LAKEVIEW VILLAGE

FEBRUARY 2021











LAKEVIEW VILLAGE - STANDARD CURB & SPLASH PAD

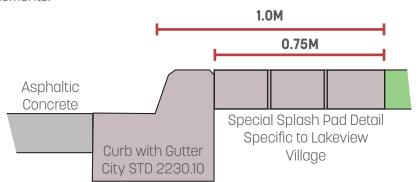
FEBRUARY 2021

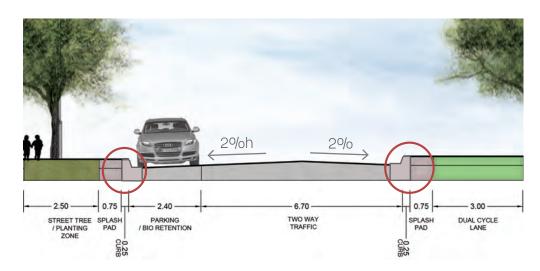


Lakeview Curb + Splash Pad Detail

Typical Lakeview Street Section

Sections have been revised to show a barrier curb with gutter. These will incorporated with a special splash pad detail to create a unique sense of identity through the detail-design of streetscape elements.





Possible Splash Pad Design Details

North Oakville Layby Parking



Lakeview Village Layby Parking







LAKEVIEW VILLAGE - STANDARD CURB & SPLASH PAD

FEBRUARY 2021

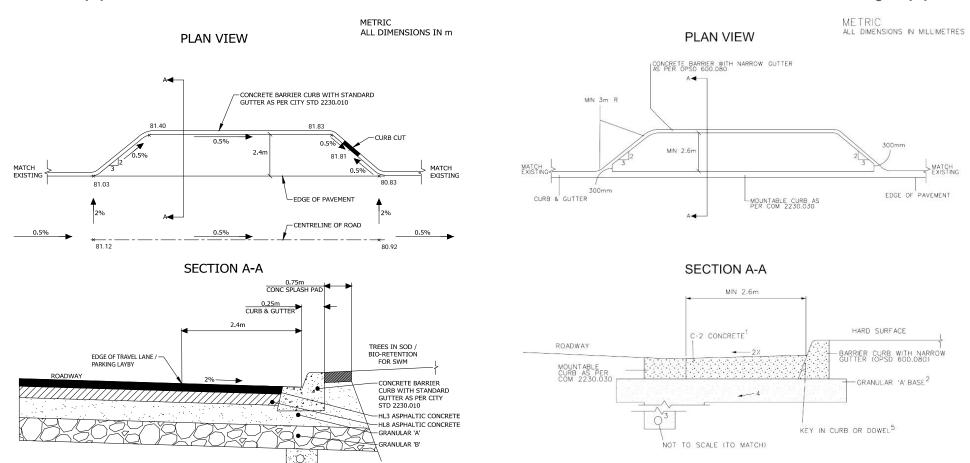


Mountable Curbs

Mountable curbs are not being proposed due to the following concerns:

- Impact runoff capture for use within the adjacent LID's
- Unnecessarily impact the ability to create compact streets
- Would require curb cuts along the travel lane to direct drainage into the bioswales and with a continuous gutter grade along the curbs, the drainage will likely by-pass the curb cuts making them less effective

Lakeview Layby Detail Mississauga Layby Detail



LAKEVIEW VILLAGE BIKE NETWORK

FEBRUARY 2021



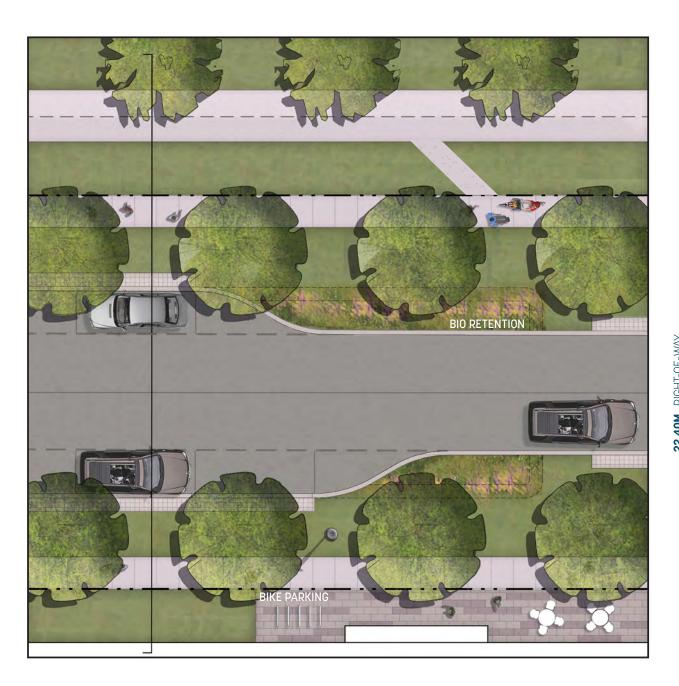




STREET B - MINOR COLLECTOR

FEBRUARY 2021



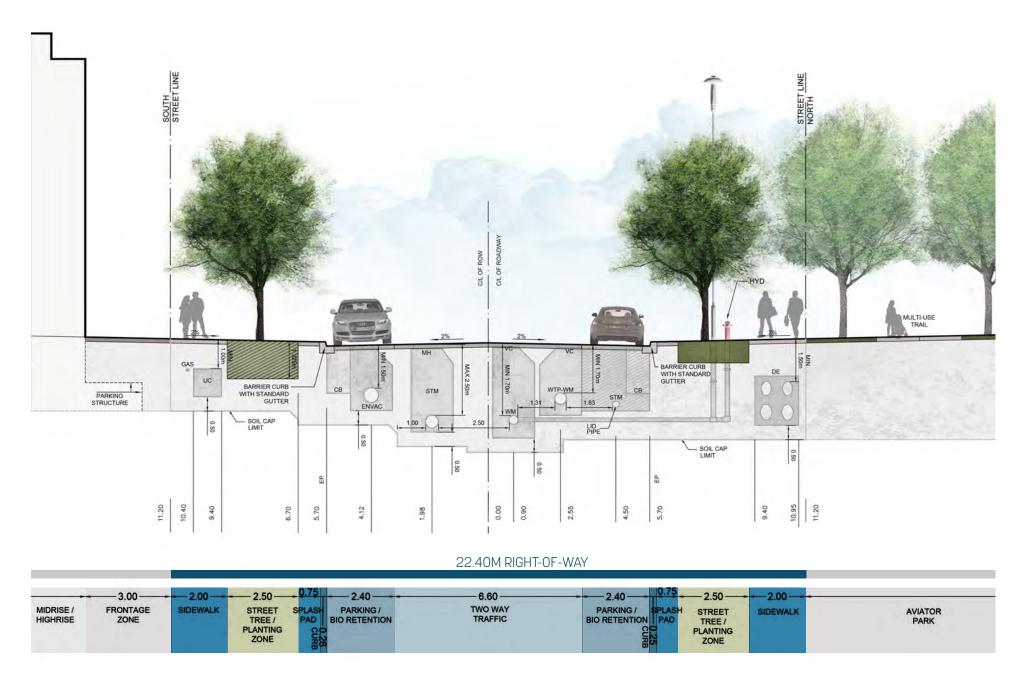


AVIATOR PARK 2.0M SIDEWALK **2.50M** STREET TREE 0.25M CURB 2.4M PARKING / LID 3.3M TRAVEL LANE 3.3M TRAVEL LANE 2.4M PARKING / LID 0.75M SPLASH PAD **2.50M** STREET TREE 2.0M SIDEWALK **3M** FRONTAGE

STREET B- MINOR COLLECTOR

FEBRUARY 2021









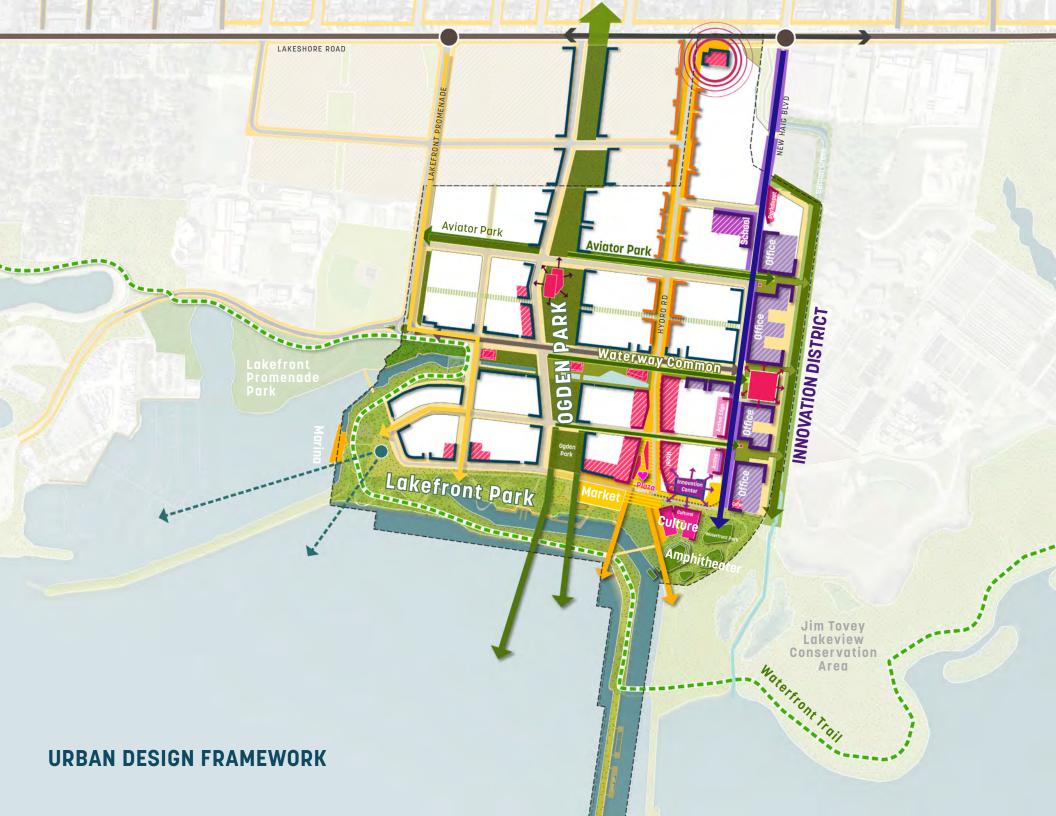
LAKEVIEW VILLAGE

HYDRO ROAD CONCEPT

FEBRUARY 2021



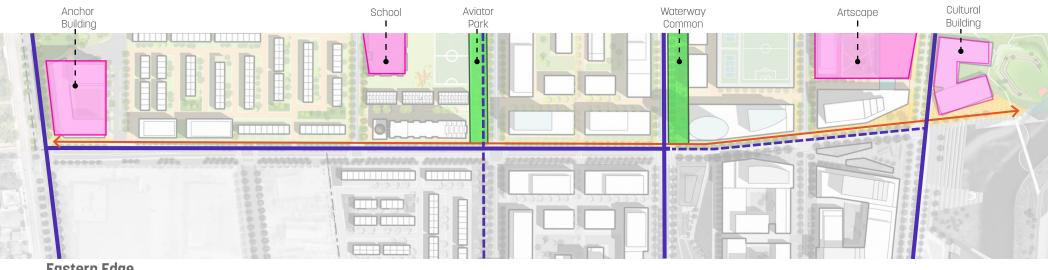








CIRCULATION + PROGRAM







Western Edge











HYDRO ROAD CONCEPT

The street as 'place'



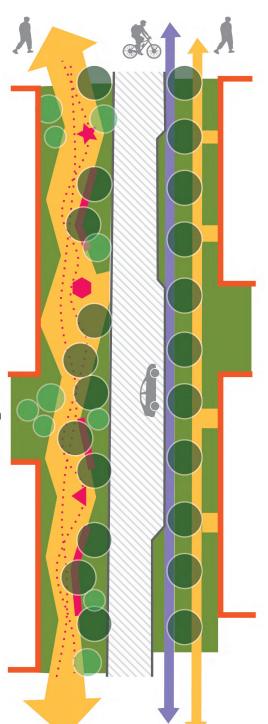


Gathering nodes



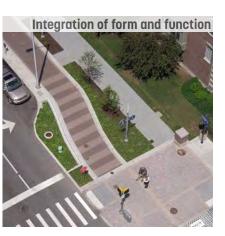
West

- Angular and Meandering
- Variety of Features
- Pedestrian Focused
- Artist's Trail
- **Enhanced Paving**
- Special Lighting
- Slower, Social, Gathering
- Staggered Row of Trees
- Diverse Planting Species
- **Direct Connection** to Lakeview Square



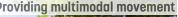
East

- Linear and Direct
- Multimodal Bike/ Pedestrian
- Fast and Direct
- Parking

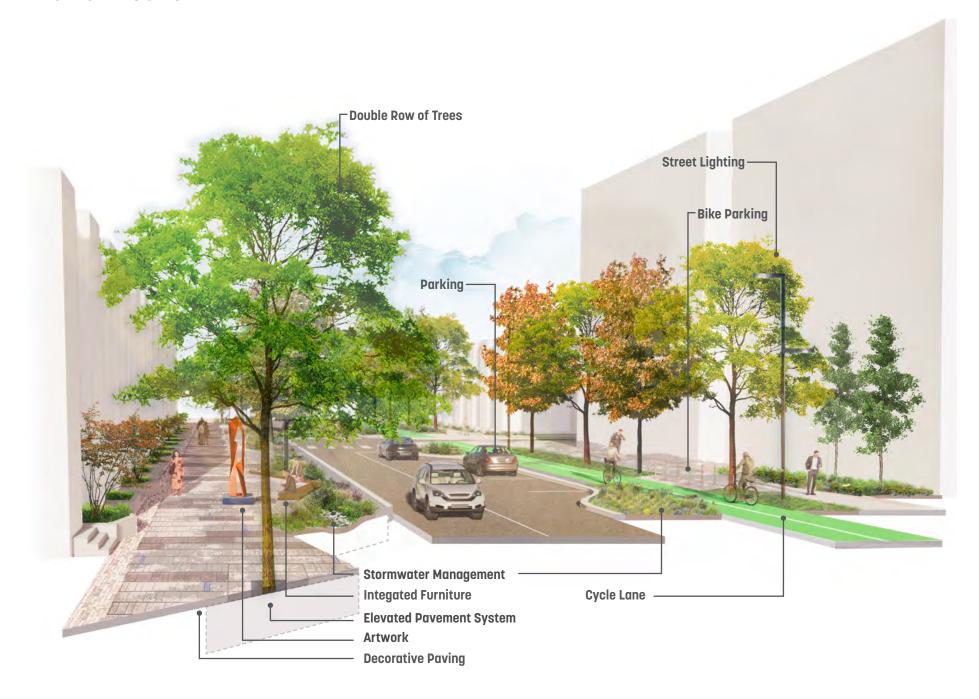




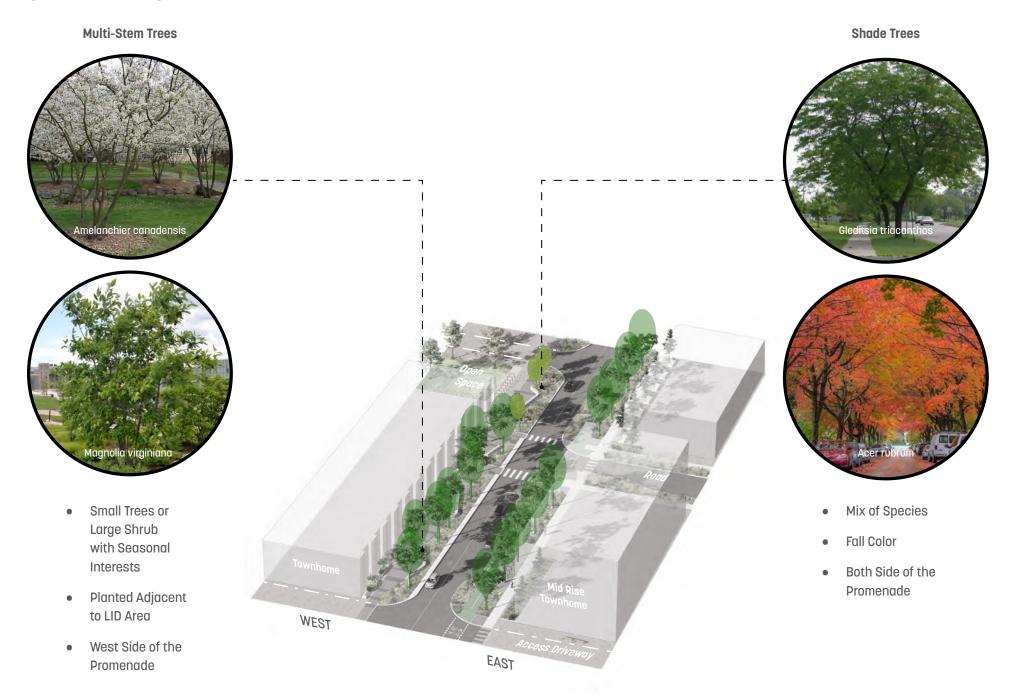




HYDRO ROAD CONCEPT



STREET TREES



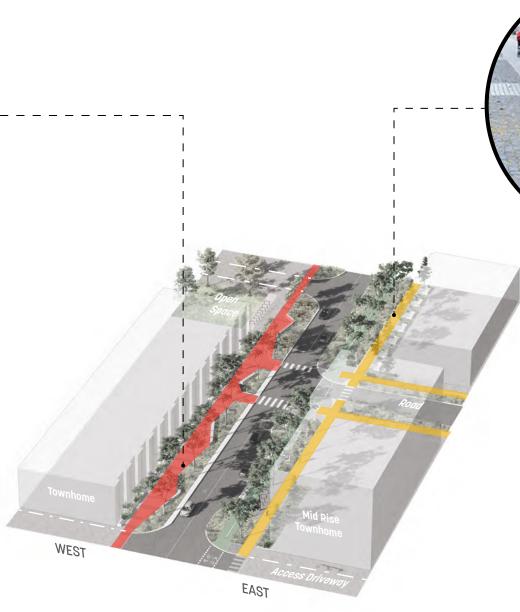
DECORATIVE PAVING







- Stone Paving
- Pattern
- Tonal / Textured
- West Side of Promenade and Lakeview Square



Standard

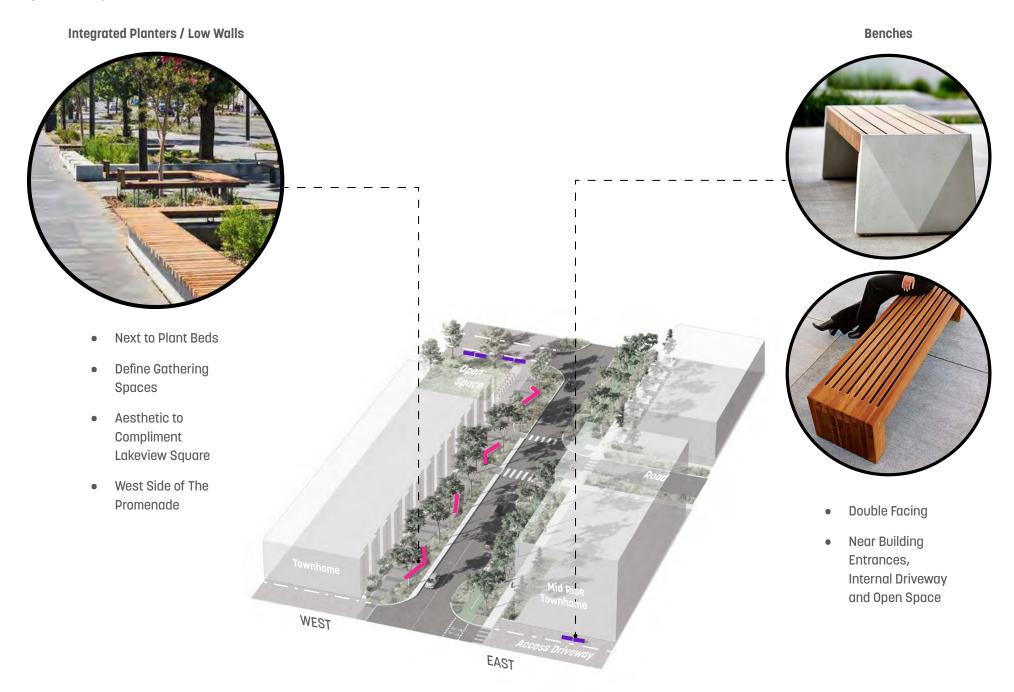
CIP Concrete

East Side of Promenade

Stone

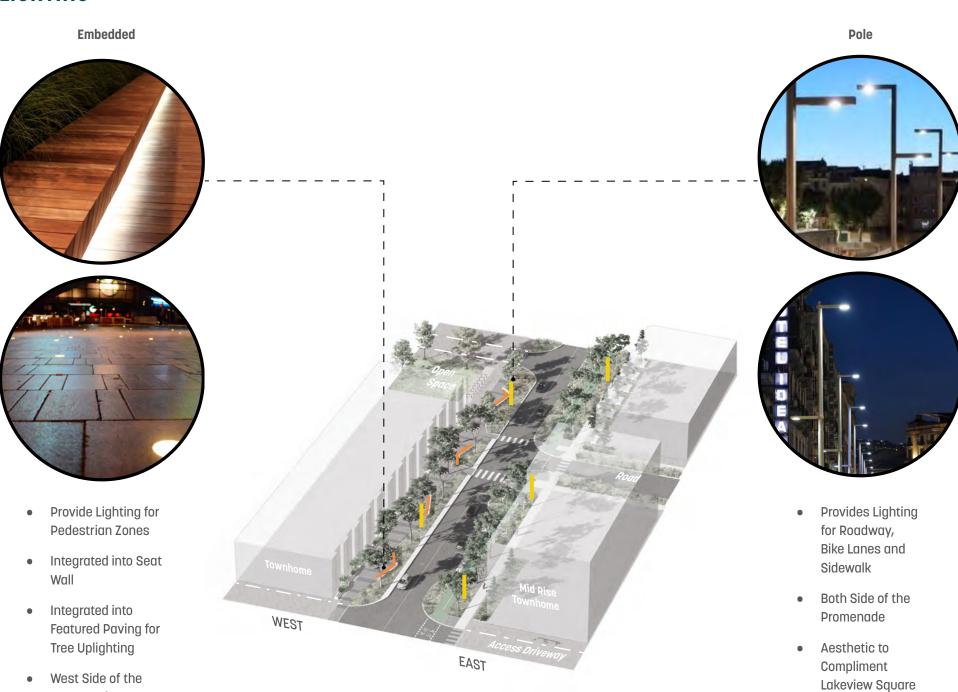
Accents / Edging

SEATING

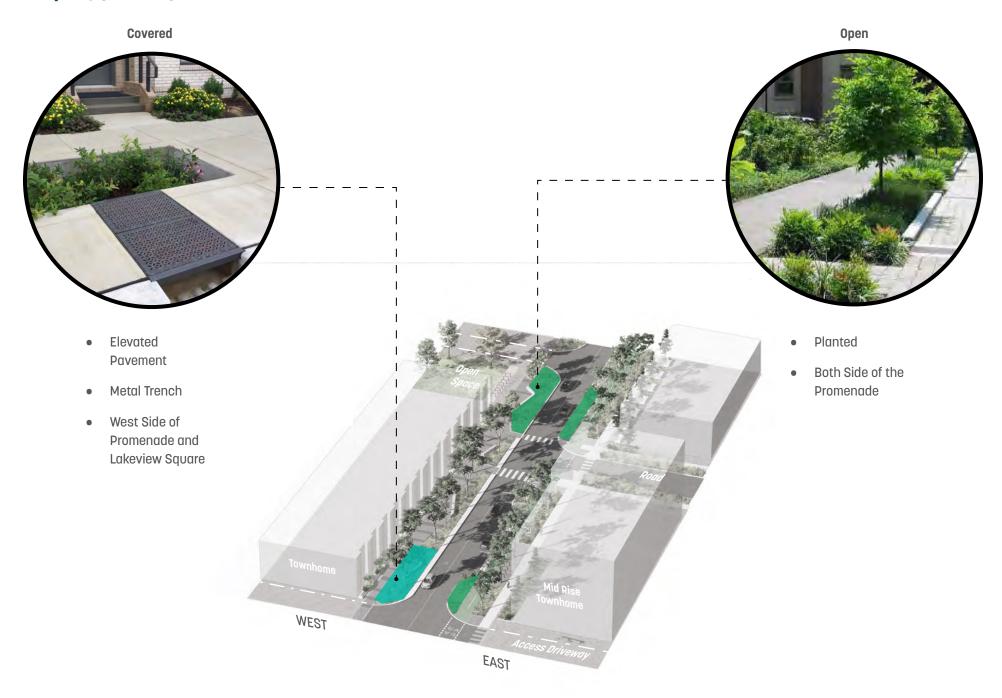


LIGHTING

Promenade



LID/BIOSWALES



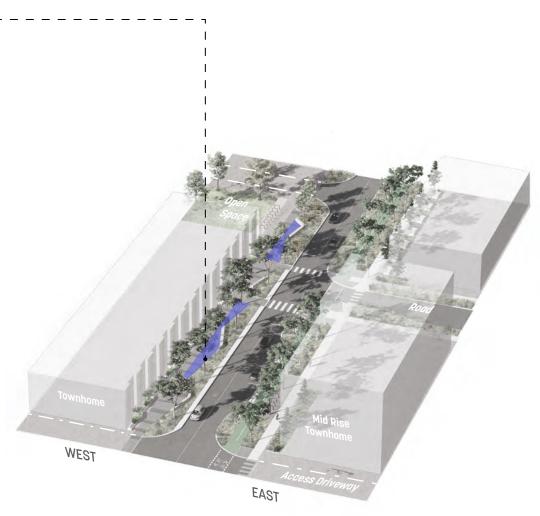
SOIL CELLS

Paved Tree Grate





- Integrated with Feature Paving
- West Side of Promenade
- Located in Paved Seating Nooks to Extend Continous Canopy Cover



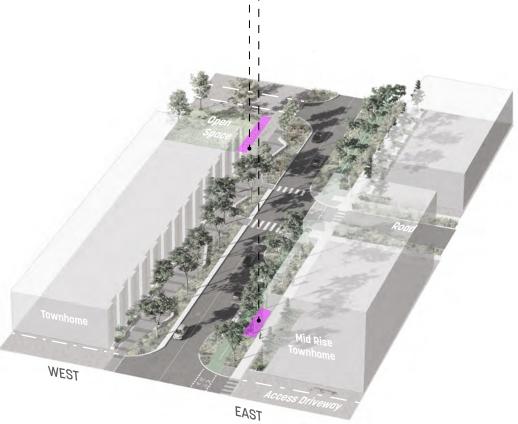
BIKE RACKS

Featured





- Near Internal Driveways
- Near Building Entrances
- Both side of Promenade



 $\Gamma_{\rm T}$

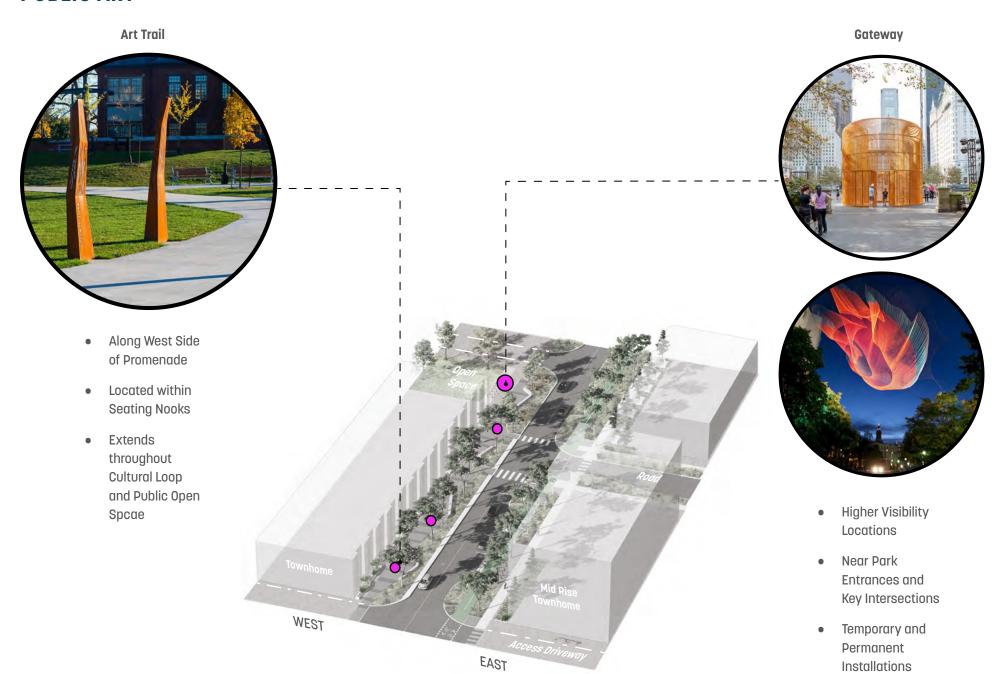
Standard





- Along City Roads
- East Side of Promenade

PUBLIC ART



VACUUM WASTE

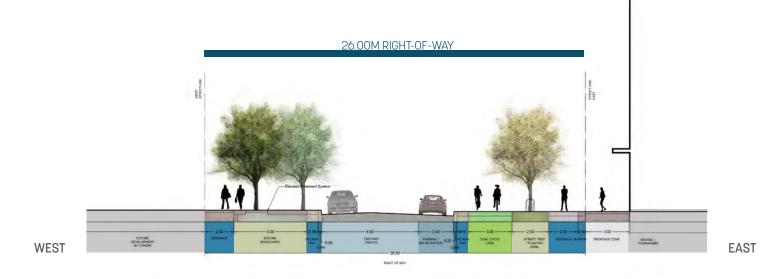


- Along Both Sides of Promenade
- Near Intersections and Other Locations with Crossing Foot Traffic
- Within Public Open Space and Near Access Driveways



ENLARGEMENT PLAN - SEGMENT 1



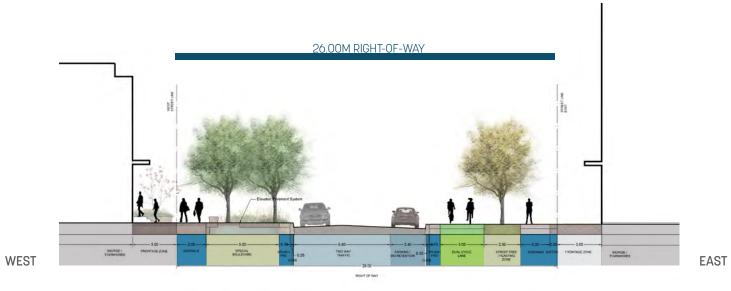




ENLARGEMENT PLAN - SEGMENT 2



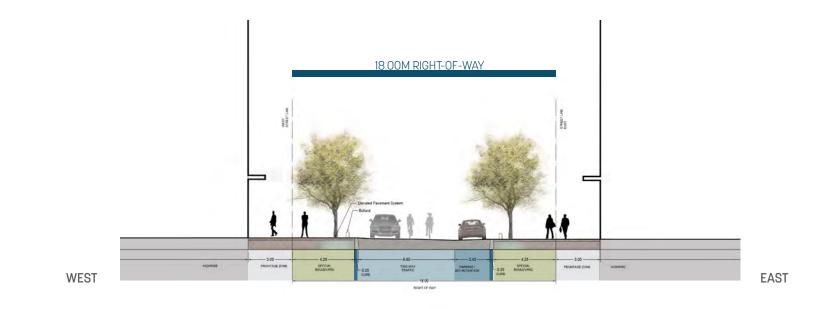


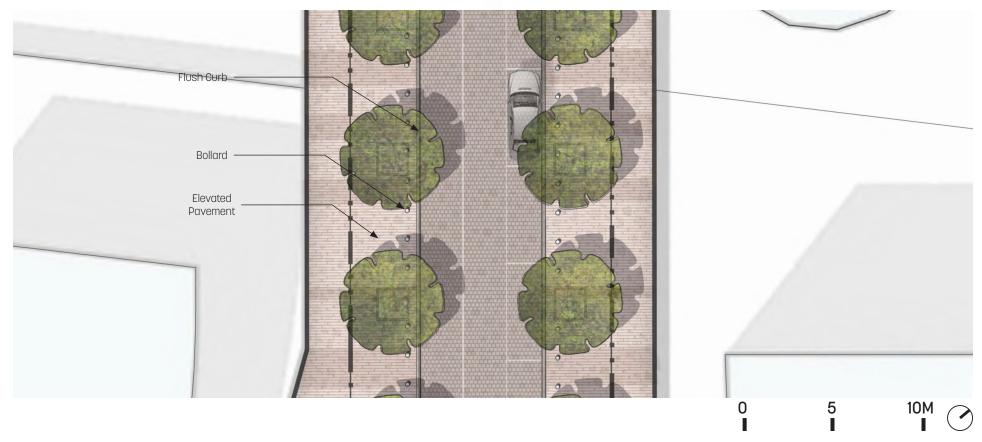




ENLARGEMENT PLAN - SEGMENT 3









LAKEVIEW VILLAGE STREETSCAPE SECTIONS

FEBRUARY 2021





STREETSCAPE TYPOLOGIES



MAJOR COLLECTOR



MINOR COLLECTOR



LOCAL ROAD



Local Road

Local Road - Character

Major collector roads provide primary connections between Lakeview Village districts and community functions, such as parks, recreation centres, and other facilities.

They largely define the community structure, serve as the primary inter-district circulation routes, and accommodate transit. The proposed major collector road has a proposed speed limit of **40km/h**.

Street H is designated as a 'Character' Street with unique details, materiality and sense of place.

Minor collector roads also provide key Connections between Lakeview Village districts.

They further break down the community structure into smaller blocks and serve as key circulation routes. The proposed minor collector road has a proposed speed limit of 30km/h.

Additional variations on the typical configuration accommodate site specific and desired character conditions.

Street H is designated as a 'Character' Street with unique details, materiality and sense of place.

Local roads serve as the finer grain street network within Lakeview Village and are intended to provide a comfortable pedestrian experience with relatively low levels of local vehicular traffic. Two lanes of traffic are accommodated with parking on one side. The local road has a proposed speed limit of 30km/h.

Dependant on adjacent uses, the character of these streets are that of an urban residential district with a variety of hard and softscape frontage zones depending on the adjacent building typology.

Streets D and H are designated as 'Character' Streets with unique details, materiality and sense of place.



Tree Lined Pedestrian Networks



Multi-Modal



Integrated Design Features



Complimentary Building Interface



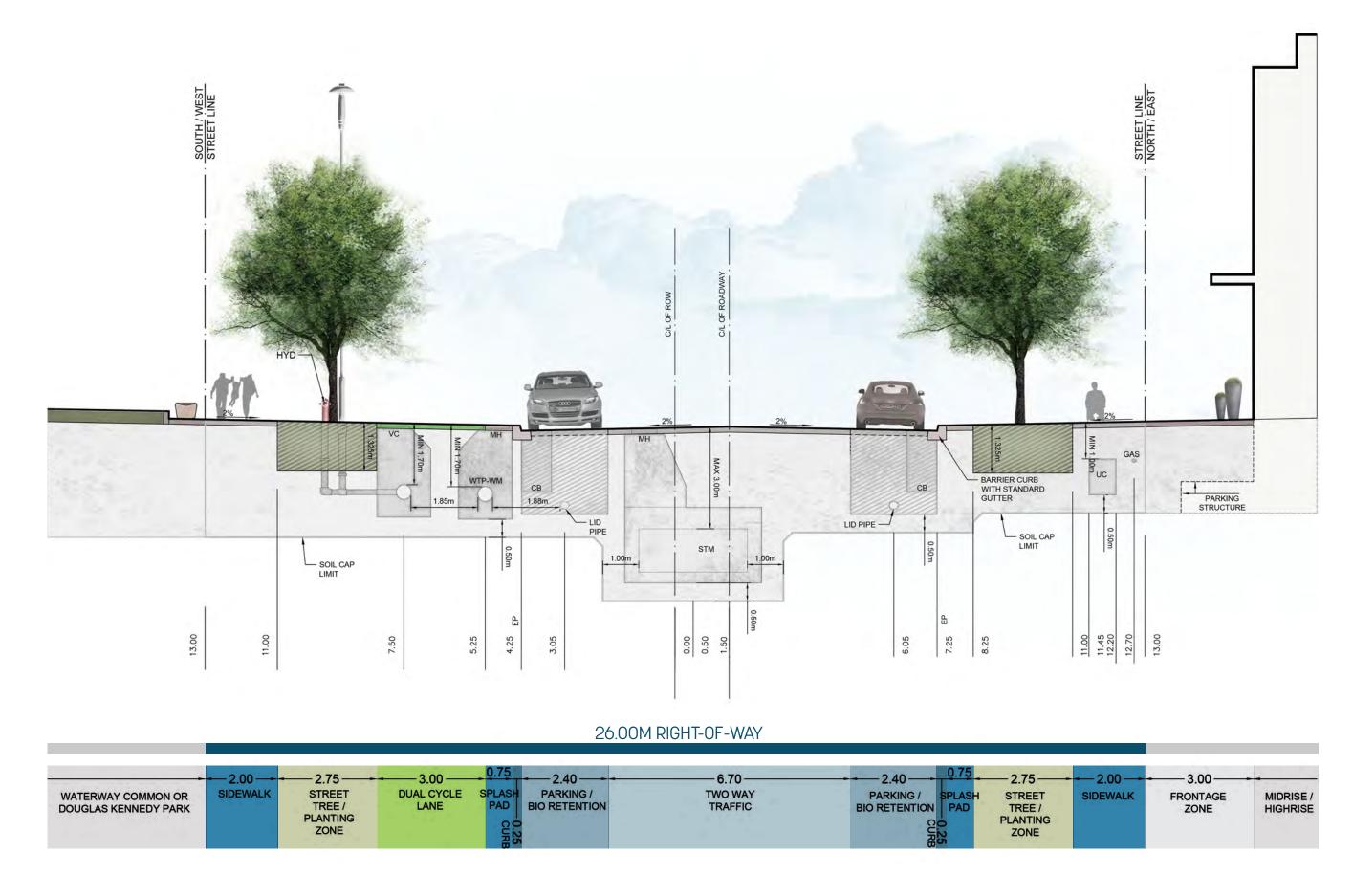
Green Streetscapes



Seating Zones

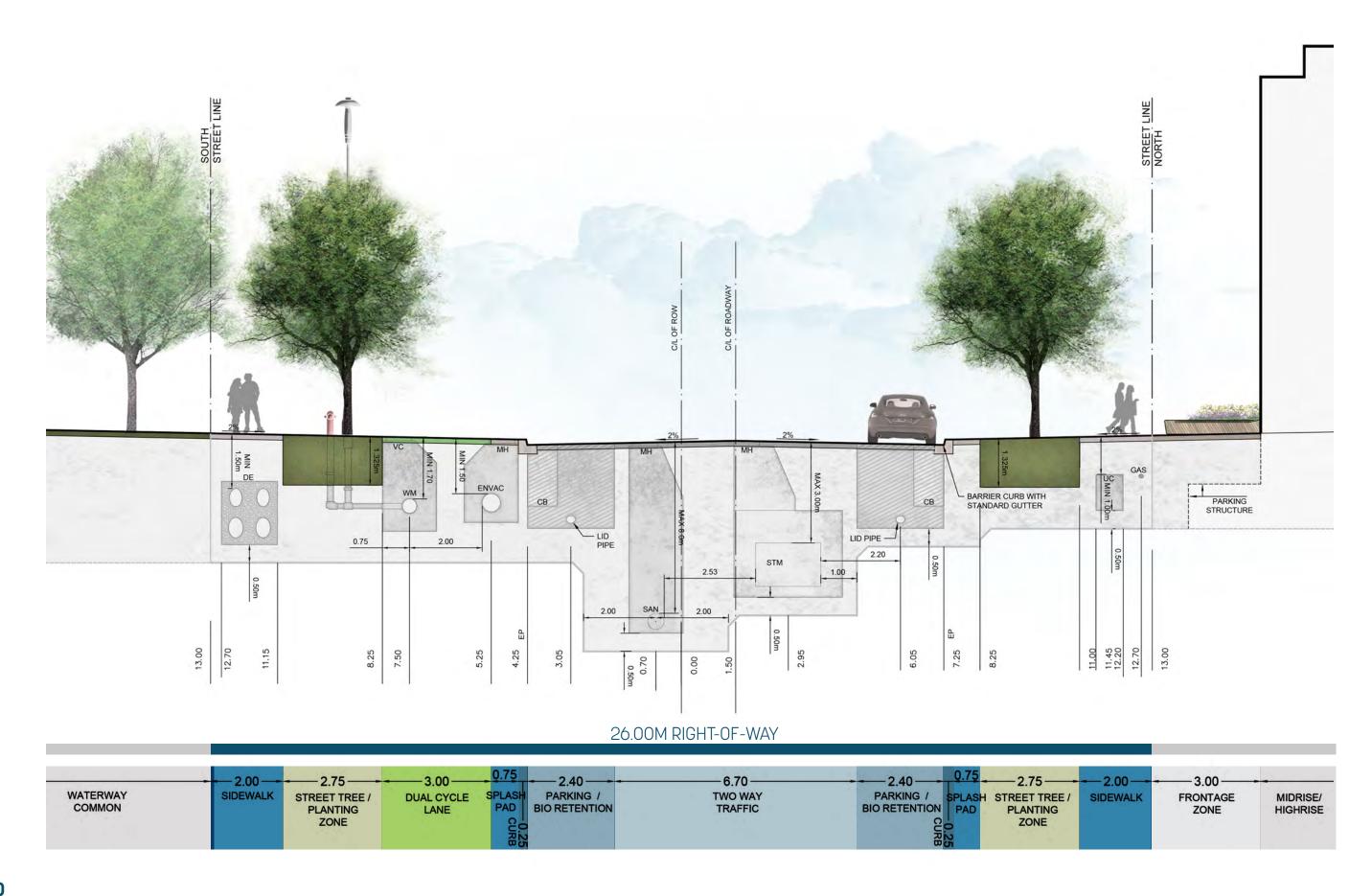
STREET K (LAKEFRONT PROMENADE) - MAJOR COLLECTOR WITH BUS ROUTE





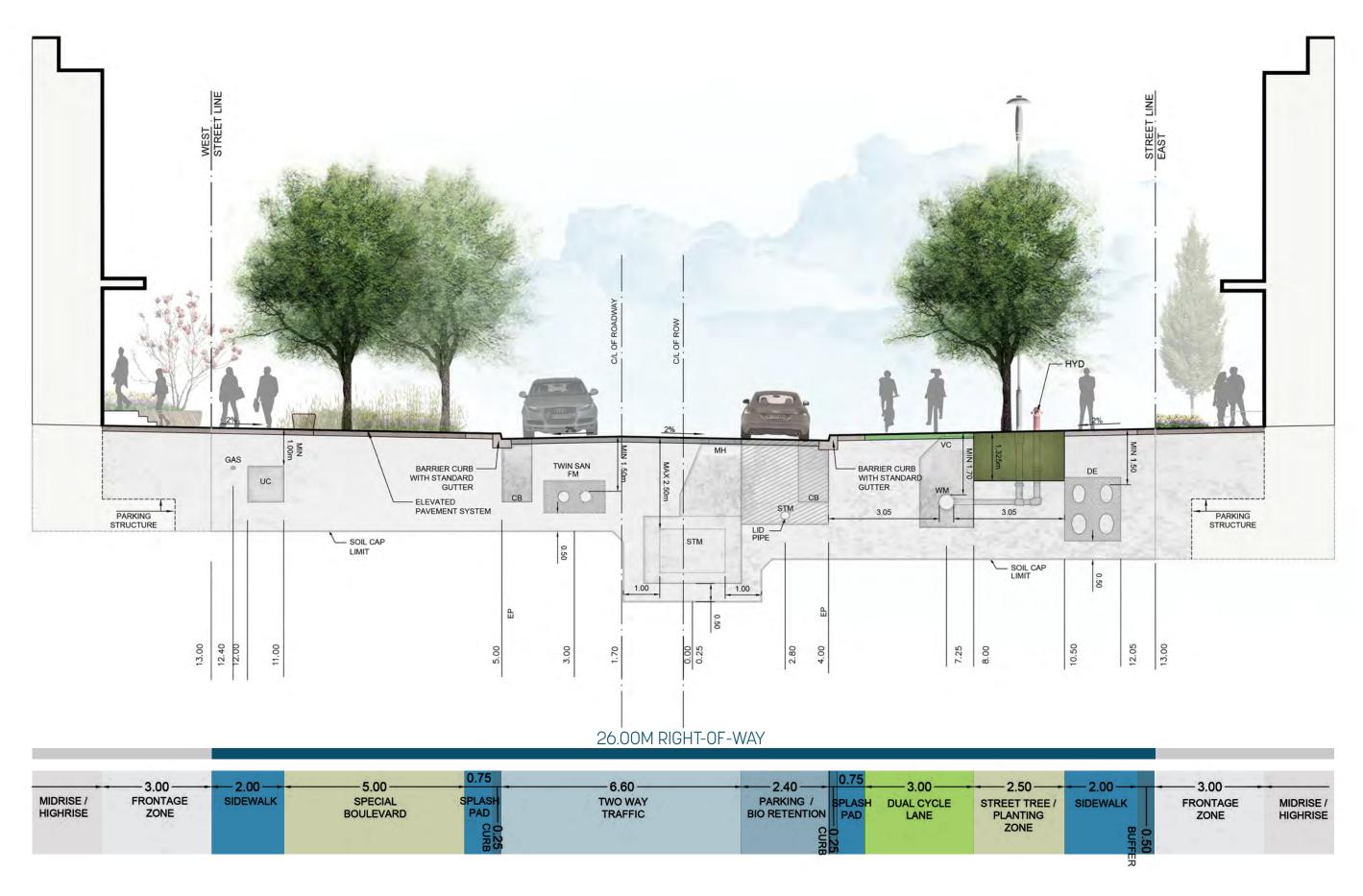
STREET A BETWEEN STREETS H & K - MAJOR COLLECTOR





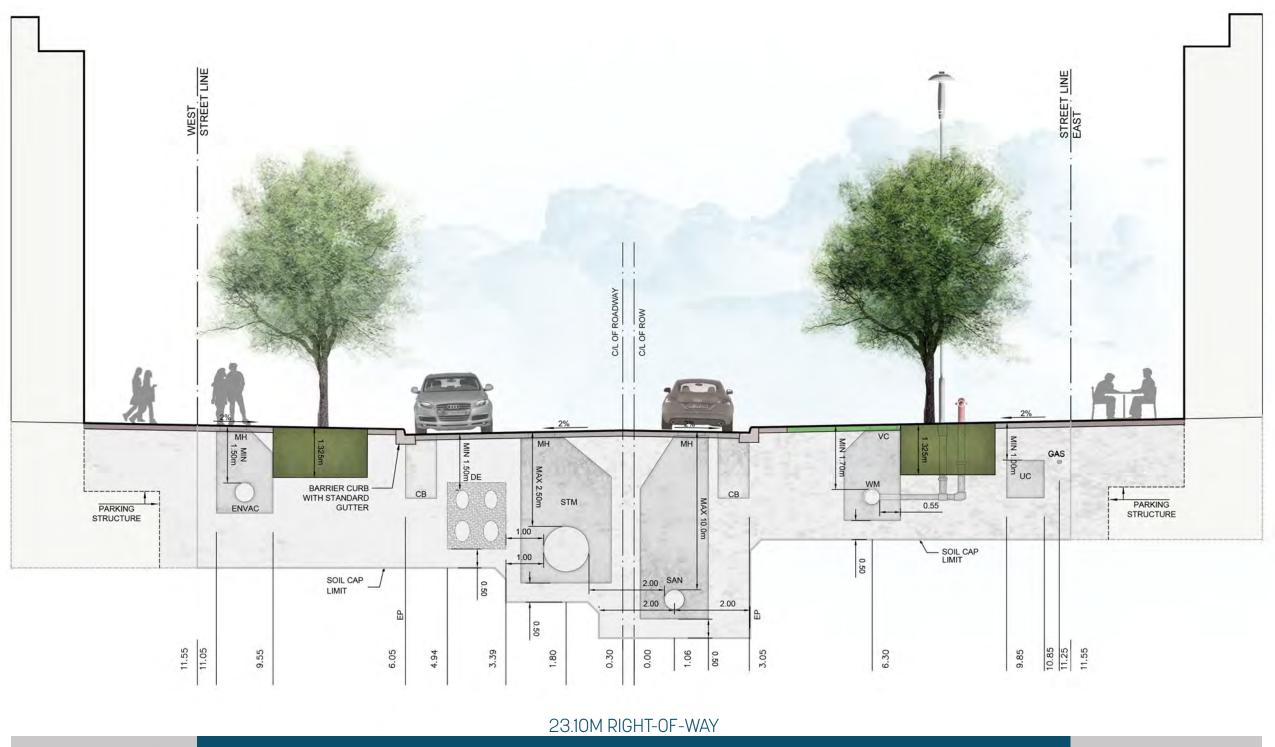
STREET H (HYDRO ROAD) BETWEEN LAKESHORE BLVD & STREET A - MAJOR COLLECTOR (CHARACTER)

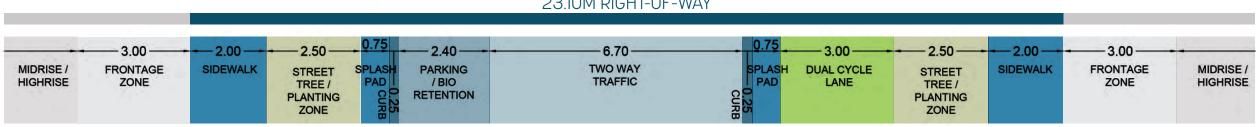




STREET I SOUTH OF STREET B - MINOR COLLECTOR

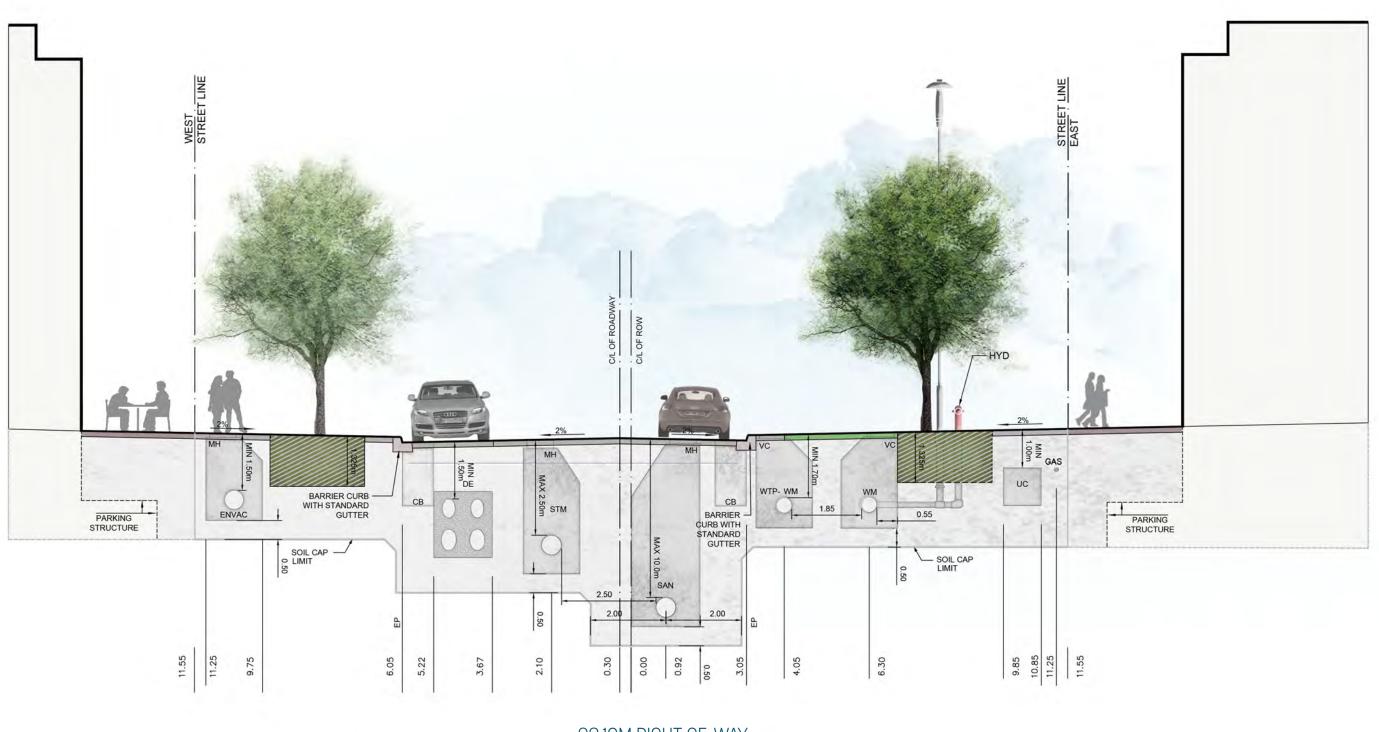






STREET I NORTH OF STREET B - MINOR COLLECTOR

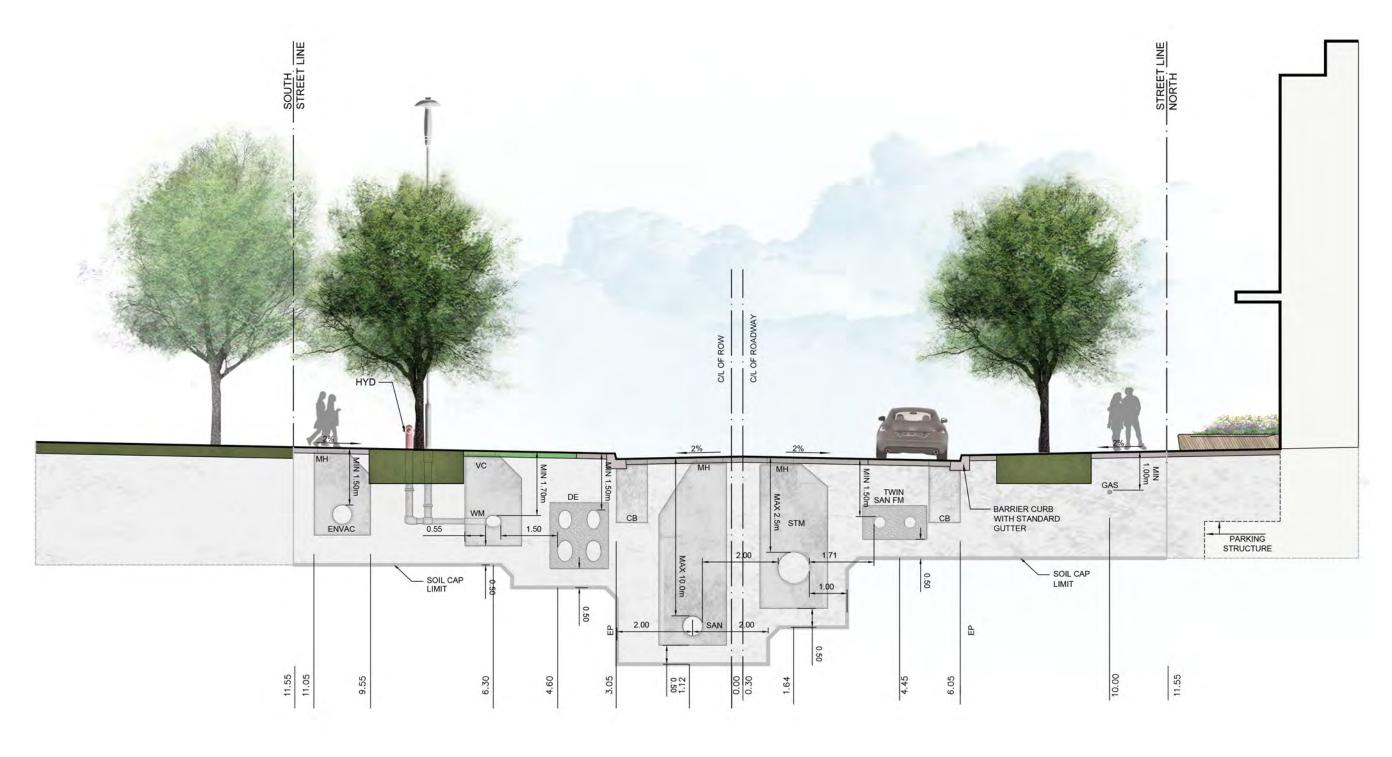


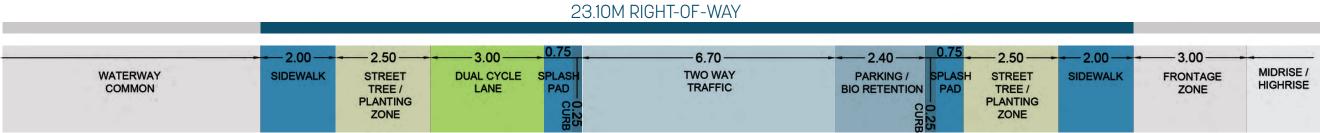


23.10M RIGHT-OF-WAY -3.00--2.00--2.50 --2.40 --6.70--3.00 --2.50 -2.00--3.00 PARKING / BIO RETENTION TWO WAY TRAFFIC DUAL CYCLE LANE FRONTAGE ZONE MIDRISE / HIGHRISE FRONTAGE MIDRISE / SIDEWALK STREET STREET TREE/ SIDEWALK HIGHRISE ZONE TREE / CURB PLANTING ZONE PLANTING ZONE

STREET A BETWEEN STREET I & STREET H - MINOR COLLECTOR

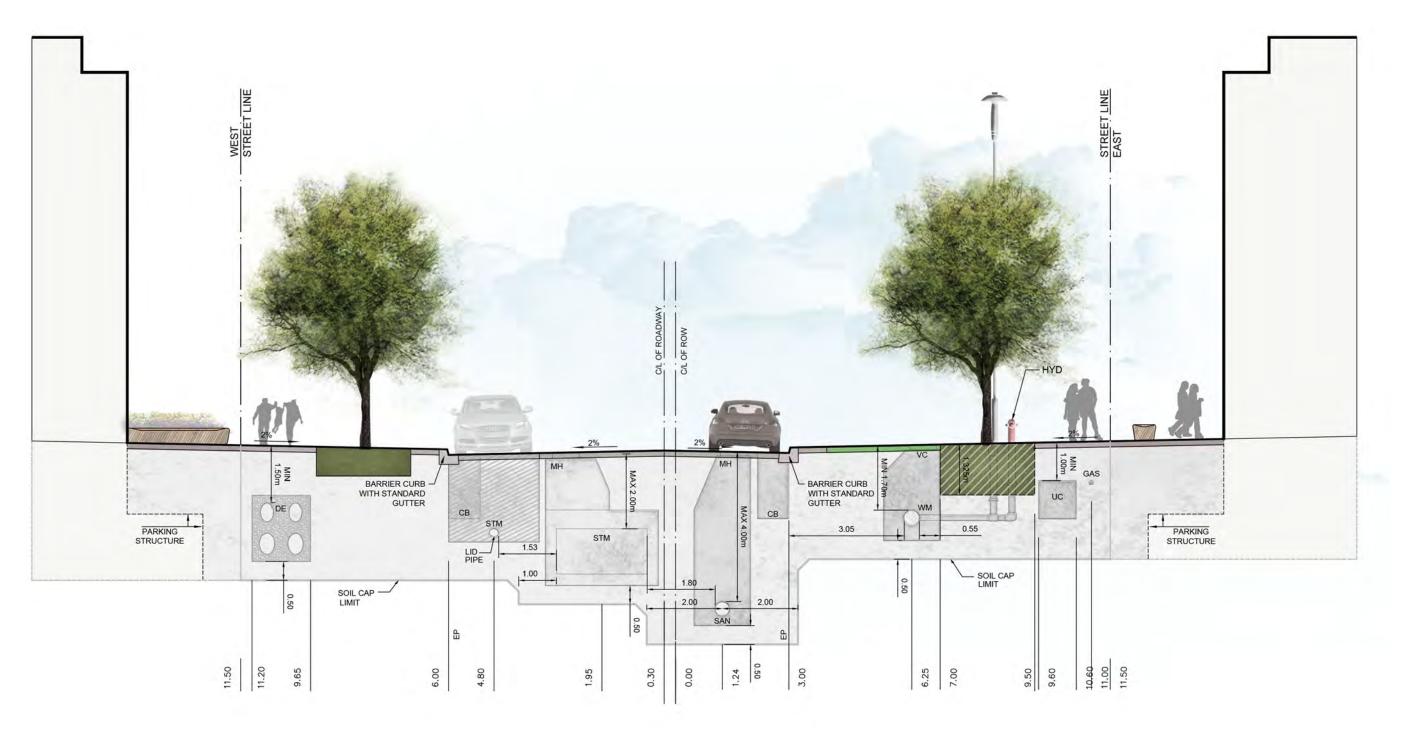


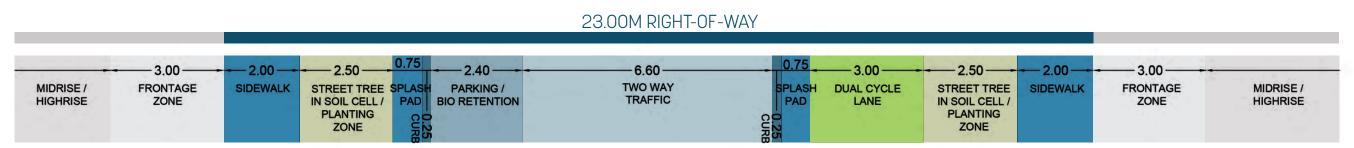




STREET G BETWEEN STREETS A & D - MINOR COLLECTOR

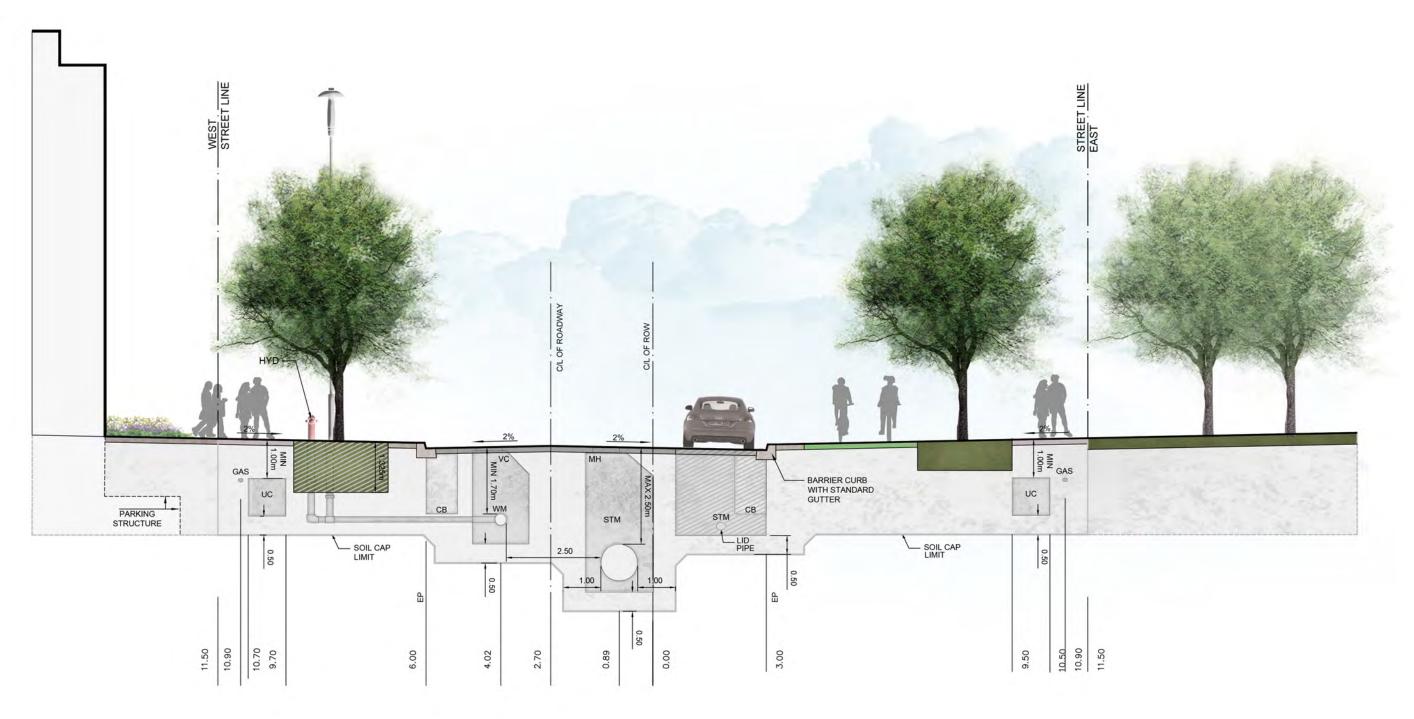




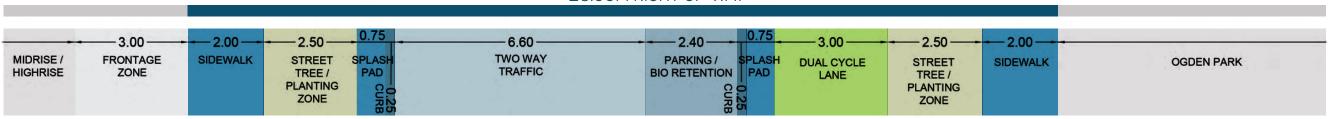


STREET F (OGDEN) - MINOR COLLECTOR



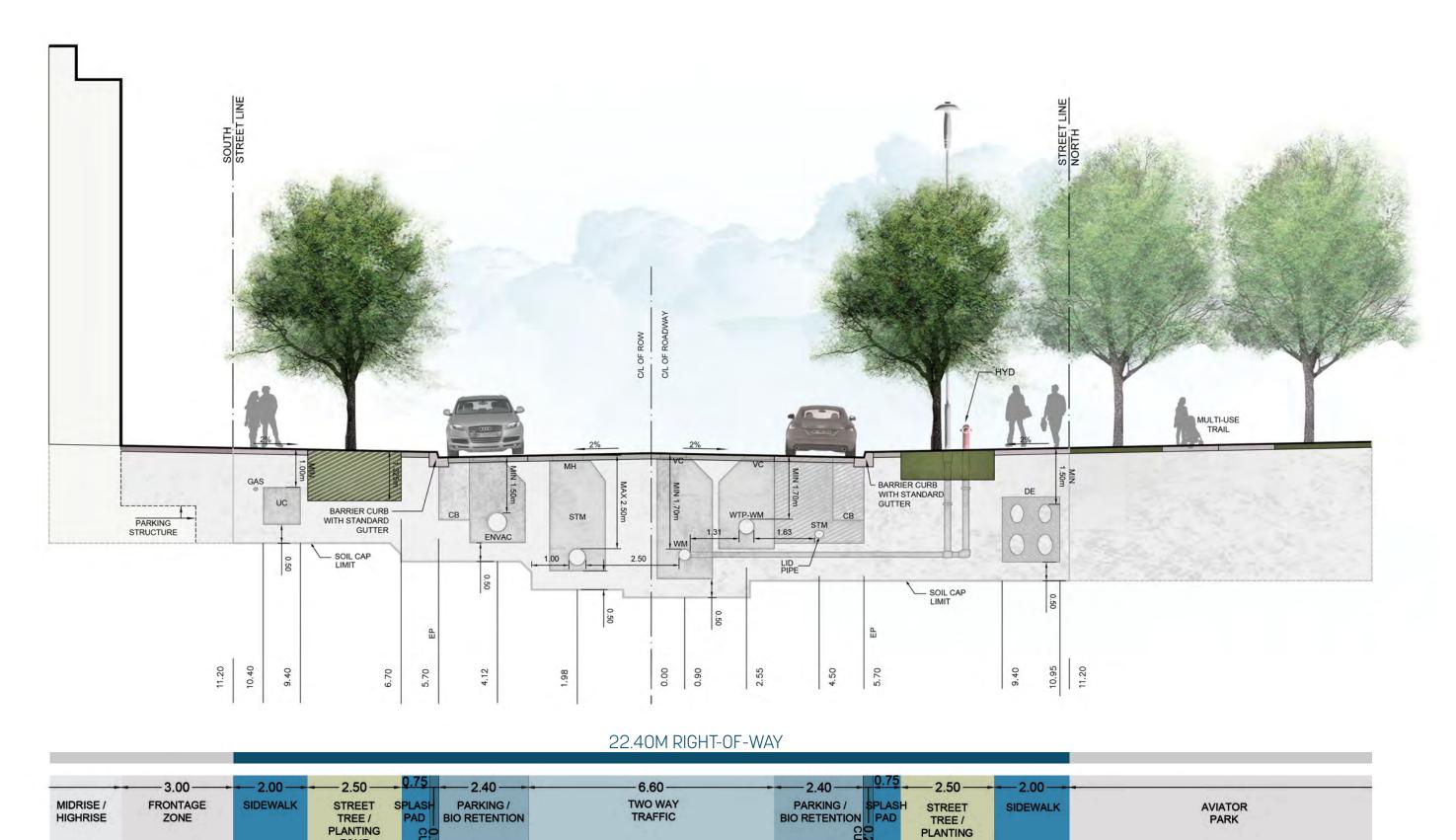






STREET B - MINOR COLLECTOR



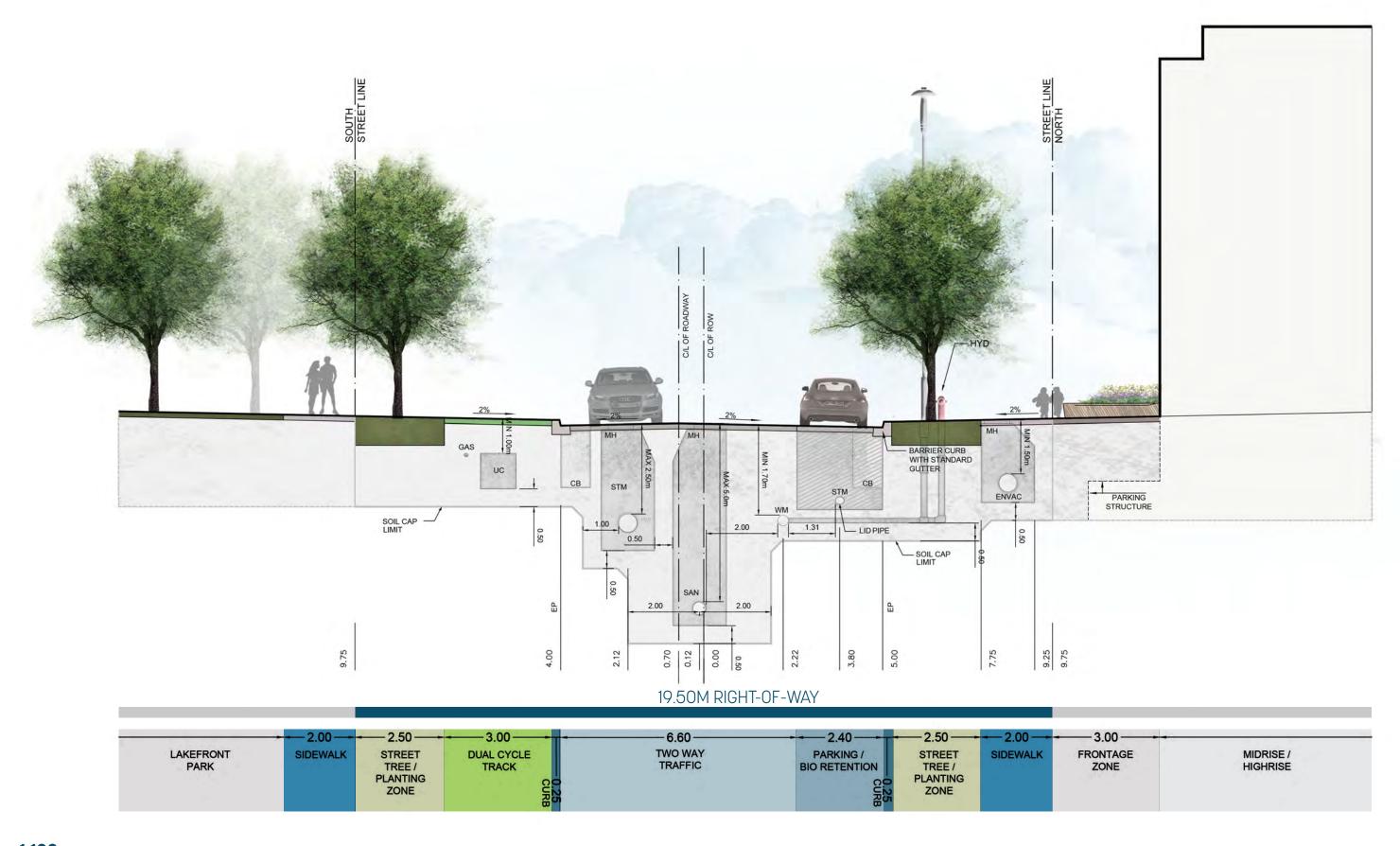


ZONE

ZONE

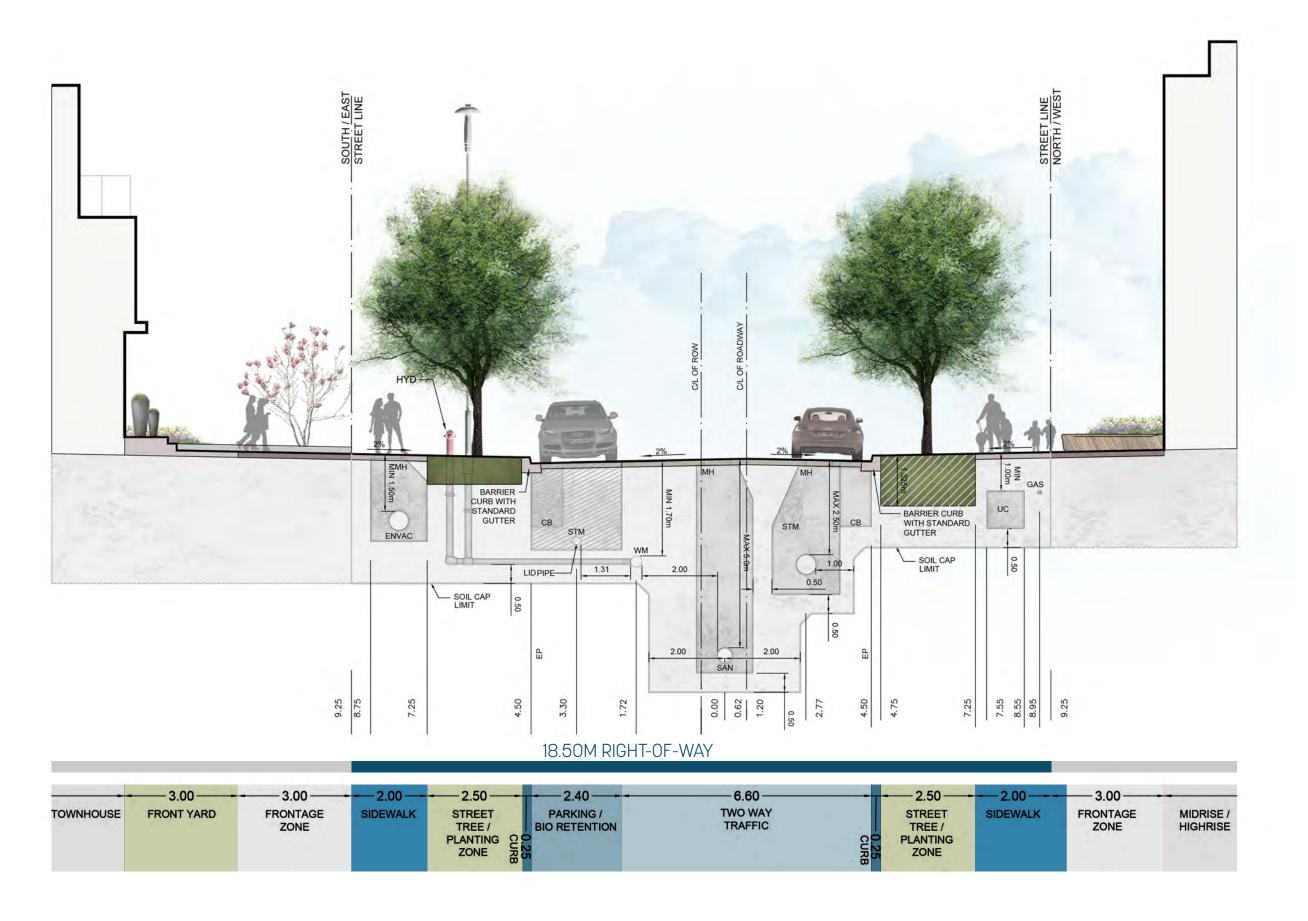
STREET D - LOCAL ROAD (CHARACTER)





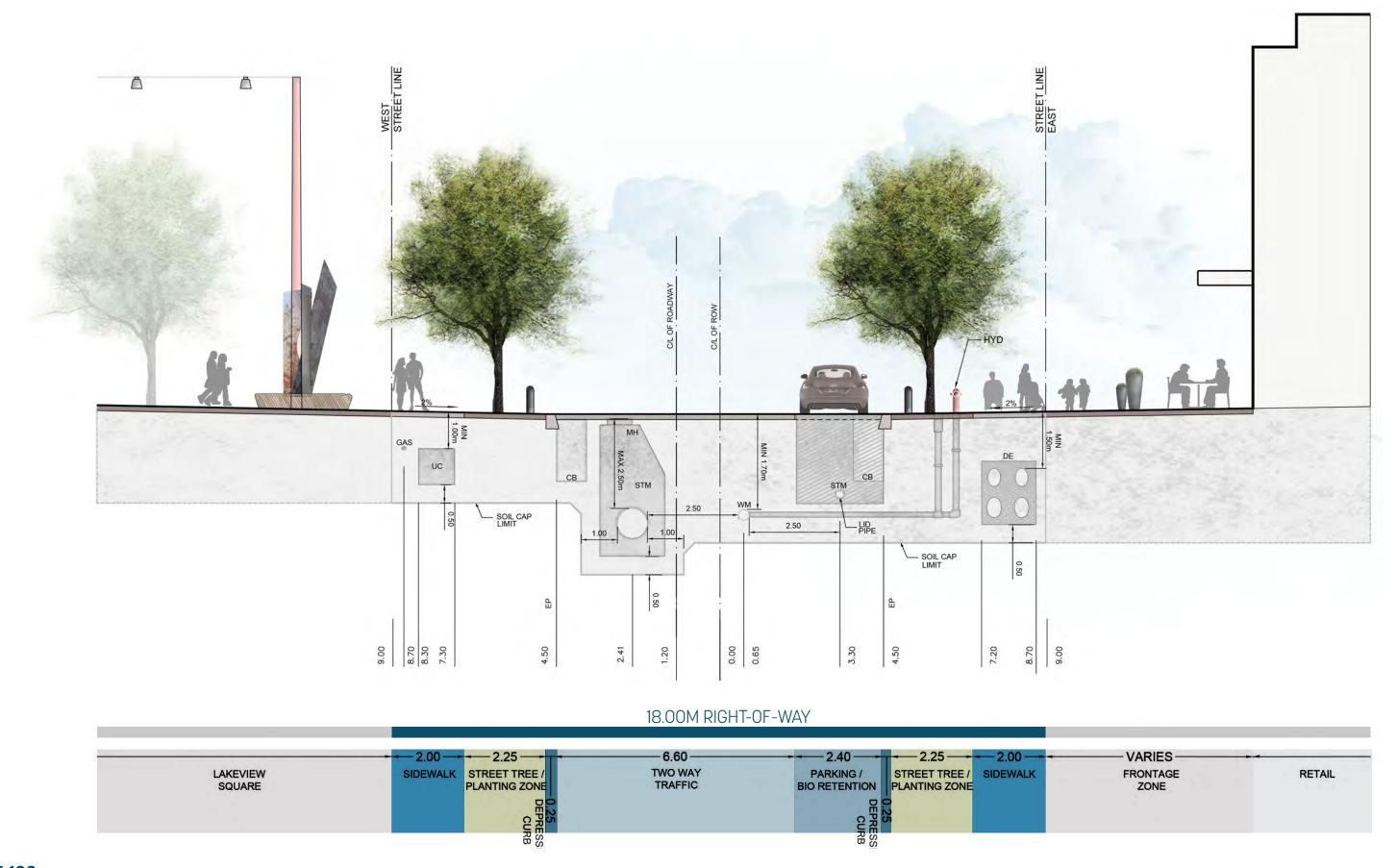
STREETS C, E, J & STREET G NORTH OF STREET A - LOCAL ROAD





STREET H (HYDRO ROAD/LAKEVIEW SQUARE) SOUTH OF STREET A - LOCAL ROAD (CHARACTER)





LAKEVIEW VILLAGE RIGHTS-OF-WAY NOVEMBER 10, 2020 MEETING WITH MISSISSAUGA/PEEL STAFF REGARDING UNDERGROUNDS

Issu	ues Raised by Region of Peel and City of Mississauga	Impact ROW Width?	Responses by Lakeview Team
1.	MECP Standards to be met for separation from watermains. LCPL Team to confirm clearances required by MECP between watermains and: District Energy Piping Vacuum Waste Piping LID Sub-Drains	Yes if greater separation is required.	The Lakeview Team has directly coordinated with MECP staff on this item and have confirmed that MECP has approved the following offsets, specifically for Lakeview Village : • District Energy pipe offset of 1.2m from watermains • Vacuum Waste pipe offset of 1.5m from watermains Discussions with MECP regarding the LID Sub-Drain pipe offset of 1.3m horizontal and 0.5m vertical from watermains is ongoing. MECP have requested details of the impermeable membrane surrounding the LID trench, which Urbantech is presently discussing with City staff.
2.	Region would like to see some additional x-sections at some key locations to demonstrate how service crossings meet the MECP separation requirements. Region to suggest locations of x-sections	No	Correspondence between our team and MECP is attached. Additional x-sections have been prepared at the locations requested by the Region.
3.	Region indicated that should service connections be proposed at road entrances/driveways to the blocks, then alternative access points should be provided to the block to allow for maintenance of the service connection.	No	The Lakeview Team has reviewed this issue and have identified that where an alternative access point can not be provided,, the service connections will be shifted out of the entrances/driveways to the blocks. The exact location of the service connections will be identified at detailed design stage, but we can confirm at this point that there is ample room for this shifting to take place.
4.	City Staff concerned with Soil Cap being shown only 1 m. from the Region/City infrastructure and risk of it being penetrated during sewer repairs. Also concerned with "sharp corners" shown	No	The Soil Cap was previously only conceptually shown on the x-sections Following comments received, the X-sections have been modified to show more realistic bevels resulting from construction of the cap. Minimum separations have been evaluated considering future infrastructure repair accounting for trench box access etc. Minimum separation distances have been reflected on the updated x-sections
5.	Region expressed concern with frost heaving of water valves and man holes if they are located within the cycle tracks	No	Valve chambers are not actually located within cycle tracks as they will be located within the road intersections. Some vacuum waste manholes may be located within the 0.75m splashpad on Street A and on Lakefront Promenade. While location of these within the splashpad will be minimized, those that are required will be fitted with anti-frost heave collars to prevent any hazard to pedestrians/cyclists within the splashpad or the adjacent cycle track.
6.	Region expressed concern with proposed twin sanitary forcemains on Street H being located immediately adjacent to property line. Concern with impact to adjacent building should forcemain fail. Concerned with having adequate room to repair twin forcemains in future. Impact to underground parking? Easement alone may not be enough. Need to look at zoning for the impacted blocks.	greater separation or revised location	The Lakeview Team recognizes and agrees with the Region's concern. To address we have relocated the gravity sanitary sewer from Street H to Street I allowing the twin forcemains on Street H to be moved to the previous sanitary sewer location under the Street H travel lane.

January 6, 2020

LAKEVIEW VILLAGE RIGHTS-OF-WAY NOVEMBER 10, 2020 MEETING WITH MISSISSAUGA/PEEL STAFF REGARDING UNDERGROUNDS

	Lakeview Team to make recommendation based on best/past practices and anticipated building setbacks.		
7.	Breaks will be required along LID's to allow for service connection crossings etc.	No	Agreed. To be addressed at detailed design stage
8.	Region asked if watermain could be moved from being under travel portion of the road. (local roads, Street F, Street B)	Yes, depending on location	No. Lakeview Team indicated that no other location available. Region staff acknowledged.
9.	District Energy setback and impact to bedding should adjacent watermain breaks and/or require future repair. Would DE pipes need to be shut down? Protocols during adjacent repairs	_	District Energy setback of 1.0 from watermain is very common and utilized in the Regent Park system in the City of Toronto. Sand bedding for the DE pipes is preferred but other bedding options can be considered. DE pipes carrying water are generally not shut down during construction, but appropriate protocols would be established by the DE System operator.
10.	Heat impact of District Energy on water quality by raising water temperature in adjacent watermains	Yes if greater separation req'd	See attached memo from FVB Energy. As noted the proposed District Energy system for Lakeview will have maximum water temperatures of only 70 deg C compared to most systems in the GTA which run at around 115 deg C. The resulting delta in soil temperature at a 1.2m setback from the DE pipes amounts to approximately 1 deg C during the summer and approximately 1.5 deg C during the winter. It is anticipated that the impact of this soil temperature delta on the municipal watermain water temperature would be insignificant
11.	Possibility to orientate all x-sections in same direction	No	The updated X-sections follow either a north or east orientation

Note: In addition to the above, the following changes have been made to our X-Sections with regard to the undergrounds:

- Figure 1 (26.0m Major Collector) cross-section previously represented both Lakefront Promenade (Street 'K') and Street 'A'. In the current submission we have split this cross-section into two, one for each of Street 'K' and Street 'A'. This change was made for the following reasons:
 - o District Energy and Vacuum Waste pipes are proposed in Street 'A' but not in Street 'K',
 - o The dedicated watermain to the Wastewater Treatment Plant is proposed in Street 'K' but not in Street 'A', and
 - o Sanitary sewers are proposed in Street 'A' ROW but not Street 'K'.
- Figure 2 (22m Minor Collector cross-section representing Street 'G' has been updated per the following:
 - o The District Energy pipe system has been moved to under the sidewalk whereas previously they were proposed under the cycle tracks.
- Figure 3 (18.0m Local Road) cross-section previously represented all the local roads within Lakeview Village. In the current submission we have split this cross-section into three, one for each of Street 'D', Street 'H', and Streets 'C', 'E', and 'J'. The only change for below ground utilities was in Street 'H', where there is no sanitary sewer proposed.
- Figure 4 (26.0m Major Collector) cross-section representing Hydro Road has been updated per the following:
 - o The sanitary sewer along Hydro Road has been moved to Street 'I'.
 - o The forcemains have been moved from under the sidewalk (i.e. adjacent to parking garages) to under the pavement in the space previously dedicated to the sanitary sewer.
 - o The District Energy or Vacuum Waste pipes are proposed under the sidewalk whereas previously they were proposed under the cycle tracks.

LAKEVIEW VILLAGE RIGHTS-OF-WAY NOVEMBER 10, 2020 MEETING WITH MISSISSAUGA/PEEL STAFF REGARDING UNDERGROUNDS

- Figure 5 (22m Minor Collector) cross-section representing Street 'F' was updated to include cycle tracks and one fewer lay-by parking / LID lane. The only change to the below ground utilities was the removal of LID on the west side of the roads and adjusting the distance between storm sewers and watermain.
- Figure 6 (22m Minor Collector) cross-section representing Street 'B' was updated to address City comments on surface features, but these revisions did not impact placement of below ground utilities.
- Figure 7 (22.2m Minor Collector) cross-section previously represented Street 'I'. In the current submission we have split this cross-section into two, one for each section of Street 'I' north and south of Street 'B'. This change was made for the following reasons:
 - Street 'I' north of Street 'B':
 - There are no LID(s) north of Street 'B' and as such removed from the new cross-section.
 - Vacuum Waste pipes were moved to under the lay-by parking lane.
 - District Energy pipes were moved from under the cycle tracks to the under the western sidewalk.
 - The dedicated watermain to the wastewater treatment plant was added to under the cycle tracks.
 - Sanitary sewers were added below the travel lanes.
 - Street 'I" south of Street 'B':
 - No changes to placement of below ground utilities from previous version.
- Figure 8 (22.0m Minor Collector) cross-section representing the section of Street 'A' between Street 'I' and Hydro Road was updated to address City comments on surface features, but these revisions did not impact placement of below ground utilities.

January 6, 2020

From: Abdul Ahmadzai
To: David Scott

Subject: FW: Minimum Separation Between Watermain and Other Pipes

Date: Friday, December 04, 2020 3:48:54 PM

Dave,

Please see below responses from MECP on separation between DE and VW pipes to WM. He has asked for more information on the LID pipes. I will see what else we can send him, perhaps the Urbantech FSR figures.

Regards

Abdul Ahmadzai TMIG | TYLI +1.905.738.5700 x271 +1.647.201.2423

From: Haq, Riaz (MECP) <Riaz.Haq@ontario.ca>

Sent: December 4, 2020 3:47 PM

To: Abdul Ahmadzai <aahmadzai@tmig.ca>

Cc: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>

Subject: RE: Minimum Separation Between Watermain and Other Pipes

Good afternoon Abdul,

Please see my response in mail below in blue.

Let me know if you have any questions

Thanks, Riaz

From: Abdul Ahmadzai aahmadzai@tmig.ca>

Sent: November 25, 2020 5:37 PM

To: Haq, Riaz (MECP) < Riaz. Haq@ontario.ca>

Subject: RE: Minimum Separation Between Watermain and Other Pipes

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good Evening Riaz,

I wanted to follow-up with you regarding the email below and see if you have reviewed the material and can provide us MECP position on separation between watermain and the District Energy and Vacuum Waste System.

If you need clarification or need more information, please give me a call.

Regards

Abdul Ahmadzai TMIG | TYLI +1.905.738.5700 x271 +1.647.201.2423

From: Abdul Ahmadzai

Sent: November 19, 2020 5:47 PM

To: Haq, Riaz (MECP) < Riaz. Haq@ontario.ca > **Cc:** Ahmed, Aziz (MECP) < Aziz. Ahmed@ontario.ca >

Subject: RE: Minimum Separation Between Watermain and Other Pipes

Citrix Attachments	Expires May 18, 2021						
17201-LakeviewVillage 2D Composite Plan.pdf	9.6 MB						
Lakeview DE 3 (DPS Trench and Circular Chaer).pdf	335.8 KB						
Lakeview ROW Sections - October 02 2020.pdf	3.4 MB						
LID-2 - LID Details.pdf	746.6 KB						
Profile of Vacuum Waste Collection Systemage.pdf	5.5 MB						
Regent Park PH2 DPS D-9290-ALL As-Built.pdf	5.5 MB						
Vacuum Waste Collection System - Quebecect.pdf	23.1 MB						
Download Attachments Abdul Ahmadzai uses Citrix Files to share documents securely.							

Good Evening Riaz,

Thank you for your call yesterday morning to discuss the District Energy and Vacuum Waste systems. I have attached for your reference the following documents to assist in your review.

- Lakeview Village development plan.
- Lakeview Village typical cross-sections.
- Vacuum Waste Collection System proposed by ENVAC for Lakeview Village.

- Sample of Vacuum Waste Collection System drawings from similar project in Quebec City (drawings are in French)
- District Energy system proposed by FVB/Corix for Lakeview Village (Typical Cross-Section and MH).
- Sample of District Energy drawings from similar projects in Regent Park area of Toronto.
- A detailed of the LID system

Below I would like to highlight a few things about the District Energy, Vacuum Waste, and LID pipe systems proposed in Lakeview Village.

For District Energy:

- Only hot and cold water are transported. No chemicals are added to the water.
- Pipe material consist of welded steel pipes.
- These are closed looped system, with welded joints, so minimal opportunity for leakage, and contents is only water.
- In the Regent Park project in City of Toronto, the offset to watermain was 0.9m.
- We are proposing a minimum offset of 1.2m from watermains.

Based on the information provided and discussion with you, I understand that under the District Energy Project;

- only clean water (hot and cold) will be recirculated between the District Energy Building and the residential units.
- A minimum clear distance of <u>1.2 m</u> will be maintain between the watermain and hot and cold water lines at all locations.
- A clear separation of <u>0.5 m</u> will be required at all crossing locations between watermain and recirculating lines.

Based on the above conditions the proposed design be <u>acceptable t</u>o the Ministry in my opinion. This conclusion is based on the information provided to date and is <u>ONLY</u> applicable to this specific project <u>and can not be use elsewhere</u>

For Vacuum Waste:

- Only solid waste in plastic bags is transported in pipes; not large quantities of fluids.
- Pipe material consist of welded steel pipes.
- These are closed looped system, with welded joints.
- There is minimal opportunity for leakage as the system operates under negative pressure (i.e. suction).
- We are proposing a minimum offset of 1.5m from watermains wherever the Vacuum Waste system is adjacent to watermain.

Based on the fact that in the Vacuum waste collection system;

- Only collect waste covered in plastic bags
- The proposed system consist of welded/sealed steel pipes and joints; and
- The system will always be operating under vacuum pressure.

Based on the above the proposed separation distance of <u>1.5 m</u> between the watermains and welded steel pipes associated with Vacuum waste collection system is <u>acceptable in my opinion</u>. This conclusion is based on the information provided and is <u>specific to this project ONLY and can not be used elsewhere.</u>

For perforated pipes in LID systems (i.e. bio-retention facilities):

- Only run-off from roads and boulevards are transported in this pipe.
- Pipes will be perforated PVC pipe.
- These pipes are provided to collect runoff that seeps through the LID facility and convey it to STM sewers. They don't infiltrate water into the surrounding soils.
- Wherever watermain is proposed with less than 2.5m separation from LID system, the watermain will be at least 0.5m below the bottom of the LID pipes.

Please provide more details on the proposed perforated pipes in the proposed LID system including servicing plans and details including x-sections and profiles for a clear understanding of the project components.

If you have any questions, please give me a call.

Regards,

Abdul Ahmadzai TMIG | TYLI +1.905.738.5700 x271 +1.647.201.2423

From: Ahmed, Aziz (MECP) < Aziz. Ahmed@ontario.ca >

Sent: November 16, 2020 3:23 PM

To: Abdul Ahmadzai <<u>aahmadzai@tmig.ca</u>> **Cc:** Haq, Riaz (MECP) <<u>Riaz.Haq@ontario.ca</u>>

Subject: RE: Minimum Separation Between Watermain and Other Pipes

Hello Abdul.

Riaz Haq from my group will be in touch with you about this matter.

Stay safe,

Aziz

From: Abdul Ahmadzai aahmadzai@tmig.ca>

Sent: November-13-20 5:10 PM

To: Ahmed, Aziz (MECP) < <u>Aziz.Ahmed@ontario.ca</u>>

Subject: RE: Minimum Separation Between Watermain and Other Pipes

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good Evening Aziz,

My apologies for the late email on Friday.

We would really appreciate it if you could also advise us whether the 2.5m separation between WM and sewers would apply to the perforated pipes that are usually placed in LID measures (bioretention swales).

Thank you very much for your help on this,

Regards,

Abdul Ahmadzai TMIG | TYLI +1.905.738.5700 x271 +1.647.201.2423

From: Abdul Ahmadzai

Sent: November 11, 2020 5:56 PM

To: aziz.ahmed@ontario.ca

Subject: Minimum Separation Between Watermain and Other Pipes

Good Evening Aziz,

We have a project in the City of Mississauga (Lakeview Village) where we are proposing two new pipe systems in the right-of-way. We wanted to confirm whether the MECP's minimum separation distances between watermain and sewers (i.e. 2.50m) would apply to these pipes.

The two pipe systems are as follows:

- 1. **District Energy:** These are steel pipes that carry hot and cold water from a central plant to the various buildings in the proposed development. This system will replace the heating and cooling system that are present in each building.
- 2. **Vacuum Waste System:** These are steel pipes that transport solid waste (i.e. garbage), recyclable materials, and organics from each building to a central sorting facility. This system will replace the individual garbage collection bays in buildings. This system works by using fans to draw air into the pipes at high speeds. This high speed air will move garbage bags to a central sorting facility.

I have attached a typical cross-section of the right-of-way showing the location of the watermain in relation to these two pipes. I have also attached a brief description of these.

I would really appreciate it if you could provide MECP's perspective on this.

Regards,

Abdul Ahmadzai, P.Eng Project Manager

TMIG | TYLIThe Municipal Infrastructure Group Ltd. a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan ON Canada L4K 0C5 p: +1.905.738.5700 x271 | m: +1.647.201.2423 tmig.ca | tylin.com

MEMORANDUM



Attention:	David Scott	Project No.:	218272
Company:	TMIG	Project Name:	Lakeview
Sender:	Michael Conte	Date/Time:	November 23, 2020
Distribution:	R.Damecour- FVB B.Sutherland- Agroland F.Mazzocco- Agroland	Total Pages:	28 pgs.

Re: Heat Gains from Buried Pre-insulated Hot Water Pipes (Rev 1)

The following memo summarizes the heat gains to the surrounding soil from the proposed buried district heating hot water pipe installation at Lakeview. The buried heating pipe under consideration is EN253¹ pre-insulated series 1 pipe. Two scenarios were considered:

- 1. Direct buried EN253 pre-insulated series 1 pipe
- 2. Direct buried EN253 pre-insulated series 1 pipe with an additional 50-65mm thick extruded polystyrene (EPS) insulation

Tables 1, 2, and 3 overleaf outlines the temperature impact the hot water lines have on the undisturbed soil temperatures at various distances from the outer pipe casing or the outer surface of the additional EPS insulation, during the maximum, minimum, and average estimated soil temperatures. The results show that the affect of the DE pipes on the surrounding soil temperature are modest. Although the affects of heat gain to the surrounding soil are lessened the further you are from the pipes, there is not a tangible difference in our opinion. Thus, we do not recommend burying the pipes deeper as this will add significant cost to the installation and future maintenance for little/no benefit. We do recommend placing additional 50mm thick high load insulation where the pipes are within 500mm of trees as this will add very little cost and there is a small reduction to the surrounding soil temperature due to the introduced thermal break. In addition, we have reached out to other DE system operators in the GTA with similar road profiles to that proposed at Lakeview and have not found any instances where the heat gain has had a negative affect on tree health. Its important to note that those systems operate upwards of 115°C in the winter compared to Lakeview which will only run at 70°C. We have also contacted our Swedish counterpart to see if they have any negative experiences in this regard and their experience aligns with ours here in Canada.

¹ The EN253 standard regulates the production of bonded pre-insulated pipes for district heating in Europe. No comparable standard currently exists in North America.

Clarifications and Assumptions:

- 1. The district heating system operating temperature is 70°C year-round. No reset schedule has been considered.
- 2. Assumed location: Lakeview, Mississauga, Ontario
- 3. Average depth of cover = 1500mm.
- 4. Soil type is assumed to be normal, with a thermal conductivity of 1.6 W/m°K.
- 5. The undisturbed annual soil temperatures are based on 2008 ASHRAE HVAC Systems, Equipment Section 11.10 and Environment Canada Climate Data; Toronto Downtown (1981-2010).
- 6. Calculated soil heat gains are taken from the Logstor energy calculator.
- 7. Soil heat gains using the additional 50-65mm thick extruded polystyrene (EPS) insulation scenario are taken from the Logstor energy calculator.



Table 1: Heat Gains to Surrounding Soil - Undisturbed Soil Temperature: 18°C (Max, Summer)									
	Pipe Size		Soil Temperature 50mm		Soil Temperature 200mm		Soil Temperature 500mm		
NPS	(ID/OD)	Additional	from Heating Pipe OD (°C)		from Heating Pipe OD (°C)		from Heating Pipe (°C)		
(Inch)	(mm)	Insulation	Maximum	Delta ²	Maximum	Delta ²	Maximum	Delta ²	
4	114/200	None	20.7	2.7	20.1	2.1	19.6	1.6	
4	114/200	+ 50mm EPS	19.9	1.9	19.5	1.5	19.2	1.2	
6	168/250	None	21.5	3.5	20.8	2.8	20.2	2.2	
0		+ 65mm EPS	20.3	2.3	19.9	1.9	19.5	1.5	
(Table 1	, Continue	<mark>(k</mark>							
NPS	Pipe Size	. Additional	Soil Temperature 1000mm		Soil Temperature 1200mm				
(Inch)	(ID/OD)		from Heating Pipe OD (°C)		from Heating Pipe OD (°C)				
(IIICII)	(mm)	IIISulation	Maximum	Delta ²	Maximum	Delta ²			
4	114/200	None	19.2	1.2	19.1	1.1			
4		+ 50mm EPS	18.9	0.9	18.8	0.8			
6	160/250	None	19.6	1.6	19.4	1.4			
6	168/250	+ 65mm EPS	19.1	1.1	19.0	1.0			

Table 2	Table 2: Heat Gains to Surrounding Soil - Undisturbed Soil Temperature: 1°C (Min, Winter)									
NPS	Pipe Size (ID/OD)	Additional Insulation	Soil Temperature 50mm		Soil Temperature 200mm		Soil Temperature 500 mm			
(Inch)			from Heating Pipe OD (°C)		from Heating Pipe OD (°C)		from Heating Pipe (°C)			
(IIICII)	(mm)		Maximum	Delta ²	Maximum	Delta ²	Maximum	Delta ²		
4	114/200	None	4.6	3.6	3.9	2.9	3.4	2.4		
4	114/200	+ 50mm EPS	3.4	2.4	3.0	2.0	2.6	1.6		
6	168/250	None	5.7	4.7	4.9	3.9	4.1	3.1		
0		+ 65mm EPS	4.0	3.0	3.5	2.5	3.1	2.1		
(Table 2	<mark>2, Continue</mark>	<mark>d)</mark>								
NPS	Pipe Size (ID/OD)	Additional Insulation	Soil Temperature 1000mm		Soil Temperature 1	.200mm				
(Inch)			from Heating Pipe OD (°C)		from Heating Pipe OD (°C)					
(IIICII)	(mm)	IIISUIALIOII	Maximum	Delta ²	Maximum	Delta ²				
4	114/200	None	2.8	1.8	2.6	1.6				
4	114/200	+ 50mm EPS	2.3	1.3	2.1	1.1				
6	169/250	None	3.4	2.4	3.1	2.1				
6	168/250	+ 65mm EPS	2.6	1.6	2.4	1.4				

Table 3:	Table 3: Heat Gains to Surrounding Soil - Undisturbed Soil Temperature: 9.5°C (Average)										
NDC	ומטאמו) ו	Additional Insulation	Soil Temperature 50mm		Soil Temperature 200mm		Soil Temperature 500 mm				
NPS			from Heating Pipe OD (°C)		from Heating Pipe OD (°C)		from Heating Pipe (°C)				
(Inch)	(mm)		Maximum	Delta ²	Maximum	Delta ²	Maximum	Delta ²			
4	114/200	None	12.7	3.2	12.0	2.5	11.5	2.0			
4	114/200	+ 50mm EPS	11.7	2.2	11.3	1.8	10.9	1.4			
	168/250	None	13.6	4.1	12.8	3.3	12.2	2.7			
6		+ 65mm EPS	12.2	2.7	11.7	2.2	11.3	1.8			
(Table 3	, Continue	d)									
NDC	(ID/OD)	۸ ما ما:4: م	Soil Temperature 1000mm		Soil Temperature 1200mm						
NPS		(ID/OD) Additional	from Heating Pipe OD (°C)		from Heating Pipe OD (°C)						
(Inch)		Insulation	Maximum	Delta ²	Maximum	Delta ²					
4	114/200	None	11.0	1.5	10.8	1.3					
4		+ 50mm EPS	10.6	1.1	10.5	1.0					
6	168/250	None	11.5	2.0	11.3	1.8					
O		+ 65mm EPS	10.9	1.4	10.7	1.2					

² Delta is defined as the difference between the maximum soil temperature and the undisturbed soil temperature.



Page 3 of 4

Tables 1 through 3 above summarize the heat gains to the surrounding soil at various undisturbed soil temperatures. The highest temperature delta occurs in the winter when the undisturbed soil temperatures are lowest. Maximum soil temperatures based on 114/200mm (4") and 168/250mm (6") EN253 pipe occur in the summer, however due to the low temperature gradient between the pipes and surrounding soil, the delta is lowest. Additional EPS insulation decreases the temperature delta by ~25-35%.

Feel free to contact me with regards to the above should you have any questions or require further clarification.

Sincerely,

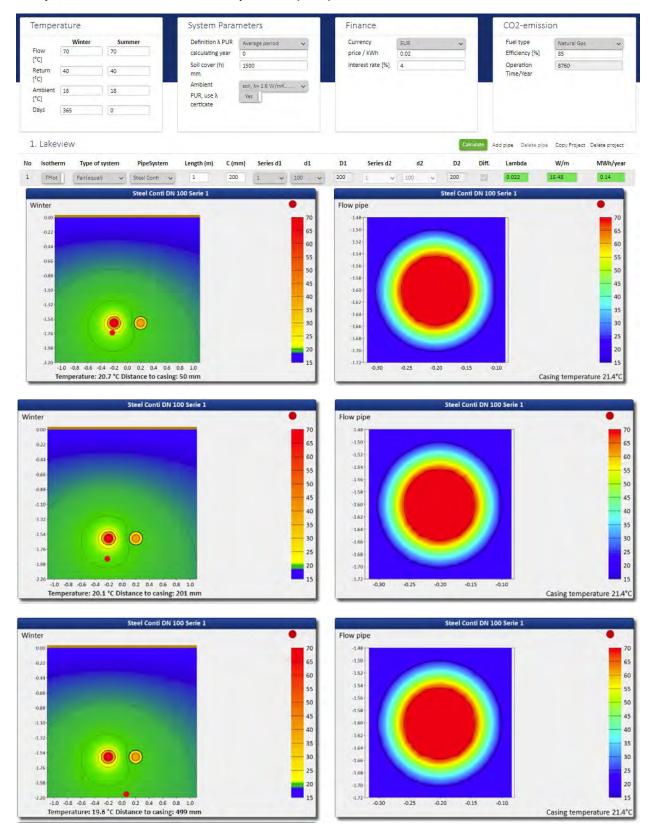
Michael Conte FVB Energy Inc.

Enclosures:

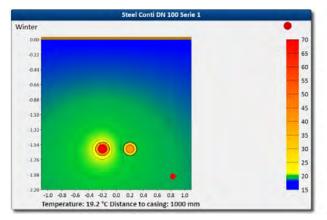
• Lakeview Heat Gain Analysis @50mm, 200mm, 500mm, 1000mm, & 1200mm (Undisturbed Soil Temperature = 18°, 1°C and 9.5°C) – 24 Pages

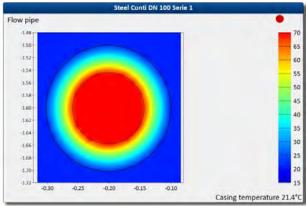


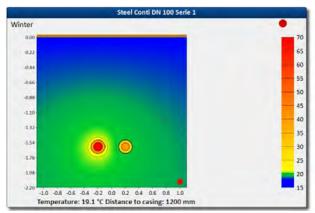
4" Pipe, Maximum Summer Soil Temperature (18°C), No Additional Insulation

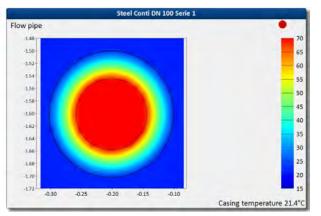






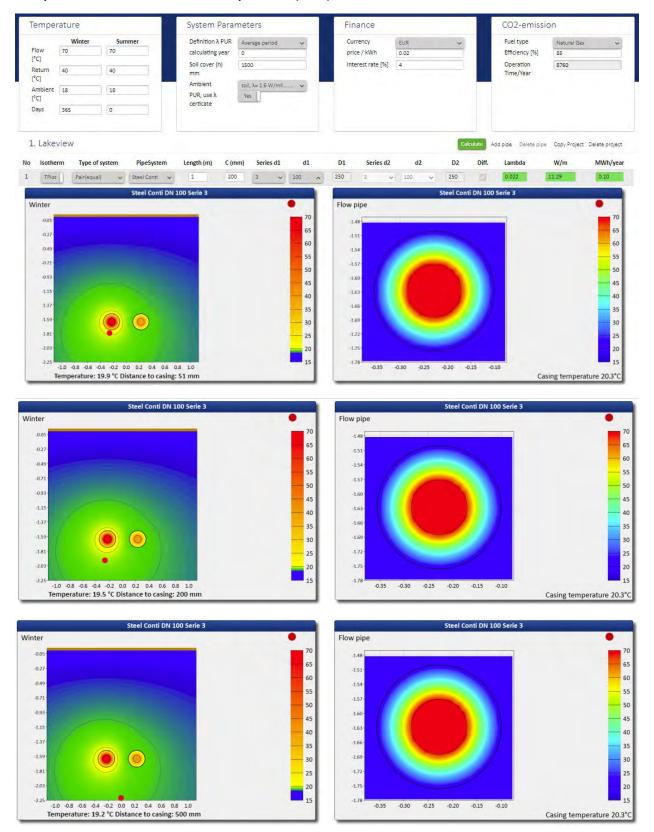




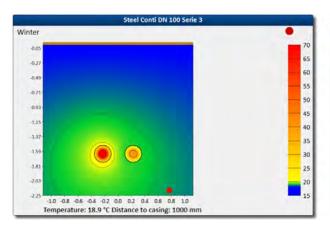


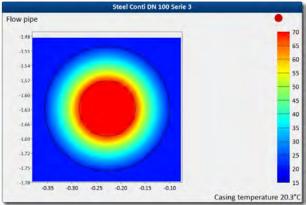


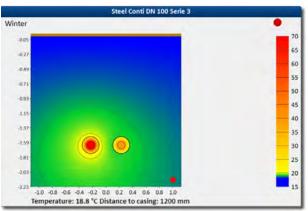
4" Pipe, Maximum Summer Soil Temperature (18°C), +~50mm Insulation

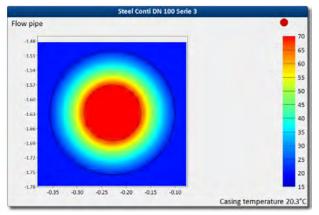






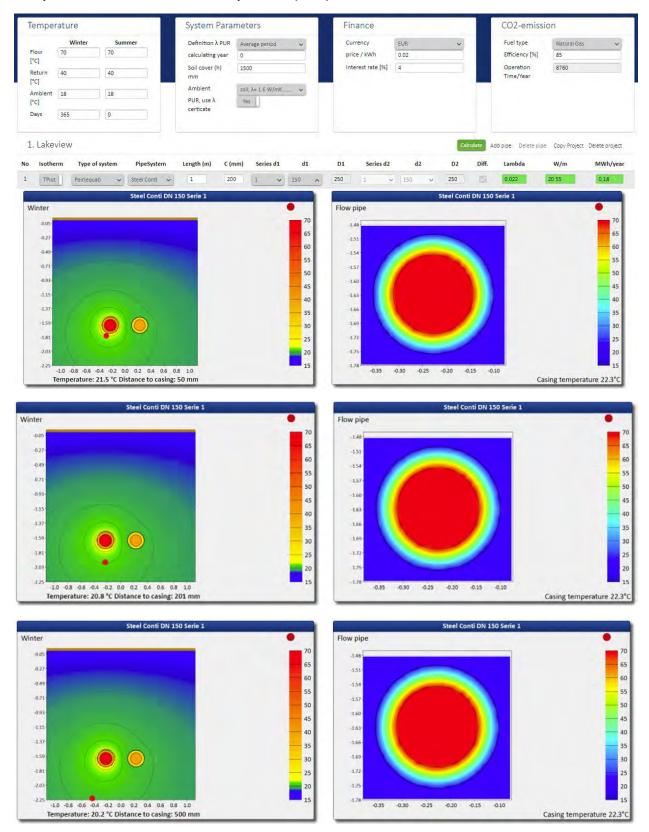




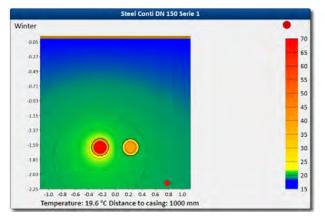


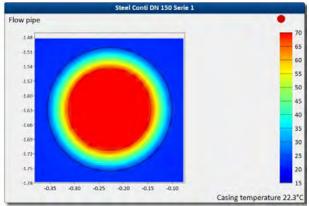


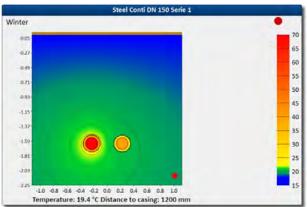
6" Pipe, Maximum Summer Soil Temperature (18°C), No Additional Insulation

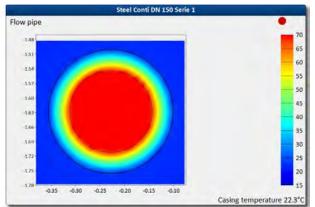






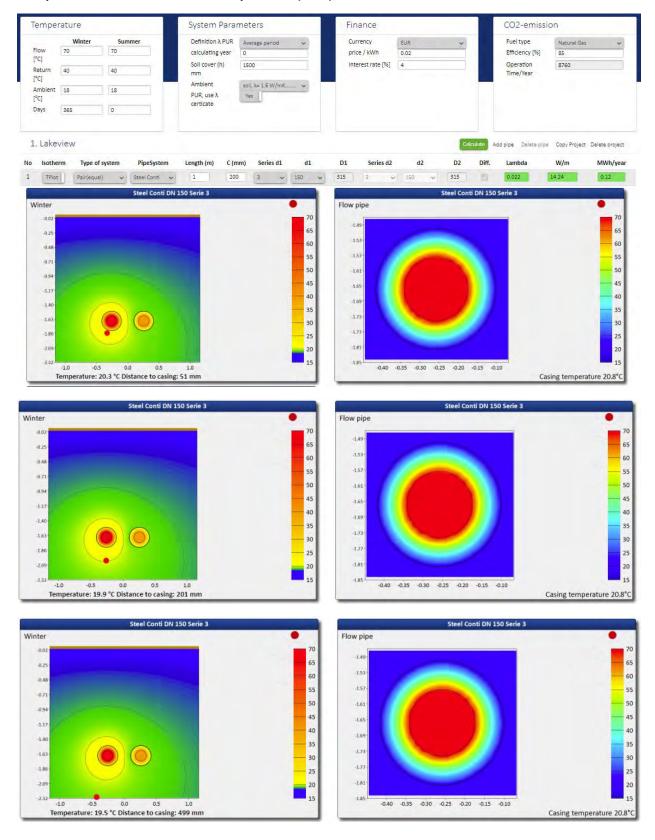




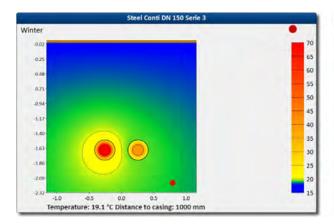


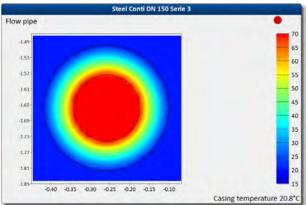


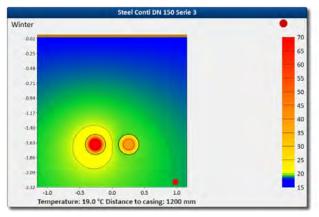
6" Pipe, Maximum Summer Soil Temperature (18°C), +~65mm Insulation

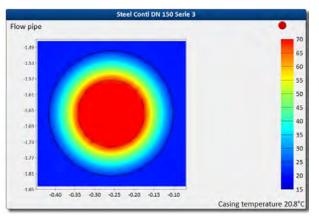






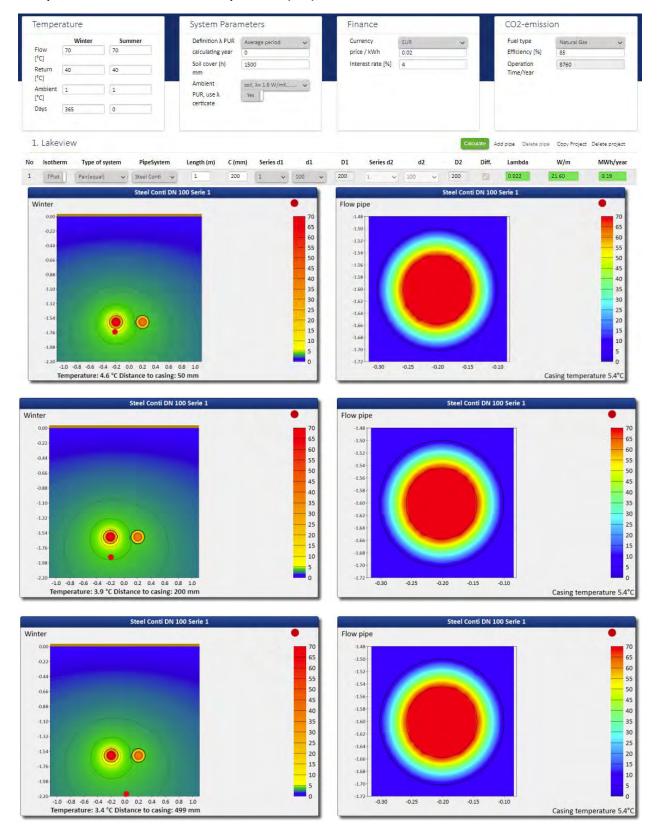




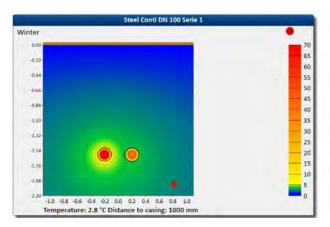


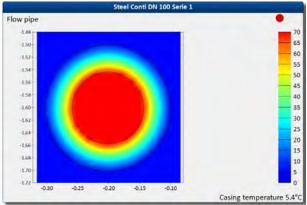


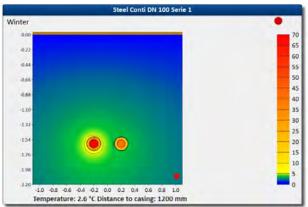
4" Pipe, Minimum Winter Soil Temperature (1°C), No Additional Insulation

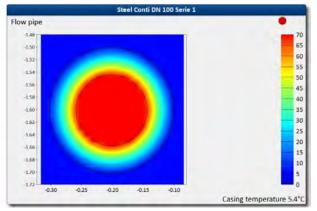






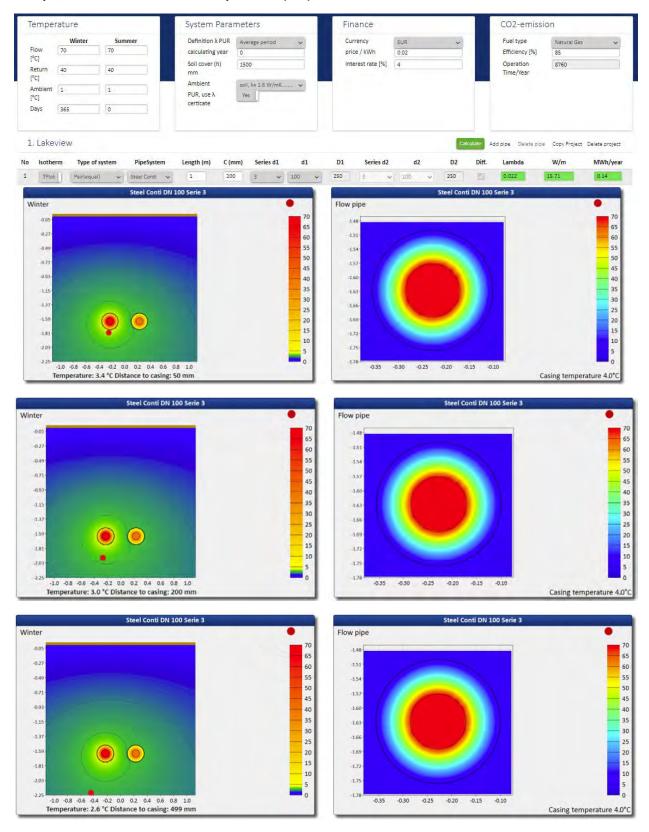




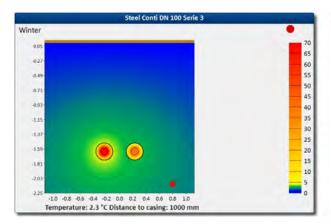


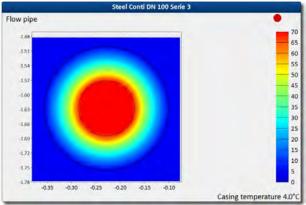


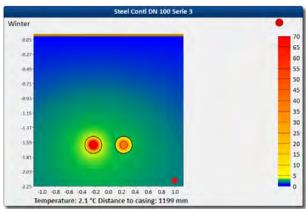
4" Pipe, Minimum Winter Soil Temperature (1°C), +~50mm Insulation

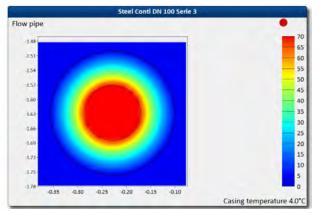






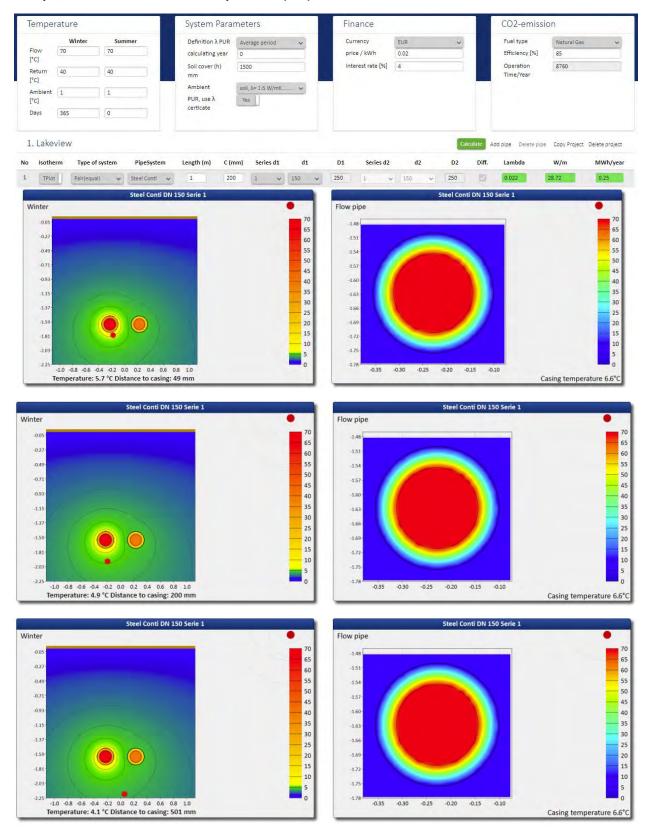




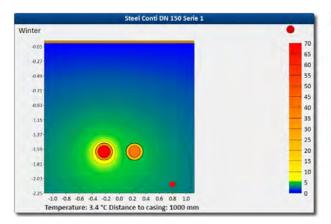


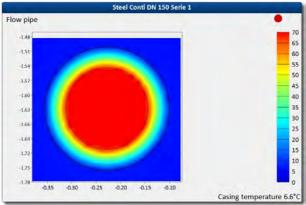


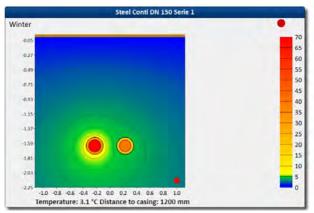
6" Pipe, Minimum Winter Soil Temperature (1°C), No Additional Insulation

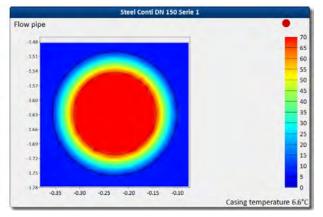




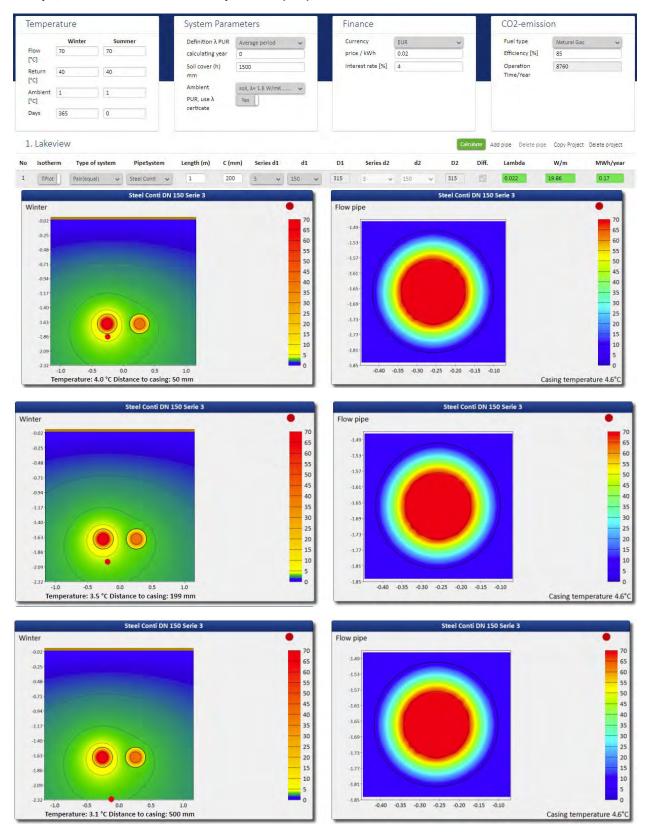




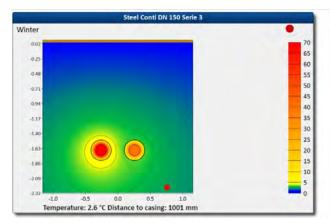


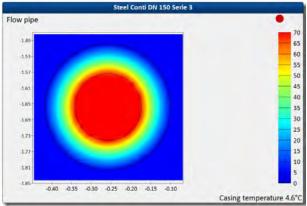


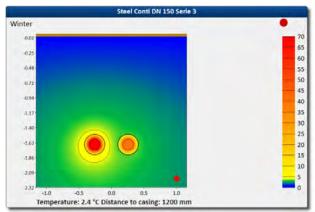
6" Pipe, Minimum Winter Soil Temperature (1°C), +~65mm Insulation

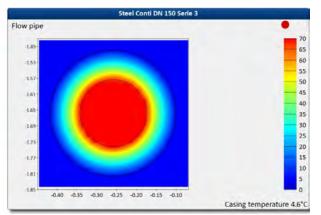






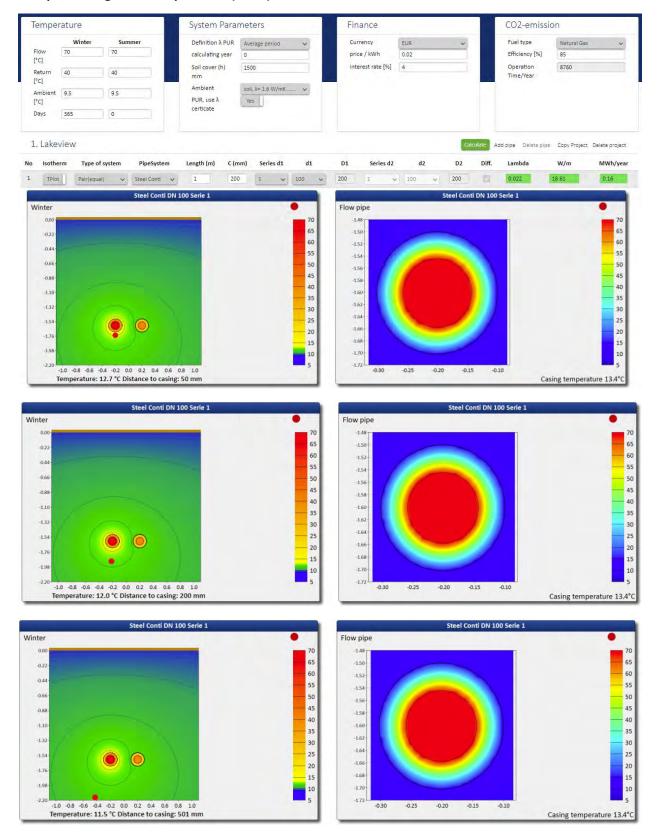




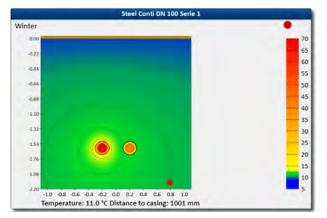


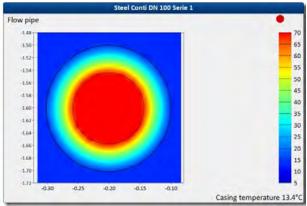


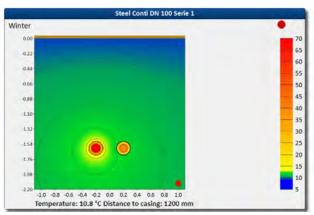
4" Pipe, Average Soil Temperature (9.5°C), No Additional Insulation

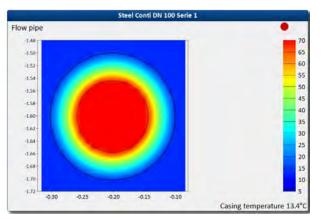






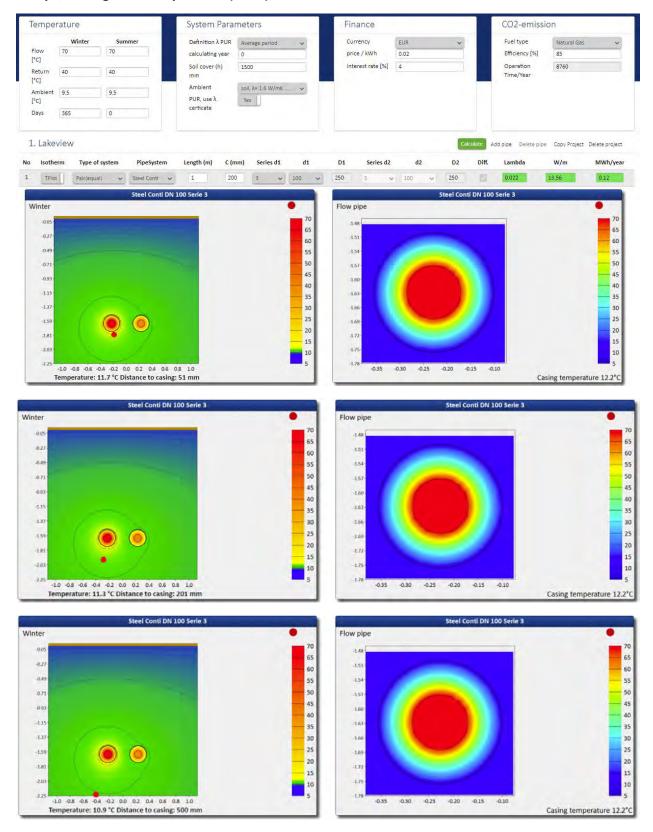




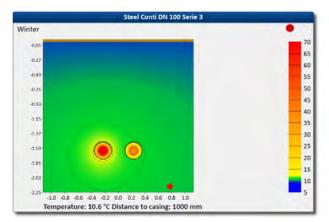


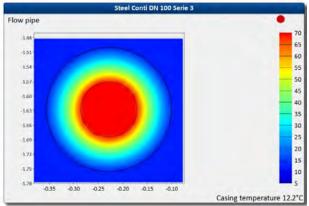


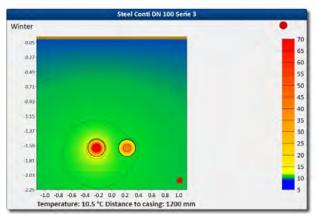
4" Pipe, Average Soil Temperature (9.5°C), +~50mm Insulation

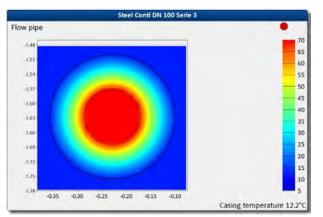






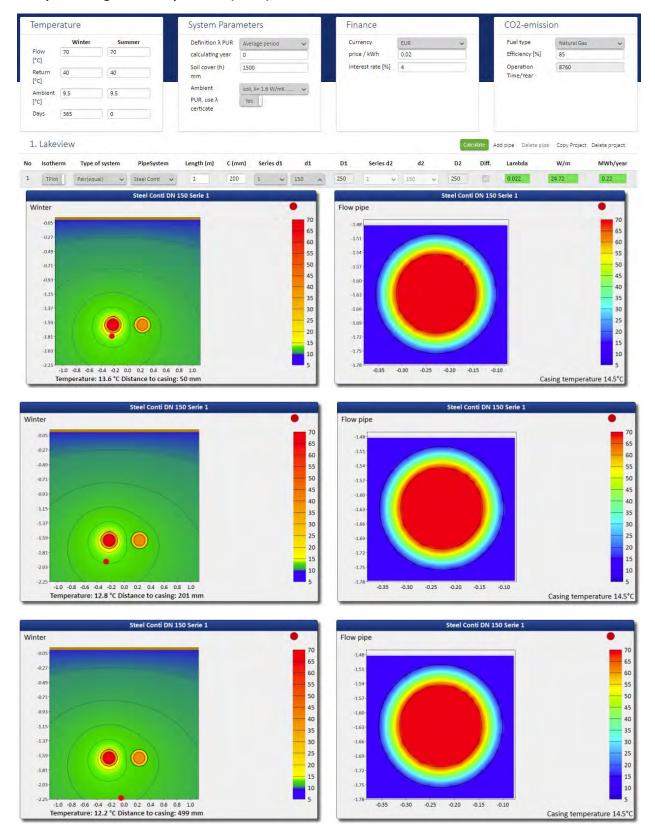




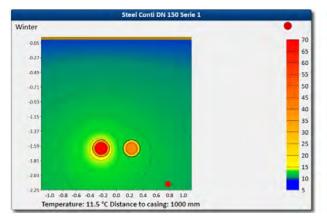


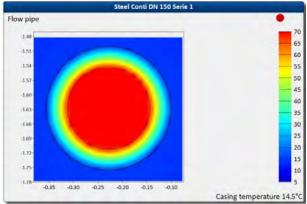


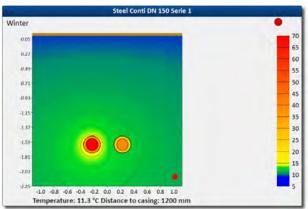
6" Pipe, Average Soil Temperature (9.5°C), No Additional Insulation

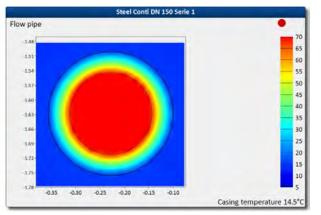






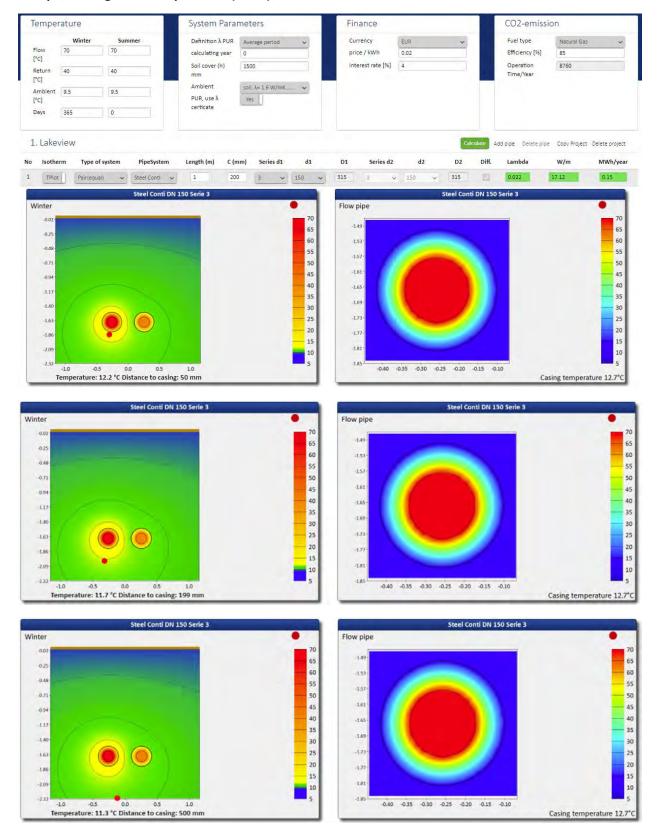




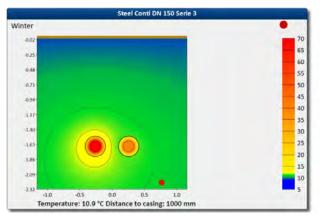


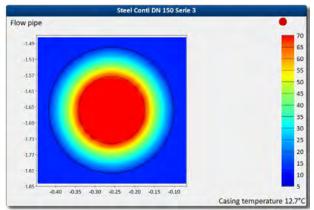


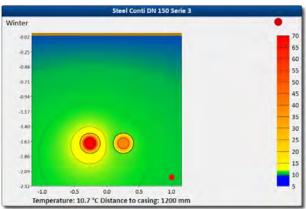
6" Pipe, Average Soil Temperature (9.5°C), +~65mm Insulation

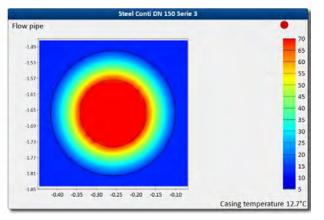




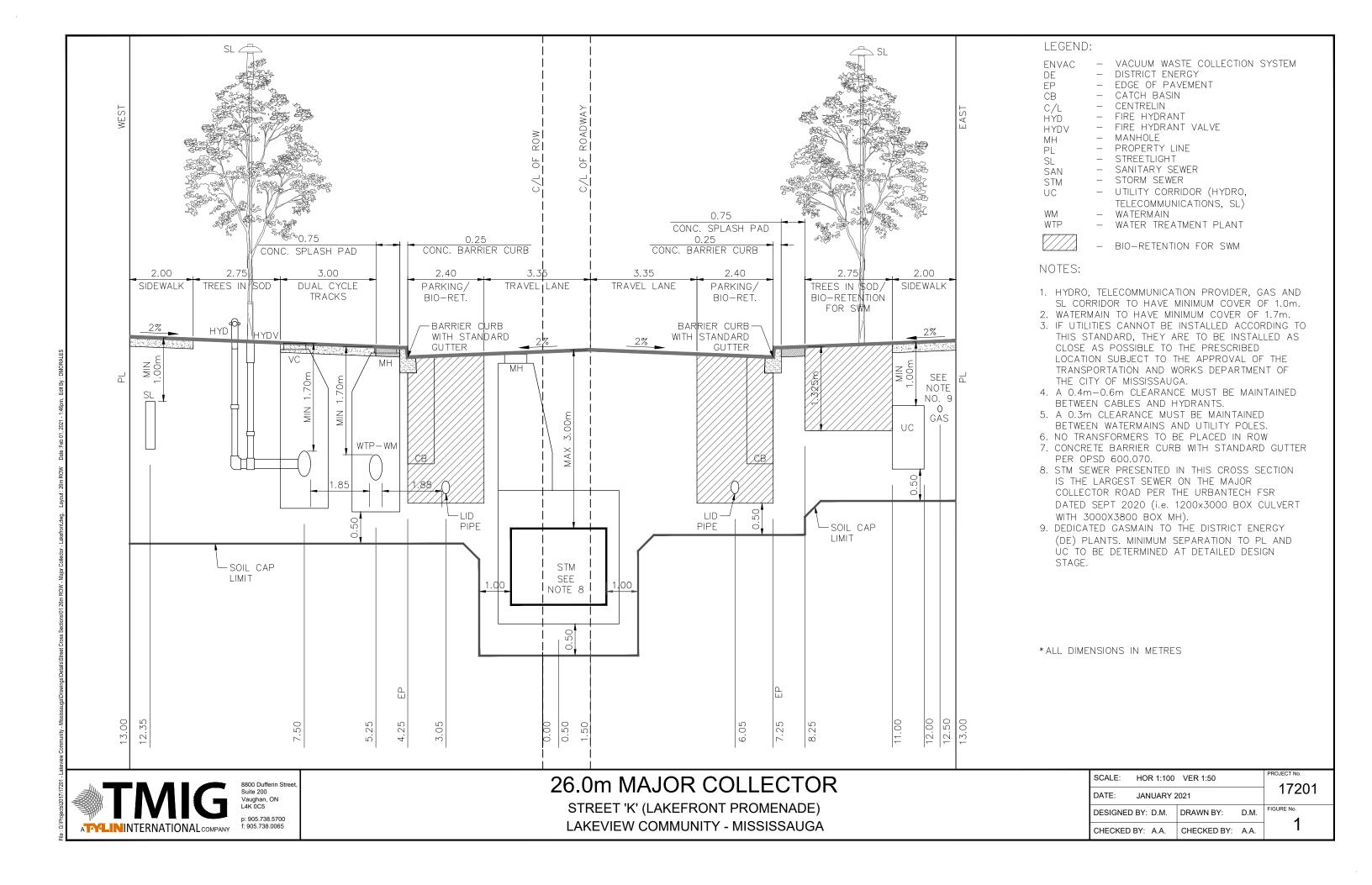


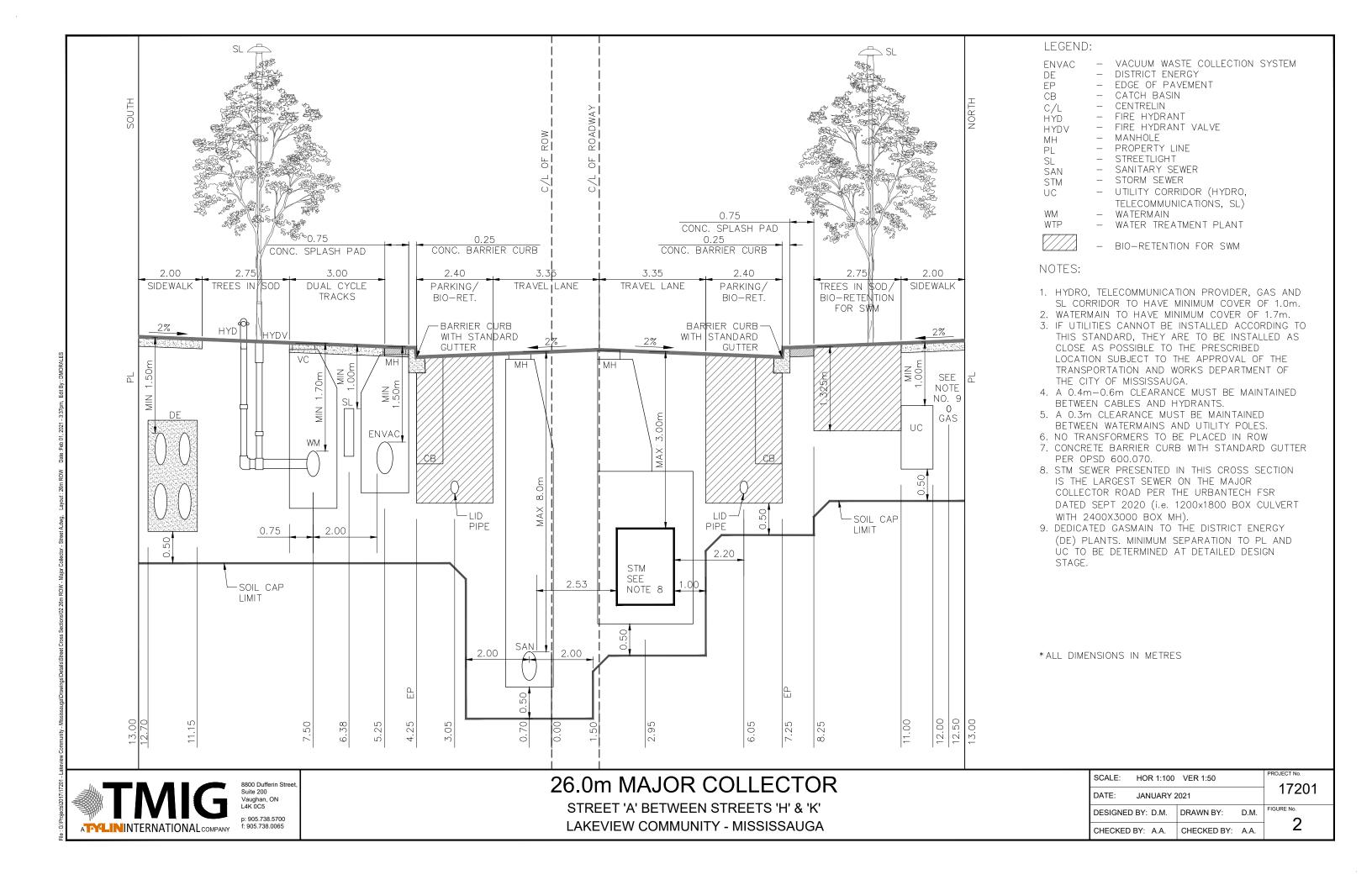


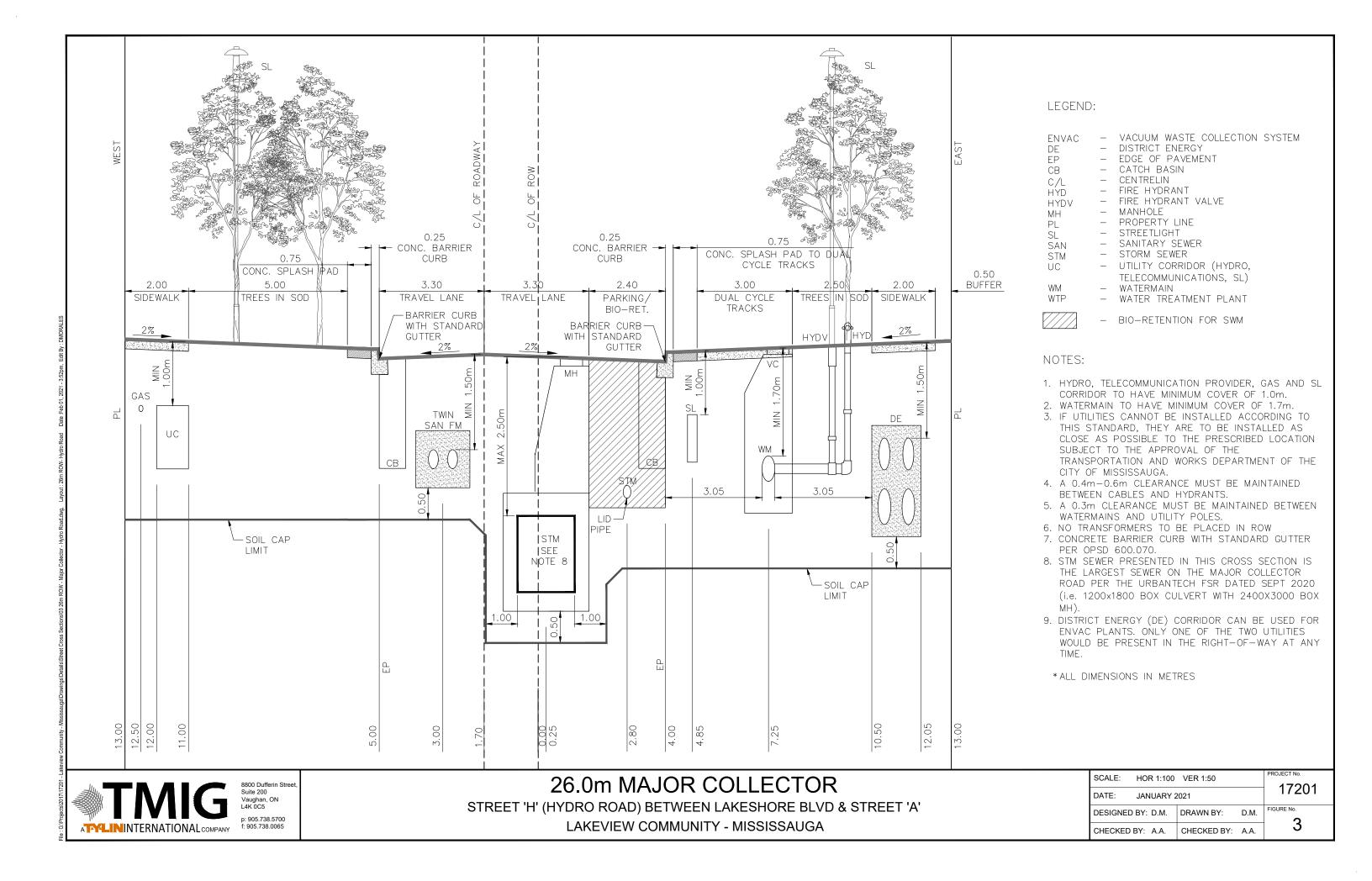


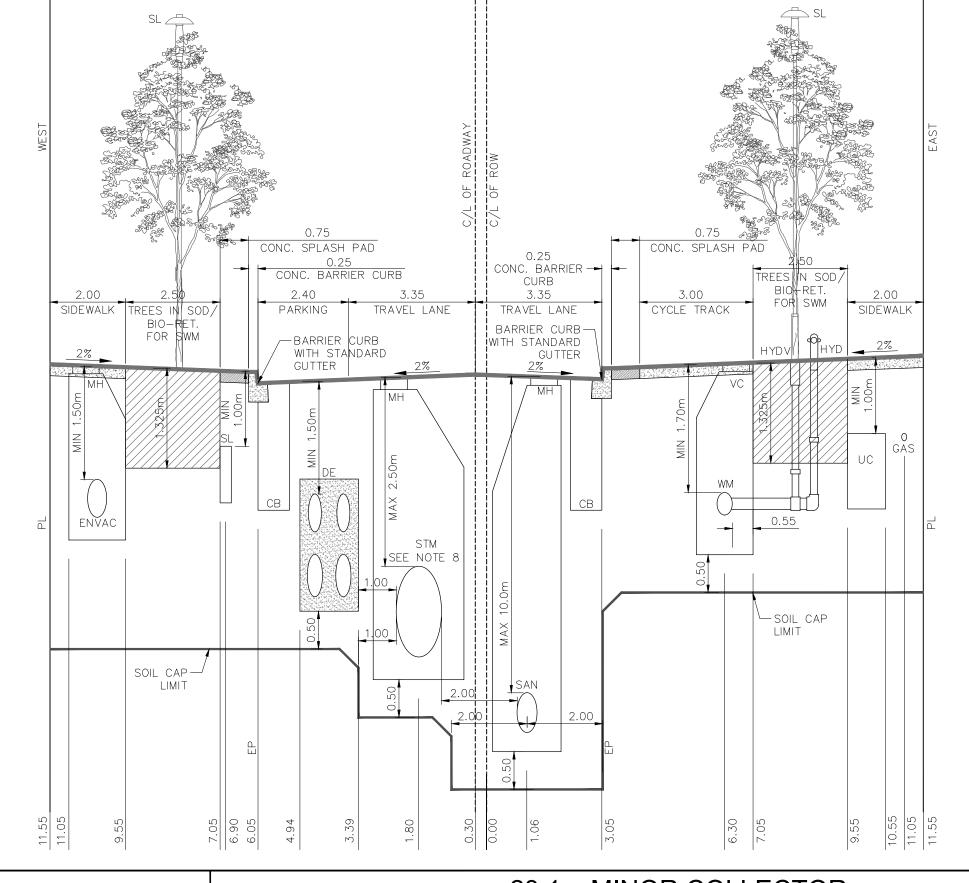












ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY EP - EDGE OF PAVEMENT

B - CATCH BASIN C/L - CENTRELIN HYD - FIRE HYDRANT

HYDV - FIRE HYDRANT VALVE

MH - MANHOLE
PL - PROPERTY LINE
SL - STREETLIGHT
SAN - SANITARY SEWER

STM - STORM SEWER
UC - UTILITY CORRIDOR (HYDRO,
TELECOMMUNICATIONS, SL)

VM — WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE 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. NO TRANSFORMERS TO BE PLACED IN ROW
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS THE LARGEST SEWER ON STREET 'I' PER THE URBANTECH FSR DATED SEPT 2020 (i.e. 1200¢ PIPE WITH 2400¢ MH).

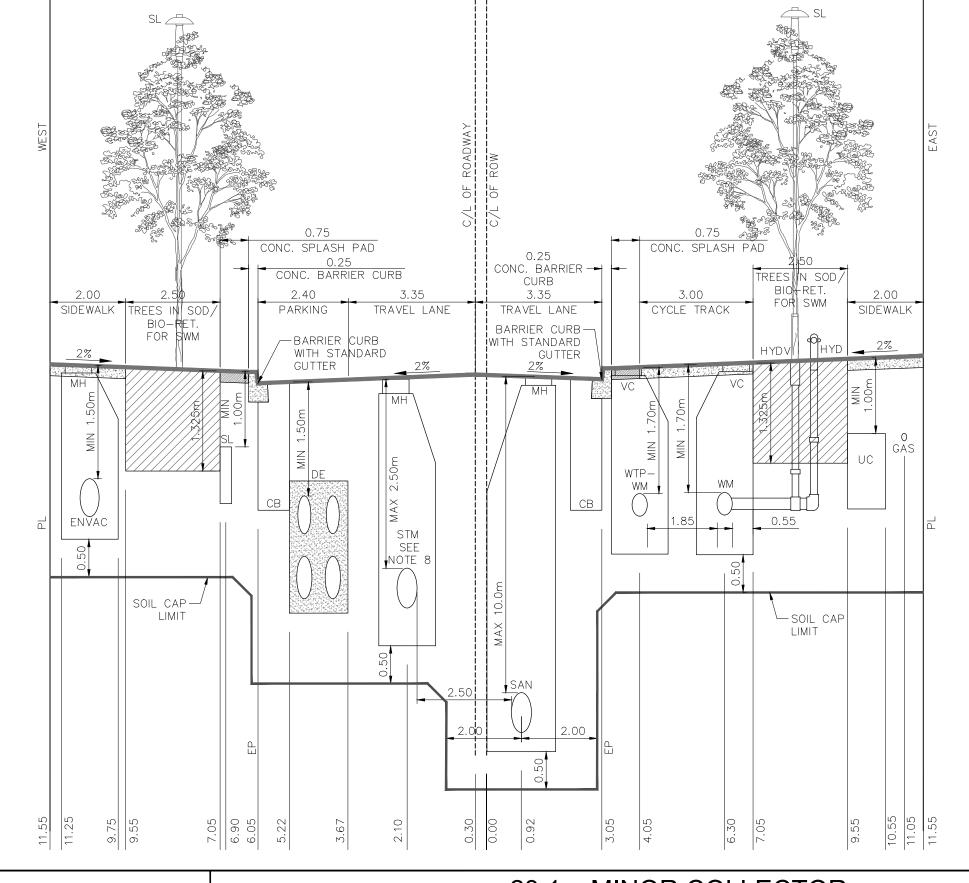
*ALL DIMENSIONS IN METRES

8800 Dufferin Stree Suite 200 Vaughan, ON L4K 0C5 p: 905.738.5700 f: 905.738.0065

23.1m MINOR COLLECTOR

STREET 'I' SOUTH OF STREET 'B'
LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	4



ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY EP - EDGE OF PAVEMENT

B - CATCH BASIN /L - CENTRELIN YD - FIRE HYDRANT

HYDV - FIRE HYDRANT VALVE

MH - MANHOLE
PL - PROPERTY LINE
SL - STREETLIGHT
SAN - SANITARY SEWER

STM - STORM SEWER
UC - UTILITY CORRIDOR (HYDRO,
TELECOMMUNICATIONS, SL)

M — WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE 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. NO TRANSFORMERS TO BE PLACED IN ROW
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS THE LARGEST SEWER ON STREET 'I' PER THE URBANTECH FSR DATED SEPT 2020 (i.e. 525¢ PIPE WITH 1500¢ MH).

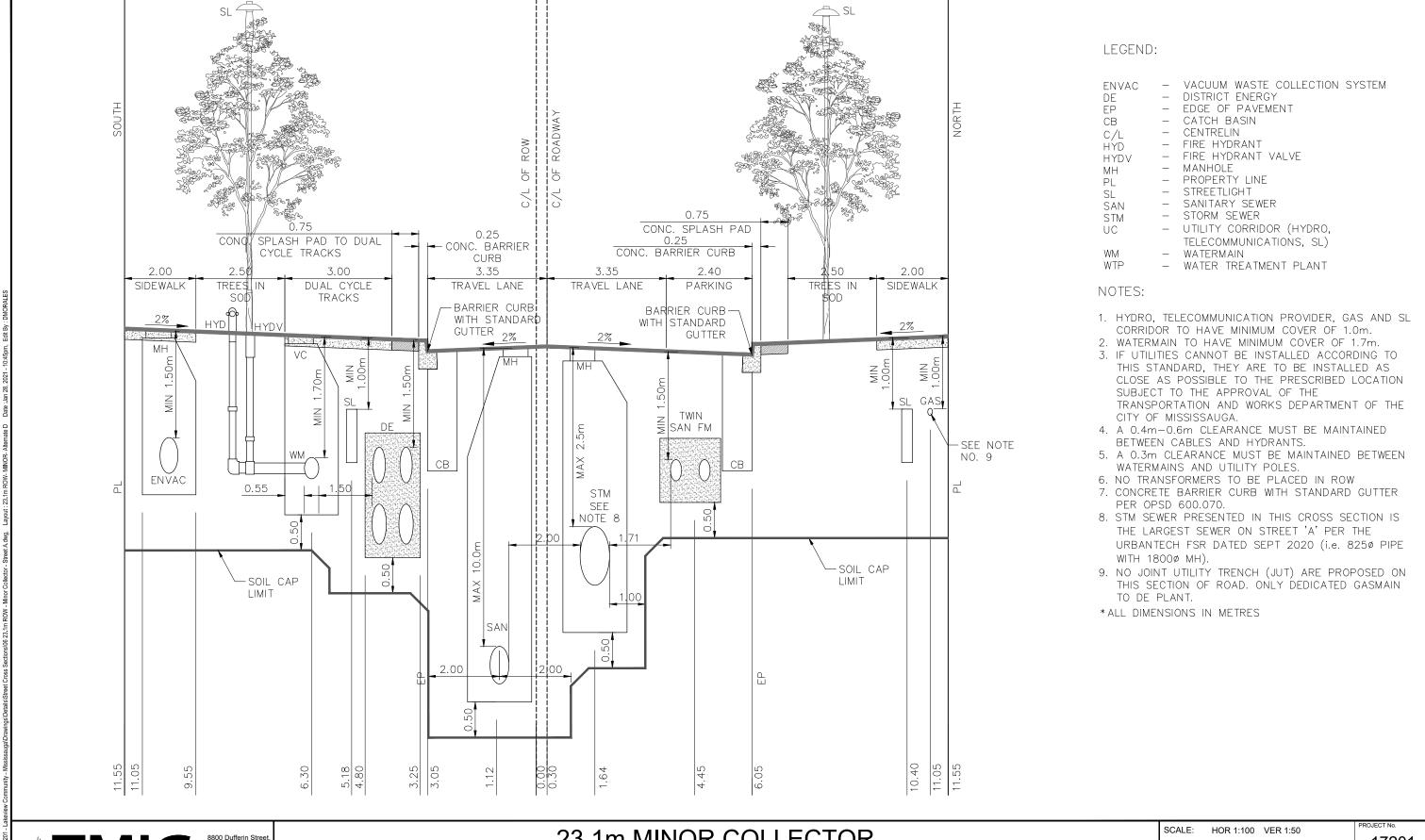
*ALL DIMENSIONS IN METRES

8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

23.1m MINOR COLLECTOR

STREET 'I' NORTH OF STREET B LAKEVIEW COMMUNITY - MISSISSAUGA

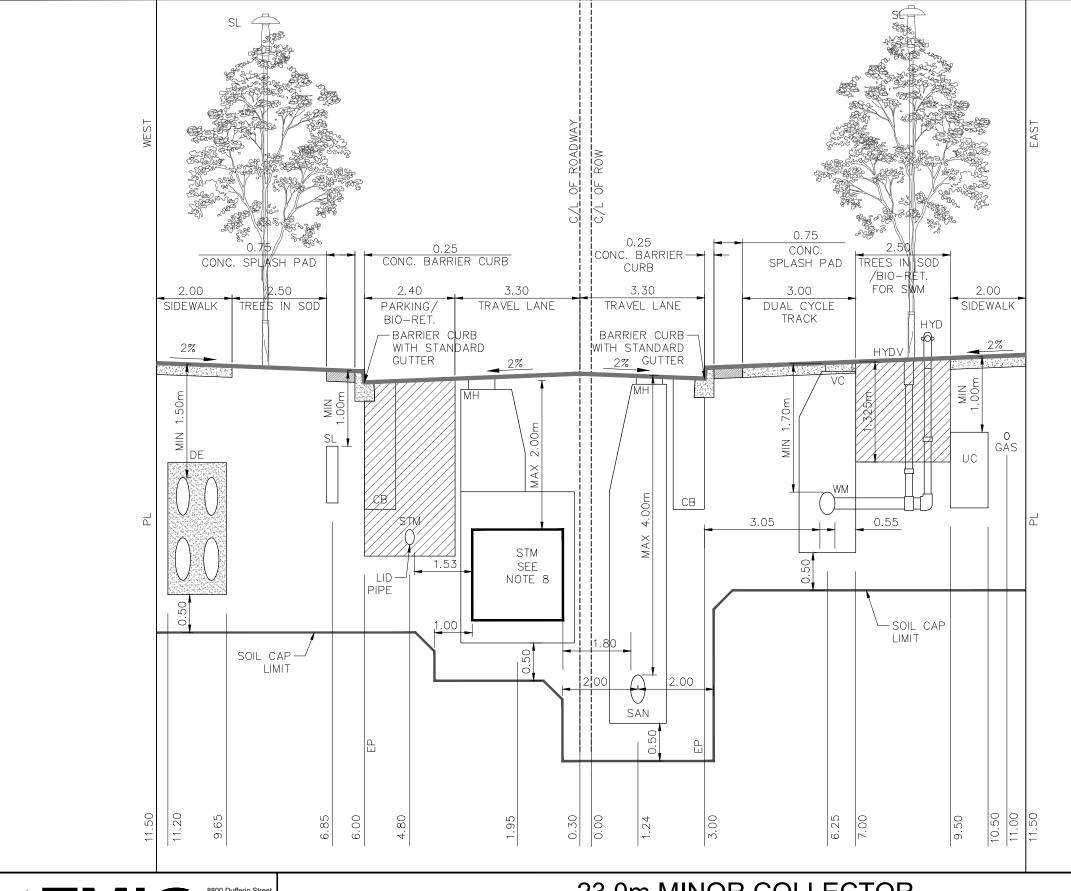
SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	5



8800 Dufferin Stree Suite 200 Vaughan, ON L4K 0C5
p: 905.738.5700 f: 905.738.0065

23.1m MINOR COLLECTOR
STREET 'A' BETWEEN STREET 'I' & STREET 'H'
LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		47004
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED E	BY: A.A.	CHECKED BY:	A.A.	Ø



VACUUM WASTE COLLECTION SYSTEM

DE DISTRICT ENERGY ĒΡ EDGE OF PAVEMENT

CB CATCH BASIN CENTRELIN C/L

HYD FIRE HYDRANT VALVE HYDV

FIRE HYDRANT

MANHOLE PROPERTY LINE

STREETLIGHT SL SANITARY SEWER SAN STM STORM SEWER

- UTILITY CORRIDOR (HYDRO, TELECOMMUNICATIONS, SL)

WATERMAIN

WTP WATER TREATMENT PLANT

WM

BIO-RETENTION FOR SWM

NOTES:

- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE 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. NO TRANSFORMERS TO BE PLACED IN ROW
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS THE LARGEST SEWER ON STREET 'G' PER THE URBANTECH FSR DATED SEPT 2020 (i.e. 1200x2400 BOX CULVERT WITH 3000X3800 BOX MH).

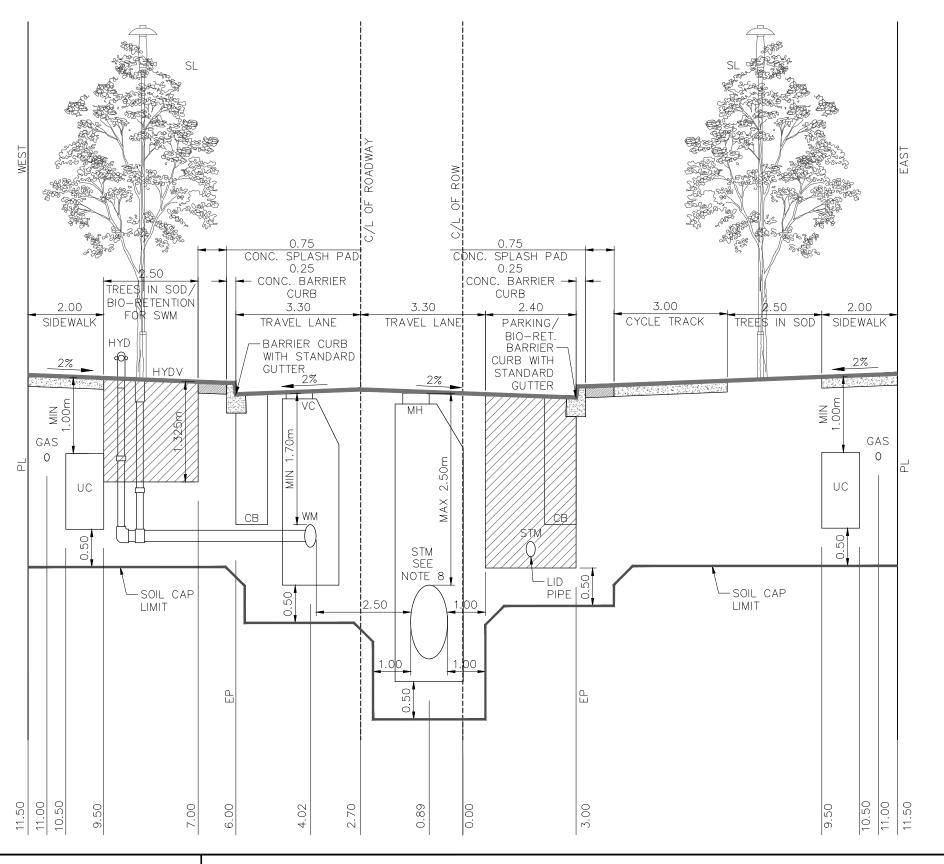
*ALL DIMENSIONS IN METRES

Suite 200 Vaughan, ON L4K 0C5

23.0m MINOR COLLECTOR

STREET 'G' BETWEEN STREETS 'A' & 'D' LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNE	DBY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	/



ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY EP - EDGE OF PAVEMENT

CB - CATCH BASIN C/L - CENTRELIN HYD - FIRE HYDRANT

HYDV - FIRE HYDRANT VALVE

MH - MANHOLE
PL - PROPERTY LINE
SL - STREETLIGHT
SAN - SANITARY SEWER
STM - STORM SEWER

JC - UTILITY CORRIDOR (HYDRO, TELECOMMUNICATIONS, SL)

WM - WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

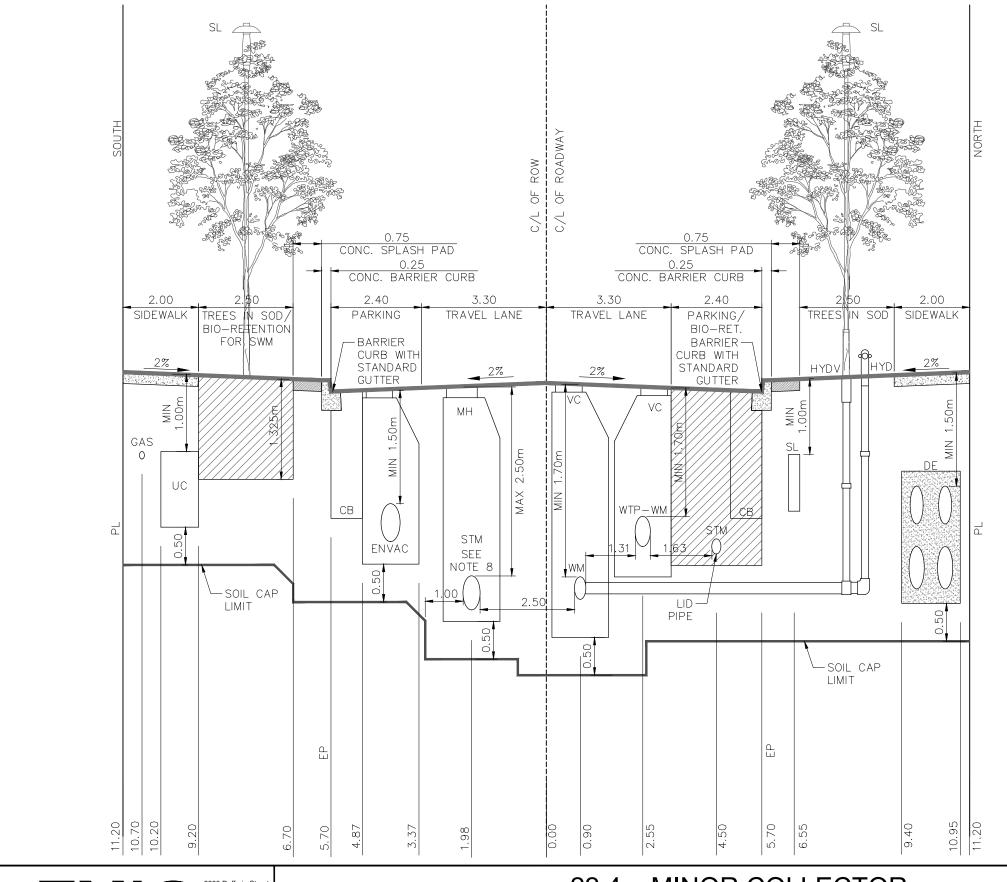
- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE MINIMUM COVER OF 1.7m.
- 3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD, THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF 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. NO TRANSFORMERS TO BE PLACED IN ROW
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS THE LARGEST SEWER ON STREET 'F' PER THE URBANTECH FSR DATED SEPT 2020 (i.e. 975¢ PIPE WITH 1800¢ MH).
- *ALL DIMENSIONS IN METRES

8800 Dufferin Stret Suite 200
Vaughan, ON L4K 0C5
p: 905.738.5700
f: 905.738.0065

23.0m MINOR COLLECTOR

STREET 'F'
LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	8



ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY EP - EDGE OF PAVEMENT

CB - CATCH BASIN C/L - CENTRELIN HYD - FIRE HYDRANT

YDV - FIRE HYDRANT VALVE

MH - MANHOLE
PL - PROPERTY LINE
SL - STREETLIGHT
SAN - SANITARY SEWER
STM - STORM SEWER

 UTILITY CORRIDOR (HYDRO, TELECOMMUNICATIONS, SL)

WM - WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

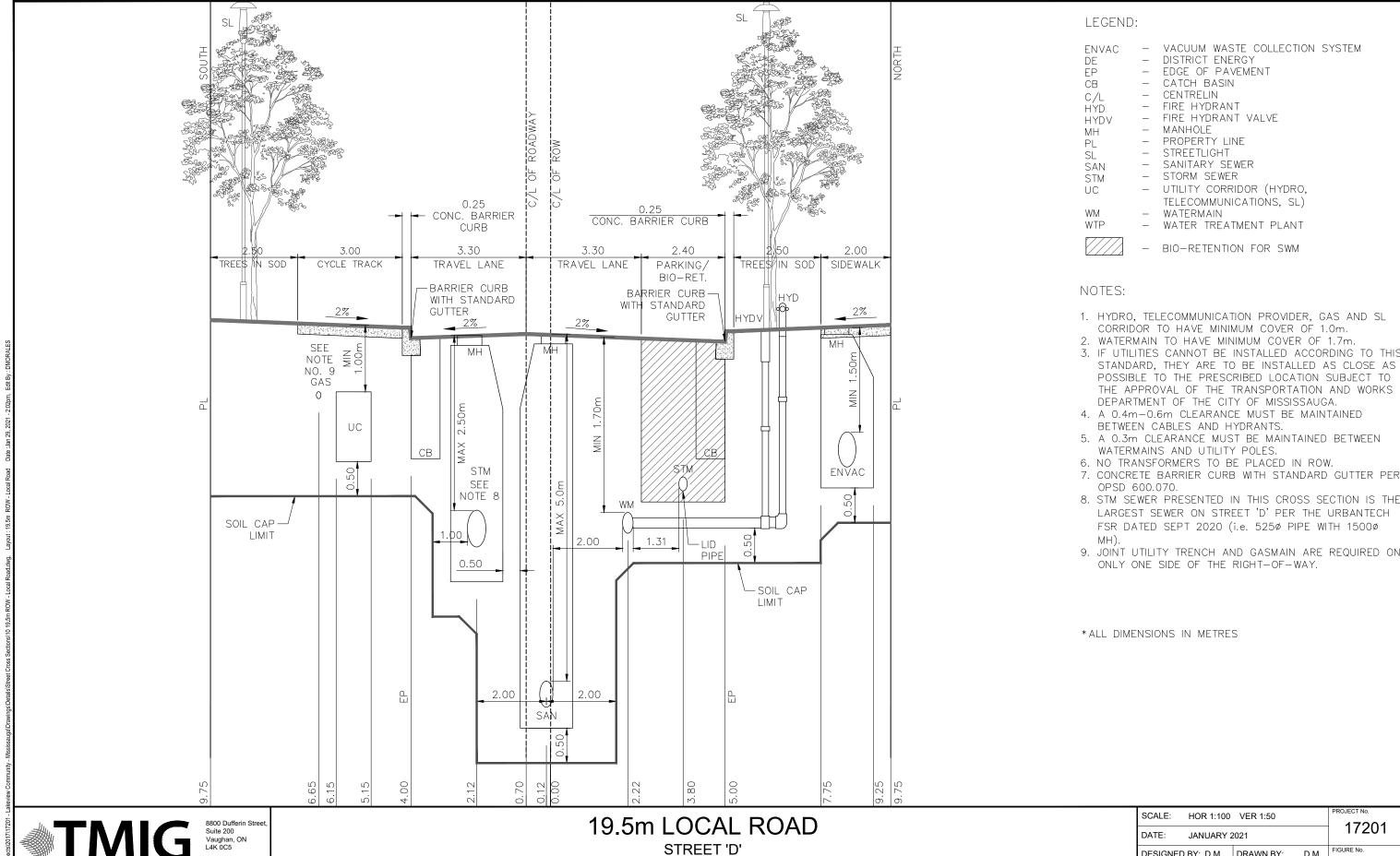
- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE MINIMUM COVER OF 1.7m.
- 3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD, THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF 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. NO TRANSFORMERS TO BE PLACED IN ROW
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS THE LARGEST SEWER ON STREET 'B' PER THE URBANTECH FSR DATED SEPT 2020 (i.e. 4500 PIPE WITH 15000 MH).
- 9. UTILITY CORRIDOR AND GASMAIN WILL ONLY BE PROVIDED ON ONE SIDE OF THE RIGHT—OF—WAY.

*ALL DIMENSIONS IN METRES



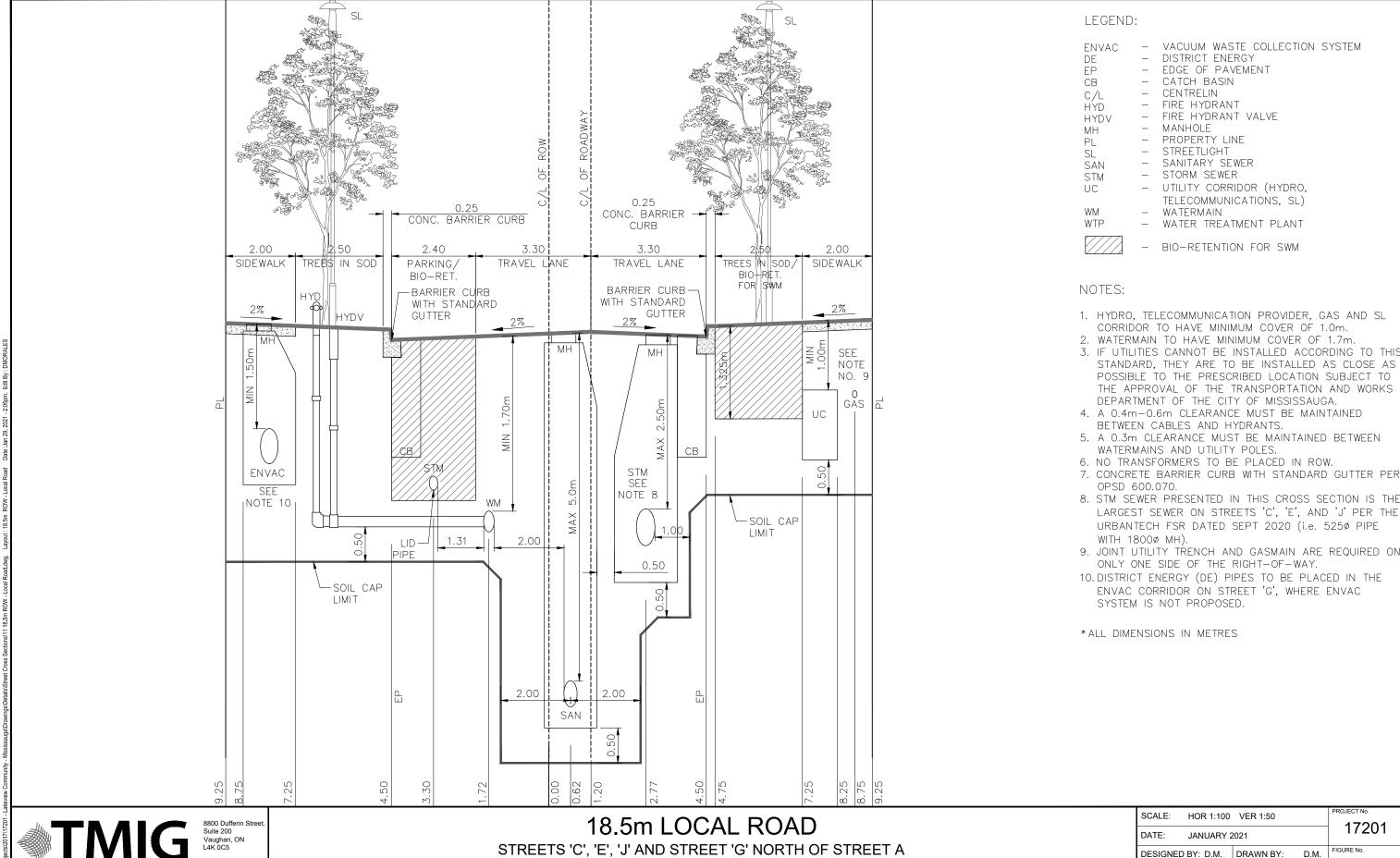
22.4m MINOR COLLECTOR
STREET 'B'
LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	9



LAKEVIEW COMMUNITY - MISSISSAUGA

DESIGNED BY: D.M. DRAWN BY: D.M. 10 CHECKED BY: A.A. CHECKED BY: A.A.



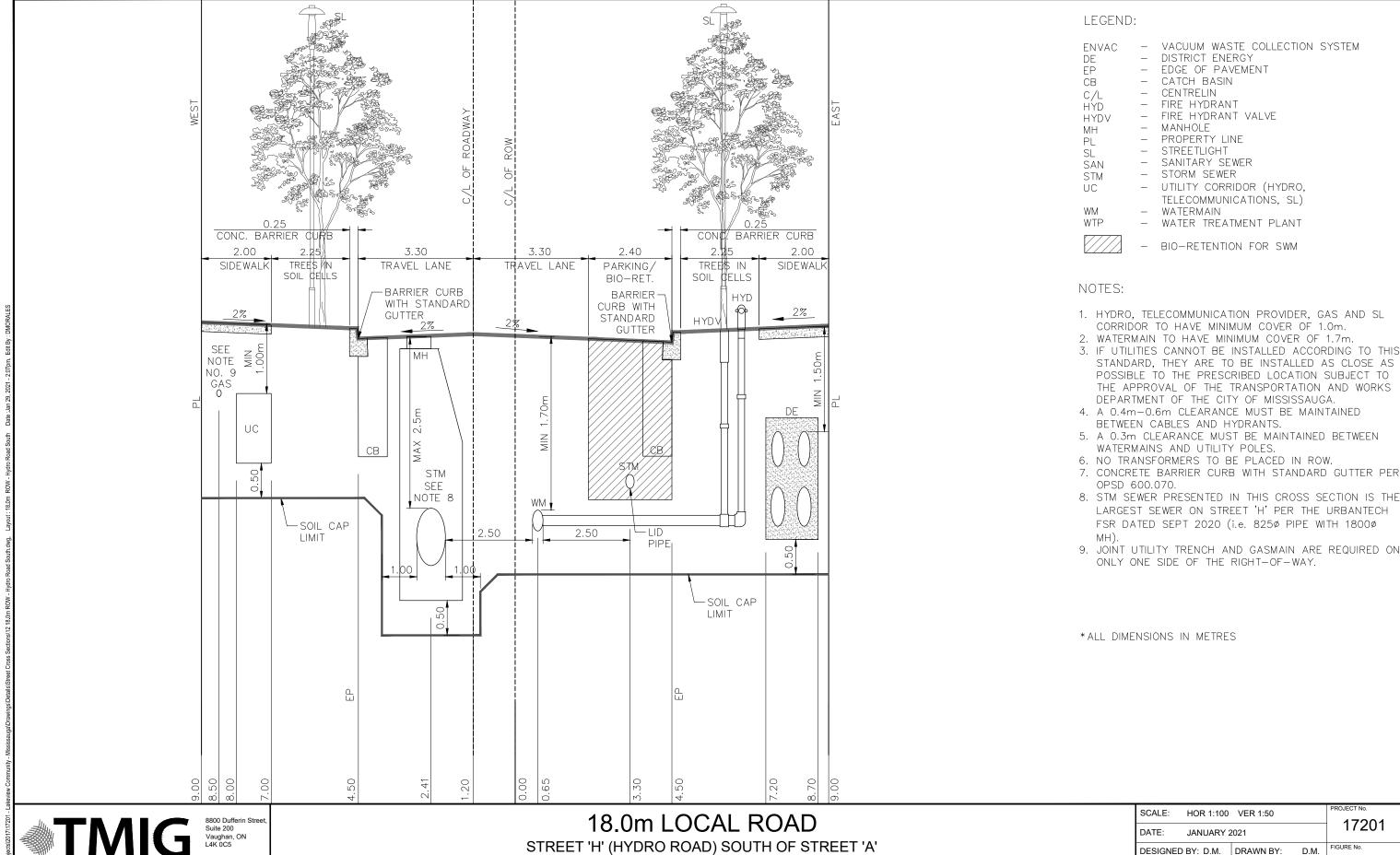
LAKEVIEW COMMUNITY - MISSISSAUGA

11

CHECKED BY: A.A.

CHECKED BY: A.A.

File : G:\Projects\2



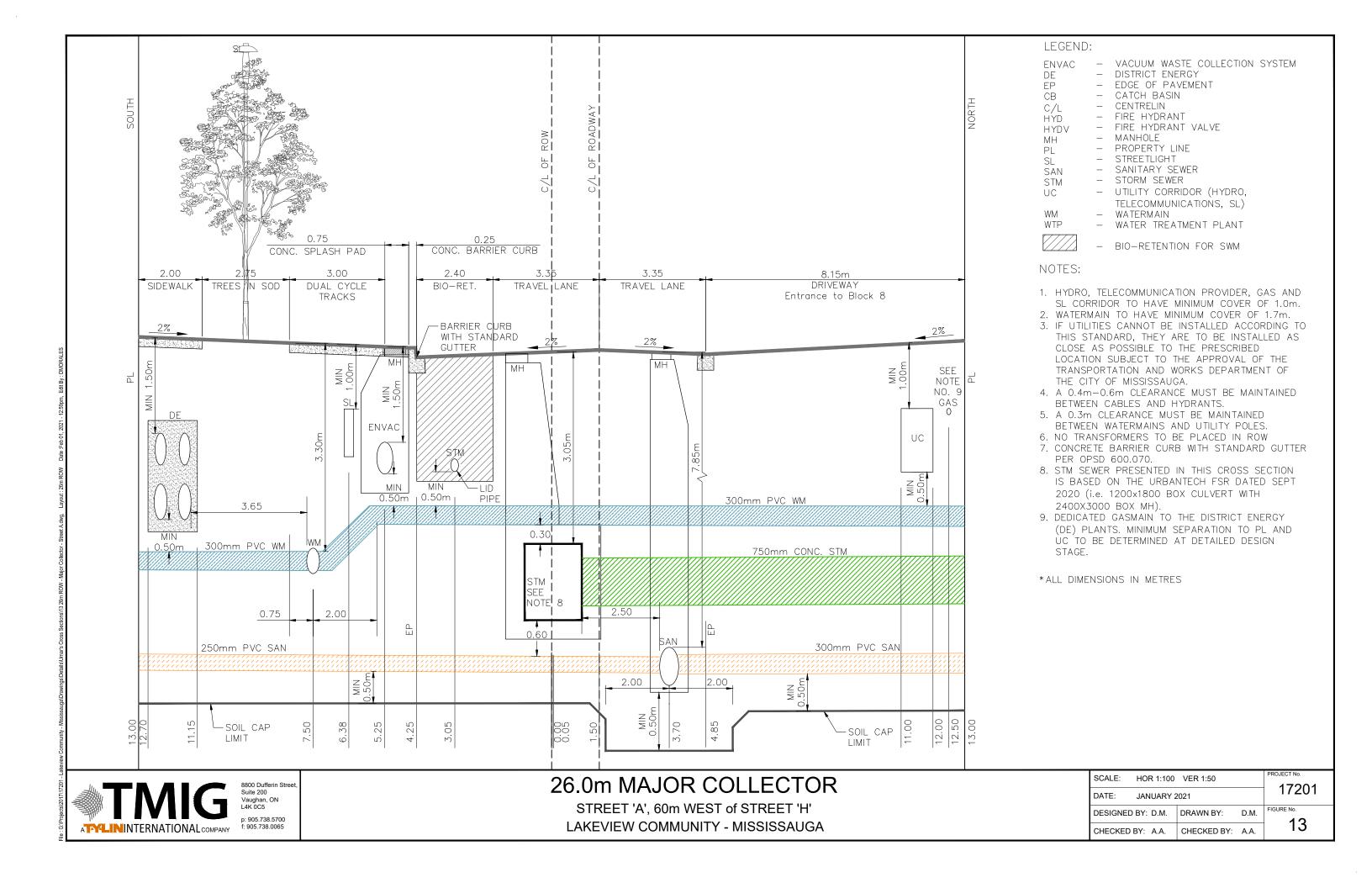
LAKEVIEW COMMUNITY - MISSISSAUGA

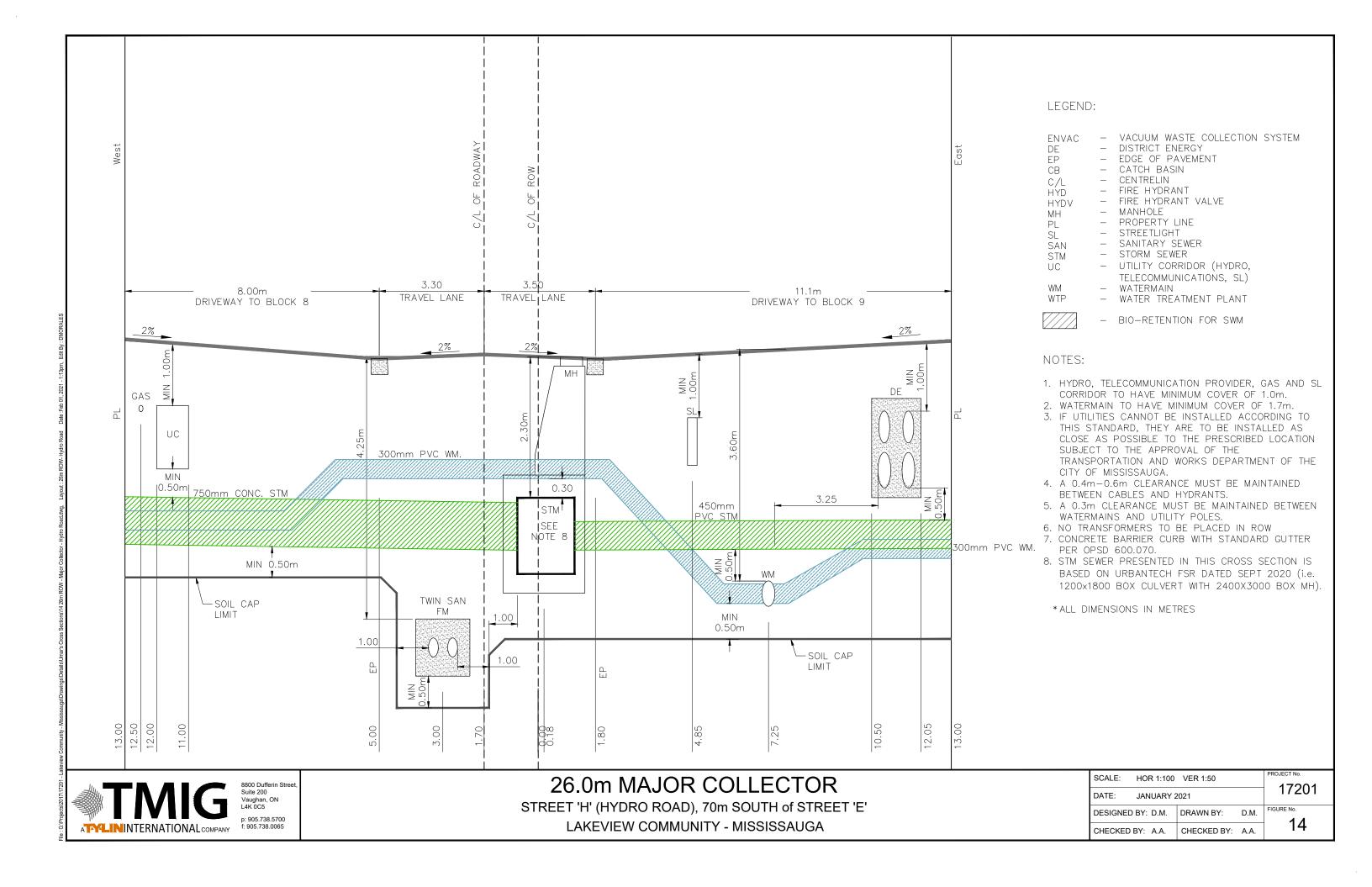
12

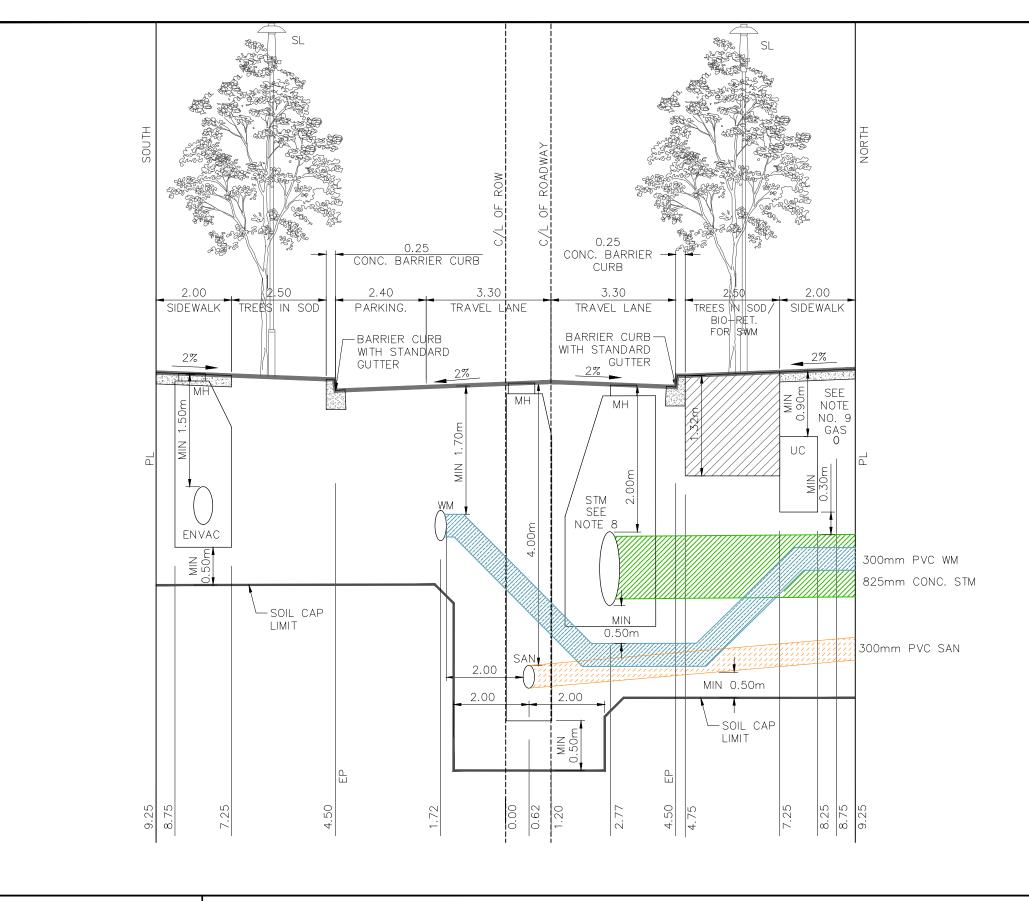
CHECKED BY: A.A.

CHECKED BY: A.A.

VI.







ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY
EP - EDGE OF PAVEMENT
CB - CATCH BASIN

C/L - CENTRELIN HYD - FIRE HYDRANT

HYDV - FIRE HYDRANT VALVE

MH - MANHOLE
PL - PROPERTY LINE
SL - STREETLIGHT
SAN - SANITARY SEWER

STM - STORM SEWER
UC - UTILITY CORRIDOR (HYDRO,
TELECOMMUNICATIONS, SL)

WM - WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

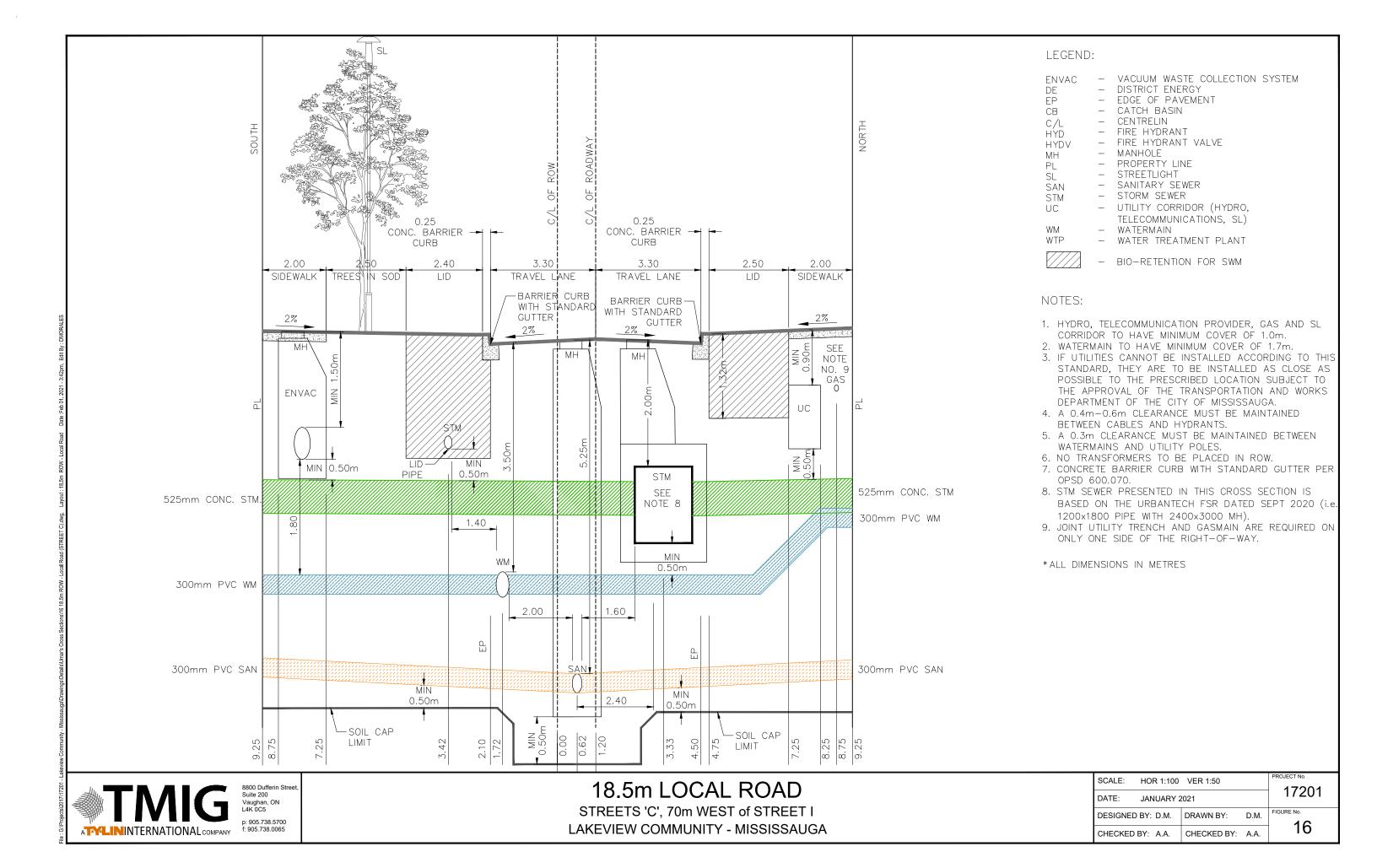
- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE MINIMUM COVER OF $1.7 \mathrm{m}$.
- 3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD, THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE 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. NO TRANSFORMERS TO BE PLACED IN ROW.
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS BASED ON URBANTECH FSR DATED SEPT 2020 (i.e. 975¢ PIPE WITH 2400¢ MH).
- 9. JOINT UTILITY TRENCH AND GASMAIN ARE REQUIRED ON ONLY ONE SIDE OF THE RIGHT-OF-WAY.

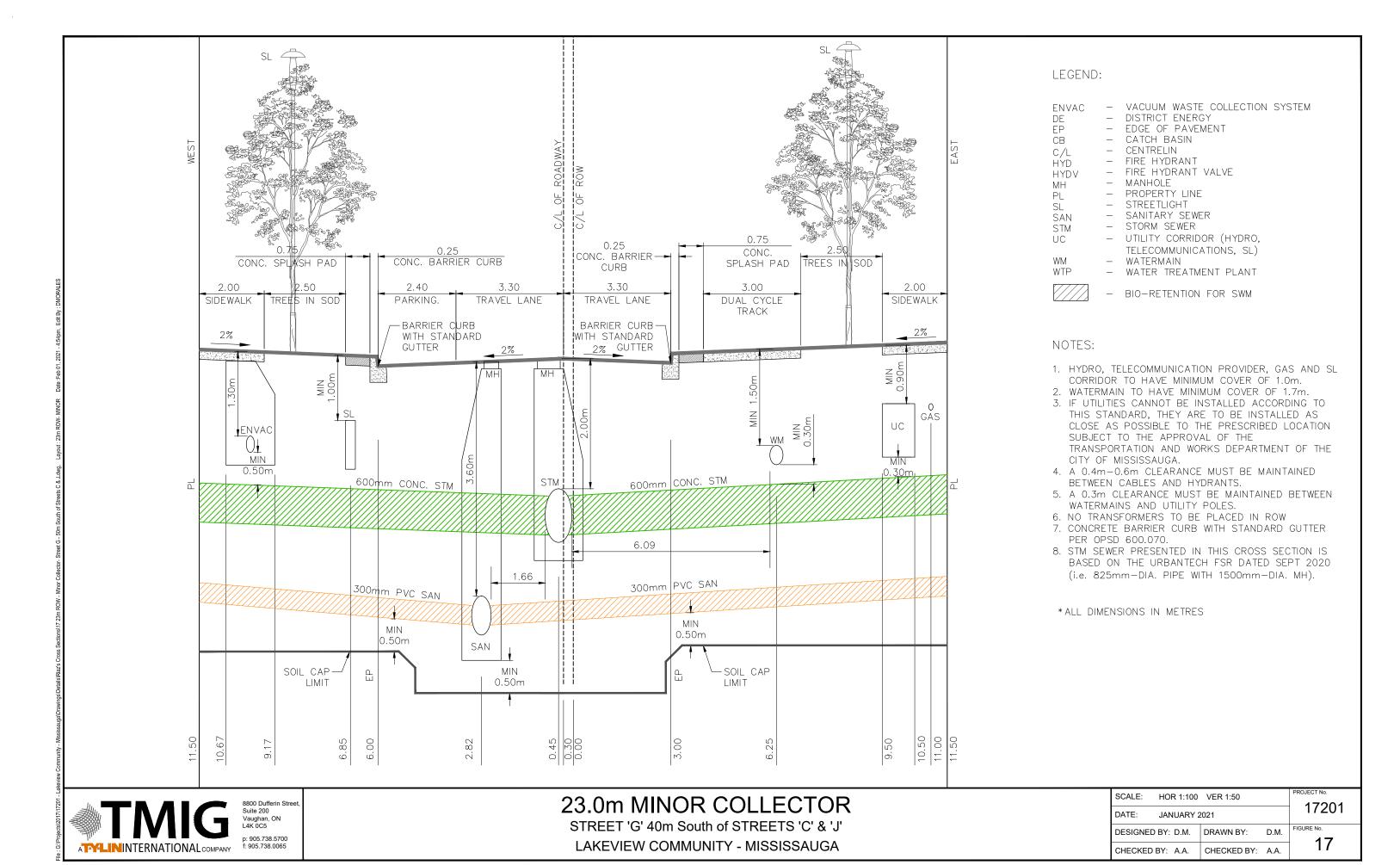
*ALL DIMENSIONS IN METRES

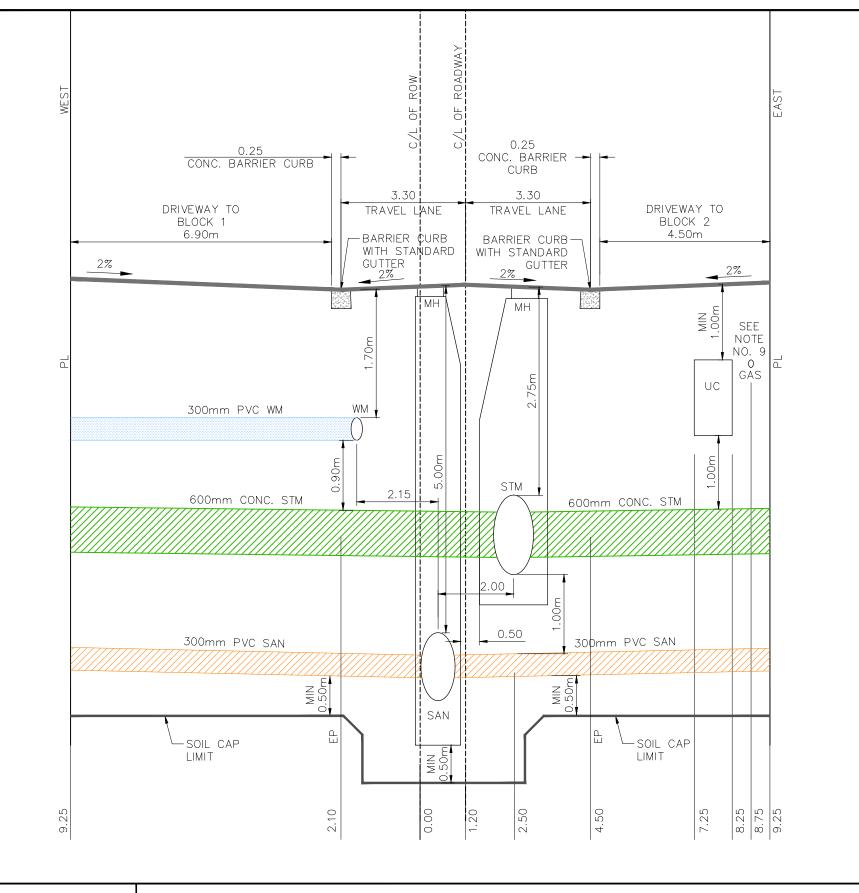
8800 Dufferin Stre Suite 200 Vaughan, ON L4K 0C5 p: 905.738.5700 f: 905.738.0065 18.5m LOCAL ROAD

STREET 'E', 120m WEST OF STREET I LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	15







ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY
EP - EDGE OF PAVEMENT
CB - CATCH BASIN

C/L - CENTRELIN HYD - FIRE HYDRANT

HYDV - FIRE HYDRANT VALVE

MH - MANHOLE

PL - PROPERTY LINE
SL - STREETLIGHT
SAN - SANITARY SEWER
STM - STORM SEWER

UC — UTILITY CORRIDOR (HYDRO, TELECOMMUNICATIONS, SL)

WM - WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE 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. NO TRANSFORMERS TO BE PLACED IN ROW.
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS BASED ON THE URBANTECH FSR DATED SEPT 2020 (i.e 10500 PIPE WITH 12000 MH).
- 9. JOINT UTILITY TRENCH AND GASMAIN ARE REQUIRED ON ONLY ONE SIDE OF THE RIGHT—OF—WAY.
- 10. DISTRICT ENERGY (DE) PIPES TO BE PLACED IN THE ENVAC CORRIDOR ON STREET 'G', WHERE ENVAC SYSTEM IS NOT PROPOSED.

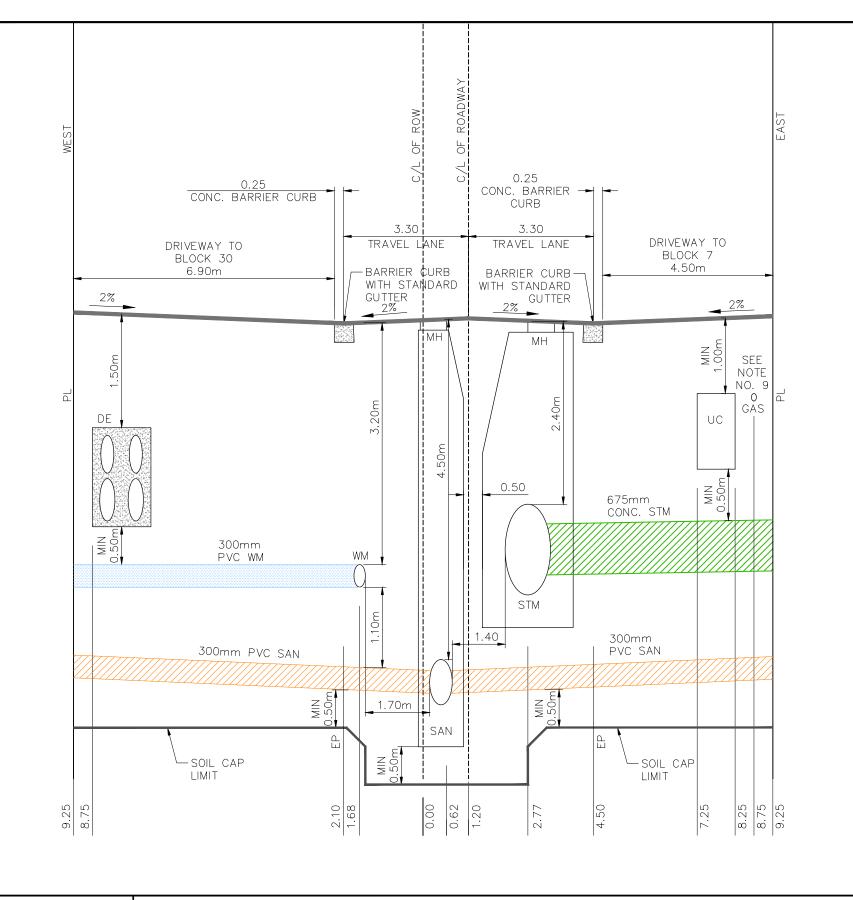
*ALL DIMENSIONS IN METRES

8800 Dufferin S
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.570
f: 905.738.0069

18.5m LOCAL ROAD

STREET 'G' 50m NORTH of STREET 'B' LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	18



ENVAC - VACUUM WASTE COLLECTION SYSTEM

DE - DISTRICT ENERGY
EP - EDGE OF PAVEMENT
CB - CATCH BASIN

C/L - CENTRELIN HYD - FIRE HYDRANT

HYDV - FIRE HYDRANT VALVE

MH - MANHOLE PL - PROPERTY LINE

SL - STREETLIGHT SAN - SANITARY SEWER STM - STORM SEWER

UC - UTILITY CORRIDOR (HYDRO, TELECOMMUNICATIONS, SL)

WM - WATERMAIN

WTP - WATER TREATMENT PLANT

- BIO-RETENTION FOR SWM

NOTES:

- 1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE MINIMUM COVER OF 1.0m.
- 2. WATERMAIN TO HAVE 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. NO TRANSFORMERS TO BE PLACED IN ROW.
- 7. CONCRETE BARRIER CURB WITH STANDARD GUTTER PER OPSD 600.070.
- 8. STM SEWER PRESENTED IN THIS CROSS SECTION IS BASED ON THE URBANTECH FSR DATED SEPT 2020 (i.e 1200¢ PIPE WITH 2400¢ MH).
- 9. JOINT UTILITY TRENCH AND GASMAIN ARE REQUIRED ON ONLY ONE SIDE OF THE RIGHT-OF-WAY.

*ALL DIMENSIONS IN METRES

8800 Dufferin S
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.570
f: 905.738.0069

18.5m LOCAL ROAD

STREET 'G' 75m NORTH of STREET 'A'
LAKEVIEW COMMUNITY - MISSISSAUGA

SCALE:	HOR 1:100	VER 1:50		PROJECT No.
DATE:	JANUARY 2	2021		17201
DESIGNED	BY: D.M.	DRAWN BY:	D.M.	FIGURE No.
CHECKED	BY: A.A.	CHECKED BY:	A.A.	19