITERIA

Min. Flow =	13	l/s			
Min Diameter =	200	mm	Avg. Domestic Flow =	290.0	l/c/d
Mannings 'n'=	0.013		Infiltration =	0.260	l/s/ha
Min. Velocity =	0.75	m/s	Max. Peaking Factor =	4.00	
Max. Velocity =	3.00	m/s	Min. Peaking Factor=	2.00	
			Domestic Sewage flow for < 1000 ppl = 0.013m^3/s		
Factor of Safety =	15	%	(Region of Peel Std. 2-5-2)		

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS								PIPE DATA					
			AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENISTY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
EXTERNAL AREA 1		EX. MH58A	10.43	10.43		50		797	797							2.7	797	3.86	10.3	13.0			15.7						
LISGAR DRIVE	EX. MH58A	EX. MH1A	0.93	11.36		50		47	844							3.0	844	3.85	10.9	13.0			16.0	0.69	300	80.3	1.14	0.88	20%
LISGAR DRIVE	EX. MH1A	EX. MH2A		11.36					844							3.0	844	3.85	10.9	13.0			16.0	0.44	300	64.1	0.91	0.74	25%
EXTERNAL AREA 2		EX. MH2A	2.49	2.49		70		175	175							0.6	175	4.00	2.3	13.0			13.6						
STREET B	MH 1A	MH 2A	0.24	0.24		50		12	12							0.1	12	4.00	0.2	13.0			13.1	1.00	200	32.8	1.04	0.97	40%
STREET B	MH 2A	MH 3A	0.15	0.39		50		8	20							0.1	20	4.00	0.3	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
STREET B	MH 3A	MH 4A	0.12	0.51		50		6	26							0.1	26	4.00	0.3	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
STREET B	MH 4A	MH 9A	0.48	0.99		50		24	50							0.3	50	4.00	0.7	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
STREET B	MH 1A	MH 5A	0.10	0.10		50		5	5							0.0	5	4.00	0.1	13.0			13.0	1.00	200	32.8	1.04	0.97	40%
STREET B	MH 5A	MH 6A	0.47	0.57		50		24	29							0.1	29	4.00	0.4	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
STREET B	MH 6A	MH 7A	0.15	0.72		50		8	37							0.2	37	4.00	0.5	13.0			13.2	0.50	250	42.0	0.86	0.75	31%
STREET B	MH 7A	MH 8A	0.28	1.00		50		14	51							0.3	51	4.00	0.7	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
STREET B	MH 8A	MH 9A		1.00					51							0.3	51	4.00	0.7	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
STREET B	MH 9A	MH 10A	0.27	2.26		50		14	115							0.6	115	4.00	1.5	13.0			13.6	0.50	250	42.0	0.86	0.75	32%
STREET A	MH 10A	MH 11A	0.29	2.55		50		15	130							0.7	130	4.00	1.7	13.0			13.7	0.50	250	42.0	0.86	0.75	32%
STREET A	MH 11A	MH 12A		2.55					130							0.7	130	4.00	1.7	13.0			13.7	0.50	250	42.0	0.86	0.75	32%
STREET A	MH 12A	MH 13A	0.17	2.72		50		9	139							0.7	139	4.00	1.9	13.0			13.7	0.50	250	42.0	0.86	0.75	33%
STREET A	MH 13A	EX. MH2A	0.06	2.78					139							0.7	139	4.00	1.9	13.0			13.7	0.50	250	42.0	0.86	0.75	33%
LISGAR DRIVE	EX. MH2A	EX. MH3A	0.54	17.17		50		27	1185							4.5	1185	3.75	14.9	14.9			19.4	0.33	300	55.6	0.79	0.71	35%
LISGAR DRIVE	EX. MH3A	EX. MH4A	0.54	17.71		50		27	1212							4.6	1212	3.74	15.2	15.2			19.8	0.32	300	54.7	0.77	0.70	36%
EXTERNAL AREA 3		EX. MH4A	1.31	1.31		50		66	66							0.3	66	4.00	0.9	13.0			13.3						
EXTERNAL AREA 4		EX. MH4A	1.22	1.22		70		86	86							0.3	86	4.00	1.2	13.0			13.3						
STREET C	MH 14A	MH 15A	0.60	0.60		50		30	30							0.2	30	4.00	0.4	13.0			13.2	1.00	200	32.8	1.04	0.97	40%
STREET C	MH 15A	MH 16A	0.42	1.02		50		21	51							0.3	51	4.00	0.7	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
STREET C	MH 16A	MH 17A	0.12	1.14		50		6	57							0.3	57	4.00	0.8	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
STREET C	MH 17A	MH 18A	0.24	1.38		50		12	69							0.4	69	4.00	0.9	13.0			13.4	0.50	250	42.0	0.86	0.75	32%
STREET C	MH 18A	MH 22A	0.30	1.68		50		15	84							0.4	84	4.00	1.1	13.0			13.4	0.50	250	42.0	0.86	0.75	32%
STREET D	MH 19A	MH 20A	0.40	0.40		50		20	20							0.1	20	4.00	0.3	13.0			13.1	1.00	200	32.8	1.04	0.97	40%
STREET D	MH 20A	MH 21A	0.44	0.84		50		22	42							0.2	42	4.00	0.6	13.0			13.2	0.50	250	42.0	0.86	0.75	31%
STREET D	MH 21A	MH 22A	0.05	0.89					42							0.2	42	4.00	0.6	13.0			13.2	0.50	250	42.0	0.86	0.75	31%
STREET A	MH 22A	MH 23A	0.22	2.79		50		11	137							0.7	137	4.00	1.8	13.0			13.7	0.50	250	42.0	0.86	0.75	33%
STREET A	MH 23A	EX. MH4A	0.13	2.92		50		7	144							0.8	144	4.00	1.9	13.0			13.8	0.50	250	42.0	0.86	0.75	33%
LISGAR DRIVE	EX. MH4A	EX. MH8A	0.57	23.73		50		29	1537							6.2	1537	3.67	18.9	18.9			25.1	0.31	375	97.6	0.88	0.73	26%

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

URBANTECH®

STORM SEWER DESIGN SHEET

10 Year Storm

AVENIA CONSTRUCTION INC.

CITY OF MISSISSAUGA

PROJECT DETAILS

Project No: 23-748-FSR
Date: 31-Aug-23
Designed by: YP
Checked by: SR

DESIGN CRITERIA

Min. Diameter =	300	mm	Rainfall Intensity =	A / (Tc+B)^c
Mannings 'n'=	0.013			
Starting Tc =	15	min	A =	1010
			B =	4.6
Factor of Safety =	15	%	c =	0.78

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
STREET B	MH1	MH2	0.07	0.55	0.04	0.04	99.2	0.011			0.011	17.5	0.50	300	0.068	0.97	15.00	0.30	15.30	16%
STREET B	MH2	MH3	0.31	0.55	0.17	0.21	98.0	0.057			0.057	69.6	0.50	375	0.124	1.12	15.30	1.03	16.33	46%
STREET B	MH3	MH4	0.06	0.55	0.03	0.24	94.2	0.063			0.063	15.0	0.50	375	0.124	1.12	16.33	0.22	16.56	51%
STREET B	MH4	MH5	0.21	0.55	0.12	0.36	93.4	0.093			0.093	52.7	0.50	375	0.124	1.12	16.56	0.78	17.34	75%
STREET B	MH5	MH9				0.36	90.8	0.090			0.090	12.2	0.50	375	0.124	1.12	17.34	0.18	17.52	73%
STREET B	MH1	MH6	0.14	0.55	0.08	0.08	99.2	0.021			0.021	51.5	0.50	300	0.068	0.97	15.00	0.89	15.89	31%
STREET B	MH6	MH7	0.10	0.55	0.06	0.13	95.8	0.035			0.035	23.1	0.50	300	0.068	0.97	15.89	0.40	16.29	51%
STREET B	MH7	MH8	0.09	0.55	0.05	0.18	94.4	0.048			0.048	21.2	0.50	375	0.124	1.12	16.29	0.31	16.60	38%
STREET B	MH8	MH9	0.45	0.55	0.25	0.43	93.3	0.111			0.111	56.0	0.50	450	0.202	1.27	16.60	0.74	17.34	55%
STREET B	MH9	MH15	0.22	0.55	0.12	0.91	90.2	0.227			0.227	72.4	0.30	675	0.460	1.29	17.52	0.94	18.46	49%
STREET D	MH10	MH13	0.35	0.55	0.19	0.19	99.2	0.053			0.053	62.1	0.50	375	0.124	1.12	15.00	0.92	15.92	43%
STREET A	MH11	MH12	0.11	0.55	0.06	0.06	99.2	0.017	0.071	0.071	0.088	28.1	0.30	450	0.156	0.98	15.00	0.48	15.48	56%
STREET A	MH12	MH13	0.29	0.55	0.16	0.22	97.3	0.059		0.071	0.130	29.6	0.30	525	0.236	1.09	15.48	0.45	15.93	55%
STREET A	MH13	MH14	0.41	0.55	0.23	0.64	95.6	0.170		0.071	0.241	63.5	0.30	600	0.336	1.19	15.93	0.89	16.82	72%
STREET A	MH14	MH15				0.64	92.5	0.164		0.071	0.235	12.2	0.30	600	0.336	1.19	16.82	0.17	16.99	70%
STREET C	MH15	MH16	0.06	0.55	0.03	1.58	87.4	0.383		0.071	0.454	16.0	0.30	825	0.786	1.47	18.46	0.18	18.64	58%
STREET C	MH16	MH24	0.84	0.55	0.46	2.04	86.8	0.492		0.071	0.563	107.8	0.30	900	0.992	1.56	18.64	1.15	19.79	57%
STREET D	MH10	MH17	0.45	0.50	0.23	0.23	99.2	0.062			0.062	66.9	0.50	375	0.124	1.12	15.00	0.99	15.99	50%
STREET D	MH17	MH20	0.07	0.55	0.04	0.26	95.4	0.070			0.070	29.4	0.50	375	0.124	1.12	15.99	0.44	16.43	56%
STREET C	MH18	MH19	0.30	0.55	0.17	0.17	99.2	0.045	0.105	0.105	0.150	20.3	0.30	525	0.236	1.09	15.00	0.31	15.31	64%
STREET C	MH19	MH20				0.17	98.0	0.045		0.105	0.150	25.4	0.30	525	0.236	1.09	15.31	0.39	15.70	64%
STREET C	MH20	MH21	0.18	0.55	0.10	0.53	93.9	0.138		0.105	0.243	43.4	0.30	675	0.460	1.29	16.43	0.56	16.99	53%
STREET C	MH21	MH22	0.14	0.55	0.08	0.60	92.0	0.154		0.105	0.259	27.3	0.30	675	0.460	1.29	16.99	0.35	17.35	56%
STREET C	MH22	MH23	0.05	0.55	0.03	0.63	90.8	0.159		0.105	0.264	13.4	0.30	675	0.460	1.29	17.35	0.17	17.52	57%
STREET C	MH23	MH24	0.10	0.55	0.06	0.69	90.2	0.172		0.105	0.277	27.3	0.30	675	0.460	1.29	17.52	0.35	17.87	60%
SERVICING BLOCK	MH24	MH25	0.01	0.55	0.01	2.73	83.6	0.635	0.331	0.507	1.142	34.5	0.30	900x1800 (BOX)	3.059	1.89	19.79	0.30	20.10	37%
Ex. LISGAR FIELDS																				
COMMUNITY PARK		EX. CBMH2	0.12	0.25	0.03	0.03														
COMMUNITY PARK	EX. CBMH2	MH101	0.19	0.25	0.05	0.08	99.2	0.021			0.021	55.0	0.72	300	0.082	1.16	15.00	0.79	15.79	26%
COMMUNITY PARK	MH101	MH102				0.08	96.2	0.021			0.021	10.4	0.50	300	0.068	0.97	15.79	0.18	15.97	30%
BLOCK 125	MH102	MH103				0.08	95.5	0.021			0.021	86.2	0.50	300	0.068	0.97	15.97	1.49	17.45	30%
BLOCK 125		MH103	0.13	0.25	0.03	0.03														
COMMUNITY PARK	MH103	EX. MH 52	0.21	0.25	0.05	0.16	90.4	0.041			0.041	13.9	0.50	300	0.068	0.97	17.45	0.24	17.69	60%
COMMUNITY PARK		EX. MH 52	0.96	0.25	0.24	0.24														
COMMUNITY PARK	EX. MH 52	EX. DCB MH 6				0.40	89.7	0.100			0.100	54.0	0.50	300	0.068	0.97	17.69	0.93	18.62	147%
COMMUNITY PARK	EX. DCB MH 6	EX. MH 39				0.40	86.9	0.097			0.097	39.3	0.59	300	0.074	1.05	18.62	0.62	19.25	131%

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

PROJECT DETAILS	
Title1:	**STORM SEWER DESIGN SHEET**
Title2:	**100YR Capture/Constant Flow Calculations**
Project Name:	**AVENIA CONSTRUCTION INC.**
Municipality:	**CITY OF MISSISSAUGA**
Project No:	**23-748-FSR**
Date:	**31-Aug-23**
Designed by:	**YP**
Checked by:	**SR**

IDF Parameters for Mississauga			
$I=A/(T+b)^c$		10-yr	100-yr
	A	1010	1450
	B	4.6	4.9
	C	0.78	0.78

ID	MH	A *ha*	R (10-Yr)	R (100-Yr) *R(10-Yr) x 1.25*	AR (10-Yr)	AR (100-Yr)	L *m*	Tc *min*	I10 *mm/hr*	I100 *mm/hr*	Q10 *m3/s*	Q100 *m3/s*	Q100-Q10 *m3/s*	Const. flow *m3/s*
100YR-1	MH11	0.64	0.55	0.69	0.35	0.44	180	16.50	93.62	132.94	0.092	0.162	0.071	0.071
100YR-2	MH24	3.34	0.55	0.69	1.84	2.30	580	19.83	83.50	118.74	0.426	0.757	0.331	0.331
100YR-3	MH18	0.95	0.55	0.69	0.52	0.65	190	16.58	93.34	132.53	0.135	0.240	0.105	0.105
				0.00	0.00	0.00		15.00	99.17	140.69	0.000	0.000	0.000	0.000
				0.00	0.00	0.00		15.00	99.2	140.7	0.000	0.000	0.000	0.000
				0.00	0.00	0.00		15.00	99.17	140.69	0.000	0.000	0.000	0.000
				0.00	0.00	0.00		15.00	99.2	140.7	0.000	0.000	0.000	0.000
				0.00	0.00	0.00		15.00	99.17	140.69	0.000	0.000	0.000	0.000

Tc calcs *where Tc = starting Tc + length/velocity*

Starting Tc (min) = 15

Velocity (m/s) = 2

P:\Projects\23-748-Lisgar Drive (Armland-Missisauga)\Reports\Functional Servicing Report\Calculations & Models\Storm Sewer Design Sheets\[23-748 FSR STM (Constant Flow).xls]100yr capture calcs

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

APPENDIX B

SWM & LID CALCULATIONS & HYDROLOGICAL MODEL VALIDATION

URBANTECH®

SWM DESIGN CALCULATIONS
HYRDO-0: Contributing Drainage Area and Land Use

Project Name: Lisgar Drive - Avenia Construction Inc.
Municipality: City of Mississauga
Project No.: 23-748
Date: 13-Oct-22

Prepared by: D.L.
Checked by: A.F.
Submission #: 1st Submission

SWM

Contributing Drainage Area

SWM	Area [ha]	Runoff Coefficient	Imperviousness (City of Mississauga Guidelines)	
			TIMP	XIMP
Front Yards Drainage to Lisgar Drive (Soakaway Pits)	**0.25**	**0.55**	**50%**	**50%**
ROW	1.55	0.90	99%	99%
Single Detached Lots	4.39	0.55	50%	50%
Development Lands (Single Detached Lots and ROW)	**5.94**	**0.66**	**66%**	**66%**
SWM Tank	**0.22**	**0.90**	**99%**	**99%**
Total Drainage to SWM Tank	6.16	0.67	68%	68%
Park Drainage Area to Existing Storm	**0.25**	**0.30**	**14%**	**14%**
Total Site Drainage Area	**6.66**	**0.65**	**65%**	**65%**

VO Input Area & Imperviousness

SWM	Area [ha]	Runoff Coefficient	Imperviousness (City of Mississauga Guidelines)	
			TIMP	XIMP
Front Yards Drainage to Lisgar Drive (Soakaway Pits)	**0.25**	**0.55**	**50%**	**50%**
ROW	**1.55**	**0.90**	**99%**	**99%**
Single Detached Lots	4.39	0.55	50%	50%
Impervious Roof Area (60% of Lots)	**2.63**	**0.90**	**99%**	**99%**
Pervious Remaining Area (40% of Lots)	**1.76**	**0.25**	**7%**	**7%**
Development Lands (Single Detached Lots and ROW)	5.94	0.66	66%	66%
SWM Tank	**0.22**	**0.90**	**99%**	**99%**
Park Drainage Area to Existing Storm	**0.25**	**0.30**	**14%**	**14%**
Total Site Drainage Area	**6.66**	**0.65**	**65%**	**65%**

SWM DESIGN CALCULATIONS
SWMF: Target Flow and Volume

Project Name: Lisgar Drive - Avenia Construction Inc.
Municipality: City of Mississauga
Project No.: 23-748
Date: 10/13/2022

Prepared by: D.L.
Checked by: A.F.
Submission #: 1st Submission

Land Use	Area (ha)	Runoff Coe	IMP	27 mm Runoff	27mm Runoff Volume Required (m^3)
Park	**0.25**	**0.25**	**30%**		
17m ROW	1.55	0.90	99%		
SWM Tank	0.22	0.22	90%		
Residential Area without roof	1.76	0.25	7%		
Roof	2.63	0.90	99%	27	711
Total	**6.16**	**0.67**	**68%**		
Soakaway Pits	**0.25**	**0.55**	**50%**	27	68
Total	**6.66**	**0.65**	**65%**		

SWM Tank 27mm on roof (60% = 2.63ha) first + first 5mm of 6.16 ha + the rest at end of pipe 6.16 ha SWM Tank

DT (min)	**5**	**~ First 5mm Runoff Volume from VO (mm)**
Pre-development Area (ha)	**6.16**	**2.22**
Post-development Area (ha)	**6.16**	**Required Volume (m^3)**
		137
		~140

Design Storm	Discharge Target (m^3/s)			Required Volume (m^3)	Infiltration Tank/Soakaway Pits (27mm)	
	Pre	Post	Control Post- to Pre-		Required Volume from VO6 (m^3)	Provided Volume per Lot (m^3)
5 mm	-	-	-	~140	711	6.41
2-year	0.256	0.702	0.446	143		
5-year	0.435	1.001	0.566	439		
100-year	1.070	2.015	1.070	985		
Regional*	0.817	0.894	N/A§	0.000		

100-yr Post minus Pre = 0.945 < 100-yr Pre, so 100-yr control flow is based on pre- flow
§ Regional control not required (post = pre < 100-year storm)
** For Regional Storm model, CN values were converted from AMCII to AMCIII and IA&DPSI=0*

Soakaway Pits 27mm into Soakaway pits first + overflow to Lisgar Drive

0.25ha rear yard lots and Lisgar Drive is within Pre-development Area #2 and #3 (1.00ha)

Design Storm	Discharge Target (m^3/s)				Soakaway Pits	
	Pre-development Area #2 and #3 (1.00ha)	Post-development west lots and Lisgar Drive (0.49ha)	Control Post- to Pre-	Outflow (m^3/s)	Required Volume from VO6 (m^3)	Provided Volume per Lot (m^3)
27 mm	-	-	-	-	68	5.19
2-year	0.075	0.065	N/A§	0.039		
5-year	0.110	0.090	N/A§	0.053		
100-year	0.229	0.172	N/A§	0.172		
Regional*	0.144	0.072	N/A§	-		

Post minus Pre < Pre, less control flow drains to Lisgar Drive, drainage area and flows have been directed to SWM Tank in the west
§ Regional control not required (post = pre < 100-year storm)
** For Regional Storm model, CN values were converted from AMCII to AMCIII and IA&DPSI=0*

SWM DESIGN CALCULATIONS
Water Quality Calculations

Project Name: Lisgar Drive - Avenia Construction Inc.
Municipality: City of Mississauga
Project No.: 23-748
Date: 10/13/2022

Prepared by: D.L.
Checked by: A.F.
Submission #: 1st Submission

SWM Tank

Area	Method	Effective TSS Removal	Area (ha)	% Area of Site	Overall TSS Removal
Roof Drainage Area to SWM Tank	Roof drainage discharged to the SWM Tank (inherently clean runoff)	100%	2.63	43%	43%
Remaining Lots Area and ROW	1 Proposed OGS units + SWM Tank facility*	82.5%	3.53	57%	47%
Total			6.16	100%	**90%**

* based on Treatment Train Approach, effective TSS Removal for the combination of OGS (with TSS removal= 50%) and SWM Tank (with TSS removal= 65%) would be 82.5%

Soakaway Pits

Area	Method	Effective TSS Removal	Area (ha)	% Area of Site	Overall TSS Removal
Roof Drainage Area to Soakaway Pits	Roof drainage discharged to Lisgar Drive (inherently clean runoff)	100%	0.15	60%	60%
Remaining Lots Area	Proposed infiltration media at the east SWM facility (Enhanced Level Treatment)	55%	0.10	40%	22%
Total			0.25	100%	**82%**

Other Drainage Area

Area	Method	Effective TSS Removal	Area (ha)	% Area of Site	Overall TSS Removal
Park	Inherent	80%	0.25	100%	80%
Total			0.25	100%	**80%**

Total Site

Area	Method	Effective TSS Removal	Area (ha)	% Area of Site	Overall TSS Removal
Total			6.66	100%	**89%**

Treatment Train Approach:

$$R = A + B - [(A \times B) / 100] \qquad \text{(Equation 4-1)}$$

Where:

R = Total TSS Removal Rate

A = TSS Removal Rate of the First or Upstream BMP

B = TSS Removal Rate of the Second or Downstream BMP

*As per 'New Jersey Stormwater Best Management Practices Manual'
Equation 4-1 (February 2004)

Treatment Train TSS Removal:

OGS = 50 %

SWM Tank (water treatment through settling contaminants) = 65 %

SWM Tank Removal at Infiltration:

R_{inf} = Rate 1 + Rate 2 - [(Rate 1 x Rate 2)/100]

R_{inf} = 82.5 %

SWM DESIGN CALCULATIONS
SWM Tank Outflow Pipe

Project Name: Lisgar Drive - Avenia Construction Inc.
Municipality: City of Mississauga
Project No.: 23-748
Date: 10/13/2022

Prepared by: D.L.
Checked by: A.F.
Submission #: 1st Submission

Orifice Control Calculations

$Q = C_d \times A \times (2 \times g \times h)^{0.5}$

d=	0.675	*diameter of the orifice (m)*
C_d=	0.82	*orifice coefficient*
A_0=	0.358	*cross-sectional area of the orifice (m^2)*
Invert Elevation=	191.288	*Invert elevation of outlet pipe + radius of the orifice (m)*
Max. W.L. =	193.35	*Top of Berm/Spill Elevation(m)*
h=	2.063	*maximum water elevation above orifice (m)*
g=	9.81	*gravitational acceleration (m^2/s)*
$Q_{orifice}$=	**1.867**	*maximum allowable orifice release rate (m^3/s)*
$Q_{Required}$=	**1.070**	*required release rate from 100-year Storm (m^3/s)*

The proposed outlet pipe provides sufficient capacity.

VO Model Validation - Flow Comparison Tables

Project Name: Lisgar Drive - Armland Group
Municipality: City of Mississauga
Project No.: 23-748
Date: 6-Oct-23

Prepared by: D.L.
Checked by: A.F.
Submission #: 1st Submission

VO ID 57 (Downstream of Site's East Outlet)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				8.261	8.214	-0.047
5-YR				12.330	12.530	0.200
10-YR				17.241	17.306	0.065
25-YR				20.993	21.033	0.040
50-YR				24.894	24.884	-0.010
100-YR				29.761	29.726	-0.035
REGIONAL	73.208	73.230	0.022	68.828	68.874	0.046

VO ID 414 (Downstream of Lisgar Drive)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				1.930	1.920	-0.010
5-YR				2.791	2.775	-0.016
10-YR				3.619	3.647	0.028
25-YR				4.329	4.361	0.032
50-YR				5.047	5.082	0.035
100-YR				5.867	5.906	0.039
REGIONAL	4.773	4.772	-0.001	4.539	4.537	-0.002

VO ID 68 (Conjunction at Sixteen Mille Creek)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				10.293	10.291	-0.002
5-YR				15.512	15.593	0.081
10-YR				21.072	21.108	0.036
25-YR				25.276	25.400	0.124
50-YR				30.558	30.708	0.150
100-YR				38.149	38.344	0.195
REGIONAL	92.663	92.697	0.034	87.113	87.162	0.049

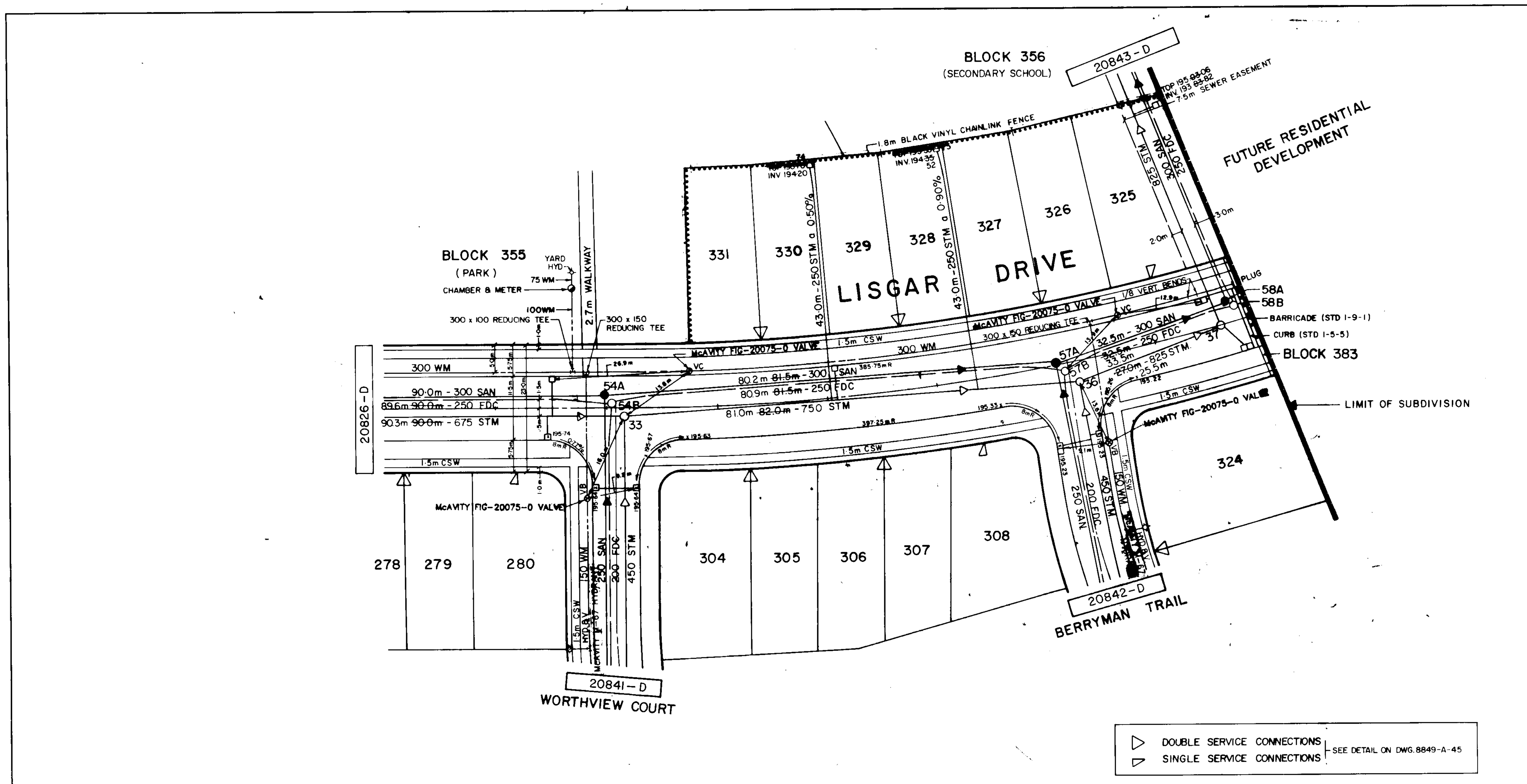
VO ID 9666 (Lisgar Detention Facility)	VO Flow Results [m3/s]			VO Required Volume Results [m3/s]		
	Existing SWM All ExSWM AMC II			Existing SWM All ExSWM AMC II		
	4C	7C	7C - 4C	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
REGIONAL	69.823	69.881	0.058	42.926	42.957	0.031

VO ID 74 (Sixteen Mille Creek - East)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				3.663	3.674	0.011
5-YR				7.138	7.180	0.042
10-YR				12.330	12.395	0.065
25-YR				18.042	18.124	0.082
50-YR				23.691	23.779	0.088
100-YR				30.364	30.466	0.102
REGIONAL	101.453	101.478	0.025	71.242	71.299	0.057

VO ID 104 (Sixteen Mille Creek - East and West)	VO Flow Results [m3/s]					
	Existing SWM Reg Control AMC III			Existing SWM All ExSWM AMC II		
	4B	7B	7B - 4B	4C	7C	7C - 4C
	Updated	Proposed	Difference	Updated	Proposed	Difference
2-YR				5.773	5.784	0.011
5-YR				11.432	11.487	0.055
10-YR				19.901	19.979	0.078
25-YR				28.523	28.613	0.090
50-YR				37.193	37.290	0.097
100-YR				47.273	47.385	0.112
REGIONAL	147.305	147.356	0.051	112.859	112.895	0.036

APPENDIX C

DRAWINGS



ROAD BASE	
HL3	- 40mm
HL8	- 65mm
20mm C.R. LIMESTONE	- 150mm
50mm C.R. LIMESTONE	- 445mm
STRUCTURAL DEPTH	700mm

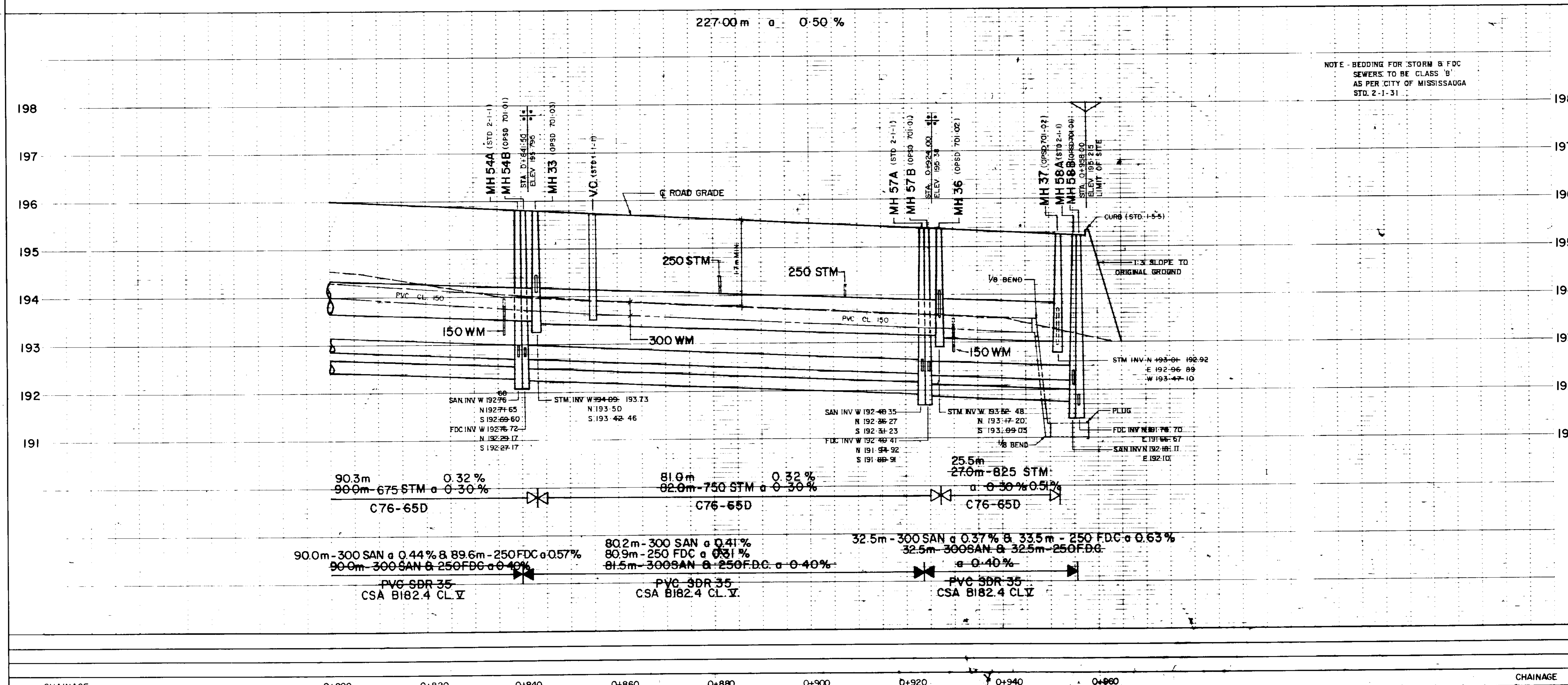
FILL NOTES

NOTES FOR SEWERS AND WATERMAINS IN FILL AREAS

1. PIPES ARE NOT TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE ENGINEER.
2. FILL TO BE PLACED TO A MINIMUM OF 600mm. ABOVE THE SEWER AND WATERMAIN GRADES AND TO 3.0m. MINIMUM ON EACH SIDE, COMPACTED TO A MINUMUM OF 100% STANDARD PROCTOR DENSITY IN 300mm. LIFTS.
3. TESTS SHALL BE TAKEN ALONG CENTRE LINE OF SEWER AND WATERMAIN AND ON LINES 1.5m. ON EIANDR SIDE OF SAME AT A MAXIMUM INTERVAL OF 30.0m. TESTS TO BE TAKEN AT EACH 300mm. LIFT.

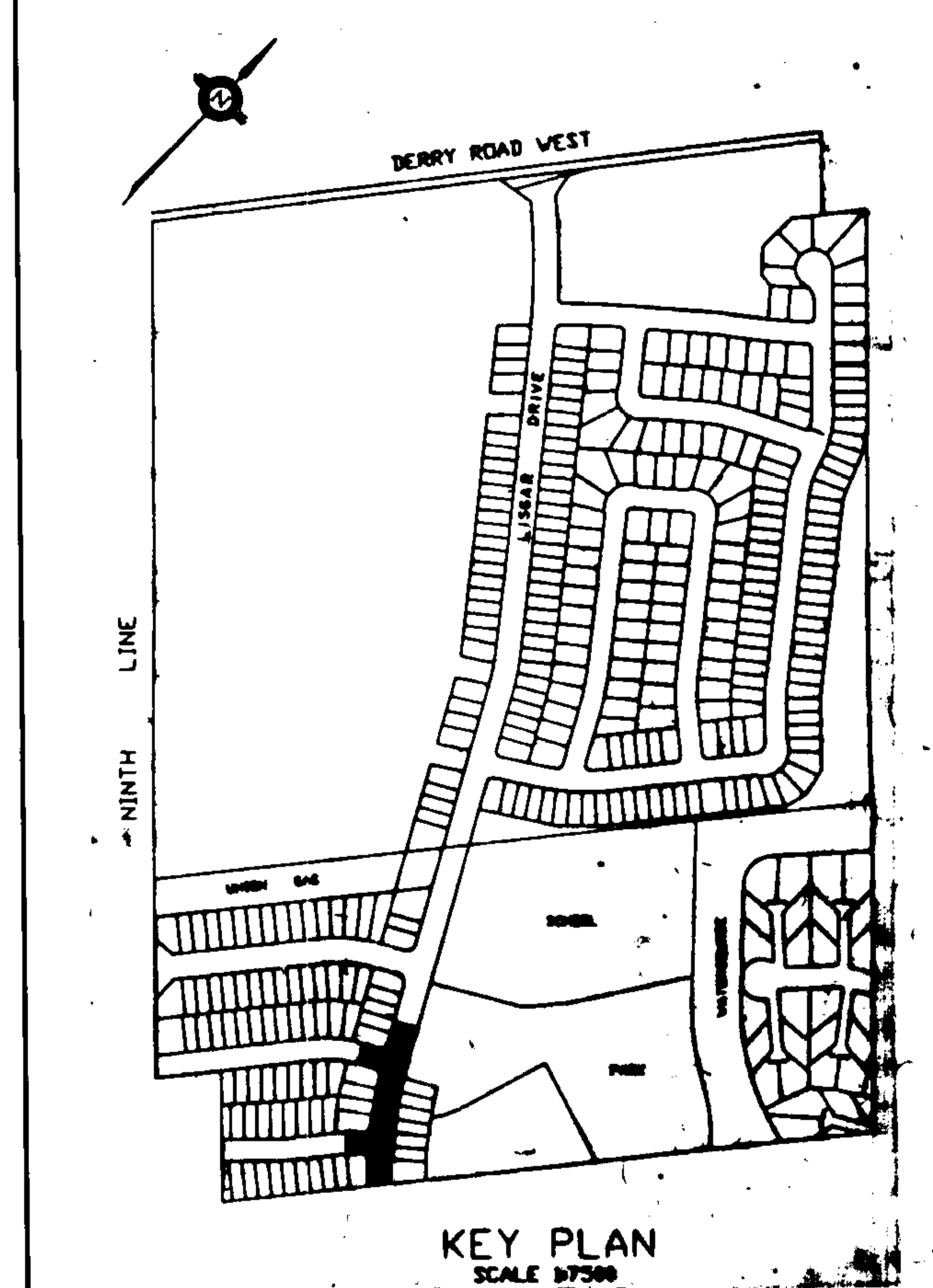
NOTES FOR WATERMAINS ONLY IN FILL AREAS

4. ALL HYDRANTS, TEES, BRANCH VALVES AND HORIZONTAL AND VERTICAL BENDS ARE TO BE TIED WITH TIE RODS IN ADDITION TO CONCRETE BLOCKING.
5. CONCRETE BLOCKING TO BE AS PER REGION OF PEEL STANDARDS 1-5-3, 1-5-4, 1-5-5, 1-5-6 AND 1-5-7.
6. PIPE JOINT DEFLECTIONS ARE NOT ALLOWED IN FILL AREAS



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS		
DATE	DETAILS	INIT.
94 - 01 - 17	AS CONSTRUCTED	WG



KEY PLAN
SCALE 1:7500

FOR GENERAL NOTES SEE DWG. 8849-A-43

GENERAL NOTES

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN FIELD.
- ● DENOTES BUILDING - NOT LOCATED
- ⊏ DENOTES BUILDING - LOCATED
- T.T.B.M. No. 637 ELEV 204.737
- TEMP BENCH MARK ELEV DESCRIPTION.

AS CONSTRUCTED 21T: 87053

F. A. EHLER

DESIGNED BY | APPROVED BY

CHKD

VENTURON DEVELOPMENT (GREENMEADOW) INC

Venturon

paul theil associates limited
consulting engineers
21 Coventry Road, Brampton, Ontario L6T 4V7

CITY OF MISSISSAUGA

ENGINEERING AND WORKS DEPARTMENT

LISGAR DRIVE

STN. 0+800 TO STN. 0+958.00

SCALE HOR 1:500 VERT 1:50	AREA	PROJECT No
DRAWN BY	CHECKED BY	PLAN No. 8849-A-8
DATE MAY 1990	SHEET OF	20827 - D

20827-D

NOTE:
EXISTING PIPES (EAST ONLY) TO BE PLUGGED AT MANHOLES AND ABANDONED SEWERS TO BE REMOVED

VENTURON DEVELOPMENT CORPORATION
21T-87053-M

BLOCK 366
SECONDARY SCHOOL

LISGAR DRIVE

EX. 7.5m SEWER EASEMENT

BLOCK 370
0.30m RESERVE

INDIGO CRESCENT

LIMIT OF SUBDIVISION

LIMIT OF SUBDIVISION

STA. 0+180

21691-D

21704

21704-D

ROAD BASE	
HL3	– 40mm
HL8	– 70mm
20mm C.R. LIMESTONE	– 150mm
50mm C.R. LIMESTONE	– 440mm
	700mm

FILL NOTES

NOTES FOR SEWERS AND WATERMAINS IN FILL AREAS

1. PIPES ARE NOT TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE ENGINEER.
2. FILL TO BE PLACED TO A MINIMUM OF 600 mm ABOVE THE SEWER AND WATERMAIN GRADES AND TO 1.0 m MINIMUM OR AS OTHERWISE DIRECTED TO A MINIMUM OF 100% STANDARD PROCTOR DENSITY IN 300 mm LIFTS.
3. TESTS SHALL BE TAKEN ALONG CENTRE LINE OF SEWER AND WATERMAIN AND ON LINES 1.5 m ON EITHER SIDE OF SAME AT A MAXIMUM INTERVAL OF 30.0 m. TESTS TO BE TAKEN AT EACH 300 mm LIFT.

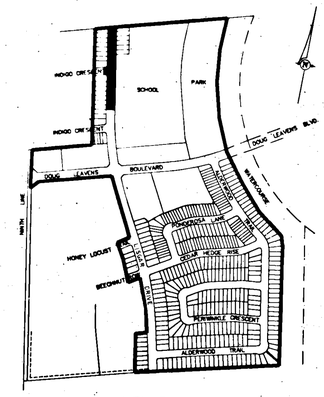
NOTES FOR WATERMAINS ONLY IN FILL AREAS

4. ALL HYDRANTS, TEES, BRANCH VALVES AND HORIZONTAL AND VERTICAL BENDS ARE TO BE TIED WITH TIE RODS IN ADDITION TO CONCRETE BLOCKING.
5. CONCRETE BLOCKING TO BE AS PER REGION OF PEEL STANDARDS 1-3-3, 1-3-4, 1-3-5, 1-3-8 AND 1-3-7.
6. PIPE JOINT DEFLECTIONS ARE NOT ALLOWED IN FILL AREAS.

▷ DOUBLE SERVICE CONNECTIONS
▷ SINGLE SERVICE CONNECTIONS
– SEE DETAIL ON DWG. 8814-A-47

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLES		
WATERMAINS			HYDRO U/G CABLES		

REVISIONS		
DATE	DETAILS	INIT.
93-12-22	AS CONSTRUCTED	KS



KEY PLAN
1:7500

FOR GENERAL NOTES SEE DWG. 8814-A-43

NOTE:
BEDDING FOR STORM & F.D.C. SEWERS TO BE CLASS 'B' AS PER CITY OF MISSISSAUGA STD. 2-1-31.

NOTE:
WATER SERVICE CONNECTIONS FOR LOTS 351 TO 365 (INCLUSIVE) TO BE INSTALLED UNDER STORM SEWER. SEE DETAIL ON DWG. 8814-A-47

EXIST 0.50% | 40.00m @ 1.50% | 110.00M @ 0.50% | 20.00m @ 0.50% | 80.00m @ 0.50%

EX. MH 37
EX. MH 58A
EX. MH 58B
EX. CB 1000
STA. 0+000.22
ELEV. 195.22

MH 1A (STD. 2-1-1) (OPSD 701.01)
MH 1B (OPSD 701.04)
MH 1 (OPSD 701.04)
STA. 0+040.00
ELEV. 195.17

℄ ROAD GRADE
V.C. (STD. 1-1-1)
BOREHOLE 9
MH 2A (STD. 2-1-1) (OPSD 701.01)
MH 2B (OPSD 701.01)
STA. 0+113.56
ELEV. 194.25
INDIGO CRESCENT
MH 2 (OPSD 701.05)
STA. 0+150.00
ELEV. 194.07
STA. 0+170.00
ELEV. 194.17
MH 3A (STD. 2-1-1) (OPSD 701.01)
MH 3B

1/8 BEND
250 STM
1/8 BENDS
1.7m MIN.
TOPSOIL
ORIGINAL GROUND
PVC CL150
SILTY CLAY, TILL
150 WM
300 WM
SANDY SILT, TILL

EX. STM INV. N. ~~193.22~~ 192.86
E. ~~193.14~~ 192.83
S. ~~192.65~~ 192.78
EX. SAN INV. N. ~~192.15~~ 192.05
E. ~~192.10~~ 192.04
PROP. S. ~~192.13~~ 192.00
EX. FDC INV. N. ~~191.78~~ 191.64
E. ~~191.66~~ 191.61
PROP. S. ~~191.71~~ 191.59

STM INV. N. ~~192.50~~ 192.60
S. ~~192.48~~ 192.42
FDC INV. N. ~~191.26~~ 191.45
S. ~~191.32~~ 191.25
SAN INV. N. ~~191.60~~ 191.73
S. ~~191.64~~ 191.58

STM INV. N. ~~192.18~~ 192.20
W. ~~192.30~~ 192.27
S. ~~192.13~~ 192.08
FDC INV. N. ~~190.88~~ 190.91
W. ~~191.20~~ 190.31
S. ~~190.85~~ 190.84
SAN INV. N. ~~191.26~~ 191.24
W. ~~191.29~~ 191.30
S. ~~191.21~~ 191.18

FDC INV. N. ~~190.80~~ 190.68
S. ~~190.86~~ 190.65
SAN INV. N. ~~190.95~~ 190.94
S. ~~190.93~~ 190.93

EX. 825 STM | ~~46.0m~~ – 825 STM @ ~~0.40%~~ 42.3m | 0.43% | ~~74.0m~~ – 825 STM @ ~~0.40%~~ 77.6m | 0.28% | ~~153.0m~~ – 825 STM @ ~~0.40%~~ 154.2m | 0.38%
C76-65D | C76-65D | C76-65D

EX. 300 SAN | 39.4m ~~40.0m~~ – 250 FDC @ ~~1.58%~~ | 0.36% | 76.8m – 300 SAN a 0.44% | 72.5m – 300 SAN a 0.33% | 81.4m – 300 SAN a 0.32%
EX. 250 FDC | ~~40.0m~~ – 300 SAN @ ~~1.10%~~ 39.4m | 0.69% | 75.8m – 250 FDC a 0.45% | 72.7m – 250 FDC a 0.22% | 81.5m – 250 FDC a 0.40%
~~75.0m~~ – 300 SAN & 250 FDC @ 0.50% | ~~73.0m~~ – 300 SAN. & 250 FDC @ 0.35% | ~~80.0m~~ – 300 SAN. & 250 FDC @ 0.35%
PVC SDR 35 | PVC SDR 35 | PVC SDR 35 | PVC SDR 35

196 195 194 193 192 191 190 189

CHAINAGE 0-040 0-020 0+000 0+020 0+040 0+060 0+080 0+100 0+120 0+140 0+160 0+180 0+200 0+220 CHAINAGE

GENERAL NOTES

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN FIELD.
- ● DENOTES BUILDING – NOT LOCATED
- ⌐ DENOTES BUILDING – LOCATED
- T.T.B.M. No. 839 ELEV. 190.853m
- TEMP. BENCH MARK ELEV.
- DESCRIPTION. ON THE W. FACE AT THE S. END OF THE S.E. CONCRETE END POST OF A BRIDGE ON NINTH LINE, 228.6m N. OF BRITANNIA RD. W.

AS CONSTRUCTED 21 T-87071

LICENSED PROFESSIONAL ENGINEER M. K. T. BROWN PROVINCE OF ONTARIO
DESIGNED BY

REGISTERED PROFESSIONAL ENGINEER P. A. EHLER PROVINCE OF ONTARIO
APPROVED BY

CHKD.

SECOND TERRAGAR HOLDINGS LIMITED
PHASE I

paul theil associates limited
consulting engineers
21 Coventry Road, Brampton, Ontario L6T 4V7

MISSISSAUGA
Public Works Department

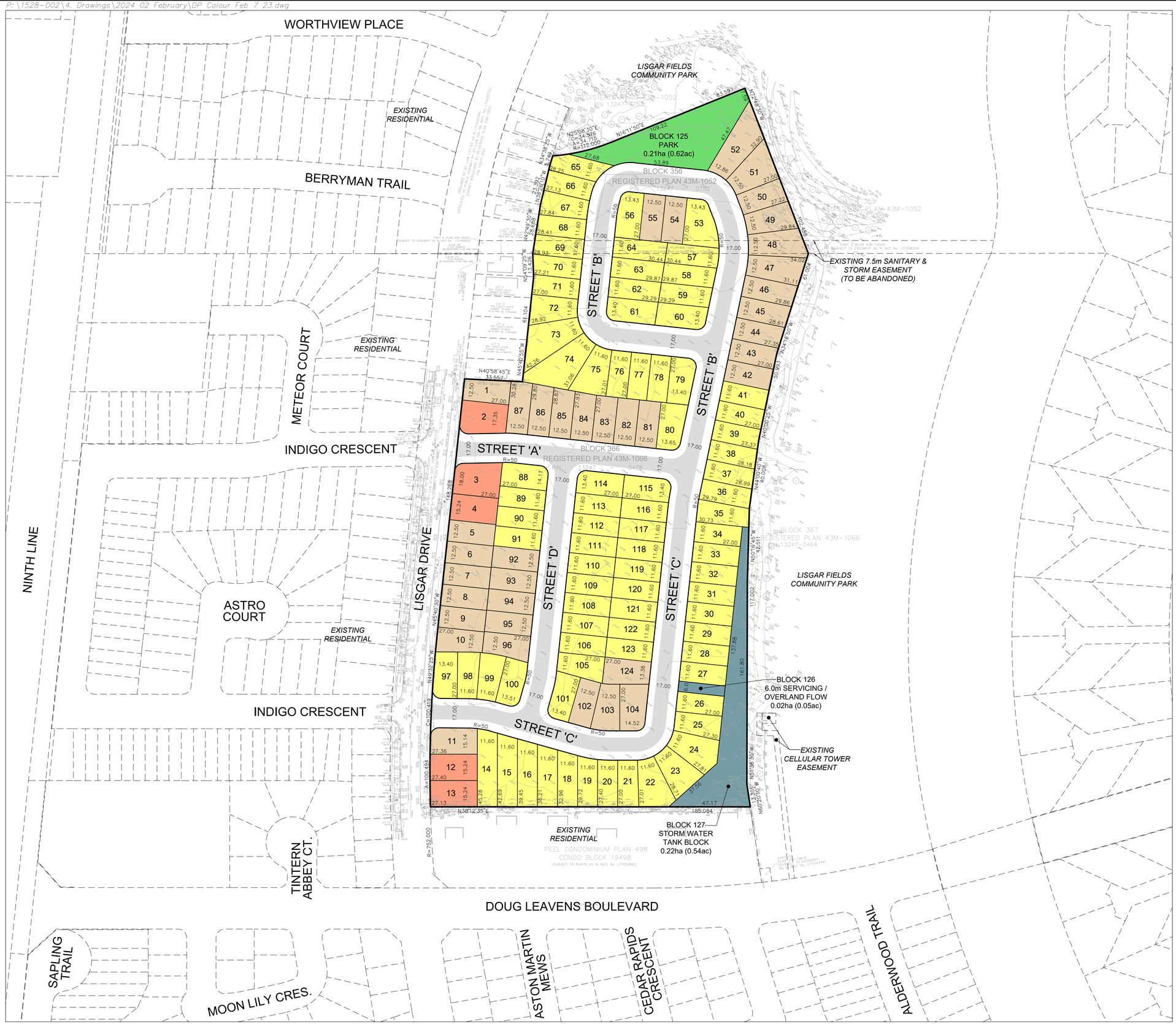
LISGAR DRIVE

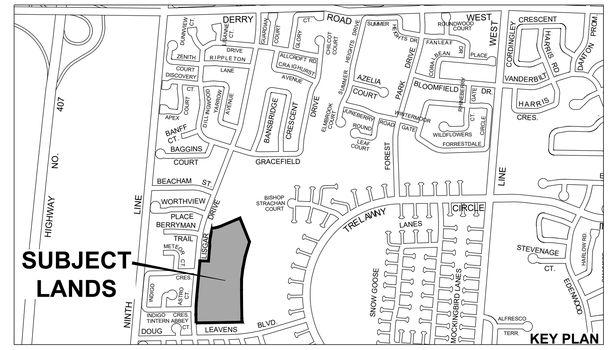
STN. 0+000 TO STA. 0+220

SCALE HORIZ 1:500 VERT. 1:50	AREA		PROJECT No.
DRAWN BY M. Rose	CHECKED BY		PLAN No. 8814-A-7
DATE SEPT. 1991	SHEET	OF	21690-D

21690-D

P:\1528-002\4. Drawings\2024 02 February\DP Colour Feb 7 23.dwg





DRAFT PLAN OF SUBDIVISION

FILE # 21T-M_____

AVENIA CONSTRUCTION INC.

BLOCK 356, REGISTERED PLAN 43M-1052 AND
BLOCK 366, REGISTERED PLAN 43M-1066,
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

OWNERS CERTIFICATE

I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF MISSISSAUGA FOR APPROVAL.

SIGNED _____ DATE August 3/23.

CARLO BALDASSARRA, A.S.O.
AVENIA CONSTRUCTION INC.

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED _____ DATE AUGUST 2, 2023

DAN DZALDOV, O.L.S.
SCHAEFFER DZALDOV PURCELL LTD.
ONTARIO LAND SURVEYORS

ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, J & L ARE SHOWN ON THE DRAFT AND KEY PLANS.

H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) SANDY LOAM AND CLAY LOAM
K) SANITARY AND STORM SEWERS TO BE PROVIDED

LAND USE SCHEDULE

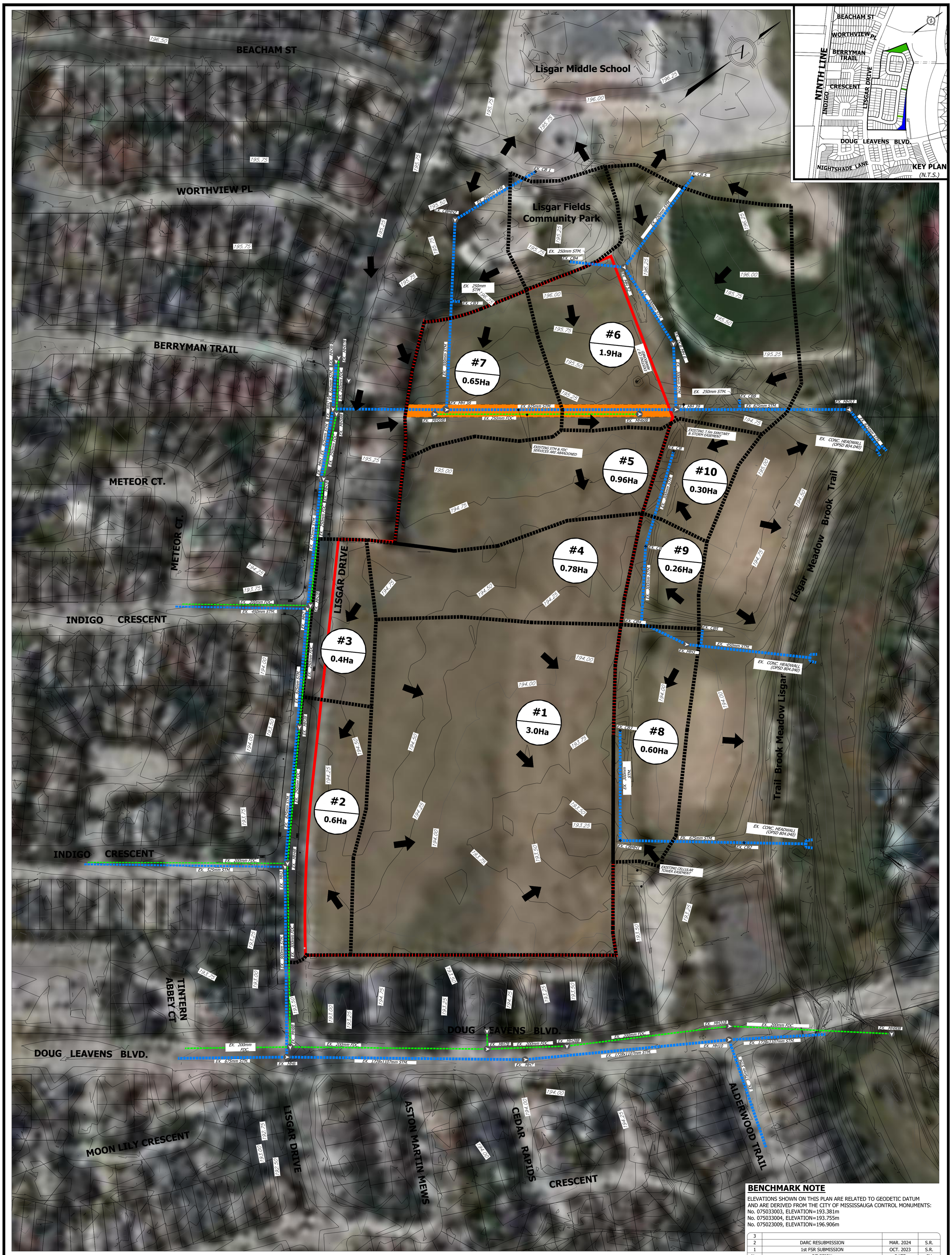
LAND USE	LOTS / BLOCKS	AREA (ha)	AREA (ac)	UNITS	DENSITY (UPHA)
DETACHED - 11.60m (38')	1-124	2.90	7.17	82	28.3
DETACHED - 12.50m (41')		1.38	3.41	37	26.8
DETACHED - 15.24m (50')		0.22	0.54	5	22.7
PARK	125	0.21	0.52		
SERVICING / OVERLAND FLOW	126	0.02	0.05		
STORM WATER TANK BLOCK	127	0.22	0.54		
17.0m ROW (934m)		1.59	3.93		
TOTAL	**127**	**6.54**	**16.16**	**124**	**27.8**

NOTES

- PAVEMENT ILLUSTRATION IS DIAGRAMMATIC
- ALL DAYLIGHT ROUNDINGS = 5m RADII

SCALE: 1:1000
(24 x 36)
FEBRUARY 7, 2024

GSAI
Glen Schnarr & Associates Inc.



LEGEND

- SUBJECT LANDS
- 195.00 EXISTING CONTOURS
- EXISTING DRAINAGE BOUNDARY
- EXISTING STORM SEWERS
- EXISTING FDC SEWERS
- EXISTING OVERLAND FLOW DIRECTION
- #3 / 0.4Ha — EXISTING STORM DRAINAGE AREA, I.D. / EXISTING DRAINAGE AREA SIZE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

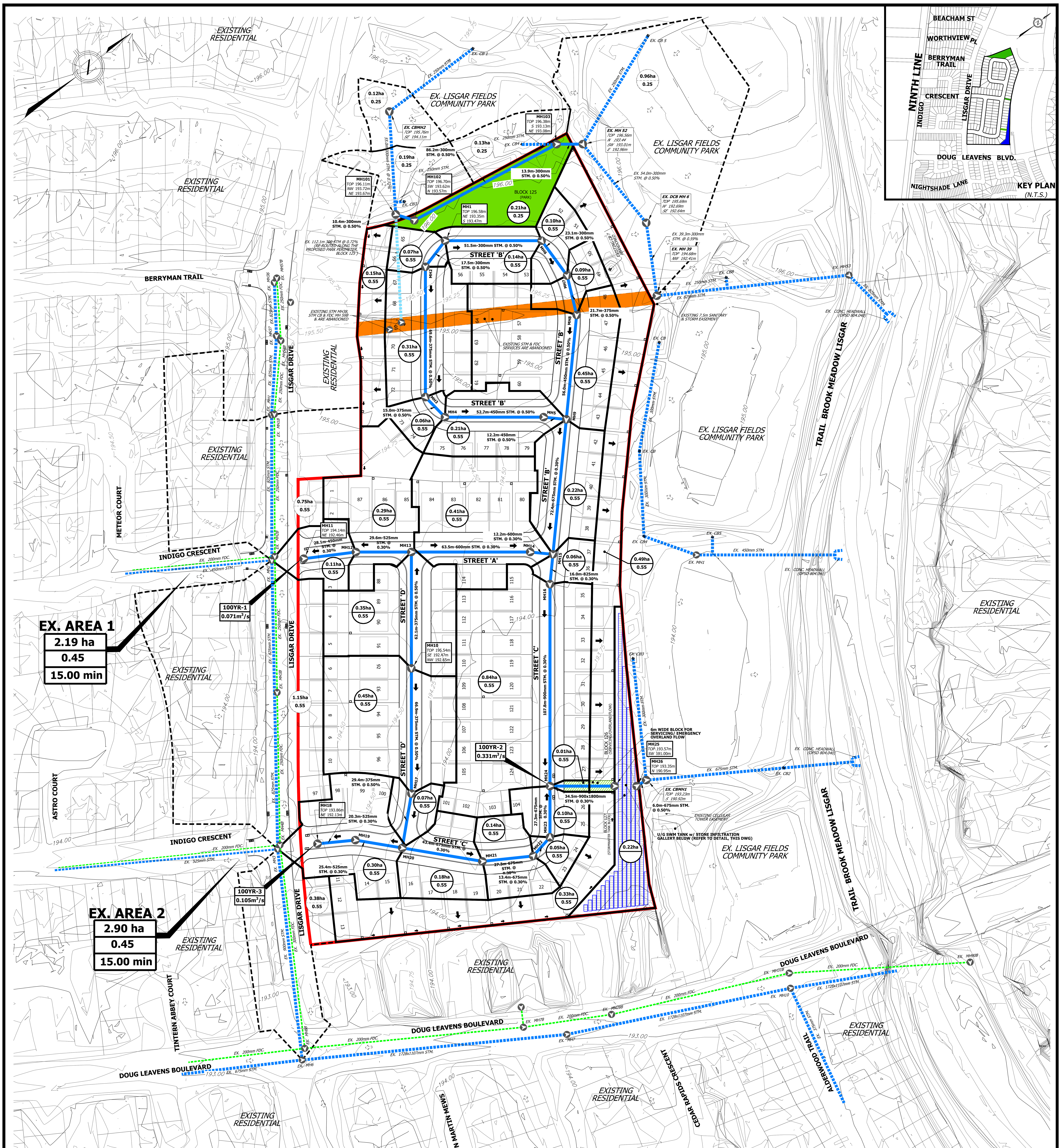
No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

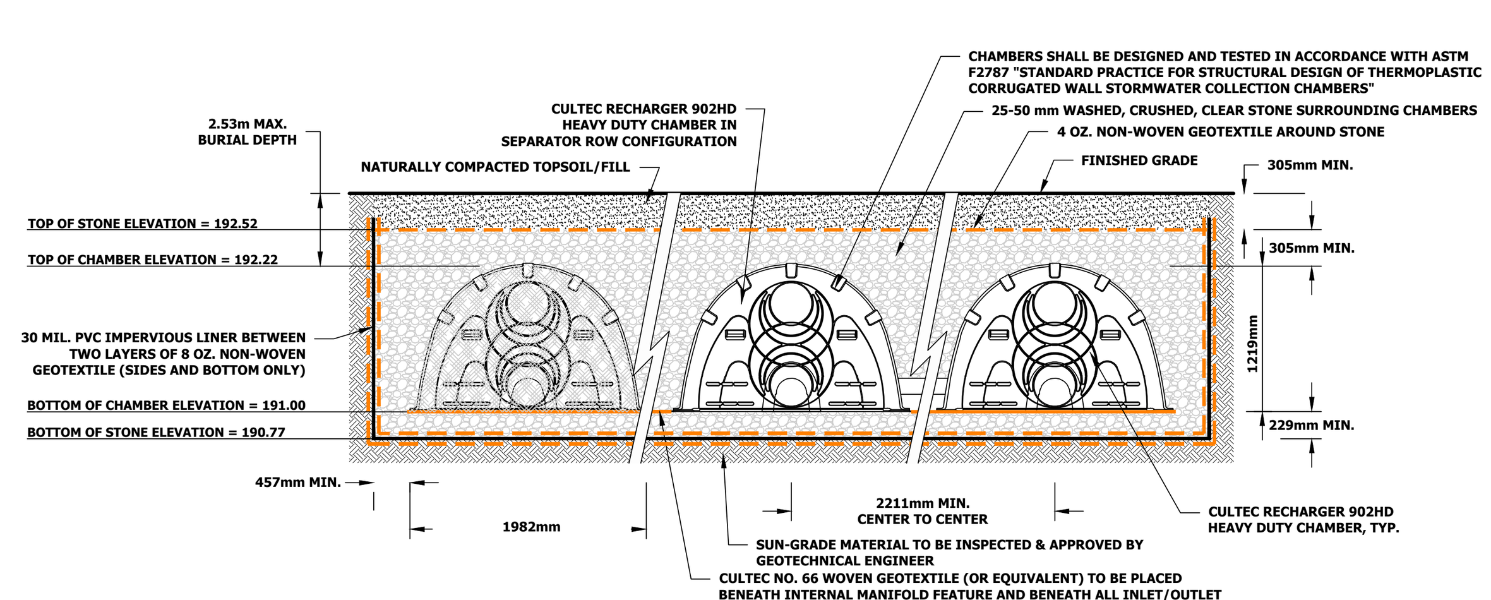
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

EXISTING STORM DRAINAGE PLAN

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:1000	4





TYPICAL UNDERGROUND SWM TANK CROSS SECTION
N.T.S.

BENCHMARK

ELEVATIONS SHOWN HEREON ARE RELATED TO MISSISSAUGA DATUM AND ARE REFERRED TO CITY OF MISSISSAUGA MONUMENT No. 075033003 HAVING A PUBLISHED ELEVATION OF 193.381 METRES.

No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

LEGEND

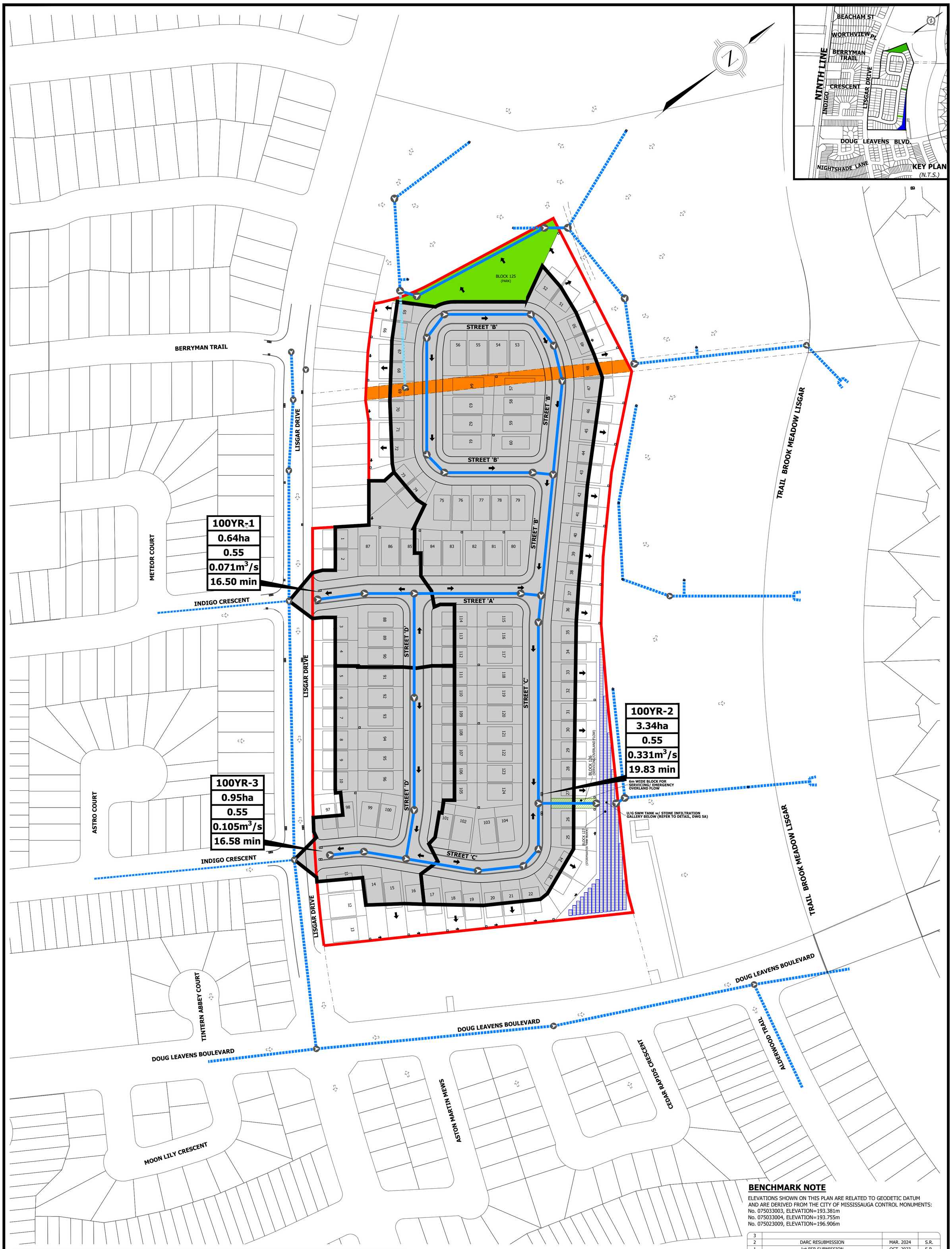
- DRAFT PLAN LIMITS
- EXISTING CONTOURS
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED MINOR SYSTEM DRAINAGE BOUNDARY
- EXISITNG DRAINAGE BOUNDARY
- PROPOSED STORM SEWERS
- EXISTING STORM SEWERS
- EXISTING FDC SEWERS
- EXISTING STORM SEWERS (TO BE REMOVED)
- 1.00 ha / 0.90 — MINOR SYSTEM DRAINAGE AREA (HECTARES) RUNOFF COEFFICIENT
- PROPOSED / FUTURE OVERLAND FLOW DIRECTION
- MH 18 / TOP 194.28m / NW 191.06m / SE 191.01m — PROPOSED STORM MH ID; PROPOSED GROUND ELEVATION; PROPOSED SEWER INVERTS
- 100YR-1 — MAJOR SYSTEM AREA ID
- 0.071 m³/s — CONSTANT FLOW CAPTURED IN PIPE AT LOW POINT
- 2.90 ha — EXTERNAL DRAINAGE AREA (ha)
- 0.45 — RUNOFF COEFFICIENT x AREA (ha)
- 15.00 min — TIME OF CONCENTRATION (min)
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

URBANTECH
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

PROPOSED STORM DRAINAGE PLAN

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:1000	5A



BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

LEGEND

- DRAFT PLAN LIMITS
- PROPOSED / FUTURE OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- 100YR-1 / 2.17ha / 0.75 / 1.640m³/s / 10.83 min — MAJOR SYSTEM CAPTURE LOCATION ID; MAJOR SYSTEM CAPTURE AREA (ha); RUNOFF COEFFICIENT x AREA (ha); CONSTANT FLOW (m³/s) CAPTURED IN PIPE AT LOW POINT (Q100-Q5); TIME OF CONCENTRATION (min)
- PROPOSED STORM SEWERS
- EXISTING STORM SEWERS
- EXISTING STORM SEWERS (TO BE REMOVED)
- 100-YEAR CAPTURE AREA (OVERLAND FLOW TO POND NOT POSSIBLE)
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

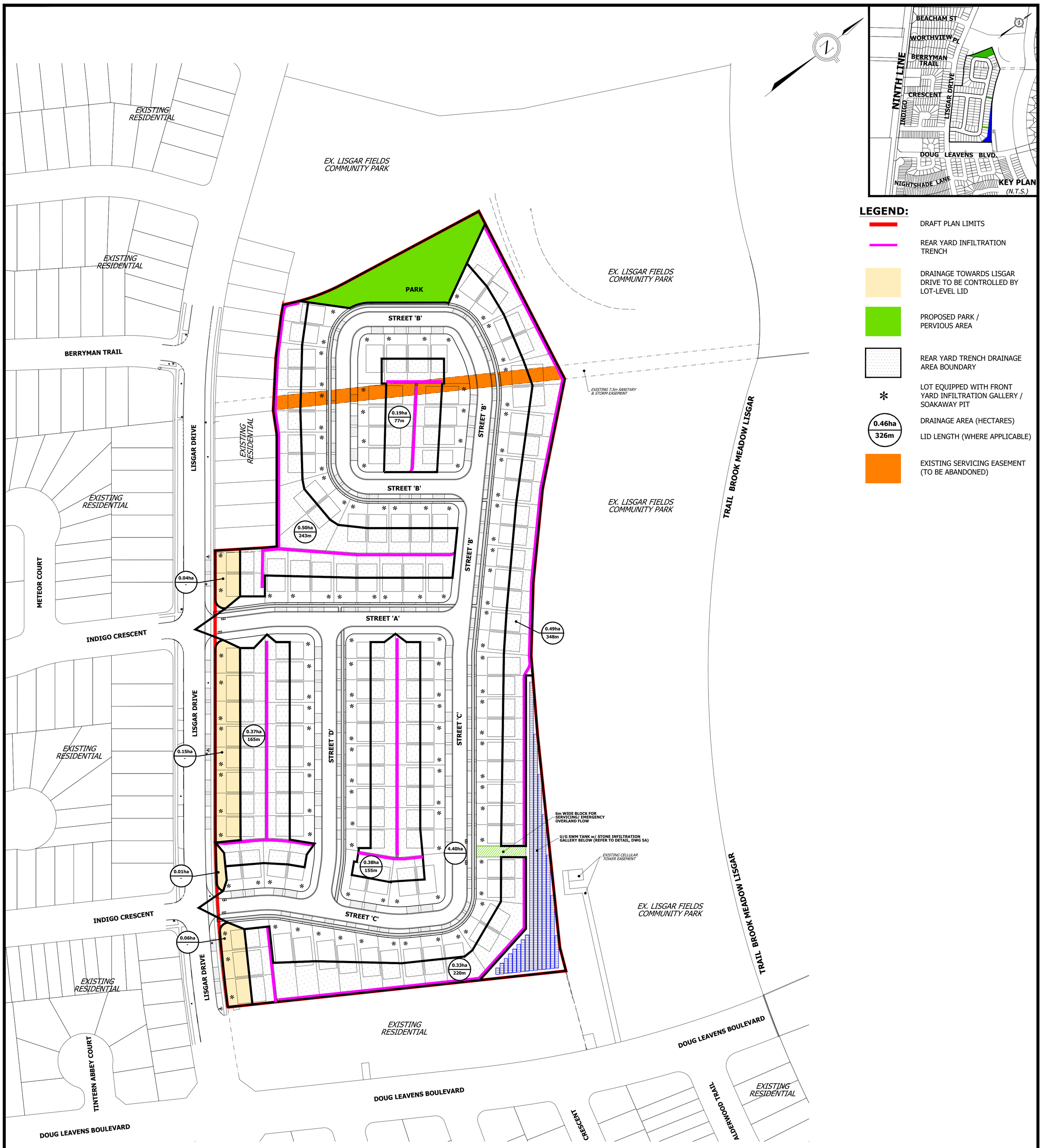
No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

MAJOR SYSTEM CAPTURE PLAN

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:1000	5B



LEGEND:

- DRAFT PLAN LIMITS
- REAR YARD INFILTRATION TRENCH
- DRAINAGE TOWARDS LISGAR DRIVE TO BE CONTROLLED BY LOT-LEVEL LID
- PROPOSED PARK / PERVIOUS AREA
- REAR YARD TRENCH DRAINAGE AREA BOUNDARY
- * LOT EQUIPPED WITH FRONT YARD INFILTRATION GALLERY / SOAKAWAY PIT
- 0.46ha / 326m — DRAINAGE AREA (HECTARES) / LID LENGTH (WHERE APPLICABLE)
- EXISTING SERVICING EASEMENT (TO BE ABANDONED)

REAR YARD INFILTRATION TRENCH
N.T.S.

NOTES

1. BASE OF SUBSURFACE INFILTRATION STRUCTURE TO BE AT OR BELOW FOUNDATION DRAIN ELEVATION , BUT NOT MORE THAN 1.0m BELOW THE UNDERSIDE OF THE HOUSE FOUNDATION.
2. FILTER FABRIC TO BE TERRAFIX 270R OR APPROVED EQUAL.
3. INFILTRATION TRENCH TO BE OUTSIDE THE EXCAVATION FOR THE BASEMENT BY A MINIMUM 4.5m CLEAR AND IN THE BACKYARD.
4. ALL ROOF DRAINAGE FROM PROPOSED UNITS TO BE DIRECTED TO THE INFILTRATION TRENCH.

FRONT-YARD SOAKAWAY PITS CROSS SECTION
NTS

LOT-LEVEL LID LOCATIONS
PLAN VIEW (TYP.)

POTENTIAL LIDs	
LINEAR LIDs	**LENGTH (m)**
Rear-Yard Trenches	**1186**
Front-Yard Soakaway Pits	**182**

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

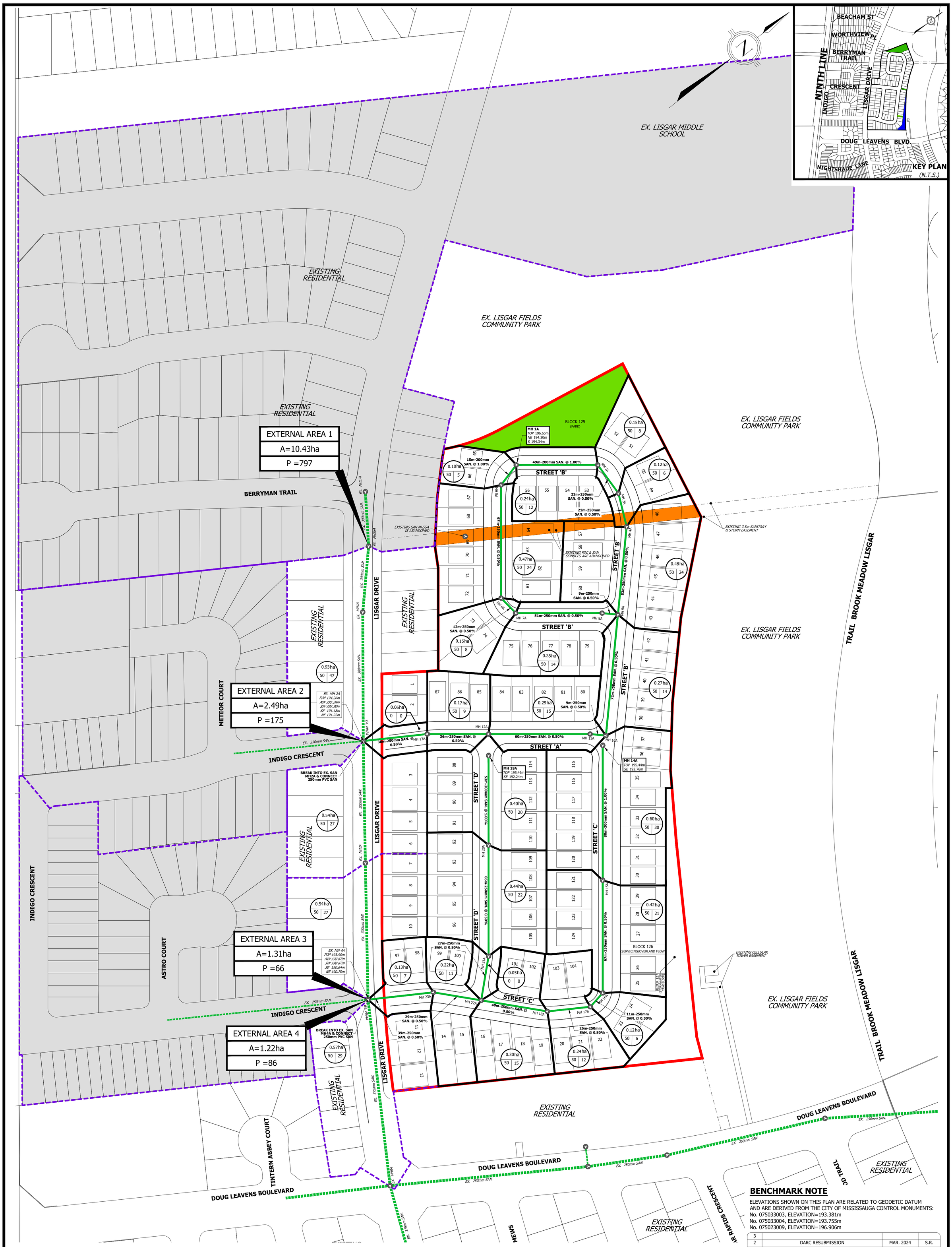
No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

PROPOSED LID PLAN

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	**1:1000**	**5B**



LEGEND

- DRAFT PLAN LIMITS
- PROPOSED SANITARY DRAINAGE BOUNDARY
- EXTERNAL SANITARY DRAINAGE BOUNDARY
- EXISTING SANITARY SEWER
- PROPOSED LOCAL SANITARY SEWER, MANHOLE AND FLOW DIRECTION
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK

MH 23A
TOP 256.53m
SW 255.72m
NW 255.72m

- PROPOSED SANITARY MH ID
- PROPOSED GROUND ELEVATION
- PROPOSED SEWER INVERTS

2.17ha | 175 | 380

- WASTEWATER DRAINAGE AREA (HECTARES)
- POPULATION (PERSONS)
- POPULATION DENSITY (PERSONS PER HECTARE)

EXTERNAL AREA 1 | A=31.4ha | P = 2,615

- AREA ID
- EXTERNAL SANITARY DRAINAGE AREA (HECTARES)
- POPULATION (PERSONS)

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

PROPOSED SANITARY DRAINAGE PLAN

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:1000	6

LEGEND

- SUBJECT LANDS
- PROPOSED MUNICIPAL WATERMAIN
- EXISTING WATERMAIN
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

NOTE:

- THE PROPOSED WORKS ARE WITHIN PRESSURE ZONE 5A
- FIRE HYDRANT LOCATIONS ARE PRELIMINARY AND ARE SUBJECT TO CHANGE AT DETAILED DESIGN.

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

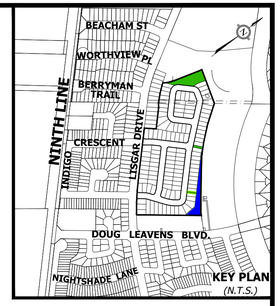
URBANTECH®

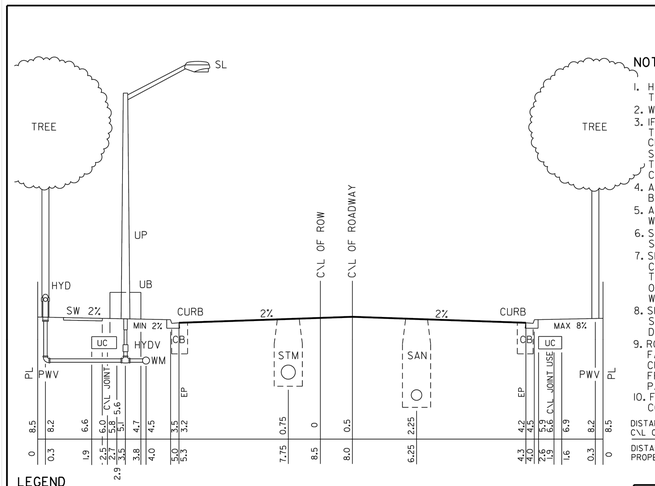
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

PROPOSED WATER SERVICING PLAN

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:750	7





METRIC

ALL DIMENSIONS IN METRES

NOTES

1. HYDRO, GAS, TELECOMMUNICATIONS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA.
4. A 0.4m - 0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
5. A 0.3m CLEARANCE MUST BE MAINTAINED BETWEEN WATERMAINS AND UTILITY POLES.
6. SIDEWALKS REQUIRED ON ONE SIDE ONLY ON STREETS OTHER THAN CUL-DE-SACS.
7. SIDEWALKS REQUIRED ON ONE SIDE ONLY ON CUL-DE-SACS SERVICING DEVELOPMENTS OTHER THAN SINGLE FAMILY OR SEMI-DETACHED DWELLINGS OR WHERE SIDEWALKS WILL FORM PART OF A WALKWAY SYSTEM.
8. SIDEWALKS WILL NOT BE REQUIRED ON CUL-DE-SACS SERVICING SINGLE FAMILY OR SEMI-DETACHED DWELLINGS.
9. ROAD WIDTH IS MEASURED FROM FACE OF CURB TO FACE OF CURB AS DEFINED ON OPSD STD. 600.040 CURB & GUTTER. PAVEMENT WIDTH IS MEASURED FROM EDGE OF PAVEMENT (EP) TO EDGE OF PAVEMENT (EP).
10. FOR LOCATION OF GAS MAIN WITHIN UTILITY CORRIDOR REFER TO STD. 2211.280

LEGEND

EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
GAS - GAS MAIN
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMMUNICATIONS,SL,GAS)
UP - UTILITY POLE
WM - WATERMAIN

MISSISSAUGA

STANDARD
MINOR LOCAL RESIDENTIAL ROAD
8.0m ROAD ON 17m ROW

EFF. DATE	2002-01-01	SCALE	N.T.S.
REV. 8	2015-06-04	STANDARD No.	2211.060

No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

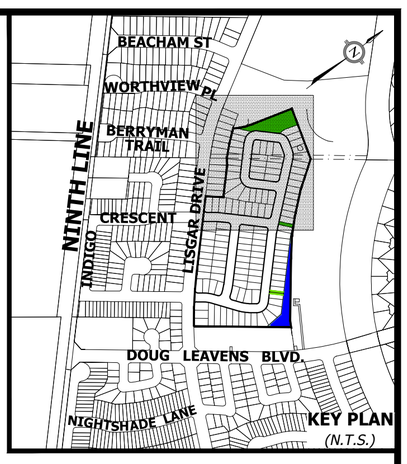
URBANTECH®

Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

ROAD CROSS SECTIONS

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	N.T.S.	8



EXISTING RESIDENTIAL

EX. LISGAR FIELDS COMMUNITY PARK

EXISTING RESIDENTIAL

EX. LISGAR FIELDS COMMUNITY PARK

BLOCK 125 (PARK)

STREET 'B'

STREET 'A'

LISGAR DRIVE

EXISTING CB 7 ABANDONED

EXISTING STM MH38, STM CB & FDC-MH 59B & ARE ABANDONED

EXISTING FDC & SAN SERVICES ARE ABANDONED

EXISTING 7.5m SANITARY & STORM EASEMENT

1.5m CONC. SWK.

15m CONC. SWK.

REFER TO FIGURE 9B

LEGEND

- DRAFT PLAN LIMITS
- 192.00 EXISTING CONTOURS
- 187.60 EXISTING ELEVATION
- 188.67 PROPOSED GRADE
- EXISTING & PROPOSED OVERLAND FLOW DIRECTION
- PROPOSED SWALE
- TRANSITION SLOPE(3:1 OR AS NOTED)
- STREET OR REAR LOT CATCHBASIN
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

NOTE: LANDSCAPE DETAILS INCLUDING FENCING LOCATIONS WILL BE COORDINATED AT A LATER DESIGN STAGE

URBANTECH®

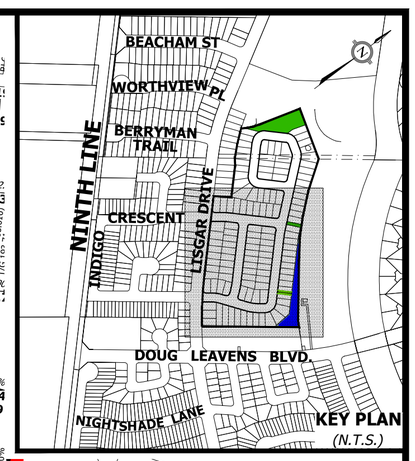
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

GRADING PLAN
(PART 1 OF 2)

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:500	9.1

REFER TO FIGURE 9A



STREET 'A'

STREET 'B'

STREET 'C'

STREET 'D'

LISGAR DRIVE

INDIGO CRESCENT

DOUG LEAVENS BOULEVARD

EXISTING RESIDENTIAL

1.5m CONC. SWK.

VERTICAL CURVE K=11.0, L=44.00m

BLOCK 126 (SERVICING/OVERLAND FLOW)

BLOCK 127 (STORMWATER TANK BLOCK)

EX. LISGAR COMMUNITY

LEGEND

- DRAFT PLAN LIMITS
- EXISTING CONTOURS
- EXISTING ELEVATION
- PROPOSED GRADE
- EXISTING & PROPOSED OVERLAND FLOW DIRECTION
- PROPOSED SWALE
- TRANSITION SLOPE(3:1 OR AS NOTED)
- STREET OR REAR LOT CATCHBASIN
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

URBANTECH®

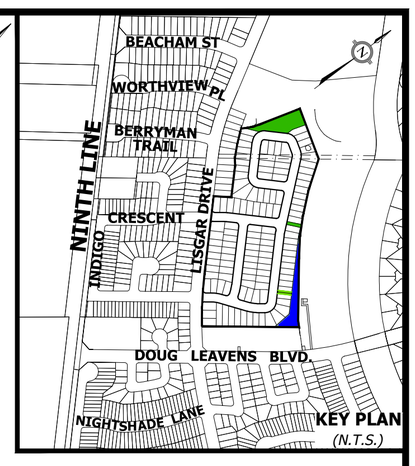
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

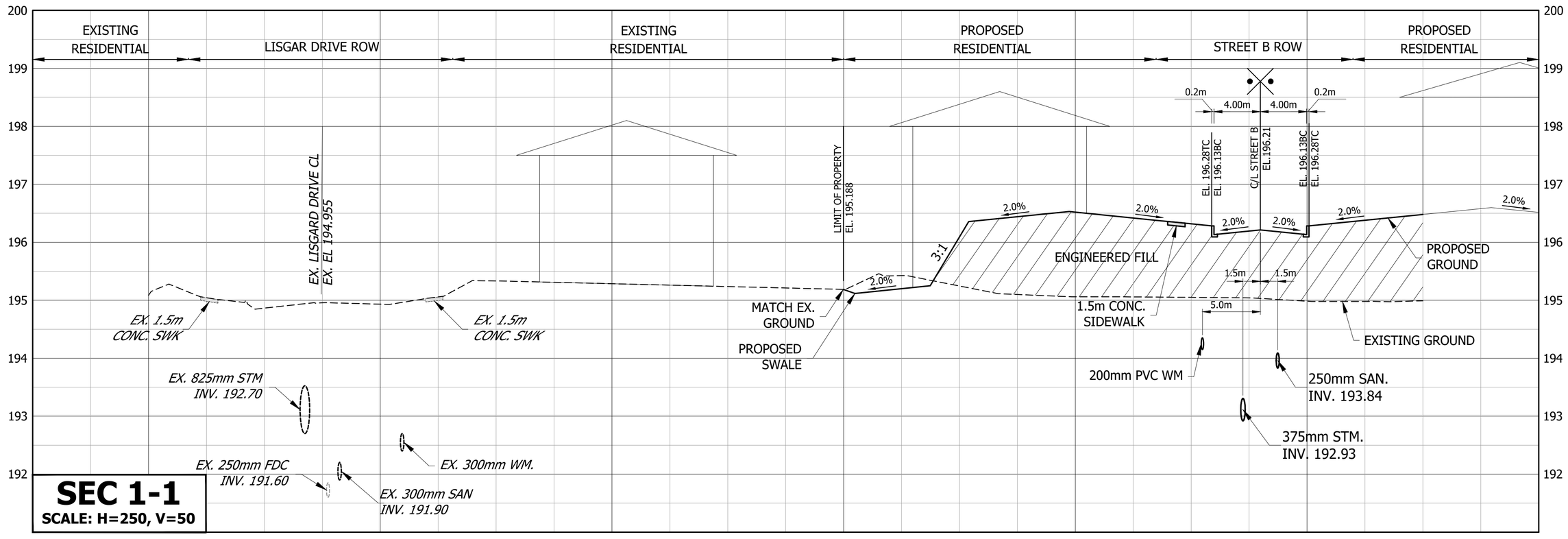
AVENIA CONSTRUCTION INC.

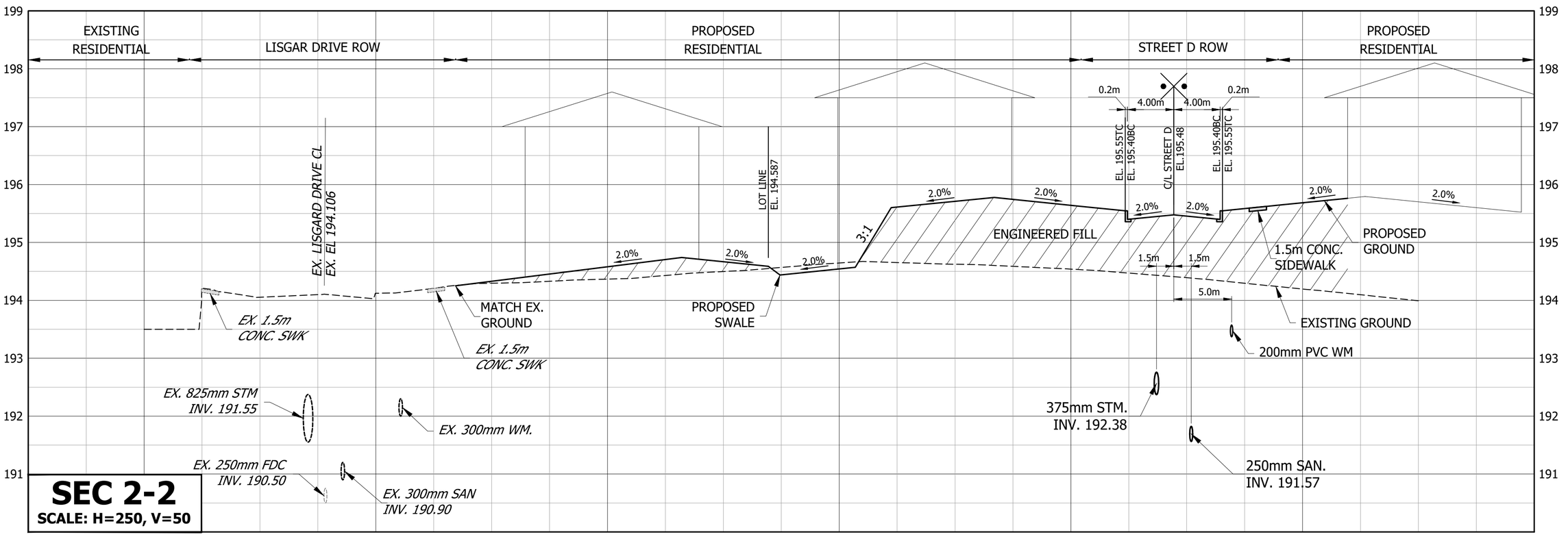
GRADING PLAN
(PART 2 OF 2)

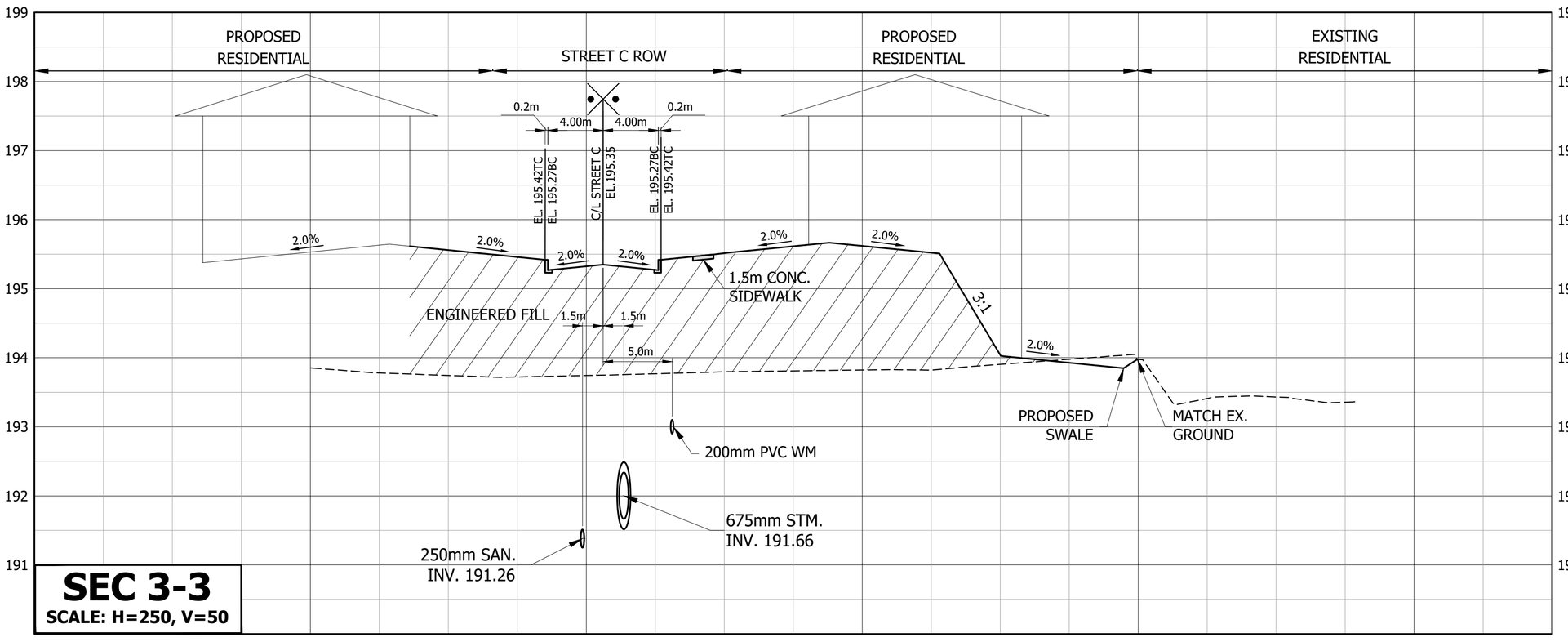
PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:500	9.2

NOTE: LANDSCAPE DETAILS INCLUDING FENCING LOCATIONS WILL BE COORDINATED AT A LATER DESIGN STAGE









BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

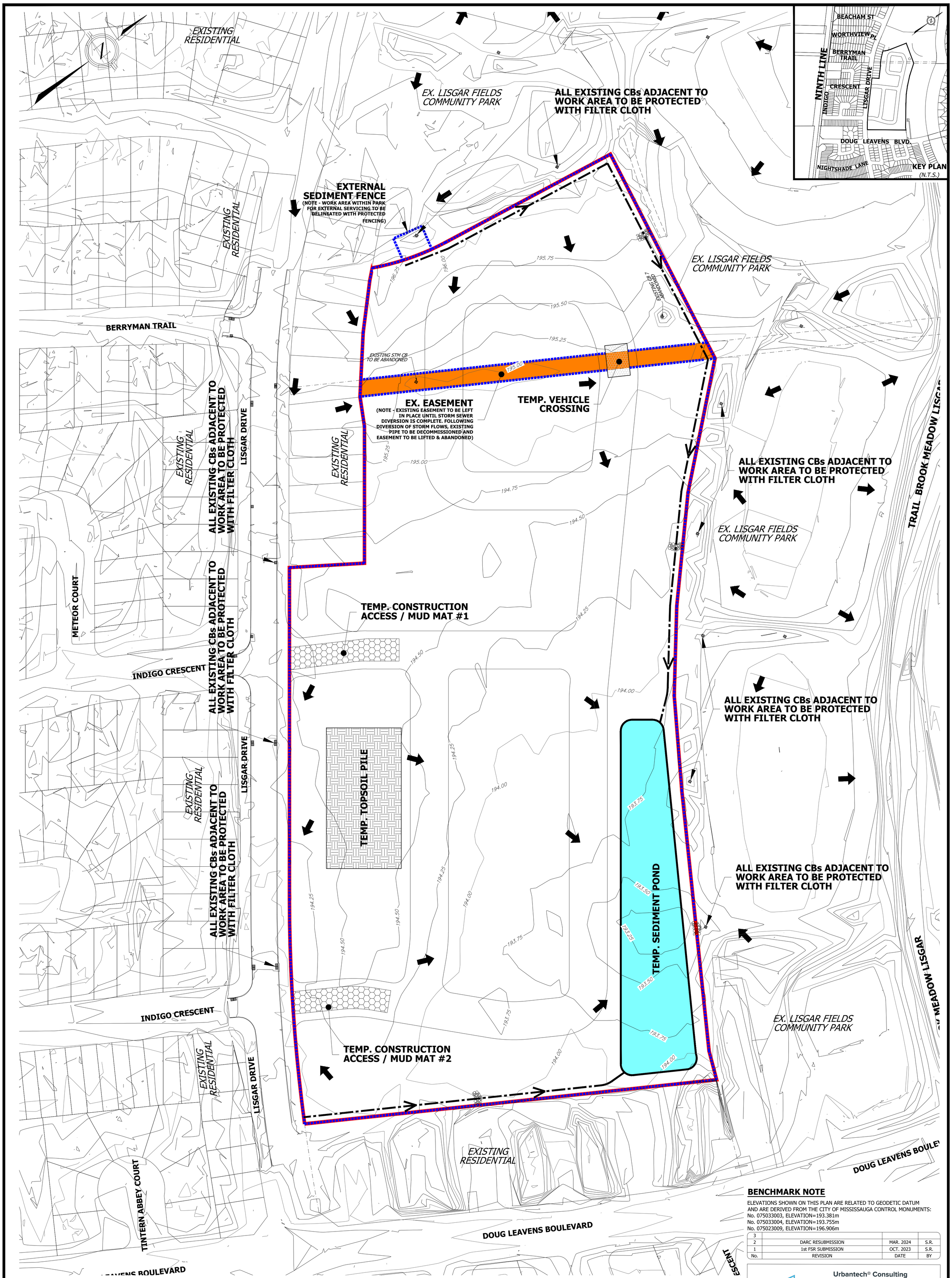
No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

GRADING CROSS SECTIONS

PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	H: 1:250 V: 1:50	9C



LEGEND

- SUBJECT LANDS
- PROPOSED SEDIMENT FENCE
- PROPOSED CUT-OFF SWALE
- PROPOSED ROCK CHECK DAM
- OVERLAND FLOW DIRECTION
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- 194.50 EXISTING CONTOUR AND ELEVATION

STAGING NOTES:

1. EXISTING EASEMENT TO BE LEFT IN PLACE UNTIL STORM SEWER DIVERSION IS COMPLETE. FOLLOWING DIVERSION OF STORM FLOWS, EXISTING PIPE TO BE DECOMMISSIONED AND EASEMENT TO BE LIFTED & ABANDONED.
2. TREE PROTECTION FENCING TO BE INSTALLED.
3. INSTALL FILTER CLOTH IN EXISTING CATCHBASINS ALONG LISGAR DRIVE ADJACENT TO THE PROPOSED DISTURBANCE AREA & WITHIN THE EXISTING PARK.
4. INSTALL CONSTRUCTION ACCESSES / MUD MATS FROM LISGAR DRIVE. APPLICABLE TRAFFIC SIGNAGE TO BE IMPLEMENTED ON LISGAR DRIVE.
5. ISOLATE SITE WITH PROTECTED FENCING AS SHOWN.
6. INSTALL CUT-OFF SWALES AND ROCK CHECK DAMS AS SHOWN ON THIS PLAN.
7. EXCAVATE PROPOSED SEDIMENT PONDS AND INSTALL ALL APPURTENANCES AS SHOWN.
8. FOLLOWING INSTALLATION OF ALL AFOREMENTIONED MEASURES, TOPSOIL TO BE STRIPPED AND STOCKPILED OR HAULED OFF SITE AS REQUIRED.
9. FOLLOWING TOPSOIL STRIPPING OPERATION, SITE TO BE SEQUENTLY GRADED & SERVICED. ESC's TO REMAIN IN PLACE WERE POSSIBLE TO FULL BUILT & STABILIZATION OF THE SITE

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

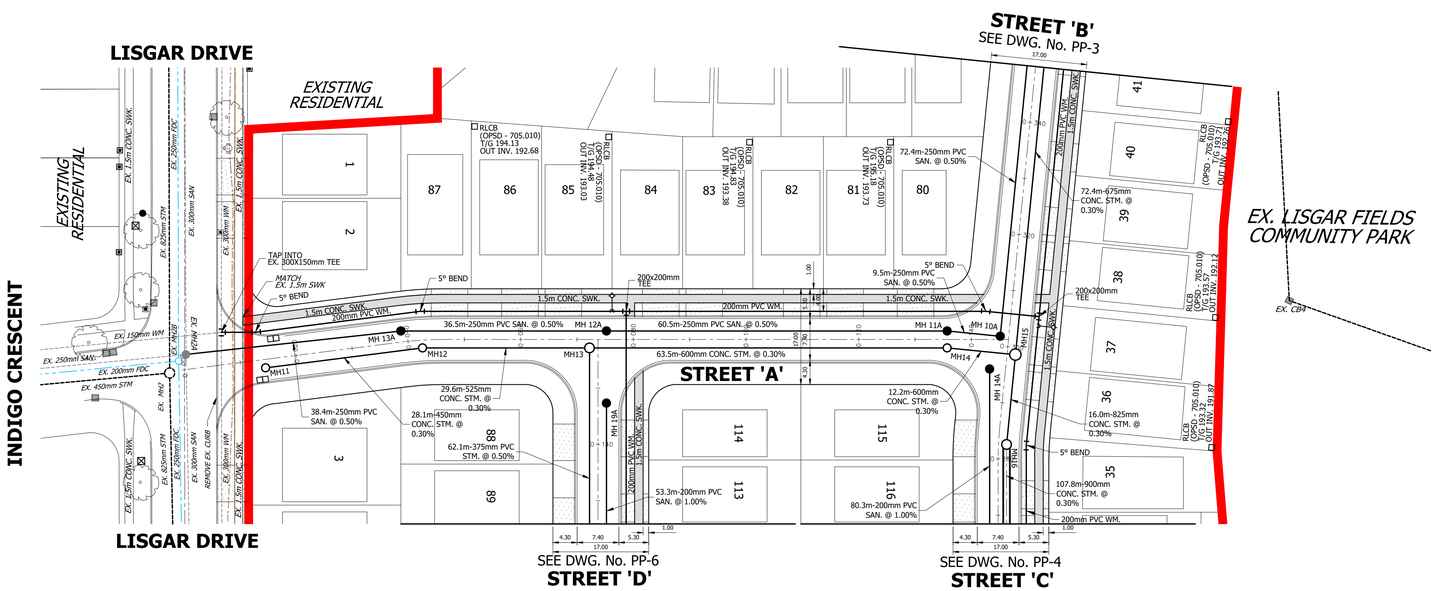
No.	REVISION	DATE	BY
3			
2	DARC RESUBMISSION	MAR. 2024	S.R.
1	1st FSR SUBMISSION	OCT. 2023	S.R.

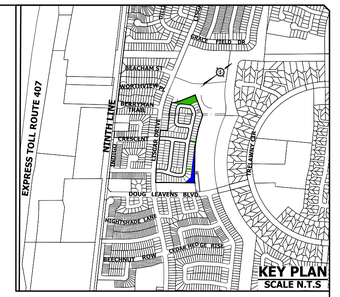
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

AVENIA CONSTRUCTION INC.

CONSTRUCTION MANAGEMENT PLAN

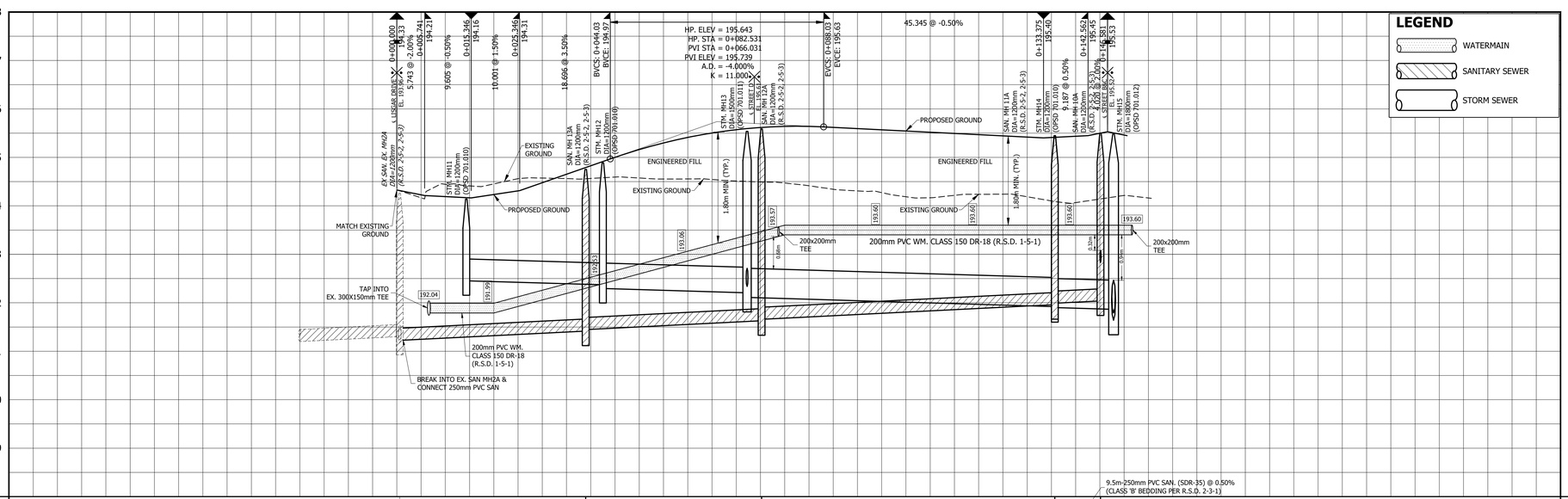
PROJECT No.	DATE	SCALE	FIG No.
23-748	OCT. 2023	1:750	10





LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA



	SANITARY SEWER INVERT	STORM SEWER INVERT	PROPOSED EXISTING CENTRELINE ELEVATION	CENTRELINE CHAINAGE
	EX. 250mm PVC SAN	SEW1.180 NW191.240 NE191.225		
	38.4m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW191.417 NE191.447		
	36.5m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW191.629 NE191.659		
	60.5m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW191.962 NE191.992		
	9.5m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)			
	12.2m-600mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	SW192.039 SW192.830		
	28.1m-450mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	NE192.455 SW192.297 NE191.2296		
	29.6m-525mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	SW192.207 NE192.237 NE191.112		
	63.5m-600mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	SW191.922 NE191.902		
		NW191.790 SW191.865 SE191.640		

NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel working with you

MISSISSAUGA

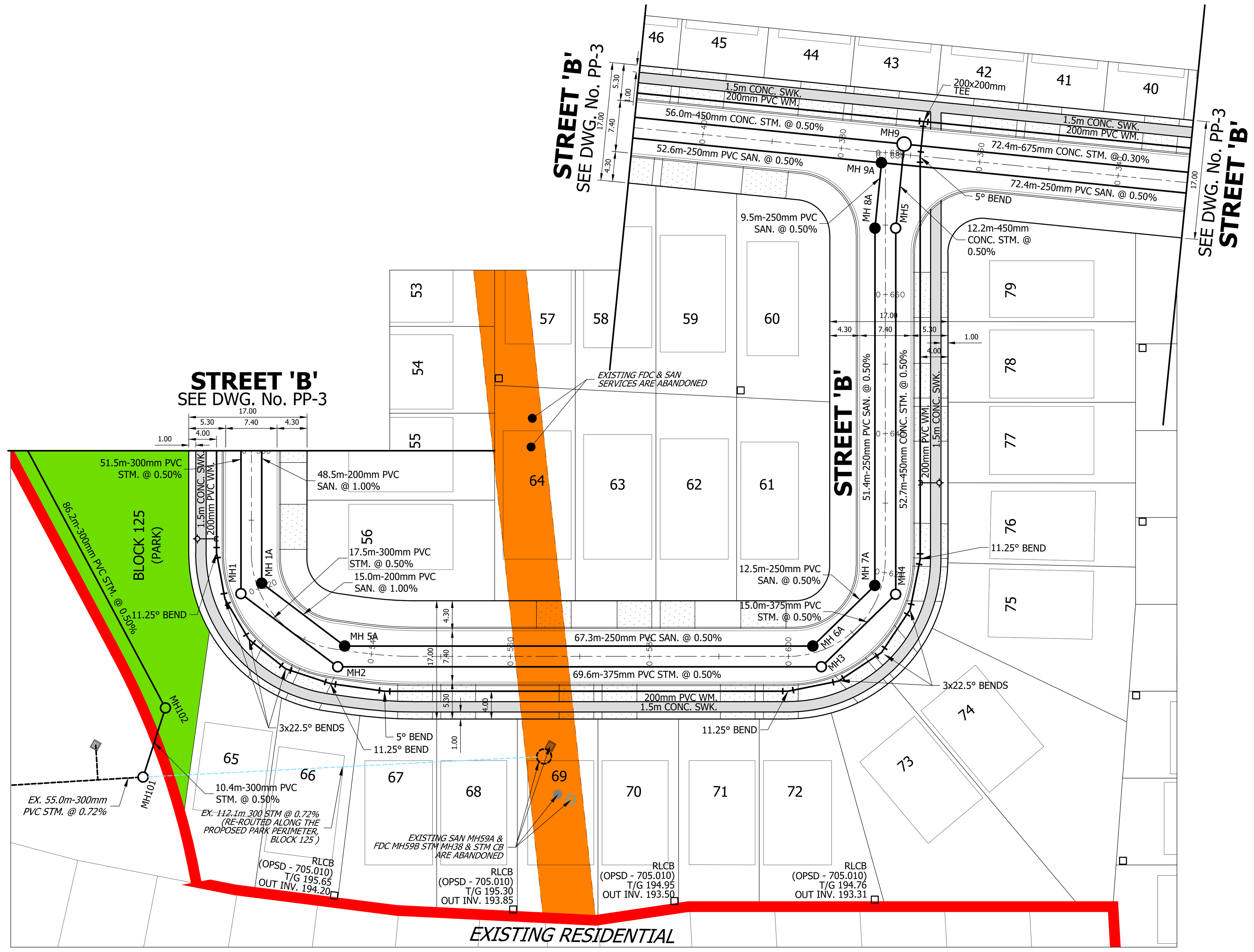
CITY FILE No.	REGION FILE No.

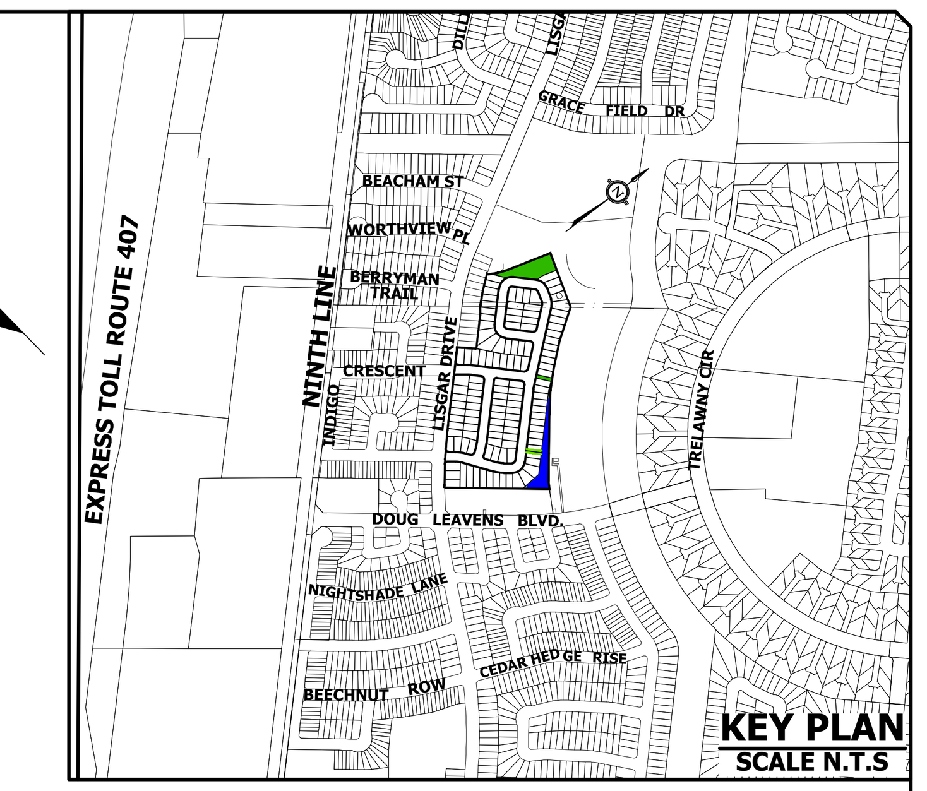
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
S.B. RIEMER
100214712
OCT. 13, 2023
PROVINCE OF ONTARIO

PLAN & PROFILE
STREET A
(STA. 0+000 TO STA. 0+150)

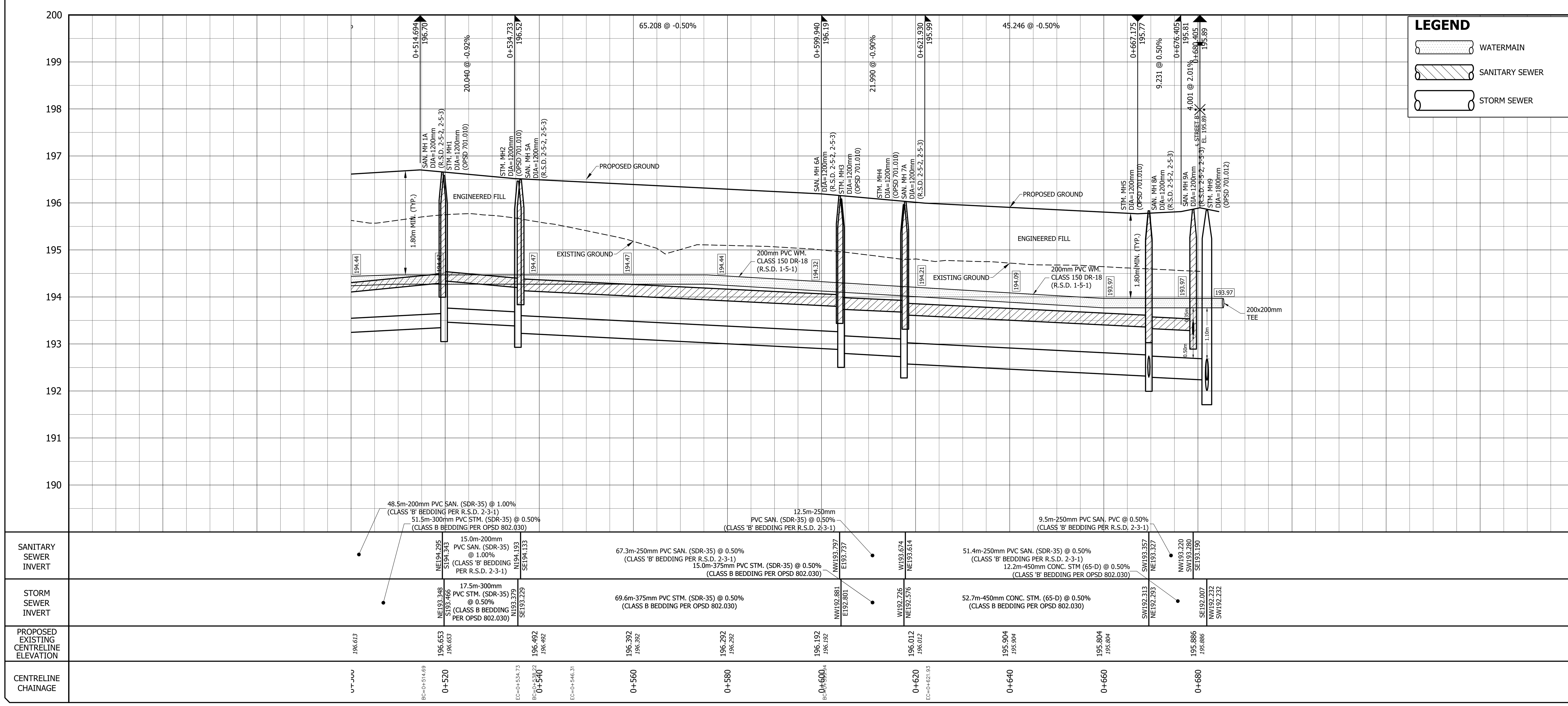
DESIGNED:	Y.P.	CHECKED:	S.R.	PROJECT No.:	23-748
DRAWN:	Y.P.	DATE:	OCTOBER 2023	SHEET No.:	
SCALE:	H 1:500 V 1:50			DRAWING No.:	PP-1





LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA



NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel
working with you

MISSISSAUGA

CITY FILE No. | REGION FILE No.

URBANTECH®

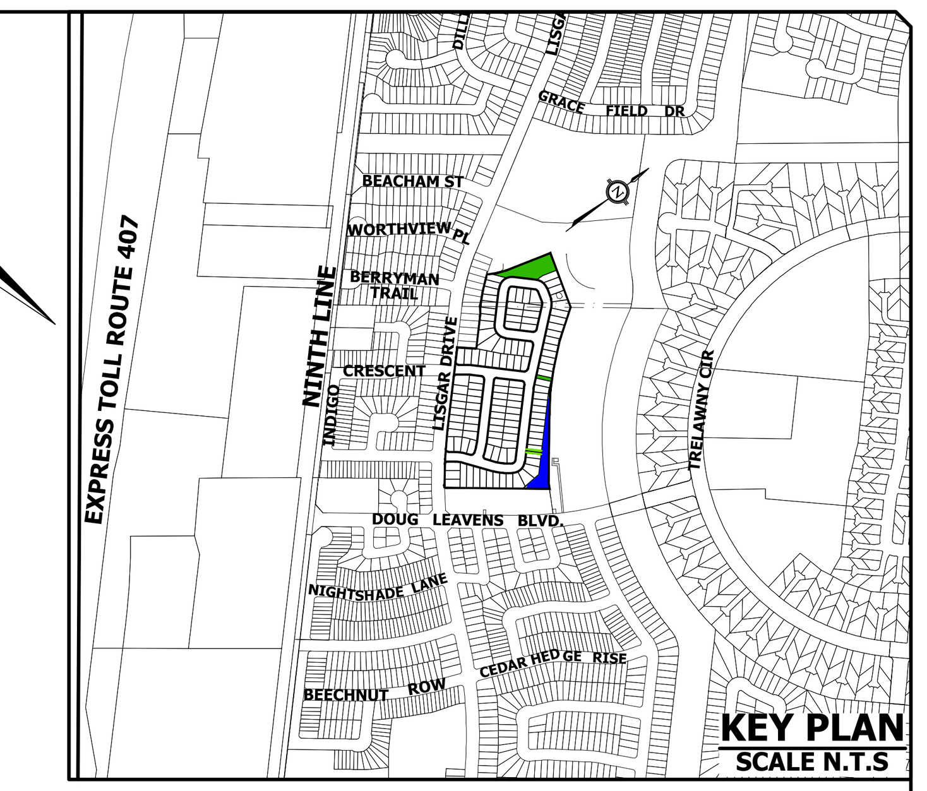
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

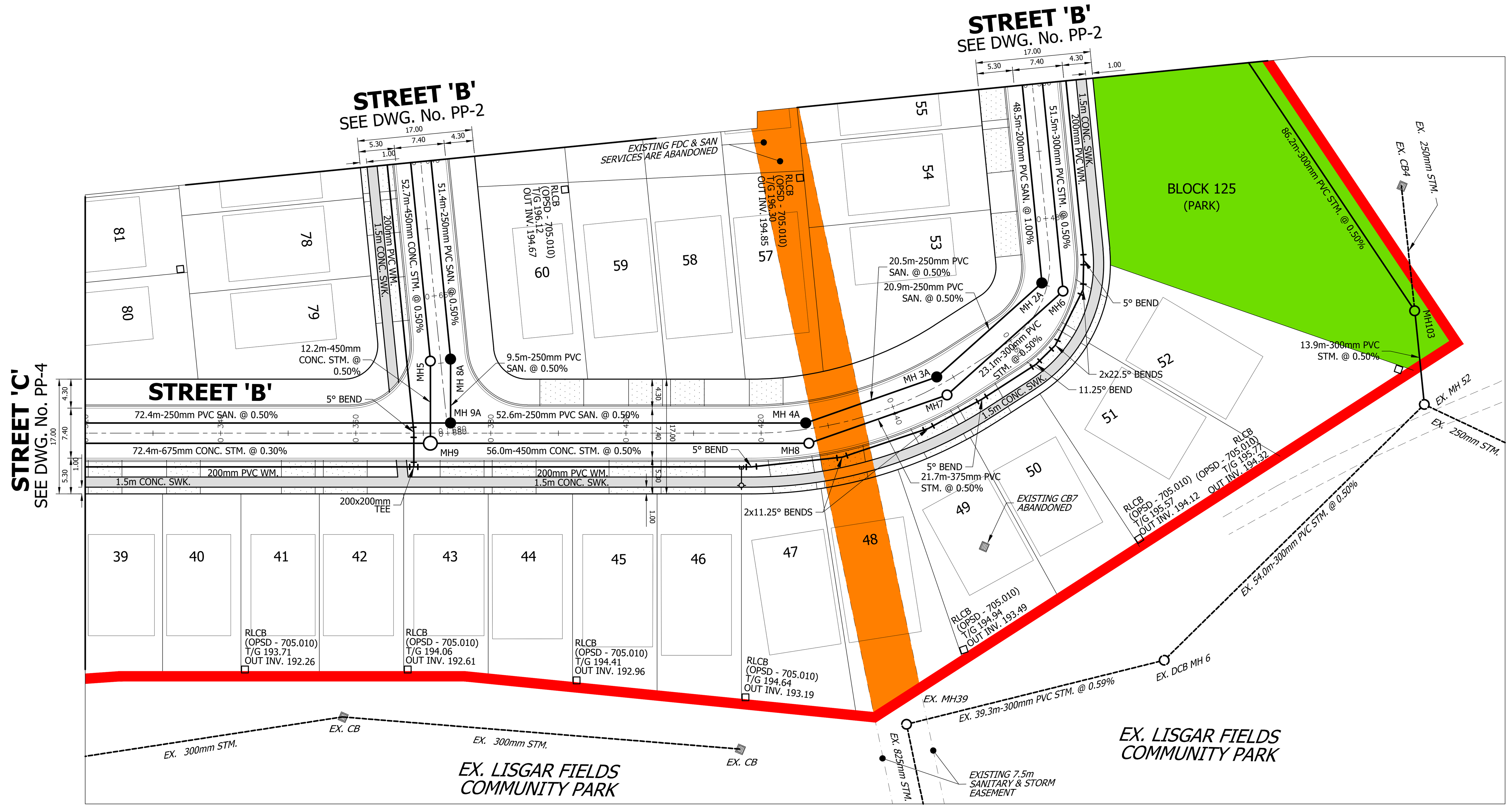
LICENSED PROFESSIONAL ENGINEER
S.B. RIEMER
100214712
OCT. 13, 2023
PROVINCE OF ONTARIO

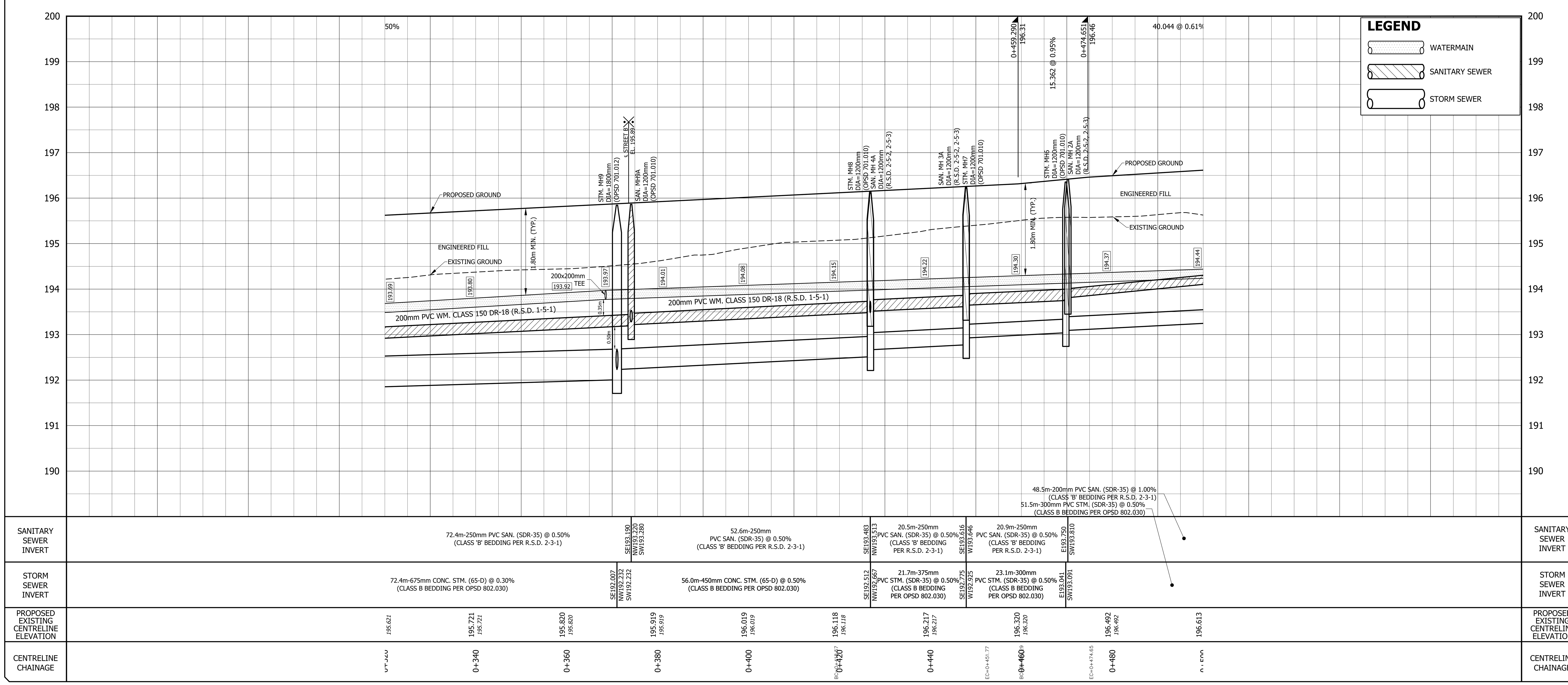
PLAN & PROFILE
STREET B
(STA. 0+500 TO STA. 0+680)

DESIGNED: Y.P.	CHECKED: S.R.	PROJECT No.: 23-748
DRAWN: Y.P.	DATE: OCTOBER 2023	SHEET No.:
SCALE: H 1:500 V 1:50		DRAWING No.: PP-2

FILE: P:\PROJECTS\23-748-LISGAR DRIVE (ARMLAND-MISSISSAUGA)\REPORTS\FUNCTIONAL SERVICING REPORT\DRAWINGS & FIGURES\PLAN & PROFILES\PP-2 STREET B.DWG REVISED BY [YPATEL] ON October 13, 2023 AT 1:45 PM







LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel
working with you

MISSISSAUGA

CITY FILE No.	REGION FILE No.

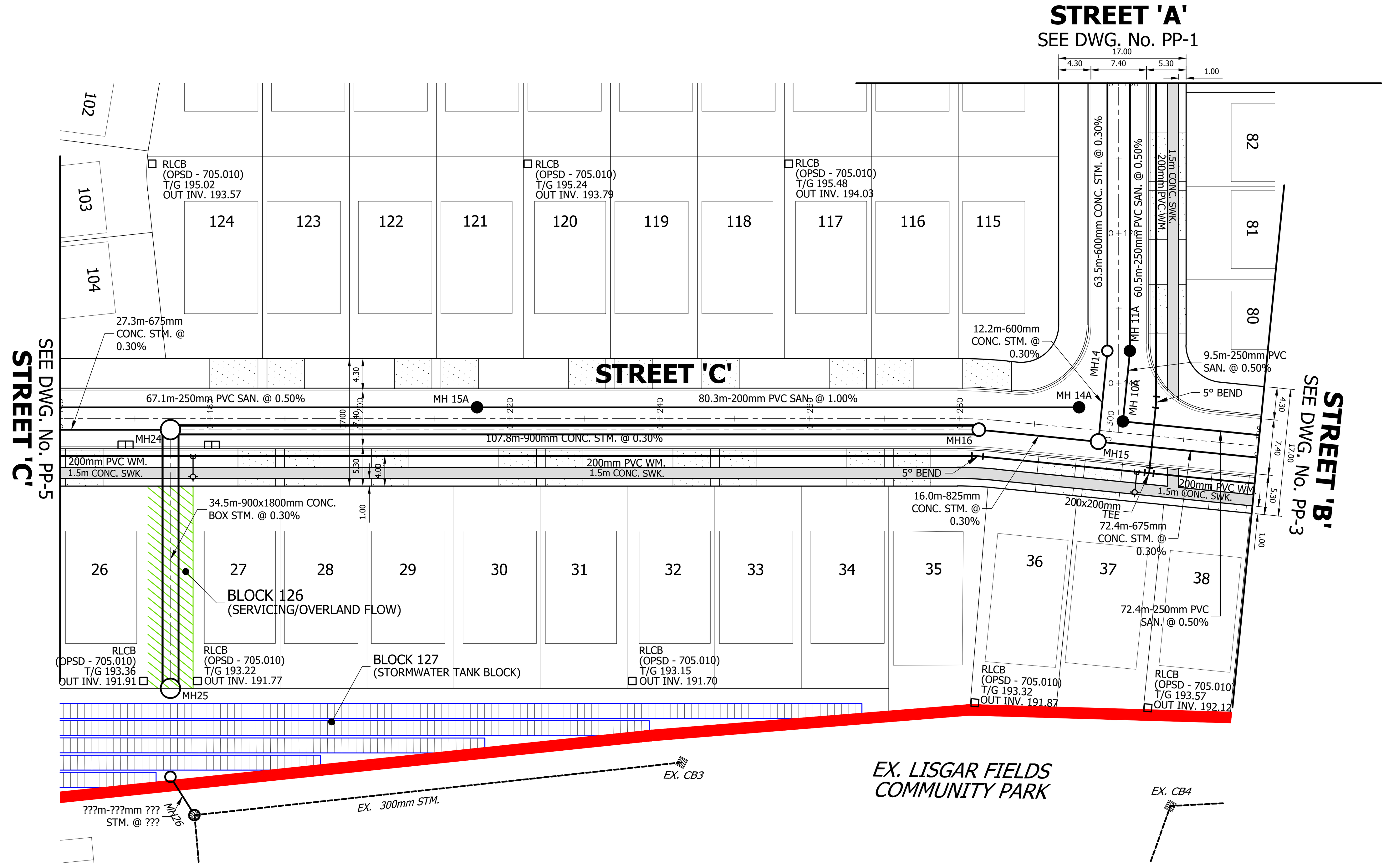
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

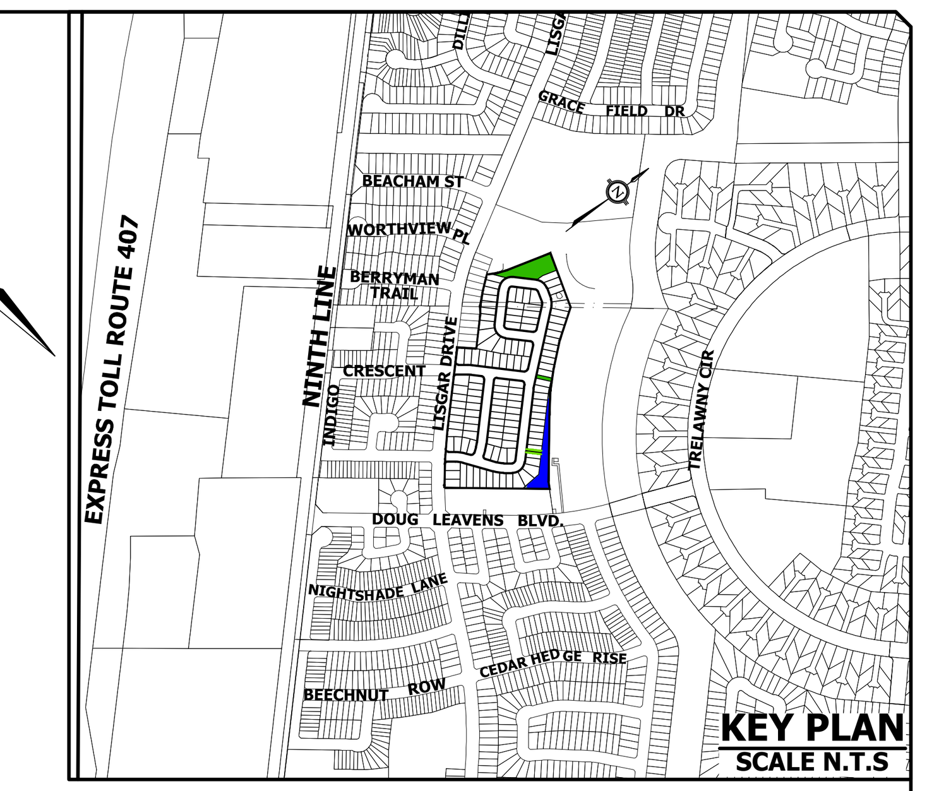
LICENSED PROFESSIONAL ENGINEER
S.B. RIEMER
100214712
OCT. 13, 2023
PROVINCE OF ONTARIO

PLAN & PROFILE
STREET B
(STA. 0+320 TO STA. 0+500)

DESIGNED: Y.P.	CHECKED: S.R.	PROJECT No.: 23-748
DRAWN: Y.P.	DATE: OCTOBER 2023	SHEET No.:
SCALE: H 1:500 V 1:50		DRAWING No.: PP-3

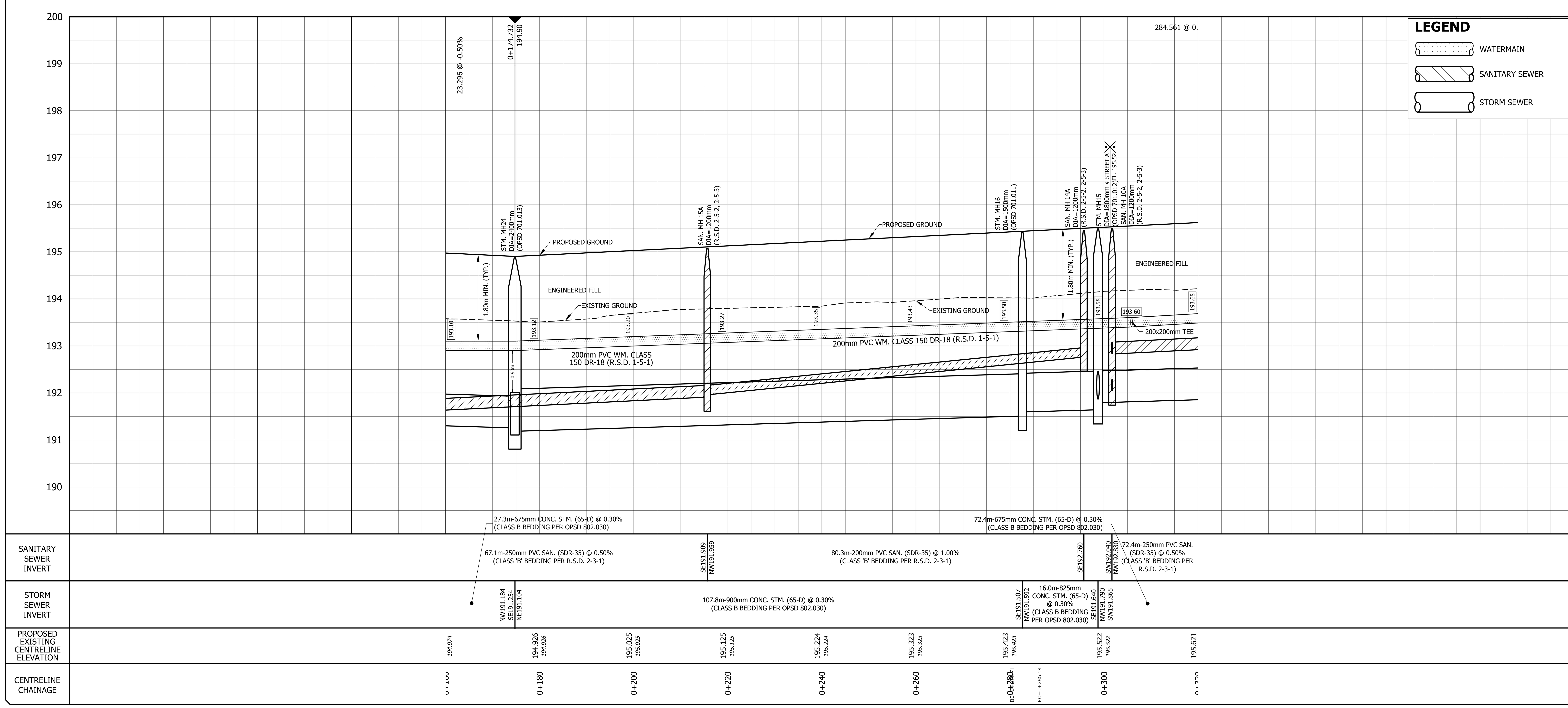
FILE: P:\PROJECTS\23-748-LISGAR DRIVE (ARMLAND-MISSISAUGA)\REPORTS\FUNCTIONAL SERVICING REPORT\DRAWINGS & FIGURES\PLAN & PROFILES\PP-3 STREET B.DWG REVISED BY [YPATEL] ON October 13, 2023 AT 1:45 PM





LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA



NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel
working with you

MISSISSAUGA

CITY FILE No.

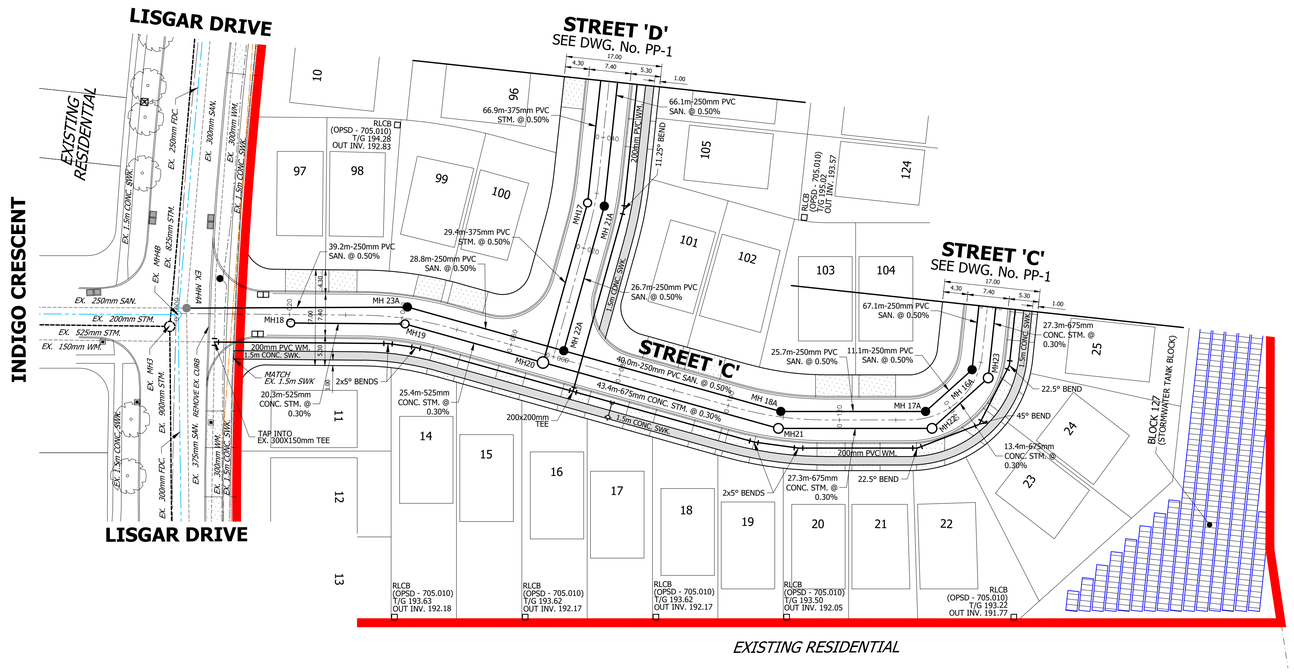
REGION FILE No.

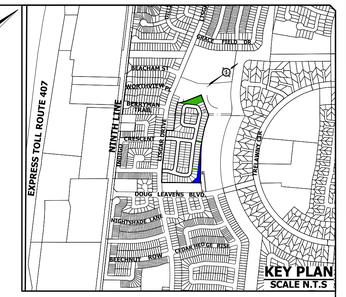
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER
S.B. RIEMER
100214712
OCT. 13, 2023
PROVINCE OF ONTARIO

PLAN & PROFILE
STREET C
(STA. 0+160 TO STA. 0+320)

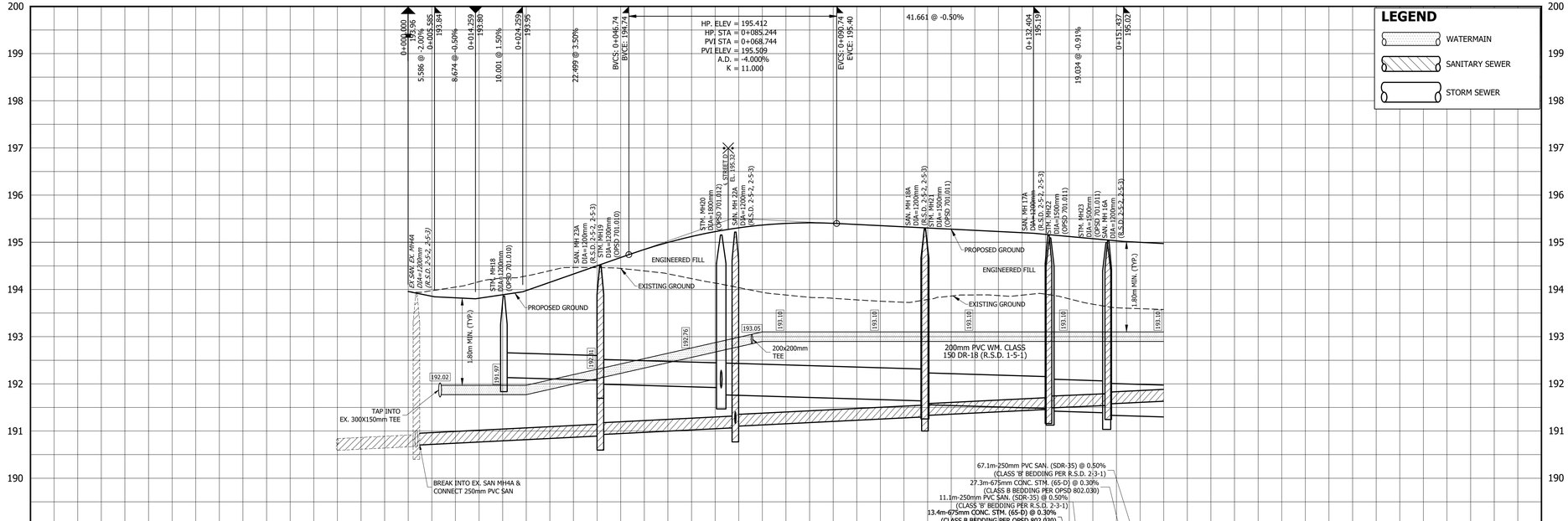
DESIGNED: Y.P.	CHECKED: S.R.	PROJECT No.: 23-748
DRAWN: Y.P.	DATE: OCTOBER 2023	SHEET No.:
SCALE: H 1:500 V 1:50		DRAWING No.: PP-4





LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA



LEGEND

- WATERMAIN
- SANITARY SEWER
- STORM SEWER

SANITARY SEWER INVERT	EX. 250mm PVC SAN	NE/190.640 NW/190.670 SW/190.670 NE/190.700	39.2m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW/190.896 NE/190.926	28.8m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW/191.070 NE/191.100 NW/191.160	40.0m-250m PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW/191.200 NE/191.300	25.7m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)	SW/191.459 NE/191.489	SW/191.544 NW/191.574	SANITARY SEWER INVERT
STORM SEWER INVERT			NE/192.155	20.3m-525mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	SW/192.074 NE/191.994	25.4m-525mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	NW/191.918 SW/191.918 NE/191.768	43.4m-675mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	SW/191.637 NE/191.557	27.3m-675mm CONC. STM. (65-D) @ 0.30% (CLASS B BEDDING PER OPSD 802.030)	SW/191.476 NE/191.426	SW/191.385 NW/191.335	STORM SEWER INVERT
PROPOSED EXISTING CENTRELINE ELEVATION		193.957 193.957		193.888 193.888		194.503 194.503	194.74 194.74	195.123 195.123		195.400 195.400	195.41 195.41	195.40 195.40	195.352 195.352	195.252 195.252		195.121 195.121		194.974	PROPOSED EXISTING CENTRELINE ELEVATION
CENTRELINE CHAINAGE		0+000		0+020	BC=0+032.92	0+040	0+046.744 EC=0+048.48	0+060		0+080	0+085.244	0+090.744	0+100 BC=0+107.52	EC=0+117.33 0+120		BC=0+132.40 0+140		EC=0+151.44	CENTRELINE CHAINAGE

NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel working with you

MISSISSAUGA

CITY FILE No.	REGION FILE No.

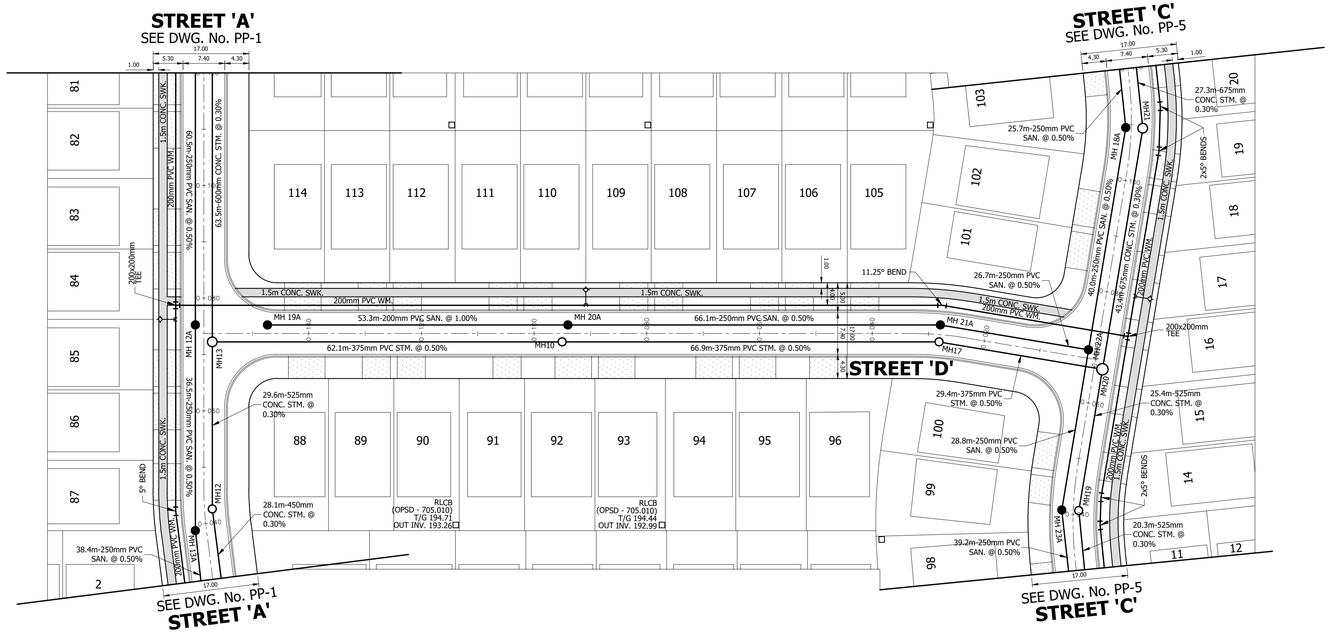
URBANTECH®

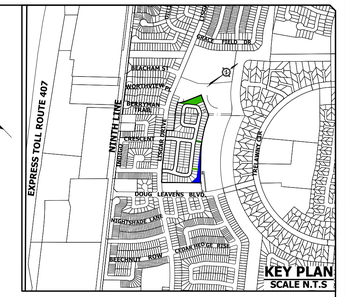
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

LICENSED PROFESSIONAL ENGINEER S.B. RIEMER 100214712 OCT. 13, 2023 PROVINCE OF ONTARIO

PLAN & PROFILE STREET C
(STA. 0+000 TO STA. 0+160)

DESIGNED: Y.P.	CHECKED: S.R.	PROJECT No.:	23-748
DRAWN: Y.P.	DATE: OCTOBER 2023	SHEET No.:	
SCALE: H 1:500 V 1:50 (5m 0m 5m 10m 20m; 0.5m 0m 0.5m 1.0m 2.0m)		DRAWING No.:	PP-5





LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA

SANITARY SEWER INVERT	SW191.620 NE191.669	SE192.257	53.3m-200mm PVC SAN. (SDR-35) @ 1.00% (CLASS 'B' BEDDING PER R.S.D. 2-3-1) SW191.704 SE191.654	66.1m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1) NW191.323 SE191.203	26.7m-250mm PVC SAN. (SDR-35) @ 0.50% (CLASS 'B' BEDDING PER R.S.D. 2-3-1) NW191.100 NE191.150 SW191.070	SANITARY SEWER INVERT
STORM SEWER INVERT	NW192.112 SW192.200 SE192.337	62.1m-375mm PVC STM. (SDR-35) @ 0.50% (CLASS B BEDDING PER OPSD 802.030) SE192.469 NW192.647	66.9m-375mm PVC STM. (SDR-35) @ 0.50% (CLASS B BEDDING PER OPSD 802.030) NW192.135 SE192.080	29.4m-375mm PVC STM. (SDR-35) @ 0.50% (CLASS B BEDDING PER OPSD 802.030) NW191.913 NE191.968 SW191.768	STORM SEWER INVERT
PROPOSED EXISTING CENTRELINE ELEVATION	195.521 195.521	195.621 195.621	195.594 195.594	195.494 195.494	195.394 195.394	195.294 195.294	195.194 195.194	195.303 195.303	PROPOSED EXISTING CENTRELINE ELEVATION
CENTRELINE CHAINAGE	0+160	0+140	0+120	0+100	0+080	0+060	0+040	EC=0+132.83	BC=0+022.21	0+020	0+000	CENTRELINE CHAINAGE

NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel working with you

MISSISSAUGA

CITY FILE No.	REGION FILE No.

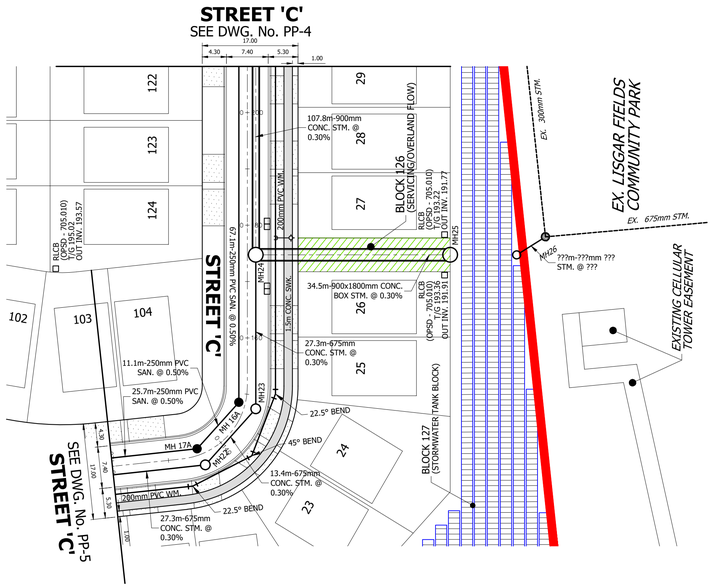
URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

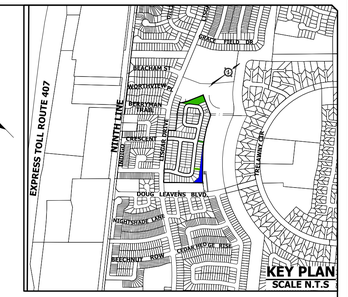
LICENSED PROFESSIONAL ENGINEER
S.B. RIEMER
100214712
PROVINCE OF ONTARIO
OCT. 13, 2023

PLAN & PROFILE
STREET D
(STA. 0+000 TO STA. 0+100)

DESIGNED:	Y.P.	CHECKED:	S.R.
DRAWN:	Y.P.	DATE:	OCTOBER 2023
SCALE:	H 1:500 V 1:50		

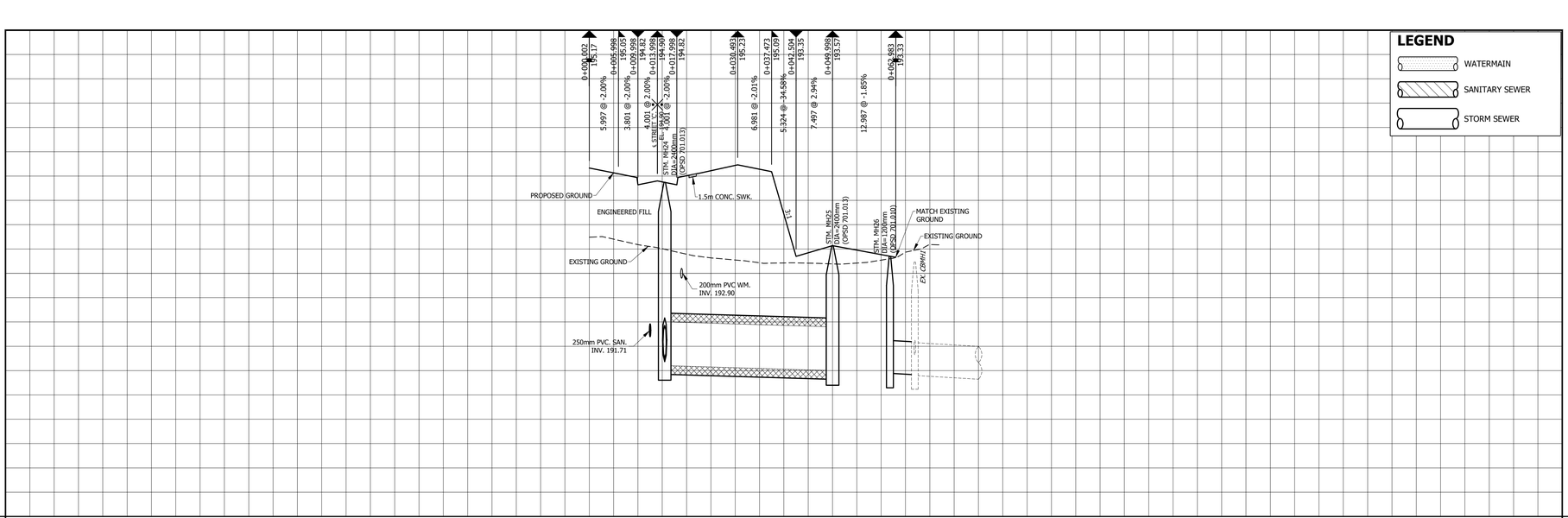
PROJECT No.: 23-748
SHEET No.:
DRAWING No.: **PP-6**





LEGEND

- DRAFT PLAN LIMITS
- SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- EXISTING FDC SEWER AND MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- REAR-LOT CATCHBASIN/ CATCHBASIN
- HYDRANT & VALVE
- EXISTING SERVICING EASEMENT (TO BE ABANDONED & LIFTED)
- PROPOSED PARK / PERVIOUS AREA



NOTE

- DIMENSIONS ON THIS PLAN ARE MEASURED TO FACE OF THE CURB. FOR EDGE OF PAVEMENT DIMENSIONS PLEASE REFER TO CROSS SECTIONS ON DWG. 8

BENCHMARK NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF MISSISSAUGA CONTROL MONUMENTS:
No. 075033003, ELEVATION=193.381m
No. 075033004, ELEVATION=193.755m
No. 075023009, ELEVATION=196.906m

No.	REVISION	DATE	BY	APP'D
4				
3				
2	DARC RESUBMISSION	MAR. 2024	Y.P.	S.R.
1	1st FSR SUBMISSION	OCT. 2023	Y.P.	S.R.

AVENIA CONSTRUCTION INC.

Region of Peel working with you

MISSISSAUGA

CITY FILE No.	REGION FILE No.

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

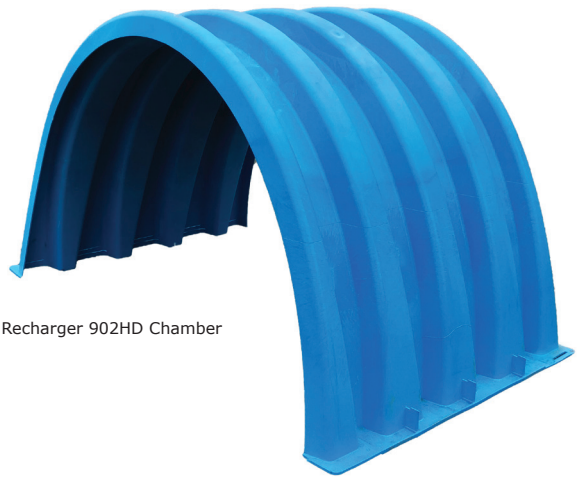
LICENSED PROFESSIONAL ENGINEER
S.B. RIEMER
100214712
OCT. 13, 2023
PROVINCE OF ONTARIO

PLAN & PROFILE
STORM SERVICING BLOCK
(STA. 0+000 TO STA. 0+070)

DESIGNED: Y.P.	CHECKED: S.R.	PROJECT No.:	23-748
DRAWN: Y.P.	DATE: OCTOBER 2023	SHEET No.:	
SCALE: H 1:500 V 1:50 (5m 0m 5m 10m 20m; 0.5m 0m 0.5m 1.0m 2.0m)		DRAWING No.:	PP-7

CULTEC RECHARGER® 902HD STORMWATER CHAMBER

The Recharger® 902HD is a 48" (1219 mm) tall, high capacity chamber. Typically when using this model, fewer chambers are required resulting in less labor and a smaller installation area. The Recharger® 902HD has the side portal internal manifold feature. HVLV® FC-48 Feed Connectors are inserted into the side portals to create the internal manifold.



Recharger 902HD Chamber

Recharger 902HD End Cap

Recharger 902HD Chamber	
Size (L x W x H)	4.25' x 78" x 48"
	1.30 m x 1981 mm x 1219 mm
Installed Length	3.67'
	1.12 m
Length Adjustment per Row - with two end caps installed	1.03'
	0.31 m
Length Adjustment per Row - when not using end caps	0.58'
	0.18 m
Chamber Storage	17.31 ft^3/ft
	1.61 m^3/m
	63.47 ft^3/unit
	1.80 m^3/unit
Min. Installed Storage	27.06 ft^3/ft
	2.53 m^3/m
	99.28 ft^3/unit
	2.81 m^3/unit
Min. Area Required	26.58 ft^2
	2.47 m^2
Chamber Weight	83.0 lbs
	37.65 kg
Shipping	15 chambers/skid
	1,370 lbs/skid
	14 skids/48' flatbed
Min. Center-to-Center Spacing	7.25'
	2.21 m
Max. Allowable Cover	8.3'
	2.53 m
Max. Allowable O.D. in Side Portal	10" HDPE, 12" PVC
	250 mm HDPE, 300 mm PVC
Compatible Feed Connector	HVLV FC-48 Feed Connector

Calculations are based on installed chamber length.
All above values are nominal.
Includes 12" (305 mm) stone above crown of chamber and typical stone surround at 7.25' (2.21 m) center-to-center spacing and stone foundation depth as listed in table.
Stone void calculated at 40%.

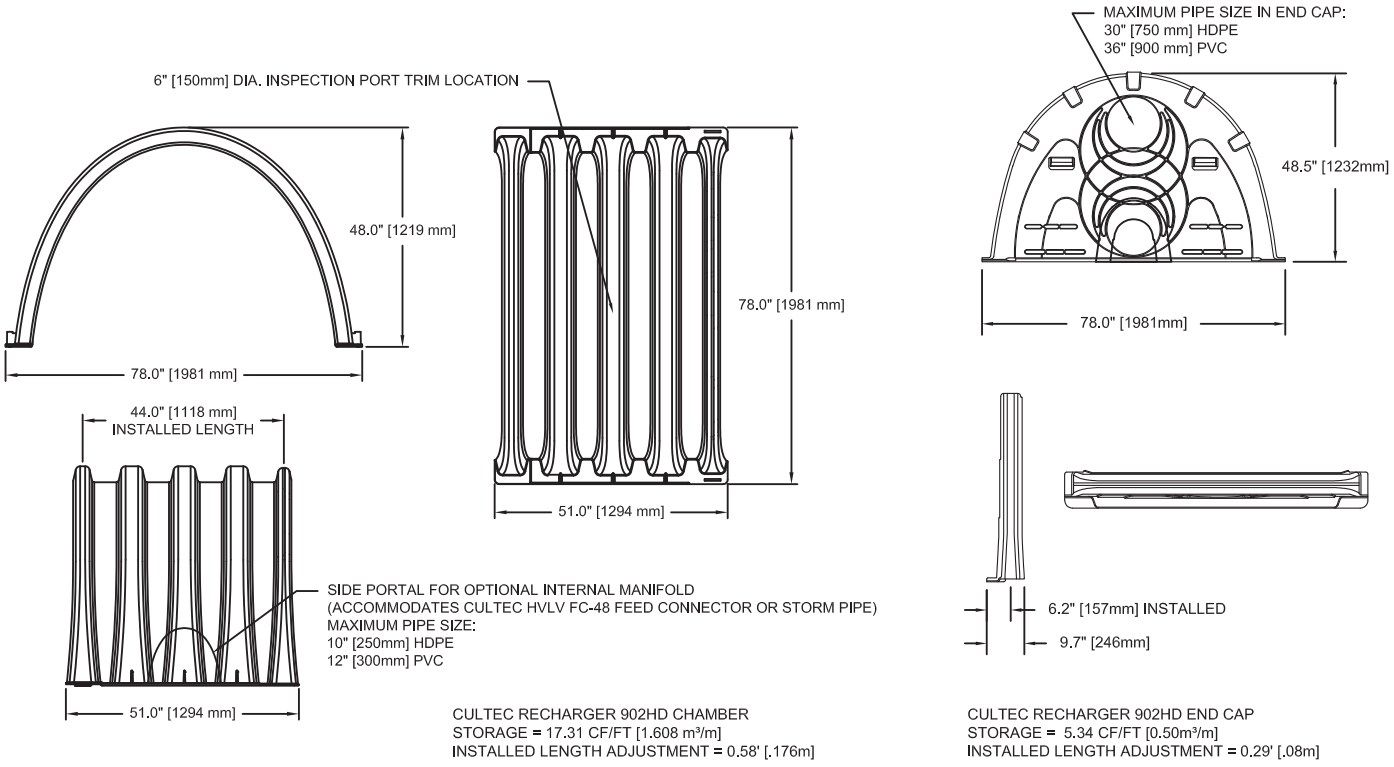
	Stone Foundation Depth		
	9"	12"	18"
	229 mm	305 mm	457 mm
Chamber and Stone Storage Per Chamber	99.28 ft^3	101.94 ft^3	107.26 ft^3
	2.81 m^3	2.89 m^3	3.04 m^3
Min. Effective Depth	5.75'	6.00'	6.5'
	1.75 m	1.83 m	1.98 m
Stone Required Per Chamber	3.32 yd^3	3.56 yd^3	4.05 yd^3
	2.54 m^3	2.72 m^3	3.06 m^3

Recharger 902HD End Cap	
Size (L x W x H)	9.7" x 78" x 48.5"
	246 mm x 1982 mm x 1231 mm
Installed Length	6.2"
	157 mm
End Cap Storage	5.34 ft^3/ft
	0.50 m^3/m
	2.76 ft^3/unit
	0.08 m^3/unit
Min. Installed Storage	19.88 ft^3/ft
	1.85 m^3/m
	10.28 ft^3/unit
	0.29 m^3/unit
End Cap Weight	52.0 lbs
	23.59 kg
Shipping	7 end caps/skid
	638 lbs/skid
	14 skids/48' flatbed
Max. Inlet Opening in End Cap	30" HDPE, 36" PVC
	750 mm HDPE, 900 mm PVC

Calculations are based on installed chamber length.
All above values are nominal.
Min. installed storage includes 9" (229 mm) stone base, 12" (305 mm) stone above crown of chamber and typical stone surround at 7.25' (2.21 m) center-to-center spacing.

For more information, contact CULTEC at (203) 775-4416 or visit www.cultec.com.

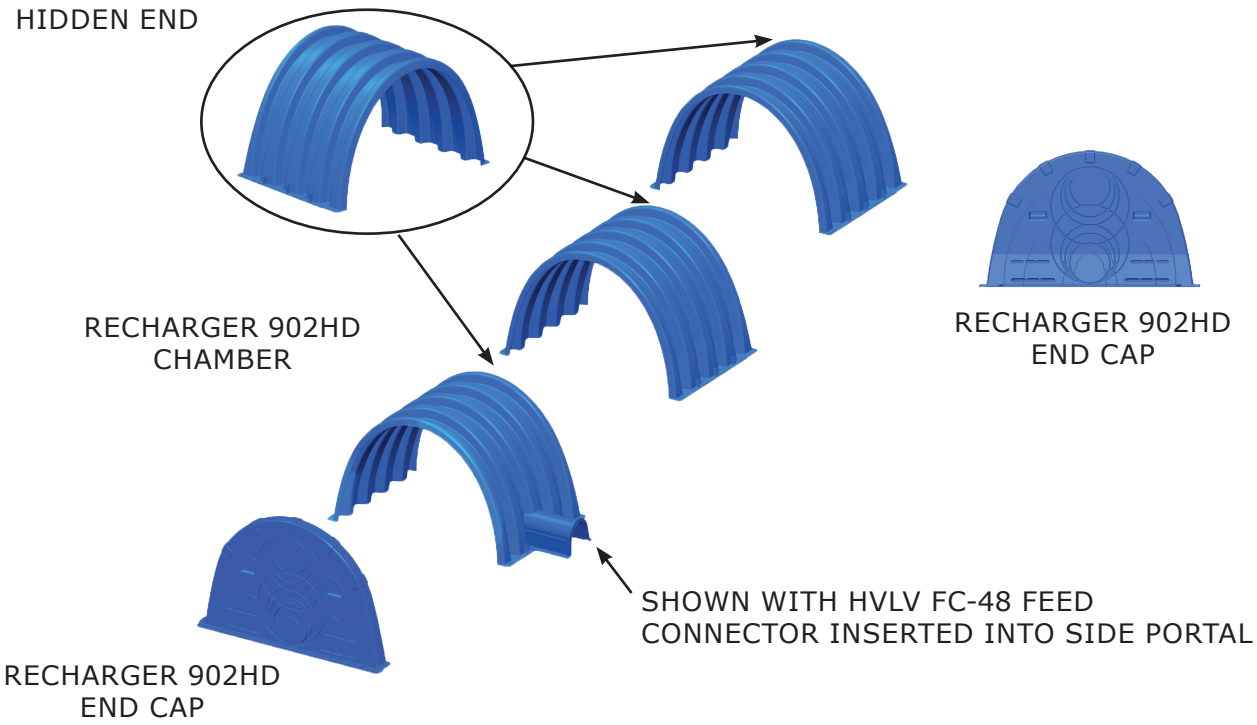
Three View Drawing



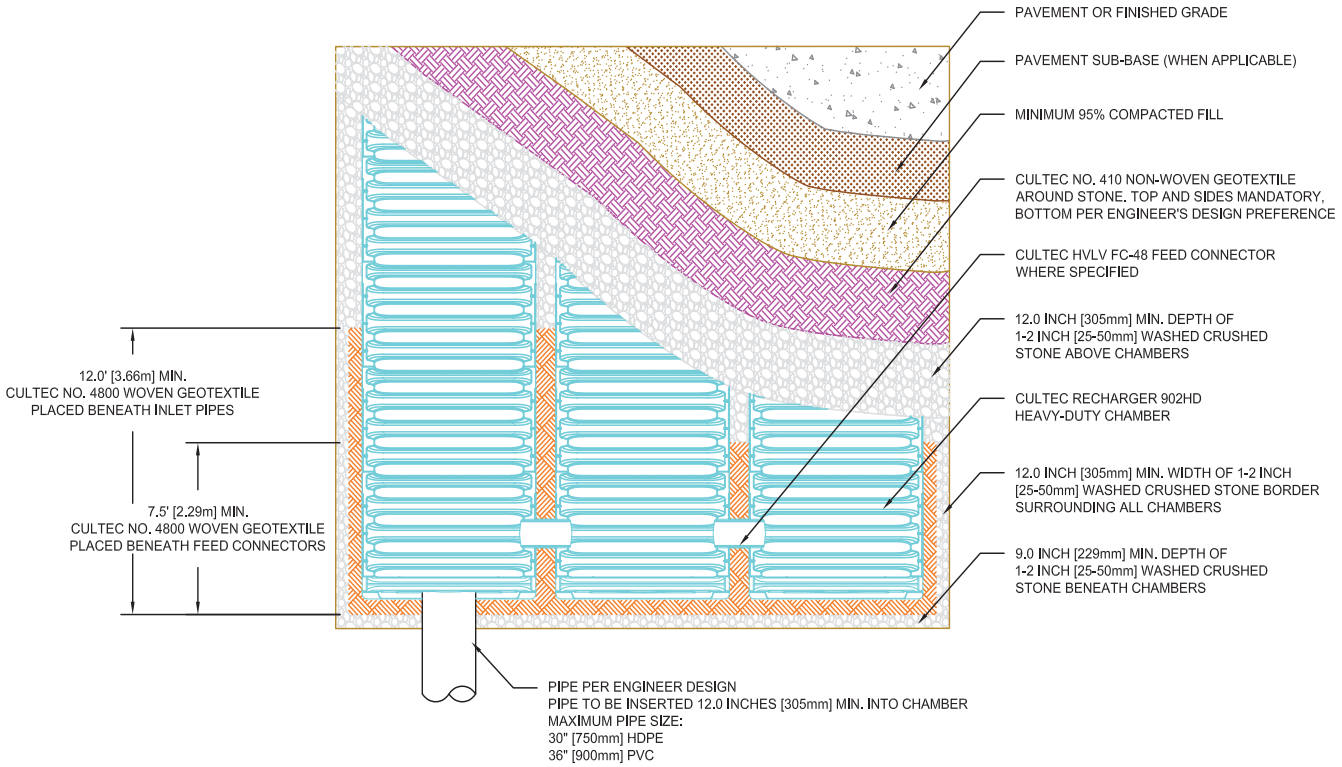
CULTEC RECHARGER 902HD CHAMBER
STORAGE = 17.31 CF/FT [1.608 m³/m]
INSTALLED LENGTH ADJUSTMENT = 0.58' [.176m]

CULTEC RECHARGER 902HD END CAP
STORAGE = 5.34 CF/FT [0.50m³/m]
INSTALLED LENGTH ADJUSTMENT = 0.29' [.08m]

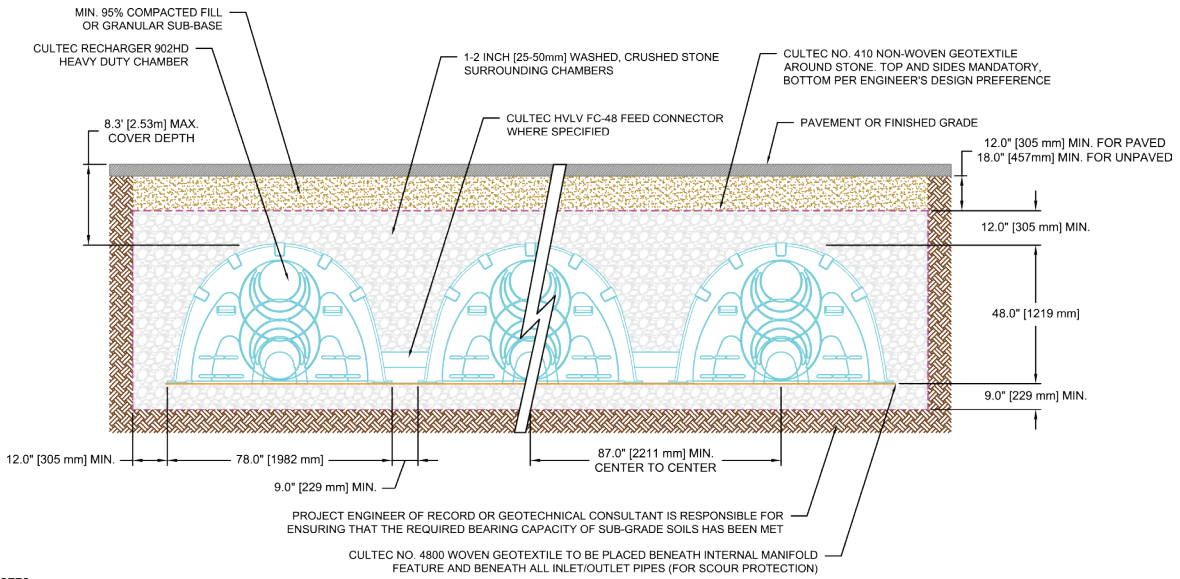
Typical Interlock Installation



Plan View Drawing



Typical Cross Section for Traffic Application



NOTES:

1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   - 1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   - 1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   - 1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   - 3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   - 3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   - 3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

CULTEC RECHARGER® 902HD STORMWATER CHAMBER

Recharger® 902HD Bare Chamber Storage Volumes

Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft³/ft	m³/m	ft³	m³	ft³	m³
48	1219	0.020	0.002	0.073	0.002	63.470	1.797
47	1194	0.050	0.005	0.183	0.005	63.397	1.795
46	1168	0.070	0.007	0.257	0.007	63.213	1.790
45	1143	0.120	0.011	0.440	0.012	62.957	1.783
44	1118	0.160	0.015	0.587	0.017	62.517	1.770
43	1092	0.200	0.019	0.733	0.021	61.930	1.754
42	1067	0.220	0.020	0.807	0.023	61.197	1.733
41	1041	0.240	0.022	0.880	0.025	60.390	1.710
40	1016	0.270	0.025	0.990	0.028	59.510	1.685
39	991	0.270	0.025	0.990	0.028	58.520	1.657
38	965	0.290	0.027	1.063	0.030	57.530	1.629
37	940	0.300	0.028	1.100	0.031	56.467	1.599
36	914	0.310	0.029	1.137	0.032	55.367	1.568
35	889	0.330	0.031	1.210	0.034	54.230	1.536
34	864	0.340	0.032	1.247	0.035	53.020	1.502
33	838	0.350	0.033	1.283	0.036	51.773	1.466
32	813	0.350	0.033	1.283	0.036	50.490	1.430
31	787	0.360	0.033	1.320	0.037	49.207	1.394
30	762	0.370	0.034	1.357	0.038	47.887	1.356
29	737	0.380	0.035	1.393	0.039	46.530	1.318
28	711	0.390	0.036	1.430	0.040	45.137	1.278
27	686	0.390	0.036	1.430	0.040	43.707	1.238
26	660	0.400	0.037	1.467	0.042	42.277	1.197
25	635	0.400	0.037	1.467	0.042	40.810	1.156
24	610	0.410	0.038	1.503	0.043	39.343	1.114
23	584	0.410	0.038	1.503	0.043	37.840	1.072
22	559	0.410	0.038	1.503	0.043	36.337	1.029
21	533	0.420	0.039	1.540	0.044	34.833	0.986
20	508	0.420	0.039	1.540	0.044	33.293	0.943
19	483	0.420	0.039	1.540	0.044	31.753	0.899
18	457	0.430	0.040	1.577	0.045	30.213	0.856
17	432	0.430	0.040	1.577	0.045	28.637	0.811
16	406	0.440	0.041	1.613	0.046	27.060	0.766
15	381	0.440	0.041	1.613	0.046	25.447	0.721
14	356	0.450	0.042	1.650	0.047	23.833	0.675
13	330	0.450	0.042	1.650	0.047	22.183	0.628
12	305	0.450	0.042	1.650	0.047	20.533	0.582
11	279	0.450	0.042	1.650	0.047	18.883	0.535
10	254	0.460	0.043	1.687	0.048	17.233	0.488
9	229	0.460	0.043	1.687	0.048	15.547	0.440
8	203	0.460	0.043	1.687	0.048	13.860	0.393
7	178	0.460	0.043	1.687	0.048	12.173	0.345
6	152	0.470	0.044	1.723	0.049	10.487	0.297
5	127	0.470	0.044	1.723	0.049	8.763	0.248
4	102	0.480	0.045	1.760	0.050	7.040	0.199
3	76	0.480	0.045	1.760	0.050	5.280	0.150
2	51	0.480	0.045	1.760	0.050	3.520	0.100
1	25	0.480	0.045	1.760	0.050	1.760	0.050
Total		**17.310**	**1.608**	**63.470**	**1.797**	**63.470**	**1.797**

Calculations are based on installed chamber length of 3.67' (1.12 m).

Recharger® 902HD Bare End Cap Storage Volumes

Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft³/ft	m³/m	ft³	m³	ft³	m³
48	1219	0.039	0.004	0.020	0.0006	2.758	0.0781
47	1194	0.058	0.005	0.030	0.0008	2.738	0.0775
46	1168	0.058	0.005	0.030	0.0008	2.780	0.0767
45	1143	0.077	0.007	0.040	0.0011	2.678	0.0758
44	1118	0.097	0.009	0.050	0.0014	2.638	0.0747
43	1092	0.077	0.007	0.040	0.0011	2.588	0.0733
42	1067	0.097	0.009	0.050	0.0014	2.548	0.0722
41	1041	0.097	0.009	0.050	0.0014	2.498	0.0707
40	1016	0.097	0.009	0.050	0.0014	2.448	0.0693
39	991	0.097	0.009	0.050	0.0014	2.398	0.0679
38	965	0.097	0.009	0.050	0.0014	2.348	0.0665
37	940	0.116	0.011	0.060	0.0017	2.299	0.0651
36	914	0.097	0.009	0.050	0.0014	2.239	0.0634
35	889	0.097	0.009	0.050	0.0014	2.189	0.0620
34	864	0.116	0.011	0.060	0.0017	2.139	0.0606
33	838	0.097	0.009	0.050	0.0014	2.079	0.0589
32	813	0.097	0.009	0.050	0.0014	2.029	0.0574
31	787	0.116	0.011	0.060	0.0017	1.979	0.0560
30	762	0.097	0.009	0.050	0.0014	1.919	0.0543
29	737	0.135	0.013	0.070	0.0020	1.869	0.0529
28	711	0.097	0.009	0.050	0.0014	1.799	0.0509
27	686	0.116	0.011	0.060	0.0017	1.749	0.0495
26	660	0.116	0.011	0.060	0.0017	1.689	0.0478
25	635	0.097	0.009	0.050	0.0014	1.629	0.0461
24	609	0.116	0.011	0.060	0.0017	1.579	0.0447
23	584	0.116	0.011	0.060	0.0017	1.519	0.0430
22	559	0.135	0.013	0.070	0.0020	1.459	0.0413
21	533	0.116	0.011	0.060	0.0017	1.389	0.0393
20	508	0.116	0.011	0.060	0.0017	1.329	0.0376
19	483	0.116	0.011	0.060	0.0017	1.269	0.0359
18	457	0.116	0.011	0.060	0.0017	1.209	0.0342
17	432	0.116	0.011	0.060	0.0017	1.149	0.0325
16	406	0.135	0.013	0.070	0.0020	1.089	0.0308
15	381	0.116	0.011	0.060	0.0017	1.019	0.0289
14	356	0.116	0.011	0.060	0.0017	0.959	0.0272
13	330	0.116	0.011	0.060	0.0017	0.899	0.0255
12	305	0.135	0.013	0.070	0.0020	0.839	0.0238
11	279	0.116	0.011	0.060	0.0017	0.770	0.0218
10	254	0.135	0.013	0.070	0.0020	0.710	0.0201
9	229	0.135	0.013	0.070	0.0020	0.640	0.0181
8	203	0.135	0.013	0.070	0.0020	0.570	0.0161
7	178	0.135	0.013	0.070	0.0020	0.500	0.0141
6	152	0.116	0.011	0.060	0.0017	0.430	0.0122
5	127	0.135	0.013	0.070	0.0020	0.370	0.0105
4	102	0.135	0.013	0.070	0.0020	0.300	0.0085
3	76	0.155	0.014	0.080	0.0023	0.230	0.0065
2	51	0.135	0.013	0.070	0.0020	0.150	0.0042
1	25	0.155	0.014	0.080	0.0023	0.080	0.0023
Total		**5.338**	**0.496**	**2.758**	**0.0781**	**2.758**	**0.0781**

Calculations are based on installed chamber length of 6.2" (157 mm).

For more information, contact CULTEC at (203) 775-4416 or visit www.cultec.com.

CULTEC Recharger® 902HD Specifications

GENERAL

CULTEC Recharger® 902HD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured in the U.S.A. or Canada by CULTEC, Inc. of Brookfield, CT (cultec.com, 203-775-4416).
2. The chambers shall be designed and tested in accordance with ASTM F2787 "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers". The load configuration shall include:
    a. Instantaneous AASHTO Design Truck live load at minimum cover
    b. Maximum permanent (50-year) cover load
    c. 1-week parked AASHTO design truck load
3. The chambers shall meet the requirements of ASTM F3430-20 "Standard Specification for Cellular Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers".
4. The installed chamber system shall provide resistance to the loads and load factors as defined in the AASHTO LRFD Bridge Design Specifications Section 12.12, when installed according to CULTEC's recommended installation instructions. The structural design of the chambers shall include the following:
    a. The Creep Modulus shall be 50-year as specified in ASTM F3430
    b. The minimum safety factor for live loads shall be 1.75
    c. The minimum safety factor for dead loads shall be 1.95
5. The chamber shall be structural foam injection molded of blue virgin high molecular weight impact-modified polypropylene.
6. The chamber shall be arched in shape.
7. The chamber shall be open-bottomed.
8. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings.
9. The nominal chamber dimensions of the CULTEC Recharger® 902HD shall be 48 inches (1219 mm) tall, 78 inches (1981 mm) wide and 4.25 feet (1.30 m) long. The installed length of a joined Recharger 902HD shall be 3.67 feet (1.12 m).
10. Multiple chambers may be connected to form different length rows. Each row shall begin and end with a separately formed CULTEC Recharger® 902HD End Cap. Maximum inlet opening on the end cap is 30 inches (750 mm) HDPE or 36 inches (900 mm) PVC.
11. The chamber shall have two side portals to accept CULTEC HVLV™ FC-48 Feed Connectors to create an internal manifold. Maximum allowable pipe size in the side portal is 10 inches (250 mm) HDPE and 12 inches (300 mm) PVC.
12. The nominal chamber dimensions of the CULTEC HVLV™ FC-48 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 49 inches (1245 mm) long.
13. The nominal storage volume of the Recharger 902HD chamber shall be 17.31 ft^3 / ft (1.61 m^3 / m) - without stone. The nominal storage volume of a joined Recharger 902HD shall be 63.47 ft^3 / unit (1.80 m^3 / unit) - without stone.
14. The nominal storage volume of the HVLV™ FC-48 Feed Connector shall be 0.913 ft^3 / ft (0.085 m^3 / m) - without stone.
15. The Recharger 902HD chamber shall have 5 corrugations.
16. The chamber shall be capable of accepting a 6 inch (150 mm) inspection port opening at the top center of each chamber, centered on the corrugation crest.
17. The units may be trimmed to custom lengths by cutting back to any corrugation.
18. The chamber shall be manufactured in a facility employing CULTEC's Quality Control and Assurance Procedures.
19. Maximum allowable cover over the top of the chamber shall be 8.3 feet (2.53 m).

END CAP PARAMETERS

1. The CULTEC Recharger® 902HD End Cap (referred to as 'end cap') shall be manufactured in the U.S.A. by CULTEC, Inc. of Brookfield, CT (cultec.com, 203-775-4416).
2. The end cap shall be twin-sheet thermoformed of virgin high molecular weight polyethylene.
3. The end cap shall be joined at the beginning and end of each row of chambers using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings.
4. The nominal dimensions of the end cap shall be 48.5 inches (1231 mm) tall, 78 inches (1982 mm) wide and 9.7 inches (246 mm) long. When joined with a Recharger 902HD Chamber, the installed length of the end cap shall be 6.2 inches (157 mm).
5. The nominal storage volume of the end cap shall be 5.34 ft^3 / ft (0.50 m^3 / m) - without stone. The nominal storage volume of an interlocked end cap shall be 2.76 ft^3 / unit (0.08 m^3 / unit) - without stone.
6. Maximum inlet opening on the end cap is 30 inches (750 mm) HDPE or 36 inches (900 mm) PVC.
7. The end cap shall provide resistance to the loads and load factors as defined in the AASHTO LRFD Bridge Design Specifications Section 12.12.