APPENDIX F

Servicing

NORTH MILTON BUSINESS PARK

Area Servicing Plan

VERSION 2 ▪ APRIL 2022

REPORT PREPARED FOR

ORLANDO CORPORATION
6205 AIRPORT ROAD
MISSISSAUGA, ON L4V 1E3

REPORT PREPARED BY

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1 INTRODUCTION

T.Y. LIN (formerly the Municipal Infrastructure Group Ltd., a TYLin International Company) was retained by Orlando Corporation (Orlando) to prepare an Area Servicing Plan (ASP) for the North Milton Business Park in Milton, Ontario. The properties (referred to herein as 'the Study Plan area' or 'the site') are generally located north of James Snow Parkway, west of Esquesing Line, south of No. 5 Side Road and east of the Canadian National Rail (CNR) as illustrated in **Figure 1**.

The Area Servicing Plan provides a greater level of detail on the provision of water and wastewater services for the North Milton Business Park area. TYLin also prepared a Functional Servicing Report (FSR) in March 2021.

The purpose of this Area Servicing Plan is to:

- Identify existing and planned trunk water and wastewater infrastructure adjacent to the North Milton Business Park;
- Summarize proposed water and wastewater demands for the North Milton Business Park Lands;
- Identify proposed water and wastewater infrastructure to support the study area;
- Identify potential development phasing limits based on planned and proposed infrastructure timing;
- Identify development timing, servicing constraints, interim servicing solutions, and potential easements associated with each development parcel in support of Draft Plan of Subdivision.

The study area includes a large portion of land that is owned by Orlando, while the remaining properties are owned by others who were not participating in the development process at the time of this study. It is primarily comprised of existing agricultural lands with a few residential dwellings and an existing industrial property. **Figure 1** identifies the participating and non-participating landowners.

2 BACKGROUND

2.1 Development Plan

A proposed development plan for the area is shown on **Figure 2** and consists of large warehouse buildings, associated driveways and parking areas for warehouse employees and transport trucks, and landscape areas. Majority of the development plan is divided into ten areas along property/parcel boundaries. Similarly, servicing plans were generally developed considering these property boundaries. The ten property areas are as follows:

- **Orlando Property (8350 Esquesing Line)** – This property is the largest parcel within the plan and will consist of four warehouse buildings, parking, driveways, landscaped areas, a channel block, and a stormwater management pond. The development plan also includes a 24 m public right-of-way along the south property boundary that connects to James Snow Parkway at two locations and provides access and servicing to the development.
- **Orlando Property (8800 Boston Church Road)** – The development plan for this property includes three warehouse buildings, parking lot and driveways, landscaped areas, a stormwater management pond, and a conveyance swale along the western property boundary.
- **Non-Participant Property #1** – There is no current development plan for this lot, however, the potential future development was included in this study
- **Non-Participant Property #2** – There is no current development plan for this lot, however, the potential future development was included in this study.
- **Non-Participant Property #3** – There is no current development plan for this lot, however, the potential future development was included in this study.
- **Existing Residential #1** – There is no current development plan for this rural residential lot, however, the potential future development was included in this study.
- **Existing Residential #2** – There is no current development plan for this rural residential lot, however, the potential future development was included in this study.
- **Existing Residential #3** – There is no current development plan for this rural residential lot, however, the potential future development was included in this study.
- **Existing Industrial #1** – There is no current development plan for this industrial lot, however, the potential future development was included in this study.
- **Proposed Residential Relocation** – There is no current development plan for this rural residential lot, however, the potential future development was included in this study.

In addition, a hydro corridor is located within the southern portion of the Study area, parallel to James Snow Parkway. There is no proposed development within the hydro corridor, except for a future public right-of-way connecting James Snow Parkway to the Proposed Orlando Development east of Boston Church Road.

3 FUTURE STUDIES

Subsequent to the preparation of this North Milton Business Park ASP, site specific water and wastewater functional servicing reports will need to be prepared for each individual draft plan of subdivision. These site specific FSR's are to:

- Provide a location plan and description of the existing land uses,
- Identify proposed land uses,
- Provide a description, timing, and map of proposed Development Charge infrastructure required for the plan,
- Provide a hydraulic analysis to confirm maximum day or minimum hour static pressure for existing and full buildout conditions, and that static pressure in the system doesn't drop below 140 kPa (20 psi) under Maximum Day & Fire Conditions.,
- Identify system redundancy (looping) and consideration of water quality (needed for flushing) for any interim or permanent dead ends, and,
- Identify development timing, servicing constraints, interim servicing solutions, and potential easements associated with the Draft Plan of Subdivision and Site Plan application.

4 SERVICING ALLOCATION / STAGING

The North Milton Business Park lands are anticipated to be developed in stages. The Staging plan is shown in **Figure 2**. The Orlando developments will be the first to be constructed starting with the North Porta property as Phase 1, followed by the North West development. All the remaining properties are considered non-participating and as such there is no current information available regarding future development timeline.

Ultimately, future developments in Milton will be conveyed to the Mid-Halton Wastewater Treatment Plant (WWTP) through the Boyne Trunk Sewers and the three new Wastewater Pumping Station. As per the Sustainable Halton Water and Wastewater Master Plan, the capacity of the Mid-Halton WWTP will be increased incrementally from 125 MLD to 175 MLD as development proceeds. The developments below are contingent on the Mid Halton WWTP phase 4/5 expansion. The water supply for this area is planned to come from the integrated lake-based water system which includes Burlington, Burloak, and Oakville Water Treatment Plants (WTP).

Improvements and expansion to the Regional Water and Wastewater Infrastructure in support of the site will be funded by Regional Development Charges and through the Regional Allocation Agreements.

5 WATER SERVICING

5.1 Background

The subject site is located at the northern limit of Town of Milton, in Halton Region Pressure District M5-L. The following water infrastructure is adjacent to the site:

- A 900 mm diameter CPP trunk feedermain is located along Boston Church Road from No. 5 Side Road to James Snow Parkway. This feedermain reduces to a 750 mm diameter main on James Snow Parkway and continues southeast to Steeles Avenue.
- A 500 mm diameter CPP trunk watermain is located along James Snow Parkway and is connected to the 300 mm CPP watermain on Boston Church Road, and
- A 300 mm diameter watermain is located on Esquesing Line south of James Snow Parkway and is connected to the 500 mm CPP watermain on James Snow Parkway, and
- A 300 mm diameter watermain is located on Boston Church Road south of James Snow Parkway and is connected to the 500 mm CPP watermain on James Snow Parkway.

These watermains have not been designed for service connections to the industrial buildings and additional water infrastructure will be required to accommodate the proposed development. Refer to **Figure 3** for the Existing and Proposed Water Infrastructure Plan.

5.2 Design Criteria

Equivalent population has been calculated using employee assumptions per Table A-8 of the 2022 DC Background Study as shown in **Table 5-1**. The water demand and design criteria are summarised in **Table 5-2** as per Table 5 of the 2022 DC Update Water/Wastewater Technical Report. These criteria were used in this analysis.

Table 5-1 Employee Population Assumptions

Type of Development	Square Feet per Employee Assumptions (2022-2031)
Commercial	403
Industrial	1,389
Institutional	740

Table 5-2 Water Demand Criteria

Average Day Water Design Criteria			
Litres per capita per day	Residential	265	
Litres per employee per day	Employment	225	
Max Day and Peak Hour		**May Day Peaking Factor**	**Peak Hour Peaking Factor**
Lake-based	Oakville, Burlington, Milton, Georgetown	1.9	3
Groundwater based	Milton, Georgetown, Acton	1.6	3

5.3 Proposed Infrastructure

The subject lands are anticipated to be serviced by future Halton Region watermain projects that have been proposed in the Region's 2022 Development Charges Update Water/Wastewater Technical Report (GM BluePlan Engineering, 2021). The DC watermain projects to accommodate the future development in this area are listed in **Table 5-3**. A figure from the Region's DC Technical Report showing the projects is provided in **Appendix B**.

Table 5-3 Region of Halton Development Charge Projects

Region IPFS ID	Project Description	Length (m)	Construction Year
6649	400mm WM on Esquesing Line from James Snow Pkwy to approx. 800m north (Zone 267)	784	2026
6650	400mm WM on new roadway from Esquesing Line to approx. 360m west of Boston Church Rd (Zone 267)	2,029	2026
6652	400mm WM on new roadway from 400m west of Boston Church Road to No. 5 Side Road (Zone 267)	695	2026
6653	400mm WM on No. 5 Side Road from approx. 400m west of Boston Church Road to Boston Church Road (Zone 267)	390	2026

The alignments of the Region's proposed DC projects are not consistent with the proposed road network and service areas which will require future modification. For example:

- Project ID 6650 along the new roadway will need to be realigned to follow the plan's east-west road from James Snow Parkway.
- Project IDs 6652 and 6653 west of Boston Church Road should be realigned since there are no public ROWs proposed in the plan that are west of Boston Church Road. Instead, the watermain should be located on Boston Church Road, from James Snow Parkway North to No. 5 Side Road.

The proposed watermain network (**Figure 3**) follows the road network and development plan and considers looping of the system. The proposed watermain layout includes:

- A 400mm diameter watermain along the east side of Boston Church Road extended from James Snow Parkway to approximately 100 m south of No. 5 Side Road,
- A 300mm diameter watermain along the proposed future public right-of-way connecting from James Snow Parkway North, and
- A 400mm diameter watermain along Esquesing line from James Snow Parkway North to approximately 430 m north of James Snow Parkway.

This proposed watermain system is approximately 1580m of new 400mm diameter watermain to be included as DC projects in place of the four DC projects outlined in the Region's DC Technical Report. The system also proposes 850m of new 300mm diameter watermain along the future public-right-of-way to service the North Porta property.

The proposed development type (industrial) is as per the Region's official plan and therefore no water pressure issues are anticipated upon the completion of the Region DC projects. As noted previously, to further mitigate future issues such as stagnant water within the watermains and water pressures at the high end of the system, the DC projects are proposed to have looping at the dead ends.

The proposed developments cannot be serviced without the provision for potable water to the sites. If the proposed developments were to proceed prior to the construction of the DC projects, the projects would need to be constructed by the developers prior to construction of the individual site plans. Each development parcel could then be developed separately, and each block serviced with its own private water servicing network.

5.4 Water System Analysis

The water demand for the subject site is calculated based on the Region of Halton Guidelines and the total floor area of 631,207 square meters. The total Average Day Demand (ADD) (excluding fire flow) is calculated as 13 L/s, and the Maximum Day Demand (MDD) as 24 L/s.

For Phase 1 only, ADD is 6.4 L/s, and MDD is 12.2 L/s.

The calculated water demands are detailed in **Table 5-4** were added to the Region's model and analysis was performed.

Table 5-4 Water Supply Requirements

	Design Criteria [1]
2022 DC Background Study - Sq. Ft. per Employee Assumptions (2022-2031): Commercial	403
Industrial	1,389
Institutional	740
Proposed Employment Day Demand [4] (L/emp/day) =	225
Peak Hour Peaking Factor [2] =	3.0
Max Day Peaking Factor [4] =	1.9

	Ex Residential 1 [3]	Ex Residential 2 [3]	Ex Residential 3 [3]	Ex Industrial 1 [3]	Proposed Residential Relocation [4]	Orlando Phase 1 - (North Porta)	Orlando Phase 2 - (North West)	Non Participating Parcel 1 [3]	Non Participating Parcel 2 [3]	Non Participating Parcel 3 [3]	TOTAL
Landuse Area (ha)	1.41	0.66	3.65	2.54	0.41	67.12	29.50	12.70	11.37	4.95	134
Landuse Area (sq m)	14,100	6,575	36,524	25,438	4,063	671,245	294,999	126,937	113,667	49,550	1,343,097
Building Area (sq m)	6,345	2,959	16,436	11,447	406	317,310	145,736	57,122	51,150	22,297	631,207
Building Area (sq ft)	68,296	31,850	176,913	123,214	4,374	3,415,519	1,568,700	614,856	550,582	240,008	6,794,313
Equivalent Population	50	23	128	89	6	2459	1130	443	397	173	4,898
Average Demand (L/s)	0.1	0.1	0.3	0.2	0.0	6.4	2.9	1.2	1.0	0.5	13
Peak Hour Demand (L/s)	0.4	0.2	1.0	0.7	0.0	19.2	8.8	3.5	3.1	1.4	38
Max Day Demand (L/s)	0.2	0.1	0.6	0.4	0.0	12.2	5.6	2.2	2.0	0.9	24
Fire Demand (L/s)	317.0	317.0	317.0	317.0	317.0	317.0	317.0	317.0	317.0	317.0	317
Max Day + Fire Flow (L/s)	317.2	317.1	317.6	317.4	317.0	329.2	322.6	319.2	319.0	317.9	-

Notes:
(1) Site areas are assumed to be developed as light industrial areas except for the proposed residential relocation which is assumed as institutional.
Population for all areas (existing and proposed) are calculated based on Table A-8 of the 2022 DC Background Study.
(2) Average day demand and peaking factors are calculated based on the 2022 Development Charges Update Water/Wastewater Technical Report
(3) The land use area is based on the total area outside the Protected Countryside Boundary. Future building footprint is assumed to be 45% of total landuse area
(4) The future building area is calculated based on 10% of total landuse area

5.5 Water System Modelling

The proposed water distribution system for the development was simulated for Phase 1 and Final conditions using the InfoWater water model.

The proposed distribution system was modelled for following scenarios for both conditions

1. Maximum Daily Demand
2. Maximum Daily Demand with Fire Flow requirement

Pressure maps indicating modelled pressure at every node for the first scenario in both conditions is given in **Figures 2** and **3** of **Appendix A**. The available fire flow at nodes for maximum day demand with Fire flow analysis for both conditions is shown in **Figures 4** and **5** of **Appendix A**. The summary of modelling results is provided for all scenarios, the anticipated residual pressures within the development area range from 63 psi to 73 psi. The model results indicate that pressure requirements set out by the Region are satisfied at all junctions. With the fire flow analysis, every node can achieve minimum fire flow identified in the design criterion. All points in the proposed subdivision will have available fire flow greater than 317 L/s. The minimum fire flow available within the development is 695 L/s for Phase 1 and 328 L/s for the Ultimate Build-out.

Table 5-5 Modelling Results Summary

Water Demand Modeling Scenario	Minimum Water System Requirements	Modelling Results within development	Development Node with Minimum Pressure*	Development Node with Maximum Pressure*
Phase 1 Maximum Day Demand	Recommended Normal Pressures within System = 40 psi to 100 psi	System Pressure = 65 psi to 70 psi	SH-J-153 – 66 psi	SH-J-151 – 69 psi
Ultimate Build-out Maximum Day Demand	Recommended Normal Pressures within System = 40 psi to 100 psi	System Pressure = 63 psi to 70 psi	WFT748195608– 63 psi	WFT748195611 – 73 psi
Phase 1 Maximum Day Demand plus Fire Flow	Required Fire Flow to be provided at a residual pressure of no less than 20 psi		**Development Node with Minimum Flow***	**Development Node with Maximum Flow***
	Employment Fire flow requirements per FUS, Q_f = 317 L/s	Entire neighbourhood has Available Fire Flow greater than 317 L/s	SH-J-153 – 695 L/s	SH-J-151 – 917 L/s
Ultimate Build-out Maximum Day Demand plus Fire Flow	Employment Fire flow requirements per FUS, Q_f = 317 L/s	Entire neighbourhood has Available Fire Flow greater than 317 L/s	WFT748195608– 328 L/s	SH-J-153 – 695 L/s

6 WASTEWATER SERVICING

6.1 Background

The subject site is at the northern limit of the Town of Milton and is not currently serviced with Halton Region infrastructure. The closest sanitary sewer to the subject site is a 300mm diameter local sanitary sewer on Boston Church Road approximately 100m south of James Snow Parkway and a 900mm diameter trunk sanitary sewer at the intersection of Steeles Avenue and James Snow Parkway approximately 1,400m southeast from the subject site.

The subject lands are proposed to be serviced through future Halton Region DC projects as noted in *The Regional Municipality of Halton 2022 Development Charges Update Water/Wastewater Technical Report, (September 2021)*. Refer to **Figure 4** for the Existing and Proposed Sanitary Servicing Plan.

6.2 Design Criteria

Equivalent population has been calculated using employee assumptions per Table A-8 of the 2022 DC Background Study as shown in **Table 5-1**. The wastewater flow design criteria are summarised in **Table 6-1** as per Table 8 of the 2022 DC Update Water/Wastewater Technical Report. These criteria were used in this analysis.

Table 6-1 Wastewater Flow Criteria for System Components

System (Booster Pumping Stations and Wastewater Mains)			
Litres per capita per day	Residential	Peak Dry Weather Flow	215 x Peaking Factor
Litres per employee per day	Employment	Peak Dry Weather Flow	185 x Peaking Factor
Litres per second per hectare	I&I Allowance	Inflow and Infiltration Design Allowance	0.286

6.3 Proposed Infrastructure

As previously noted, the proposed development is tributary to future Halton Region trunk sewers that have been proposed in the Region's 2022 DC Update Water/Wastewater Technical Report (GM BluePlan Engineering, 2021). The DC wastewater projects designed to accommodate the future development are listed in **Table 6-2**.

Table 6-2 Halton Region Development Charge Projects

Region IPFS ID	Project Description	Length (m)	Construction Year
6560	525mm trunk sewer on James Snow Pkwy and new road alignment from Steeles Ave to Esquesing Line (MIL)	1,708	2026
6564	525mm trunk sewer on new alignment from Esquesing Line to Boston Church Road (MIL)	2,104	2026

The sanitary sewer design for the subject site follows the design criteria in the Regional Municipality of Halton's *2022 Background Study and 2022 DC Update Water/Wastewater Technical Report.* The sanitary design criteria from **Table 6-1** were used to calculate future flows.

The proposed developments are considered in the Halton Region's DC projects and therefore no capacity constraints are expected in the future trunk sanitary sewer system.

If the proposed developments move forward prior to the construction of the Regional DC projects, alternative servicing strategies will be required. The developers will be required to construct the proposed trunk wastewater infrastructure for individual sites.

A proposed local sanitary sewer along Esquesing Line from James Snow Parkway North to approx. 400 m north of James Snow may be required for future developments of the non-participating properties along the eastern boundary of the study area. This will be subject to approval by the Region of Halton.

Two options have been included as part of this study, with both alignments starting at Boston Church Road and terminating at the James Snow Parkway and Steeles Avenue intersection. Option 1 proposes the trunk sewer continue along James Snow Parkway, whereas option 2 proposes the trunk sewer to be constructed within the south limits of the Orlando lands. More information is discussed below.

6.3.1 Option 1

As mentioned above, this includes the installation of the 525mm trunk sewer from Boston Church Road which continues to James Snow Parkway connecting into the existing 900mm sanitary sewer at Steeles Avenue as shown on **Figure 4-1**. This option involves microtunneling for approximately 600m at the intersection of James Snow and Boston Church. The microtunnel is deemed the appropriate method given the significant depth of installation near the intersection and based on the need to avoid major traffic management/costs and traffic disturbance which would be the case if open cut were carried out in and around the intersection. On the other hand, the microtunnel will introduce significant construction costs of $11,155,244. Details of the cost estimate is provided in **Appendix E**.

6.3.2 Option 2

For this option, the proposed 525mm sewers will be constructed within the Orlando property from approximately 180m north of James Snow Parkway until it reaches Esquesing Line where it will continue to James Snow Parkway and connect into the existing 900mm sanitary sewer. This layout is shown on **Figure 4-2**. This alternative eliminates the need for microtunneling and eliminates issues with traffic and utility conflicts. Cost Estimates on **Appendix E** shows a lower construction cost of $5,328,686.

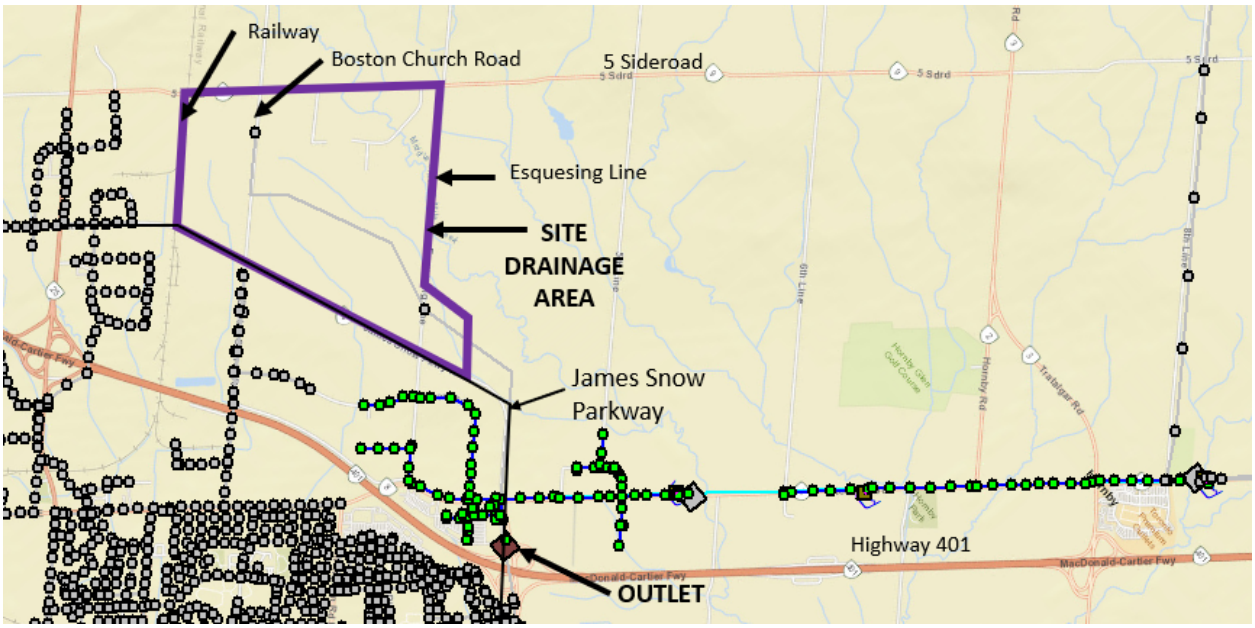
Due to the lowered costs and simpler installation, Option 2 is the preferred method. The design sheet for this network is presented in **Appendix C** and plan profiles are shown on **Appendix D**.

6.4 Wastewater System Modelling

6.4.1 Model Setup

TYLin was provided with the existing sanitary sewer network model, prepared by Halton Region, to assist with the analysis of trunk sewer on James Snow Parkway. TYLin trimmed the model to include the area that is upstream of the trunk sewer on James Snow Parkway. The trimmed model and the sanitary drainage area are shown below:

Figure 6-1 Trimmed Model and Sanitary Drainage Area



The provided model includes several scenarios. The one used in this analysis is the "2016-PEAK-WWF, June 3, 2011 Update" scenario.

6.4.2 Model Inputs

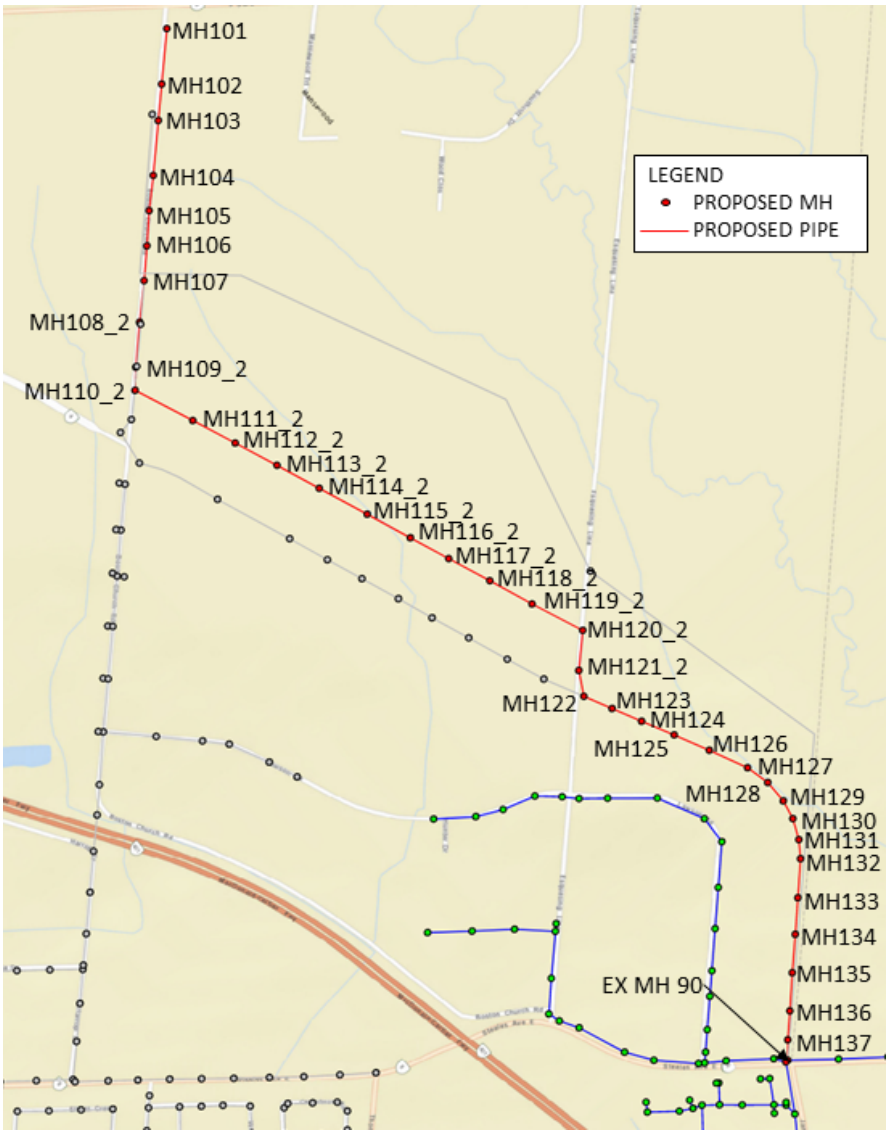
The proposed Regional DC projects were added to the model along Boston Church Road and James Snow Parkway. The two following options were considered and added to the model:

1. Construction of a 525mm PVC trunk sewer using open cut on Boston Church Road to James Snow Parkway. Microtunneling a 900mm trunk sewer from the southwest corner of the intersection at James Snow Parkway to approximately 600m east. Construction of a proposed 525mm PVC trunk sewer after by open cut on James Snow Parkway to the connection at Steeles Avenue East.
2. Construction of a 525mm PVC trunk sewer using open cut on Boston Church Road to approximately 180m north of James Snow Parkway North continuing east along the south limits of the Orlando property up to Esquesing Line. This will continue south to James Snow Parkway to the connection at Steeles Avenue East.

Figure 6-2 and **Figure 6-3** show the new pipes and manholes added to the model for each option.

Figure 6-2 New Pipes and Manholes – Option 1

Figure 6-3 New Pipes and Manholes – Option 2



Using the design sheet and drainage plan, the model was loaded to include the Orlando development, existing residential and non-participating landowners. The loading details are shown in **Table 6-3**:

Table 6-3 Added Model Demands

Property	Peaked Flow (m^3/s)	Option 1 Loading Manhole	Option 2 Loading Manhole
Orlando – North West	0.01573	MH101	MH101
Orlando – North Porta	0.03400	MH112_1	MH111_2
Non-Participating 1	0.00667	MH106	MH106
Non-Participating 2	0.00599	MH103	MH103
Non-Participating 3	0.00265	MH122	MH122
Ex. Residential 1	0.00077	MH104	MH106
Ex. Residential 2	0.00036	MH105	MH103
Ex. Residential 3	0.00197	MH122	MH122
Ex. Industrial 1	0.00138	MH122	MH122
Proposed Residential Relocation	0.00016	MH122	MH122

6.4.3 Model Results

6.4.3.1 Existing Conditions

This section includes details of the 900mm trunk sewer on James Snow Parkway under existing conditions. Existing conditions is the model in its received state and these results can be used to show the existing capacity constraints of the 900mm trunk sewer.

The sewer immediately south of Steeles Avenue on James Snow parkway has a full flow capacity of 814 L/s. Under existing conditions, there is a sewage flow of 15 L/s, resulting in a reserve capacity of 796 L/s.

The trimmed model includes three segments of 900mm sewer south of Steeles Avenue are shown in **Figure 6-4** and the pipe details are tabulated in **Table 6-4**:

Figure 6-4 900mm Trunk Sewer

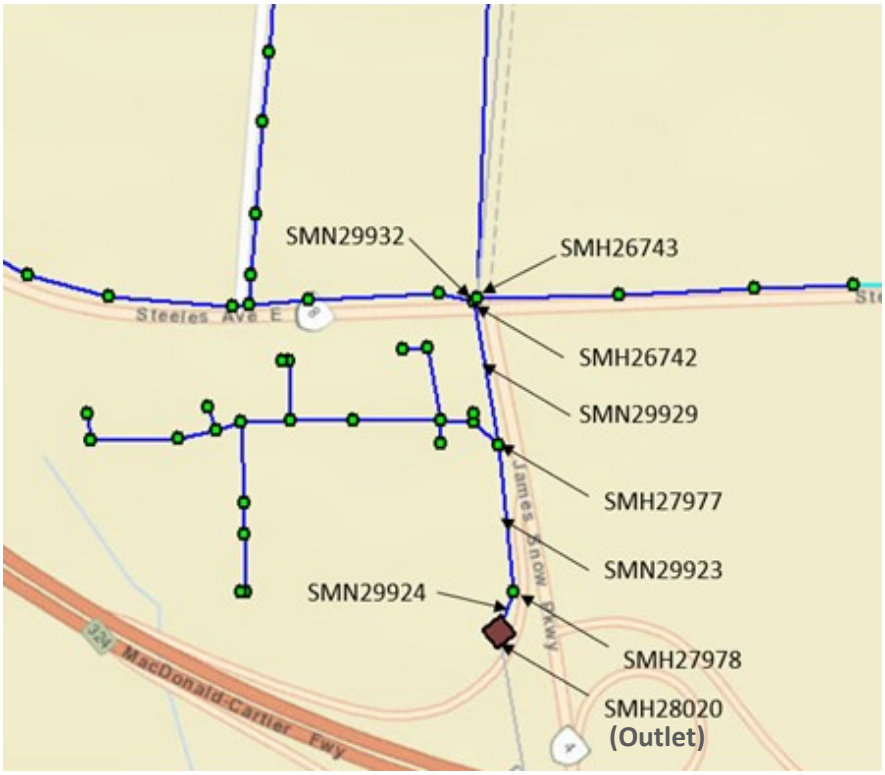


Table 6-4 900mm Trunk Sewer Details

Pipe ID	Upstream MH	Downstream MH	Length (m)	Diameter (mm)	Existing Conditions Flow (L/s)	Full Flow Capacity (L/s)	Velocity (m/s)	Reserve Capacity (L/s)
SMN29932	SMH26743	SMN26742	6.33	900	1.325	790.369	0.231	789.044
SMN29929	SMH26742	SMH27977	149.159	900	15.489	814.095	0.499	798.606
SMN29923	SMH27977	SMH27978	151.622	900	23.436	807.454	0.562	784.018
SMN29924	SMH27978	SMH28020	43.480	900	23.743	825.874	0.573	802.131

6.4.3.2 Proposed Development

With the addition of the proposed development, the flow to the 900mm trunk sewer increases substantially.

Table 6-5 and **Table 6-6** show the pipe details, capacity, velocity, reserve capacity with the proposed development added in **Option 1** and **Option 2** respectively.

Figure F-1 and **F-2** in **Appendix F** show the hydraulic gradeline of the sewers in **Option 1** and **2**, respectively.

Table 6-5 Proposed Development Flow – Option 1

Pipe ID	Upstream MH	Downstream MH	Length (m)	Diameter (mm)	Proposed Conditions Flow (L/s)	Full Flow Capacity (L/s)	Velocity (m/s)	Reserve Capacity (L/s)
TMIG_1	MH101	MH102	525	159	15.72	0.619	236.194	220.474
TMIG_2	MH102	MH103	525	102.1	15.72	0.619	236.079	220.359
TMIG_3	MH103	MH104	525	156	21.7	0.681	236.194	214.494
TMIG_4	MH104	MH105	525	100.3	22.47	0.688	236.234	213.764
TMIG_5	MH105	MH106	525	99.8	22.83	0.69	236.037	213.207
TMIG_6	MH106	MH107_2	525	98.3	29.5	0.744	236.234	206.734
TMIG_V1_1	MH107_2	MH108_1	525	122	29.5	0.744	236.194	206.694
TMIG_V1_2	MH108_1	MH109_1	525	120.5	29.5	0.745	236.358	206.858
TMIG_V1_3	MH109_1	MH110_1	525	149.6	29.5	0.744	235.984	206.484
TMIG_V1_4	MH110_1	MH111_1	525	47.7	29.5	0.746	236.936	207.436
TMIG_V1_5	MH111_1	MH112_1	900	101.964	29.5	0.697	994.434	964.934
TMIG_V1_6	MH112_1	MH113_1	900	243.894	63.5	0.876	993.795	930.295
TMIG_V1_7	MH113_1	MH114_1	900	237.725	63.5	0.876	994.137	930.637
TMIG_V1_8	MH114_1	MH115_1	525	119.983	63.5	0.926	236.211	172.711
TMIG_V1_9	MH115_1	MH116_1	525	110.758	63.5	0.926	236.452	172.952
TMIG_V1_10	MH116_1	MH117_1	525	117.866	63.5	0.925	235.995	172.495
TMIG_V1_11	MH117_1	MH118_1	525	111.726	63.5	0.925	236.132	172.632
TMIG_V1_12	MH118_1	MH119_1	525	115.581	63.5	0.926	236.282	172.782
TMIG_V1_13	MH119_1	MH120_1	525	124.502	63.5	0.926	236.351	172.851
TMIG_V1_14	MH120_1	MH121_1	525	118.545	63.5	0.925	235.983	172.483
TMIG_V1_15	MH121_1	MH122	525	124.696	63.5	0.925	236.167	172.667
TMIG_22	MH122	MH123	525	86.828	69.51	0.944	234.61	165.1
TMIG_23	MH123	MH124	525	91.847	69.51	0.949	236.391	166.881
TMIG_24	MH124	MH125	525	99.413	69.51	0.948	236.1	166.59
TMIG_25	MH125	MH126	525	108.432	69.51	0.948	236.087	166.577
TMIG_26	MH126	MH127	525	119.491	69.51	0.949	236.368	166.858

TMIG_27	MH127	MH128	525	70.359	69.51	0.949	236.151	166.641
TMIG_28	MH128	MH129	525	67.982	69.51	0.949	236.226	166.716
TMIG_29	MH129	MH130	525	57.439	69.51	0.948	235.977	166.467
TMIG_30	MH130	MH131	525	62.055	69.51	0.948	236.09	166.58
TMIG_31	MH131	MH132	525	54.817	69.51	0.95	236.588	167.078
TMIG_32	MH132	MH133	525	109.734	69.51	0.948	236.122	166.612
TMIG_33	MH133	MH134	525	102.939	69.51	0.949	236.264	166.754
TMIG_34	MH134	MH135	525	108.579	69.51	0.948	235.927	166.417
TMIG_35	MH135	MH136	525	108.467	69.51	0.949	236.412	166.902
TMIG_36	MH136	MH137	525	81.344	69.51	0.949	236.179	166.669
TMIG_37	MH137	SMH26743	525	59.228	69.51	0.951	237.067	167.557
SMN29932	SMH26743	SMH26742	900	7.258	70.835	0.733	738.118	667.283
SMN29929	SMH26742	SMH27977	900	149.159	84.999	0.829	814.095	729.096
SMN29923	SMH27977	SMH27978	900	151.622	92.946	0.846	807.454	714.508
SMN29924	SMH27978	SMH28020	900	43.48	93.253	0.86	825.874	732.621

Table 6-6 Proposed Development Flow – Option 2

Pipe ID	Upstream MH	Downstream MH	Length (m)	Diameter (mm)	Proposed Conditions Flow (L/s)	Full Flow Capacity (L/s)	Velocity (m/s)	Reserve Capacity (L/s)
TMIG_1	MH101	MH102	525	159	15.72	0.619	236.194	220.474
TMIG_2	MH102	MH103	525	102.1	15.72	0.619	236.079	220.359
TMIG_3	MH103	MH104	525	156	21.7	0.681	236.194	214.494
TMIG_4	MH104	MH105	525	100.3	22.47	0.688	236.234	213.764
TMIG_5	MH105	MH106	525	99.8	22.83	0.69	236.037	213.207
TMIG_6	MH106	MH107	525	98.3	29.5	0.744	236.234	206.734
TMIG_7	MH107_2	MH108_2	525	102	29.5	0.744	236.194	206.694
TMIG_8	MH108_2	MH109_2	525	110.6	29.5	0.744	236.266	206.766
TMIG_9	MH109_2	MH110_2	525	107.3	29.5	0.744	235.864	206.364
TMIG_10	MH110_2	MH111_2	525	82.9	29.5	0.645	192.968	163.468
TMIG_11	MH111_2	MH112_2	525	190.3	63.5	0.863	214.536	151.036
TMIG_12	MH112_2	MH113_2	525	134.716	63.5	0.925	236.151	172.651
TMIG_13	MH113_2	MH114_2	525	134.109	63.5	0.926	236.392	172.892
TMIG_14	MH114_2	MH115_2	525	135.483	63.5	0.925	236.064	172.564
TMIG_15	MH115_2	MH116_2	525	155.888	63.5	0.926	236.279	172.779
TMIG_16	MH116_2	MH117_2	525	138.585	63.5	0.926	236.264	172.764
TMIG_17	MH117_2	MH118_2	525	132.958	63.5	0.926	236.232	172.732
TMIG_18	MH118_2	MH119_2	525	135.113	63.5	0.925	236.096	172.596
TMIG_19	MH119_2	MH120_2	525	161.598	63.5	0.926	236.245	172.745
TMIG_20	MH120_2	MH121	525	112.289	63.5	0.926	236.241	172.741
TMIG_21	MH121	MH122	525	75.539	63.5	0.926	236.394	172.894
TMIG_22	MH122	MH123	525	86.828	69.51	0.944	234.61	165.1
TMIG_23	MH123	MH124	525	91.847	69.51	0.949	236.391	166.881
TMIG_24	MH124	MH125	525	99.413	69.51	0.948	236.1	166.59
TMIG_25	MH125	MH126	525	108.432	69.51	0.948	236.087	166.577
TMIG_26	MH126	MH127	525	119.491	69.51	0.949	236.368	166.858

TMIG_27	MH127	MH128	525	70.359	69.51	0.949	236.151	166.641
TMIG_28	MH128	MH129	525	67.982	69.51	0.949	236.226	166.716
TMIG_29	MH129	MH130	525	57.439	69.51	0.948	235.977	166.467
TMIG_30	MH130	MH131	525	62.055	69.51	0.948	236.09	166.58
TMIG_31	MH131	MH132	525	54.817	69.51	0.95	236.588	167.078
TMIG_32	MH132	MH133	525	109.734	69.51	0.948	236.122	166.612
TMIG_33	MH133	MH134	525	102.939	69.51	0.949	236.264	166.754
TMIG_34	MH134	MH135	525	108.579	69.51	0.948	235.927	166.417
TMIG_35	MH135	MH136	525	108.467	69.51	0.949	236.412	166.902
TMIG_36	MH136	MH137	525	81.344	69.51	0.949	236.179	166.669
TMIG_37	MH137	SMH26743	525	59.228	69.51	0.951	237.067	167.557
SMN29932	SMH26743	SMH26742	900	7.258	70.835	0.733	738.118	667.283
SMN29929	SMH26742	SMH27977	900	149.159	84.999	0.829	814.095	729.096
SMN29923	SMH27977	SMH27978	900	151.622	92.946	0.846	807.454	714.508
SMN29924	SMH27978	SMH28020	900	43.48	93.253	0.86	825.874	732.621

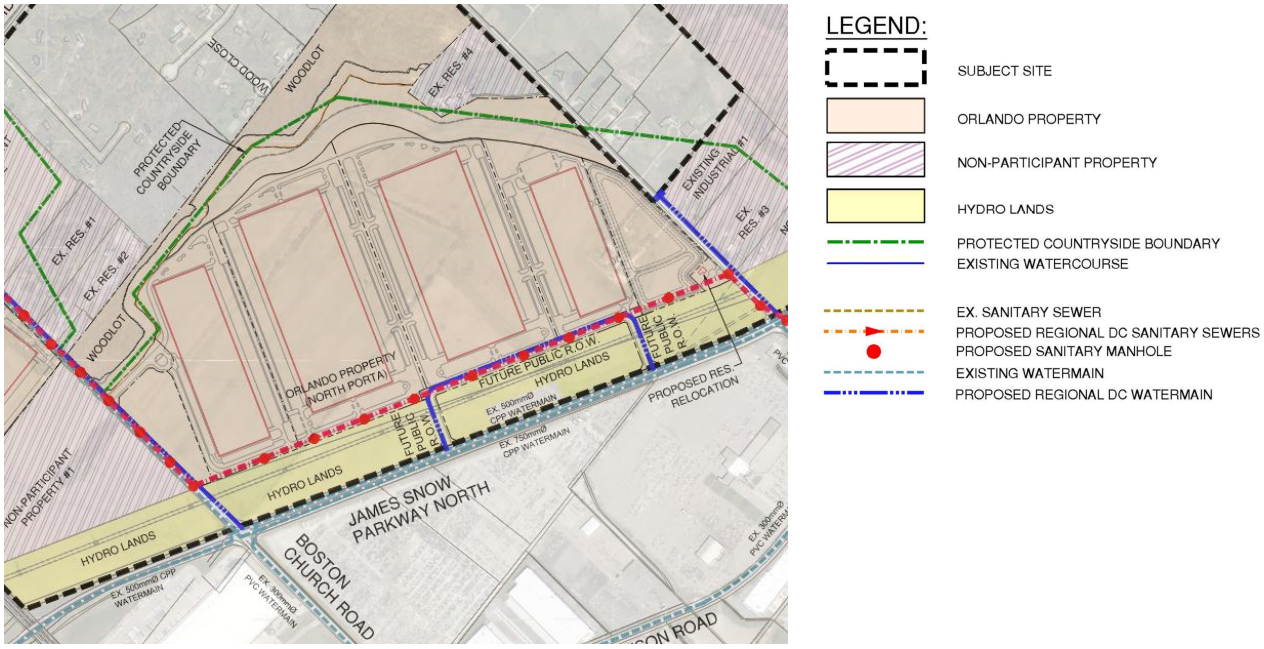
6.4.3.3 Conclusion

As shown, all sewers in this area have adequate capacity to accommodate the proposed development, including the non-participating landowners and existing residential. The addition of this development also improves the velocity through the 900mm trunk sewer.

7 SITE SPECIFIC SERVICING SUMMARY

7.1 Orlando Corporation

7.1.1 North Porta Lands – 8350 Esquesing Line



Phasing/Timing

These lands are located north of James Snow Parkway North, between Boston Church Road and Esquesing Line. As mentioned in Section 4, this is scheduled to be constructed prior to any other development. Servicing is anticipated to be completed in 2024.

Water

These lands can be serviced via a proposed local watermain service connection from the proposed 300mm watermain along the future public right-of-way.

Wastewater

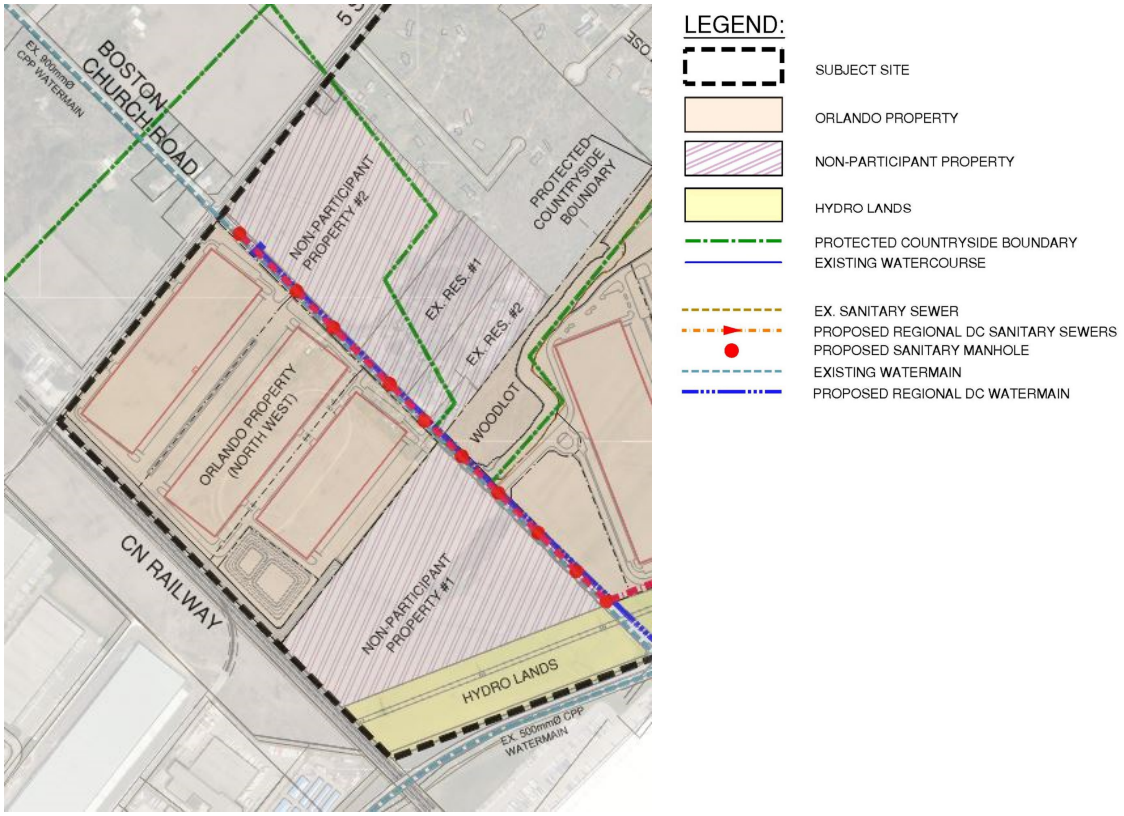
The North Porta development can be serviced via a local sanitary sewer service connection from the proposed 525 mm trunk sewer along the proposed future public right-of-way that ultimately discharges into James Snow Parkway North and Steeles Avenue.

Constraints/Easement Requirements

The proposed site cannot be serviced without the provision for potable water. The 300mm watermain along the future public right-of-way would need to be constructed by Orlando. The proposed watermain will follow the general alignment along the future public right-of-way as shown on **Figure 3**.

Similarly, if the proposed developments move forward prior to the construction of the Regional DC sanitary trunk projects, alternative servicing strategies will be required. The developer will be required to construct the proposed trunk wastewater infrastructure.

7.1.2 North Porta Lands – 8800 Boston Church Road



Phasing/Timing

These lands are located south of No. 5 Side Road, between the CN Railway and Boston Church Road. As mentioned in Section 4, this is scheduled to be constructed after the development of the North Porta property. Servicing is anticipated to be completed in 2025.

Water

These lands can be serviced via a proposed local watermain service connection from the proposed 400mm watermain along Boston Church Road.

Wastewater

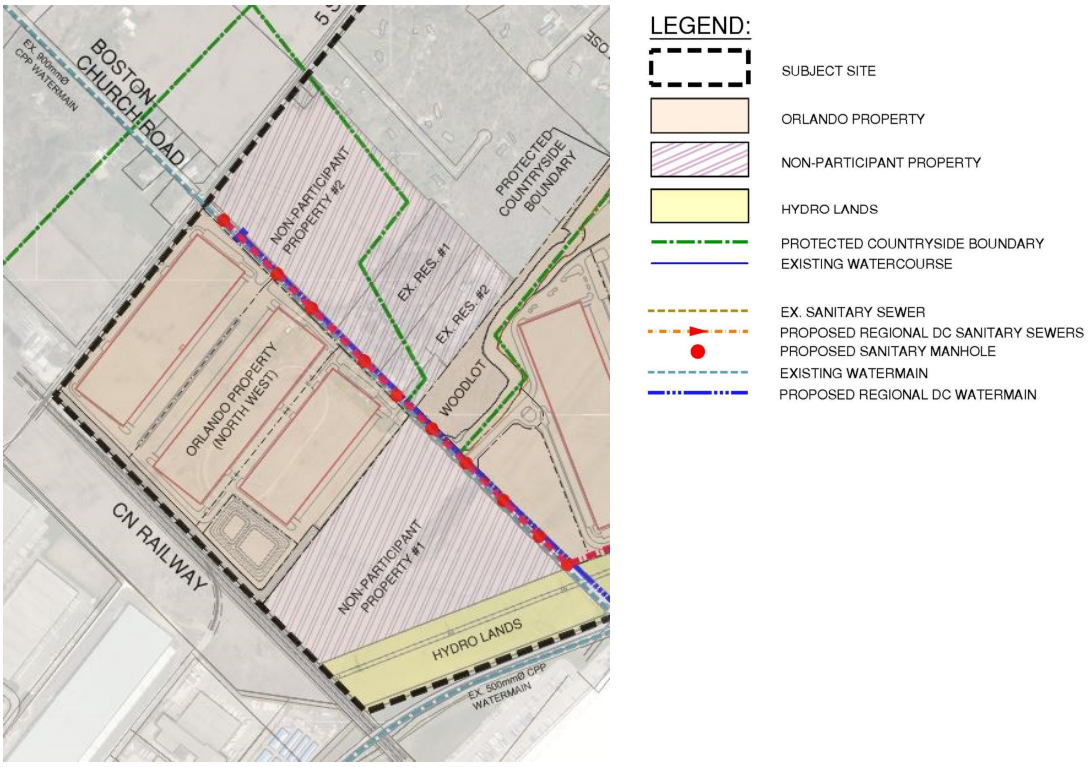
The North Porta Phase 2 development can be serviced via a local sanitary sewer service connection from the proposed 525 mm trunk sewer along Boston Church Road that ultimately discharges into James Snow Parkway North and Steeles Avenue.

Constraints/Easement Requirements

Since this development will be constructed following the installation of sewers and watermains for the North Porta site, there are no constraints to the development of this site. No easements are required.

7.2 Non-Participating Properties

7.2.1 Non-Participant #1 & #2, and Existing Residential #1 & #2



Phasing/Timing

These lands are located north of James Snow Parkway North, between the CN Railway and Mansewood Trail. These properties are considered non-participating and as such no information is available regarding future developments at the time of this study.

Water

These lands can be serviced via a proposed local watermain service connection from the proposed 400mm watermain along Boston Church Road.

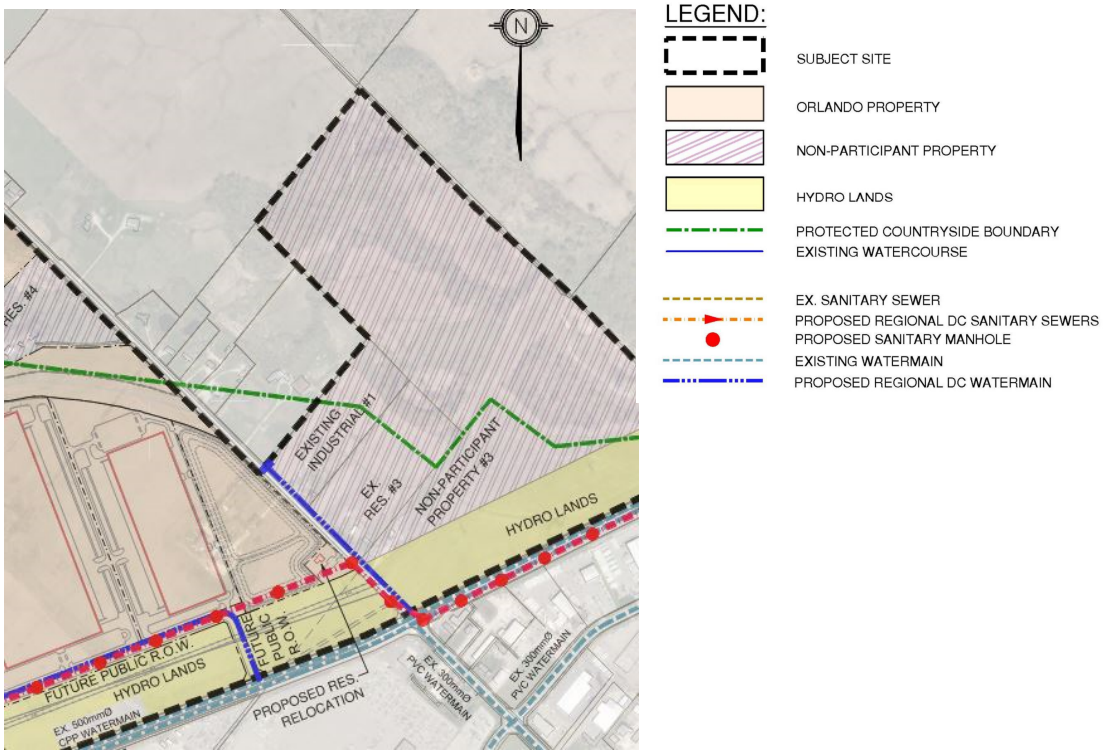
Wastewater

These non-participating developments can be serviced via a local sanitary sewer service connection from the proposed 525 mm trunk sewer along Boston Church Road that ultimately discharges into James Snow Parkway North and Steeles Avenue.

Constraints/Easement Requirements

If development of these lands advance after the Orlando properties, there will be no sanitary and watermain constraints. However, if the owner proceeds to develop these lands prior to the construction of the DC projects, the developer will be required to construct the proposed infrastructure.

7.2.2 Non-Participant #3, Existing Industrial #1, and Existing Residential #3



Phasing/Timing

These lands are located on the northeast boundary of the study area, north of Hydro Lands, and along Esquesing Line. These properties are considered non-participating and as such no information is available regarding future developments at the time of this study.

Water

These lands can be serviced via a proposed local watermain service connection from the proposed 400mm watermain along Esquesing Line.

Wastewater

This non-participating development can be serviced via a local sanitary sewer extension from the proposed 525 mm trunk sewer along James Snow Parkway North that ultimately discharges into Steeles Avenue. This will be subject to approval by the Region of Halton.

Constraints/Easement Requirements

If development of these lands advance after the Orlando properties, there will be no sanitary constraints. However, if the owner proceeds to develop these lands prior to the construction of the DC projects, the developer will be required to construct the proposed infrastructure.

8 SUMMARY / CONCLUSION

The ASP for the North Milton Business Park area in Milton, Ontario was prepared to outline how water and wastewater services will be provided throughout the site. The area is generally located north of James Snow Parkway, west of Esquesing Line, south of No. 5 Side Road and east of the CNR. The conceptual development plan for the subject areas generally consists of large warehouse buildings and associated parking, driveways, and landscaping.

The subject lands are anticipated to be serviced by future Halton Region watermain projects that have been proposed in the Region's 2022 DC Update Water/Wastewater Technical Report (GM BluePlan Engineering, 2021). These infrastructures are critical for the various development stages and are summarized below:

Table 8-1 Region of Halton Development Charge Projects – Water Servicing

Region IPFS ID	Project Description	Length (m)	Updated Length (m)	Construction Year
6649	400mm WM on Esquesing Line from James Snow Pkwy to approx. 800m north (Zone 267)	784	435	2026
6650	400mm WM on new roadway from Esquesing Line to approx. 360m west of Boston Church Rd (Zone 267)	2,029	850*	2026
6652	400mm WM on new roadway from 400m west of Boston Church Road to No. 5 Side Road (Zone 267)	695	1,140	2026
6653	400mm WM on No. 5 Side Road from approx. 400m west of Boston Church Road to 3rd Line (Zone 267)	390	See above	2026

*Local 300mm watermain along the future public right-of-way

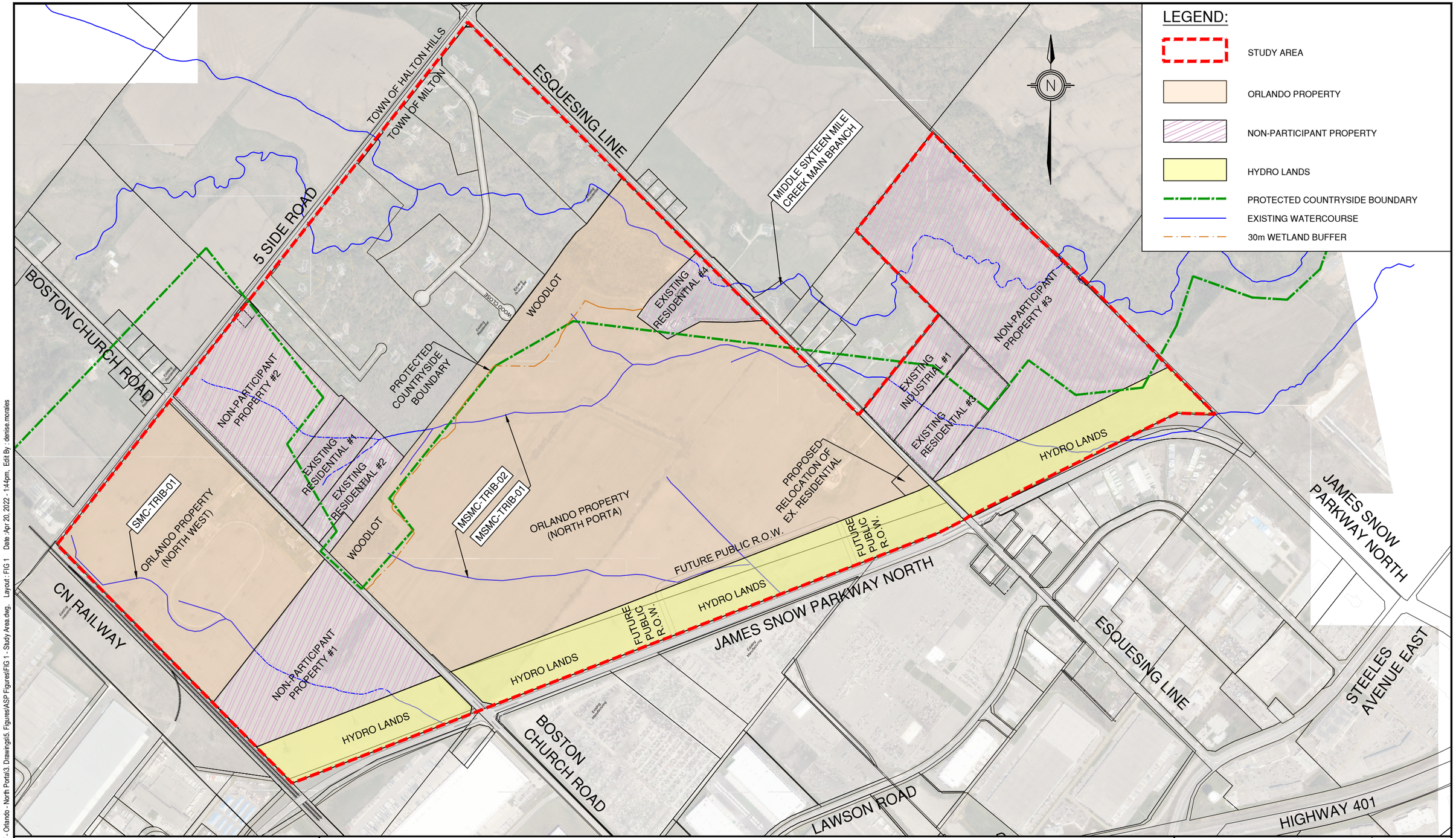
Table 8-2 Halton Region Development Charge Projects – Sanitary Servicing

Region IPFS ID	Project Description	Length (m)	Updated Length - Option 2 (m)	Construction Year
6560	525mm trunk sewer on James Snow Pkwy and new road alignment from Steeles Ave to Esquesing Line (MIL)	1,708	4,040	2026
6564	525mm trunk sewer on new alignment from Esquesing Line to Boston Church Road (MIL)	2,104	See above	2026

As mentioned above, if the proposed developments were to proceed prior to the construction of the DC watermain and sanitary projects, the DC projects would need to be constructed by the developers prior to construction of the individual site plans.

As for the non-participating properties along the eastern boundary of the site, watermains and sewers can be extended from the intersection of James Snow Parkway North and Esquesing Line. This will be subject to approval by the Region of Halton.

FIGURES



File : G:\Projects\2017\17197 - Orlando - North Porta\3. Drawings\5. Figures\ASP Figures\FIG 1 - Study Area.dwg, Layout : FIG 1 Date : Apr 20, 2022 - 1:44pm, Edit By : denise.morales

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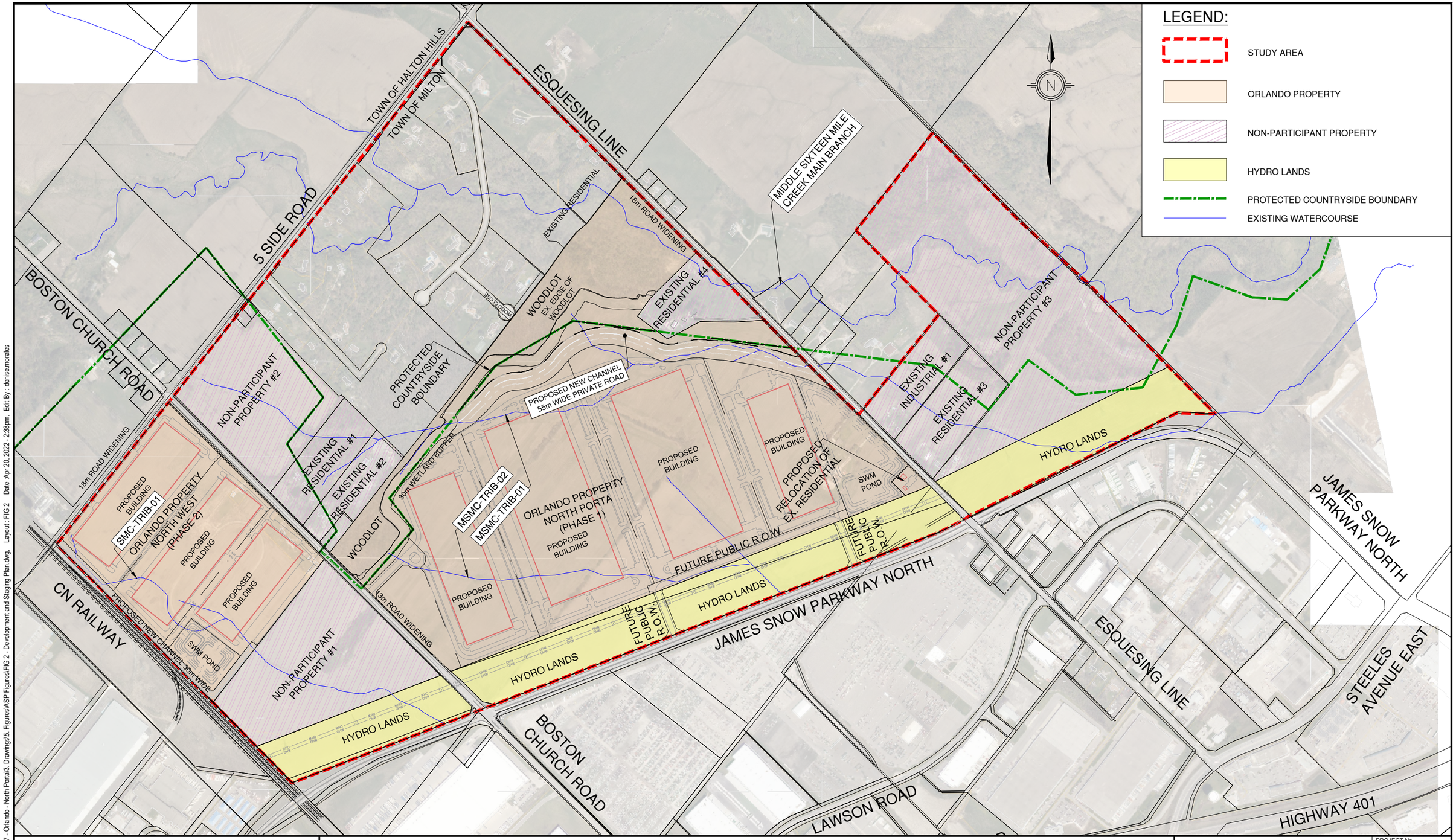
ORLANDO - NORTH PORTA

STUDY AREA & OWNERSHIP

SCALE: NTS			PROJECT No. 17197
DATE: APRIL 2022			
DESIGNED BY: D.M.	DRAWN BY: S.V.		FIGURE No. 1
CHECKED BY: A.A.	CHECKED BY: A.A.		



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ORLANDO - NORTH PORTA

DEVELOPMENT AND STAGING PLAN

SCALE: NTS			PROJECT No. 17197
DATE: APRIL 2022			
DESIGNED BY: D.M.	DRAWN BY: S.V.		FIGURE No. 2
CHECKED BY: A.A.	CHECKED BY: A.A.		

File : G:\Projects\2017\17197 - Orlando - North Porta\3. Drawings\5. Figures\ASP Figures\FIG 2 - Development and Staging Plan.dwg, Layout : FIG 2 Date: Apr 20, 2022 - 2:38pm, Edit By: denise.morales

PROPOSED REGION OF HALTON DC PROJECTS:

6649 - 400mm Ø WM ON EQUESING LINE FROM JAMES SNOW PARKWAY TO 800mm Ø NORTH.
6650 - 400mm Ø WM ON NEW ROAD FROM ESQUEING LINE TO APPROXIMATE 360m WEST OF BOSTON CHURCH RD.
6652 - 400mm Ø WM ON NEW ROAD FROM 360m WEST OF BOSTON CHURCH RD TO No 5 SIDEROAD.
6653 - 400mm Ø WM ON No 5 SIDEROAD FROM 400mm WEST OF BOSTON CHURCH RD TO BOSTON CHURCH RD.

LEGEND:

- STUDY AREA
- PROTECTED COUNTRYSIDE BOUNDARY
- PROPOSED WATERMAIN CONSTRUCTION BY DEVELOPMENT
- EXISTING WATERMAIN
- PROPOSED REGIONAL DC WATERMAIN

N

ESQUESING LINE
5 SIDE ROAD
BOSTON CHURCH ROAD
WOOD CLOSE
WOODLOT
EX. RES. #4
PROTECTED COUNTRYSIDE BOUNDARY
NON-PARTICIPANT PROPERTY #3
EXISTING INDUSTRIAL #1
EX. RES. #3
HYDRO LANDS
JAMES SNOW PARKWAY NORTH
EX. 500mmØ CPP WATERMAIN
EX. 750mmØ CPP WATERMAIN
EX. 900mmØ CPP WATERMAIN
EX. 300mmØ PVC WATERMAIN
EX. 600mmØ CPP WATERMAIN
STEELES AVENUE EAST
HIGHWAY 401
LAWSON ROAD
EX. 300mmØ DI WATERMAIN
WATERMAIN TO BE LOOPED AT TOP END
REGIONAL DC PROJECT 6649 - PROP 400mmØ WATERMAIN (2026) (ALIGNMENT MODIFIED)
PROP 300mmØ WATERMAIN (THIS WATERMAIN IS IN LIEU OF A SPECIFIC DC PROJECT)
REGIONAL DC PROJECT 6652 & 6650 - PROP 400mmØ WATERMAIN (ALIGNMENT MODIFIED)
ORLANDO PROPERTY (NORTH PORTA)
ORLANDO PROPERTY (NORTH WEST)
INSTALL WATERMAIN LOOP
NON-PARTICIPANT PROPERTY #2
NON-PARTICIPANT PROPERTY #1
EX. RES. #1
EX. RES. #2
WOODLOT
FUTURE PUBLIC R.O.W.
PROPOSED RES. RELOCATION
CN RAILWAY

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ORLANDO - NORTH PORTA

PROPOSED REGIONAL WATER WORKS

SCALE: NTS		PROJECT No.	17197
DATE: APRIL 2022			
DESIGNED BY: D.M.	DRAWN BY: S.V.	FIGURE No.	3
CHECKED BY: A.A.	CHECKED BY: A.A.		

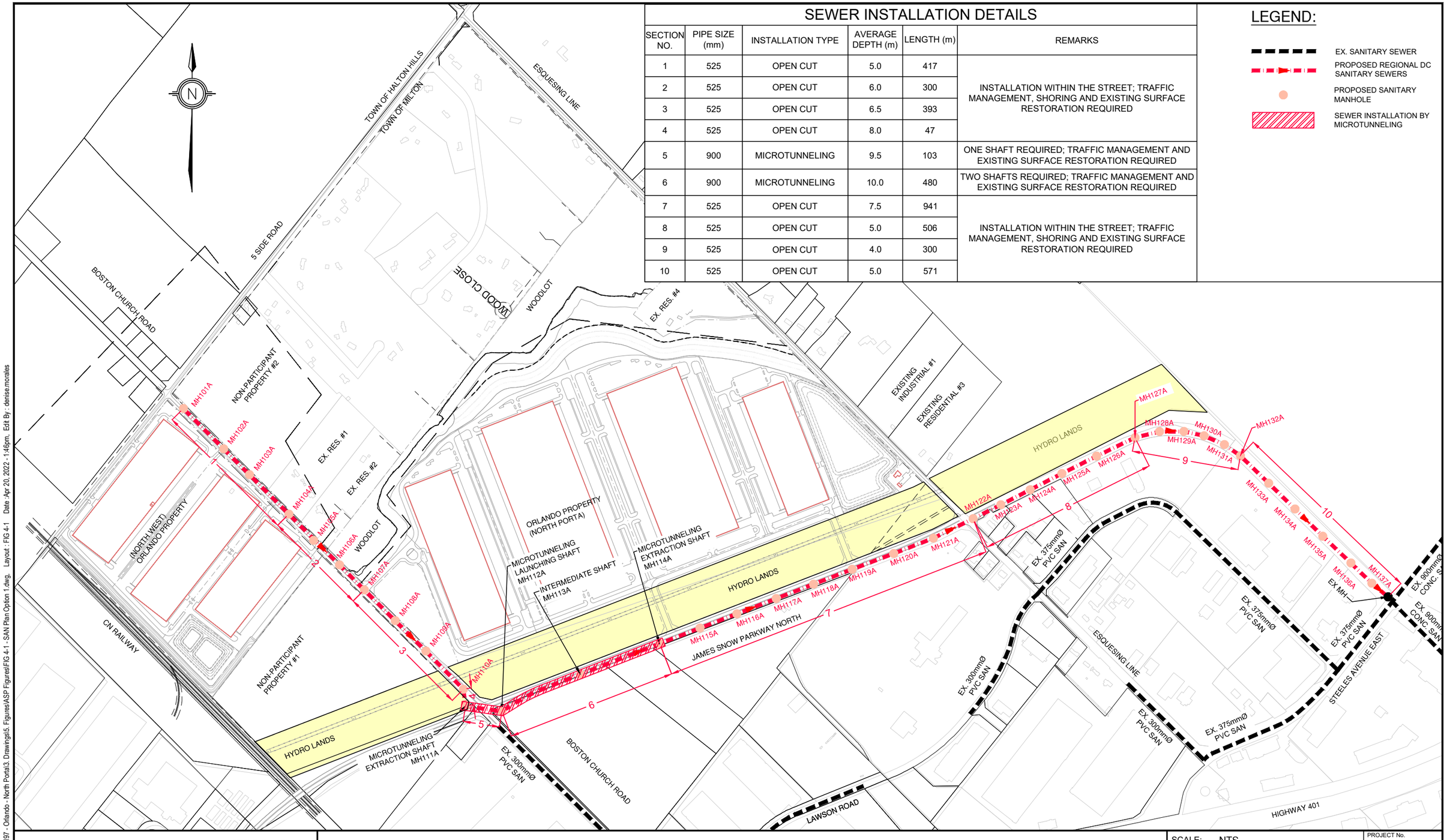
File: G:\Projects\2017\17197 - Orlando - North Porta\3. Drawings\5. Figures\ASP Figures\FIG 3 - WM Plan.dwg, Layout: FIG 3 Date: Apr 20, 2022 - 1:45pm. Edit By: denise.morales

SEWER INSTALLATION DETAILS

SECTION NO.	PIPE SIZE (mm)	INSTALLATION TYPE	AVERAGE DEPTH (m)	LENGTH (m)	REMARKS
1	525	OPEN CUT	5.0	417	INSTALLATION WITHIN THE STREET; TRAFFIC MANAGEMENT, SHORING AND EXISTING SURFACE RESTORATION REQUIRED
2	525	OPEN CUT	6.0	300	
3	525	OPEN CUT	6.5	393	
4	525	OPEN CUT	8.0	47	
5	900	MICROTUNNELING	9.5	103	ONE SHAFT REQUIRED; TRAFFIC MANAGEMENT AND EXISTING SURFACE RESTORATION REQUIRED
6	900	MICROTUNNELING	10.0	480	TWO SHAFTS REQUIRED; TRAFFIC MANAGEMENT AND EXISTING SURFACE RESTORATION REQUIRED
7	525	OPEN CUT	7.5	941	INSTALLATION WITHIN THE STREET; TRAFFIC MANAGEMENT, SHORING AND EXISTING SURFACE RESTORATION REQUIRED
8	525	OPEN CUT	5.0	506	
9	525	OPEN CUT	4.0	300	
10	525	OPEN CUT	5.0	571	

LEGEND:

- EX. SANITARY SEWER
- PROPOSED REGIONAL DC SANITARY SEWERS
- PROPOSED SANITARY MANHOLE
- SEWER INSTALLATION BY MICROTUNNELING



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ORLANDO - NORTH PORTA

PROPOSED REGIONAL TRUNK WASTEWATER WORKS - OPTION 1

SCALE: NTS			PROJECT No. 17197
DATE: APRIL 2022			
DESIGNED BY: M.R.	DRAWN BY: K.K.		FIGURE No. 4-1
CHECKED BY: A.A.	CHECKED BY: A.A.		

File : G:\Projects\2017\17197 - Orlando - North Porta\3. Drawings\5. Figures\ASP Figures\FIG 4-1 - SAN Plan Option 1.dwg, Layout : FIG 4-1 Date: Apr 20, 2022 - 1:46pm, Edit By: denise.morales

TABLE 1

SECTION NO.	PIPE SIZE (mm)	INSTALLATION TYPE	AVERAGE DEPTH (m)	LENGTH (m)	REMARKS
1	525	OPEN CUT	5.0	417	INSTALLATION WITHIN THE STREET; TRAFFIC MANAGEMENT, SHORING AND EXISTING SURFACE RESTORATION REQUIRED
2	525	OPEN CUT	6.0	300	
3	525	OPEN CUT	8.0	300	INSTALLATION IN OPEN FIELD; WIDE TRENCH INSTALLATION WITH NO SHORING, NO TRAFFIC MANAGEMENT AND NO SURFACE RESTORATION REQUIRED
4	525	OPEN CUT	8.0	460	
5	525	OPEN CUT	5.5	428	
6	525	OPEN CUT	7.5	553	
7	525	OPEN CUT	7.0	187	INSTALLATION WITHIN THE STREET; TRAFFIC MANAGEMENT, SHORING AND EXISTING SURFACE RESTORATION REQUIRED
8	525	OPEN CUT	5.0	506	
9	525	OPEN CUT	4.0	300	
10	525	OPEN CUT	5.0	571	

LEGEND:

- EX. SANITARY SEWER
- PROPOSED REGIONAL DC SANITARY SEWERS
- PROPOSED SANITARY MANHOLE

TOWN OF HALTON HILLS
TOWN OF MILTON
ESQUESING LINE
5 SIDE ROAD
BOSTON CHURCH ROAD
WOOD CLOSE
WOODLOT
EX. RES. #4
PROTECTED COUNTRYSIDE BOUNDARY
NON-PARTICIPANT PROPERTY #2
EXISTING INDUSTRIAL #1
EXISTING RESIDENTIAL #3
EX. RES. #1
EX. RES. #2
ORLANDO PROPERTY (NORTH WEST)
ORLANDO PROPERTY (NORTH PORTA)
ALIGNMENT TO BE CONFIRMED THROUGH COORDINATION WITH THE SITE DESIGN PLAN
EASEMENT TO BE PROVIDED WITHIN THE ORLANDO PROPERTY LIMITS FOR THE NEW DC SANITARY SEWER
FUTURE PUBLIC R.O.W.
HYDRO LANDS
HYDRO LANDS
HYDRO LANDS
HYDRO LANDS
CN RAILWAY
NON-PARTICIPANT PROPERTY #1
JAMES SNOW PARKWAY NORTH
BOSTON CHURCH ROAD
LAWSON ROAD
ESQUESING LINE
STEELES AVENUE EAST
HIGHWAY 401
EX. 300mmØ PVC SAN
EX. 375mmØ PVC SAN
EX. 900mmØ CONC. SAN
EX MH
MH101A
MH102A
MH103A
MH104A
MH105A
MH106A
MH107A
MH108A
MH109A
MH110A
MH111A
MH112A
MH113A
MH114A
MH115A
MH116A
MH117A
MH118A
MH119A
MH120A
MH121A
MH122A
MH123A
MH124A
MH125A
MH126A
MH127A
MH128A
MH129A
MH130A
MH131A
MH132A
MH133A
MH134A
MH135A
MH136A
MH137A
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ORLANDO - NORTH PORTA

PROPOSED REGIONAL TRUNK WASTEWATER WORKS - OPTION 2

SCALE: NTS			PROJECT No. 17197
DATE: MARCH 2022			
DESIGNED BY: M.R.	DRAWN BY: K.K.		FIGURE No. 4-2
CHECKED BY: A.A.	CHECKED BY: A.A.		

PROPOSED REGION OF HALTON DC PROJECTS:

6560 - 525mm Ø SAN SEWER ON JAMES SNOW PARKWAY FROM STEELES TO ESQUESING.
6564 - 525mm Ø SAN SEWER ON NEW ALIGNMENT FROM ESQUESING TO 3rd LINE.

NOTE:
SITE AREAS ARE ASSUMED TO BE DEVELOPED AS LIGHT INDUSTRIAL AREAS EXCEPT FOR RELOCATED RESIDENTIAL AREA WHICH IS ASSUMED TO BE INSTITUTIONAL. POPULATION WAS CALCULATED USING TABLE A-8 OF THE 2022 DC BACKGROUND STUDY.

LEGEND:
- STUDY AREA
- SANITARY DRAINAGE AREA
- 50 / 3.50 — POPULATION / AREA IN HECTARES
- PROTECTED COUNTRYSIDE BOUNDARY
- PROPOSED SANITARY SEWER CONSTRUCTION BY DEVELOPMENT
- EX. SANITARY SEWER
- PROPOSED REGIONAL DC SANITARY SEWERS
- PROPOSED SANITARY MANHOLE

N

TOWN OF HALTON HILLS
TOWN OF MILTON
ESQUESING LINE
5 SIDE ROAD
BOSTON CHURCH ROAD
WOOD CLOSE
WOODLOT
EX. RES. #4
PROTECTED COUNTRYSIDE BOUNDARY
EXISTING INDUSTRIAL #1
NON-PARTICIPANT PROPERTY #3
NON-PARTICIPANT PROPERTY #2
NON-PARTICIPANT PROPERTY #1
EX. RES. #1
EX. RES. #2
EX. RES. #3
ORLANDO PROPERTY (NORTH WEST)
ORLANDO PROPERTY (NORTH PORTA)
REGIONAL DC PROJECT 6564 - PROP 525mmØ TRUNK SAN (2026)
REGIONAL DC PROJECT 6560 - PROP 525mmØ TRUNK SAN (2026)
PROPOSED RES. RELOCATION
FUTURE SANITARY SEWER
FUTURE PUBLIC R.O.W.
HYDRO LANDS
CN RAILWAY
JAMES SNOW PARKWAY NORTH
JAMES SNOW PARKWAY NORTH
STEELES AVENUE EAST
ESQUESING LINE
LAWSON ROAD
HIGHWAY 401
EX. 300mmØ PVC SAN
EX. 375mmØ PVC SAN
EX. 900mmØ CONC. SAN
EX MH

TYLin	ORLANDO - NORTH PORTA	SCALE: NTS	PROJECT No. 17197
8800 Dufferin Street, Suite 200, Vaughan, ON L4K 0C5 p: 905.738.5700 f: 905.738.0065	SANITARY DRAINAGE AREAS - OPTION 2	DATE: APRIL 2022	
		DESIGNED BY: D.M. / DRAWN BY: S.V.	FIGURE No. 5
		CHECKED BY: A.A. / CHECKED BY: A.A.	

File : G:\Projects\2017\17197 - Orlando - North Porta\3. Drawings\5. Figures\ASP Figures\FIG 5 - SAN Drainage Plan.dwg, Layout: : FIG 5 Date: Apr 20, 2022 - 2:18pm, Edit By: denise.morales

APPENDIX A

Fireflow Calculations and Water System Modelling

TYLin

Fire Flow Calculation

Fire Underwriters Survey Methodology

North Porta - Orlando

Project: 17197 **Date:** 4/21/2022
By: GS **Checked:** KCB

Step 1: Fire Flow Formula

$$F = 220 * C * A^{0.5}$$

C= Construction Coefficient

C=	**0.6**

1.5 Wood Framing
1.0 Ordinary - Brick Walls, Combustible Interior
0.8 Non-combustible (metal structure, masonry or metal walls)
0.6 Fire Resistive

A= Total Floor Area in sq.meters

A=	**110,795 m²**

Floor	Area [m²]	Adjustment	Adjusted [m²]
1	110,795	100%	110,795
2		100%	0
		TOTAL:	**110,795**

F=	**43,937 L/min**

Step 2: Reduction/Surcharge for Occupancy

Non Combustible Content	-25%
Limited Combustible	-15%
Combustible	No Charge
Free Burning	15%
Rapid Burning	25%

Charge=	**-15%**
Revised F=	**37,346 L/min**

Step 3: Reduction for Sprinkler System

The Revised F value may be reduced up to:
50% for a complete automatic sprinkler system
30% for a sprinkler system conforming to NFPA 13

Reduction=	**50%**	*(Note 1)*
Reduction=	**18,673 L/min**	

Step 4: Exposure Surcharges

0 to 3.0 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%
Unpierced Party Wall	10%

The sum of all exposures must be less than 75%

Direction	Distance	Charge %
North	>50	0%
South	>50	0%
East	>50	0%
West	>50	0%
	Total Charge=	**0%**
	Exposure Surcharge=	**0 L/min**

Step 5: Design Fire Flow

Min 2,000 L/min; Max 40,000 L/min (rounded to 1,000 L/min)

Revised F=	**19,000 L/min**
Revised F=	**317 L/s**

Note 1: Additional credit of 10% is applied because the water supply will be standard for both the system and the fire department hose lines. (per "Water Supply for Public Fire Protection, FUS 1999)

Figure 1 Proposed Water Main Layout

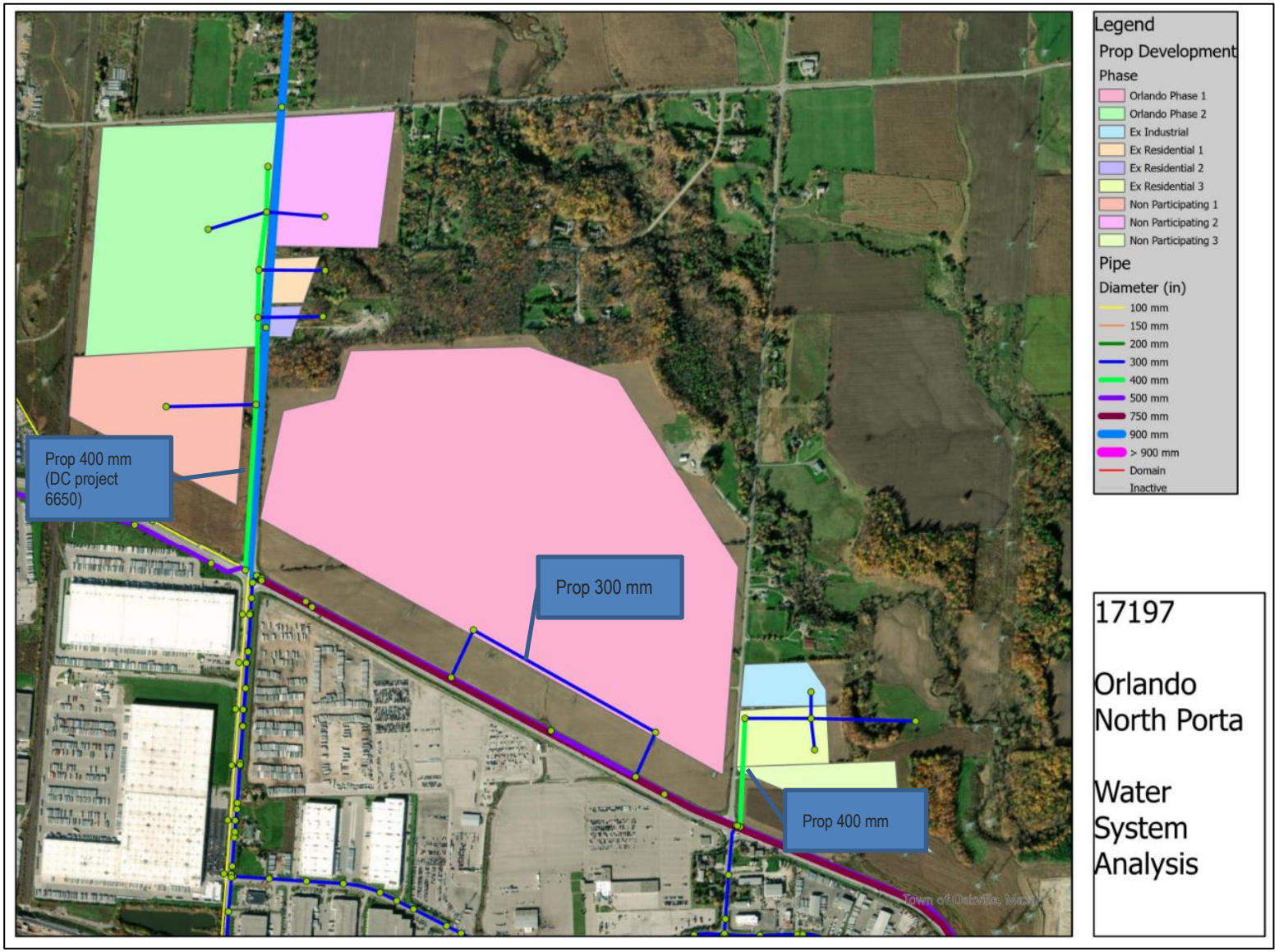


Figure 2 Phase 1 Maximum Day Demand Scenario

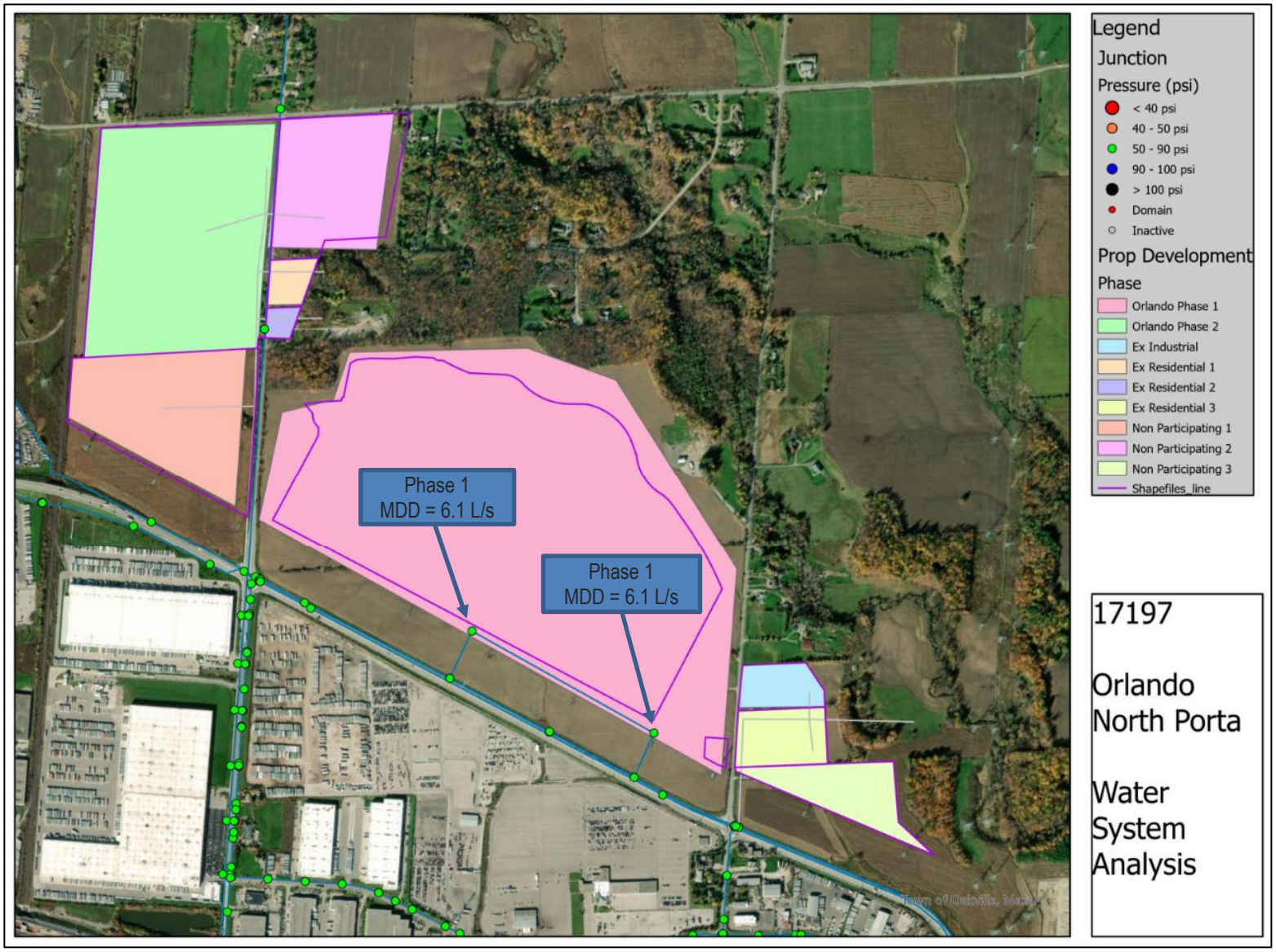


Figure 3 Final Phase Maximum Day Demand Scenario

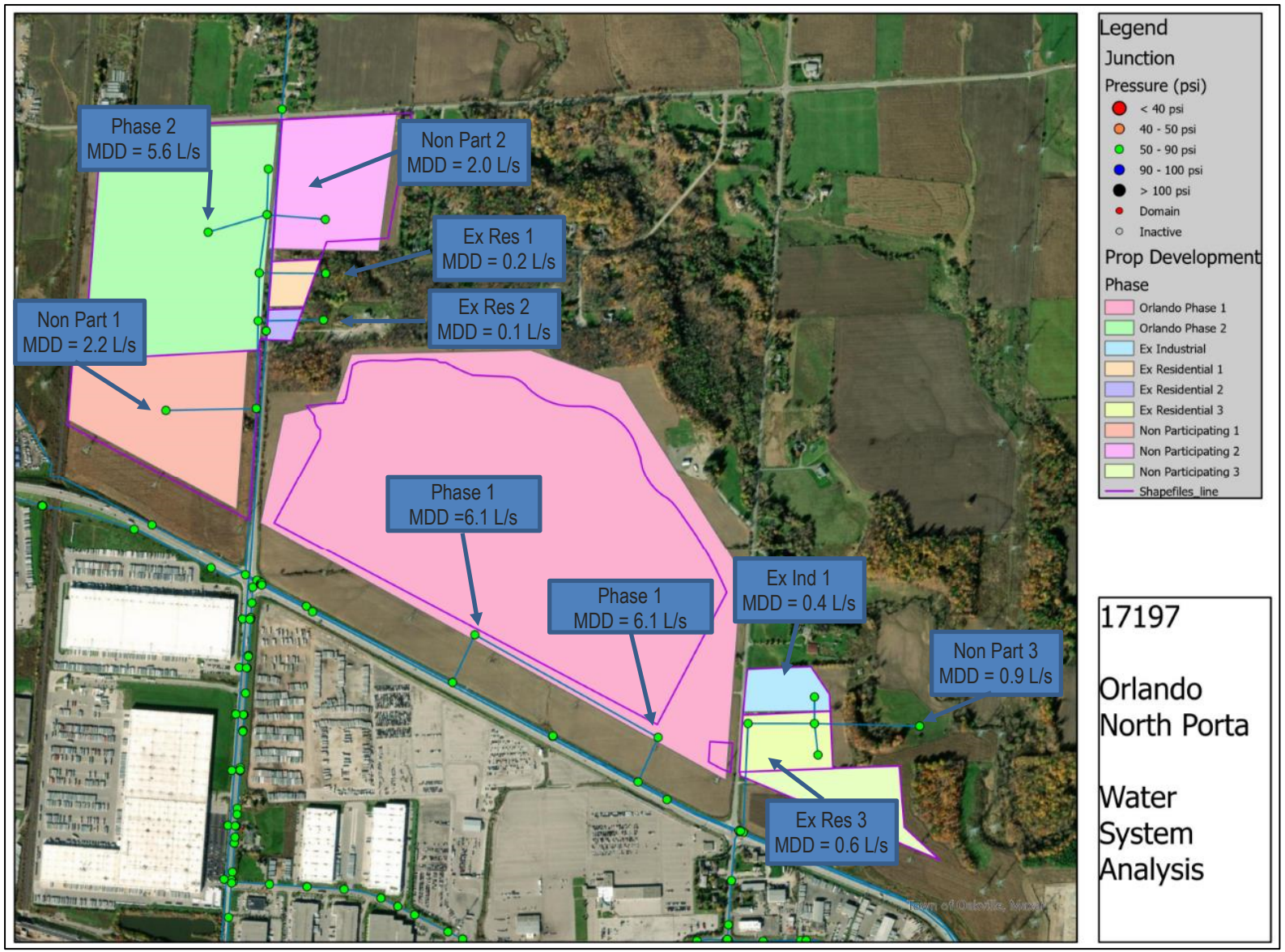


Figure 4 Phase 1 Maximum Day Plus Fire Scenario

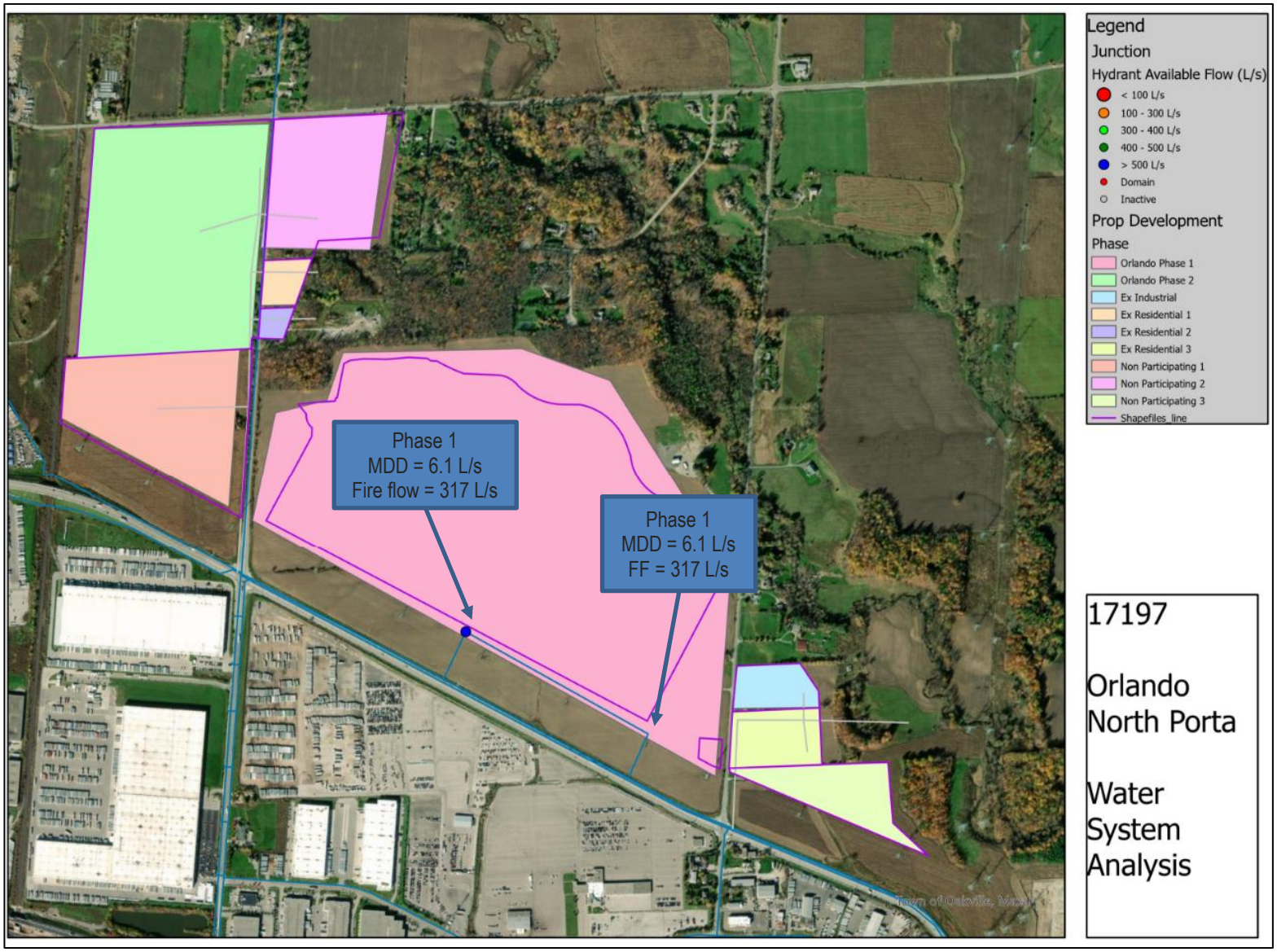
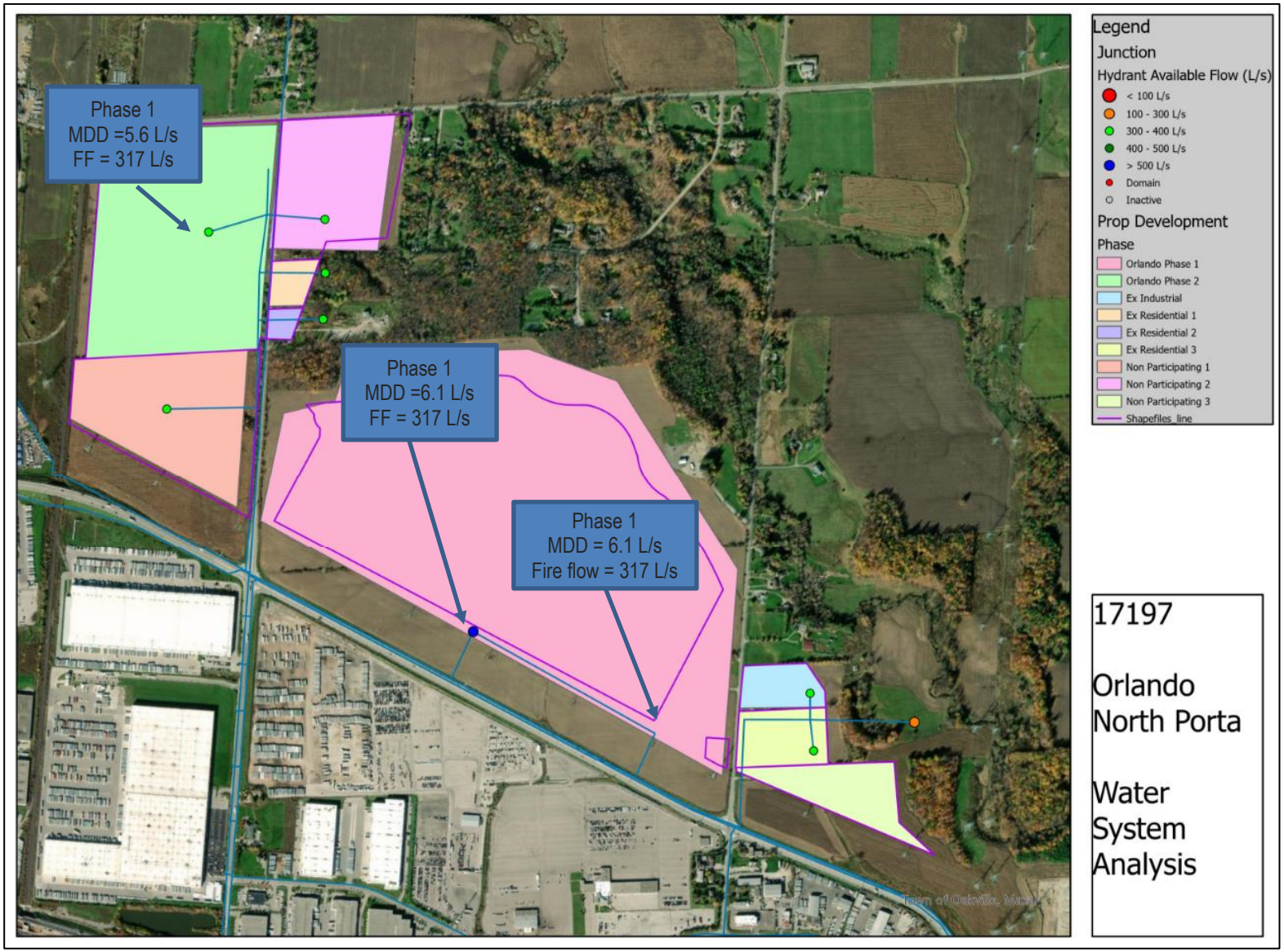


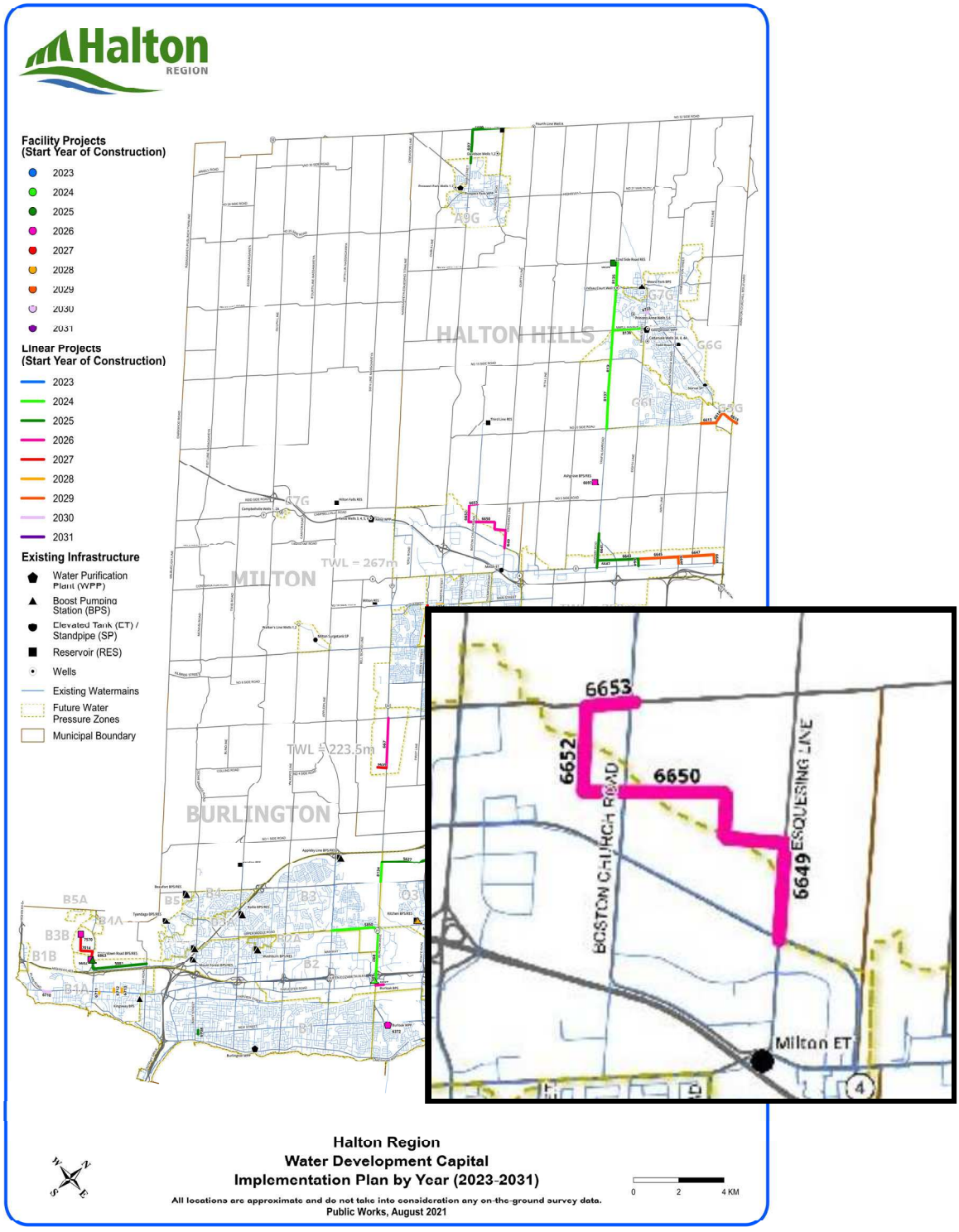
Figure 5 Final Phase Maximum Day Plus Fire Scenariore



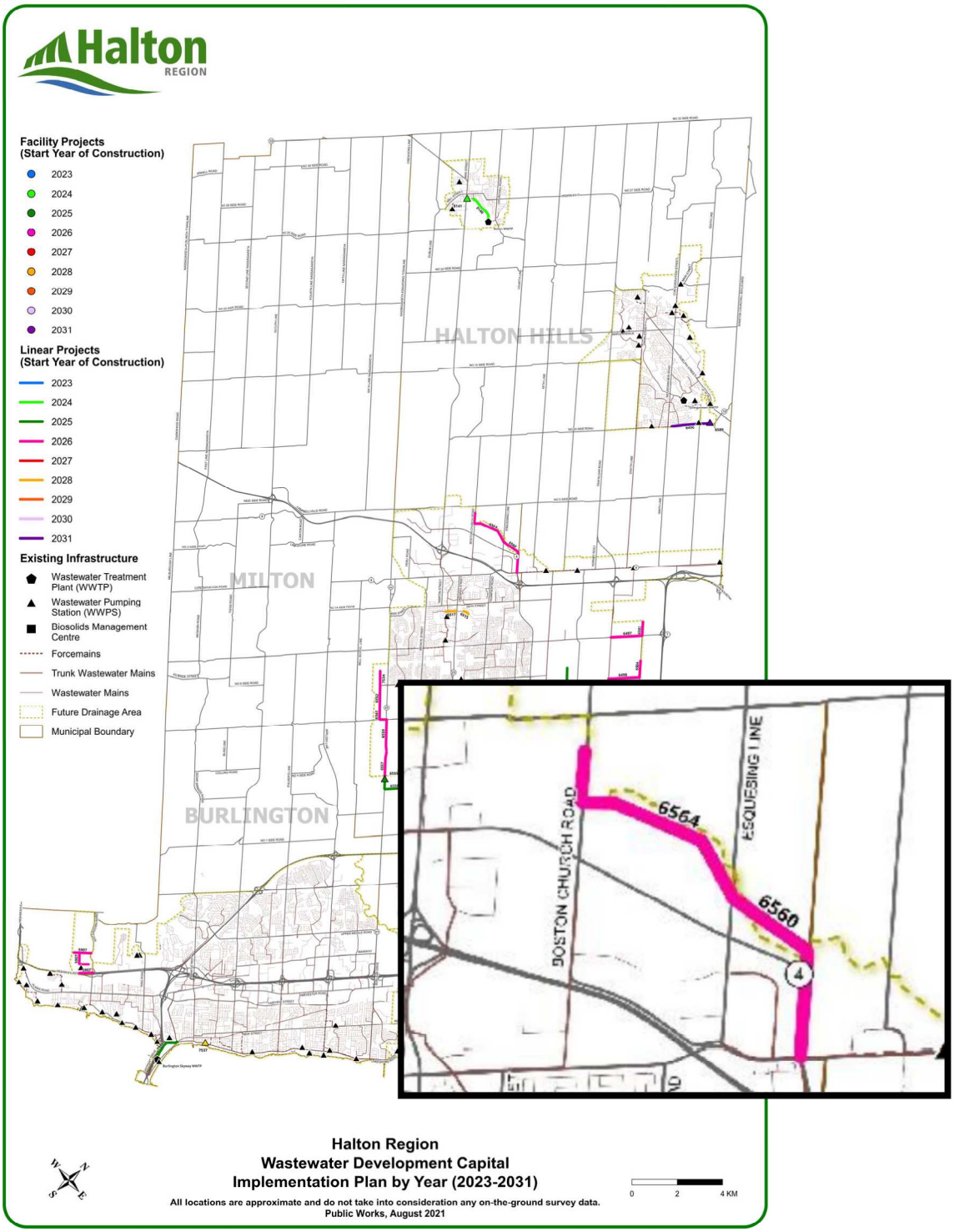
APPENDIX B

Regional Development Capital Projects

Map B-1 Water Development Capital Implementation Plan (2023-2031)



Map B-2 Wastewater Development Capital Implementation Plan (2023-2031)


Halton
REGION
Facility Projects
(Start Year of Construction)
2023
2024
2025
2026
2027
2028
2029
2030
2031
Linear Projects
(Start Year of Construction)
2023
2024
2025
2026
2027
2028
2029
2030
2031
Existing Infrastructure
Wastewater Treatment Plant (WWTP)
Wastewater Pumping Station (WWPS)
Biosolids Management Centre
Forcemains
Trunk Wastewater Mains
Wastewater Mains
Future Drainage Area
Municipal Boundary
HALTON HILLS
MILTON
BURLINGTON
6564
6560
4
BOSTON CHURCH ROAD
ESQUESING LINE
Halton Region
Wastewater Development Capital
Implementation Plan by Year (2023-2031)
All locations are approximate and do not take into consideration any on-the-ground survey data.
Public Works, August 2021
0
2
4 KM

APPENDIX C

Sanitary Design Calculations

SANITARY SEWER DESIGN

The Regional Municipality of Halton

Project No. 17197
Location North Porta
Town of Milton

Sanitary Sewer Option 2 @ 0.3%

Date 17-Apr-22
Designed By GS
Checked By CBL

Street	Manhole From	Manhole To	Lot Area (ha)	Total (ha)	Tributary Area (Sq. ft) Increment Res. S.F.	Townhouse	Semi	IND.	Total	Population Tributary Increment Res. S.F.	Townhouse	Semi	IND.	Total	Average Increment m3/s	Average Total m3/s	Peaking Factor	Max. Flow m3/s	Infiltration m3/s	Max. Flow Expect m3/s	SEWER Size (mm)	Slope (%)	Q (m3/s)	V m/s Full Flow	Qa/Qf	Act. Flow	Capacity (%)	PIPE Type	Class	REMARKS
BOSTON CHURCH ROAD																														
ORLANDO - NORTH WEST	MH101A	MH102A	29.50	29.50				1,568,700	1,568,700	0	0	0	1130	1130	0.00242	0.00242	3.01	0.00729	0.00844	0.01573	525	0.30	0.236	1.09	0.07	0.61	7%	CONC.		
	MH102A	MH103A	-	29.50					1,568,700	0	0	0	0	1130	0.00000	0.00242	3.01	0.00729	0.00844	0.01573	525	0.30	0.236	1.09	0.07	0.61	7%	CONC.		
NON PARTICIPATING 2	MH103A	MH104A	11.37	40.87				550,582	2,119,282	0	0	0	397	1527	0.00085	0.00327	2.94	0.00961	0.01169	0.02130	525	0.30	0.236	1.09	0.09	0.68	9%	CONC.		
EXISTING RESIDENTAL 1	MH104A	MH105A	1.41	42.28				68,296	2,187,578	0	0	0	50	1577	0.00011	0.00338	2.93	0.00990	0.01209	0.02199	525	0.30	0.236	1.09	0.09	0.60	9%	CONC.		
EXISTING RESIDENTAL 2	MH105A	MH106A	0.66	42.94				31,850	2,219,428	0	0	0	23	1600	0.00005	0.00343	2.93	0.01003	0.01228	0.02231	525	0.30	0.236	1.09	0.09	0.57	9%	CONC.		
NON PARTICIPATING 1	MH106A	MH107A	12.70	55.64				614,856	2,834,284	0	0	0	443	2043	0.00095	0.00437	2.86	0.01252	0.01591	0.02844	525	0.30	0.236	1.09	0.12	0.46	12%	CONC.		
	MH107A	MH108A	-	55.64				-	2,834,284	0	0	0	0	2043	0.00000	0.00437	2.86	0.01252	0.01591	0.02844	525	0.30	0.236	1.09	0.12	0.46	12%	CONC.		
	MH108A	MH109A	-	55.64				-	2,834,284	0	0	0	0	2043	0.00000	0.00437	2.86	0.01252	0.01591	0.02844	525	0.30	0.236	1.09	0.12	0.46	12%	CONC.		
	MH109A	MH110A	-	55.64				-	2,834,284	0	0	0	0	2043	0.00000	0.00437	2.86	0.01252	0.01591	0.02844	525	0.30	0.236	1.09	0.12	0.46	12%	CONC.		
JAMES SNOW PARKWAY	MH110A	MH111A	67.12	122.76				3,415,519	6,249,803	0	0	0	2459	4502	0.00527	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH111A	MH112A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH112A	MH113A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH113A	MH114A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH114A	MH115A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH115A	MH116A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH116A	MH117A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH117A	MH118A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
	MH118A	MH119A	-	122.76				-	6,249,803	0	0	0	0	4502	0.00000	0.00964	2.63	0.02535	0.03511	0.06046	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
PROPOSED RESIDENTIAL RELOCATION	MH119A	MH120A	0.41	123.17				4,374	6,254,177	0	0	0	6	4508	0.00001	0.00965	2.63	0.02538	0.03523	0.06060	525	0.30	0.236	1.09	0.26	0.75	26%	CONC.		
ESQUESING LINE																														
EXISTING INDUSTRIAL 1	MH201A	MH202A	2.54	125.71				123,214	6,373,017	0	0	0	89	4597	0.00019	0.00984	2.62	0.02582	0.03595	0.06177	525	0.30	0.236	1.09	0.26	0.76	26%	CONC.		
EXISTING RESIDENTIAL 3	MH202A	MH120A	3.65	129.36				176,913	6,549,930	0	0	0	128	4725	0.00027	0.01012	2.61	0.02645	0.03700	0.06344	525	0.30	0.236	1.09	0.27	0.77	27%	CONC.		
NON PARTICIPANT 3	MH120A	MH121A	4.95	134.31				240,008	6,494,185	0	0	0	173	4898	0.00037	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH121A	MH122A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
JAMES SNOW PARKWAY	MH122A	MH123A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH123A	MH124A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH124A	MH125A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH125A	MH126A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH126A	MH127A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH127A	MH128A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH128A	MH129A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH129A	MH130A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH130A	MH131A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH131A	MH132A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH132A	MH133A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH133A	MH134A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH134A	MH135A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH135A	MH136A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH136A	MH137A	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		
	MH137A	MH90 EX	-	134.31				-	6,494,185	0	0	0	0	4898	0.00000	0.01049	2.60	0.02730	0.03841	0.06571	525	0.30	0.236	1.09	0.28	0.79	28%	CONC.		

Residential Design Parameters:

Flow (l/cap./day) - 215
Single Family Density (pers/ha) - 55
Townhouse Density (pers/ha) - 135
Semi-Detached Density (pers/ha) - 100
Minimum Pipe Size - 200 mm

Commercial Design Parameters:

Flow - Existing Parcel (m3/ha./day) - 24.750
Flow - Proposed Parcel (l/emp/day) - 185.000
Density (employee/sq ft) - 0.00248

Industrial Design Parameters:

Flow (m3/ha./day) - 34.375
Flow - Proposed Parcel (l/emp/day) - 185.000
Density (employee/sq ft) - 0.0007

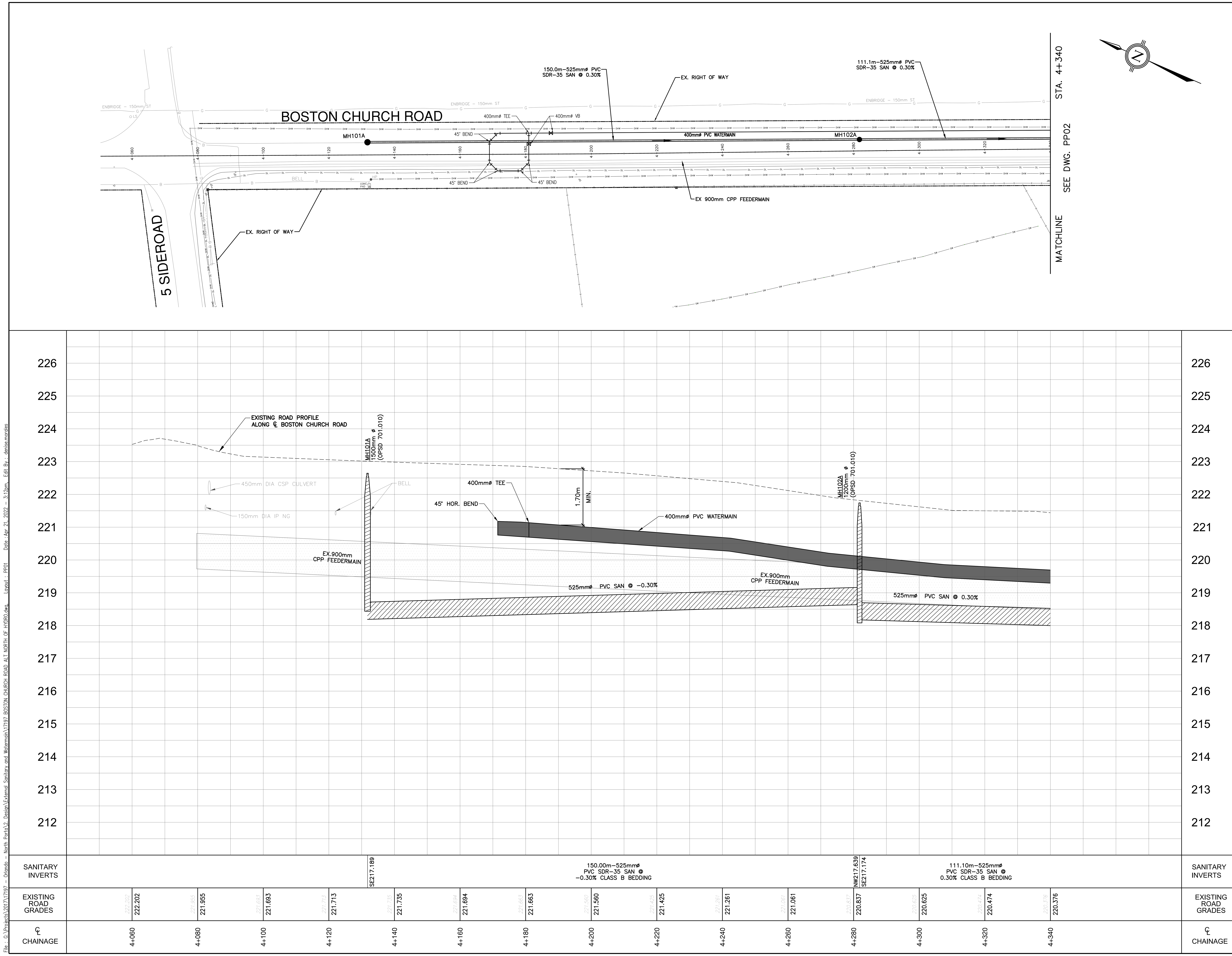
Infiltration Rate - 0.000286 m3/s/ha
mannings 'n' - 0.0130
Peaking Factor - Res. Harmon
Comm. & ind. 0.8*Res PF
Modified Harmon

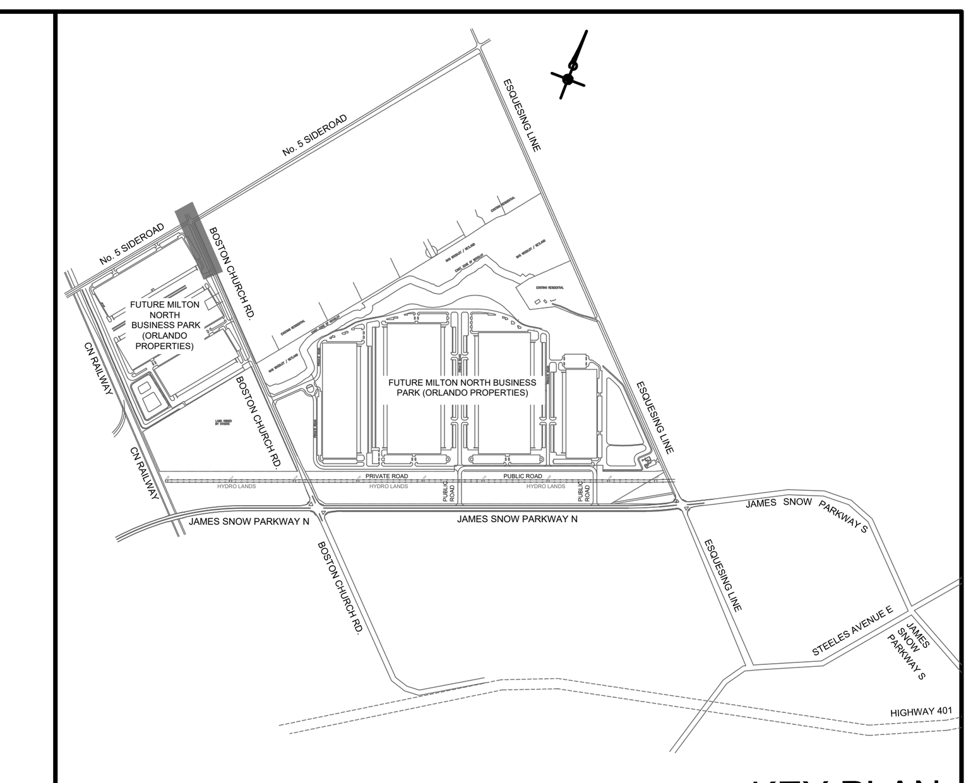
Institutional Design Parameters:

Flow - Proposed Parcel (l/emp/day) - 185.000
Density (employee/sq ft) - 0.0014

APPENDIX D

Profile Drawings





KEY PLAN
N.T.S.

LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY: APPROVED BY:

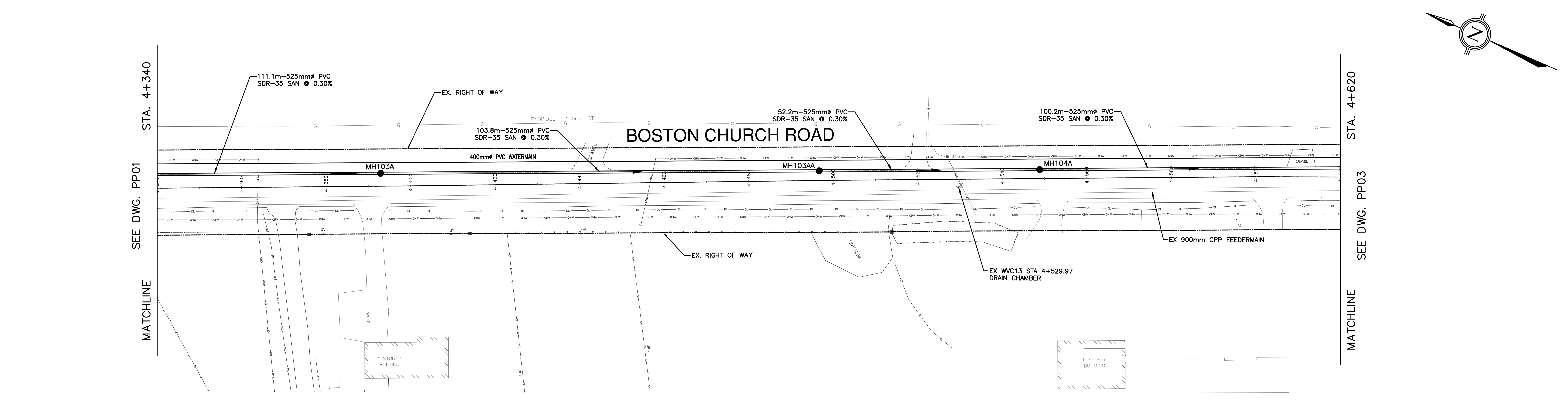
TYLin
8800 Dufferin Street, Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

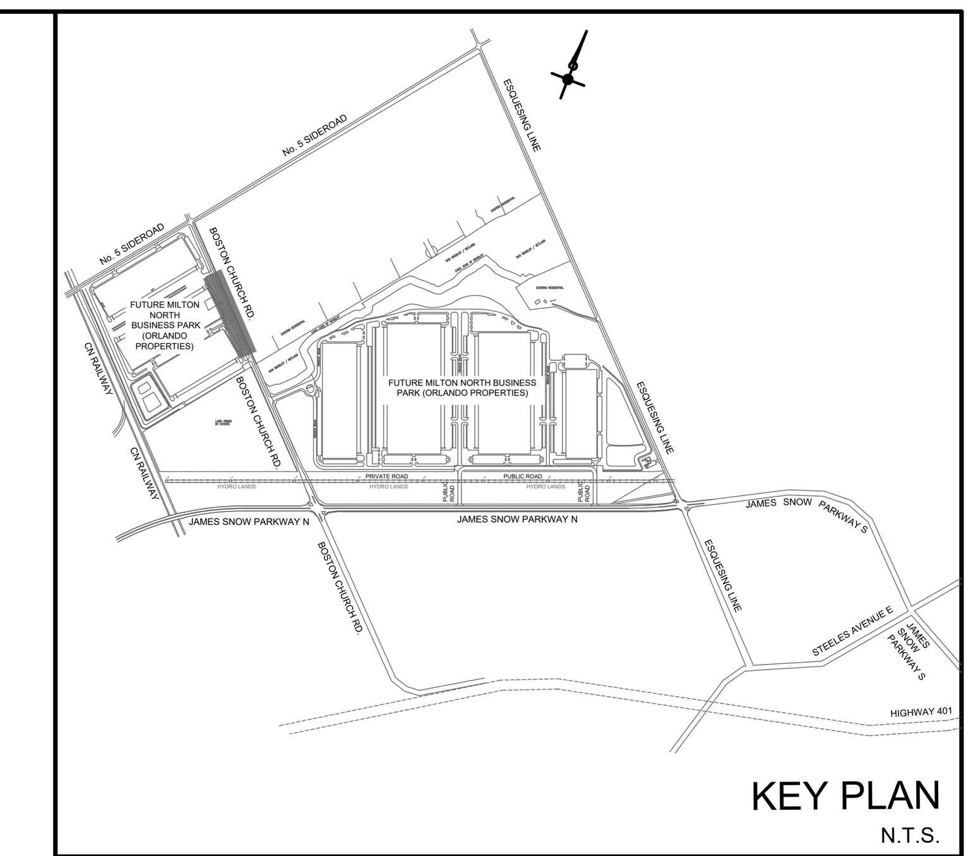
6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
p: 905.677.5480
f: 905.677.2824

MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

BOSTON CHURCH ROAD
FROM STA. 4+060 TO STA. 4+340

Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP01
Checked By:			
Date:	FEBRUARY 2022		





LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
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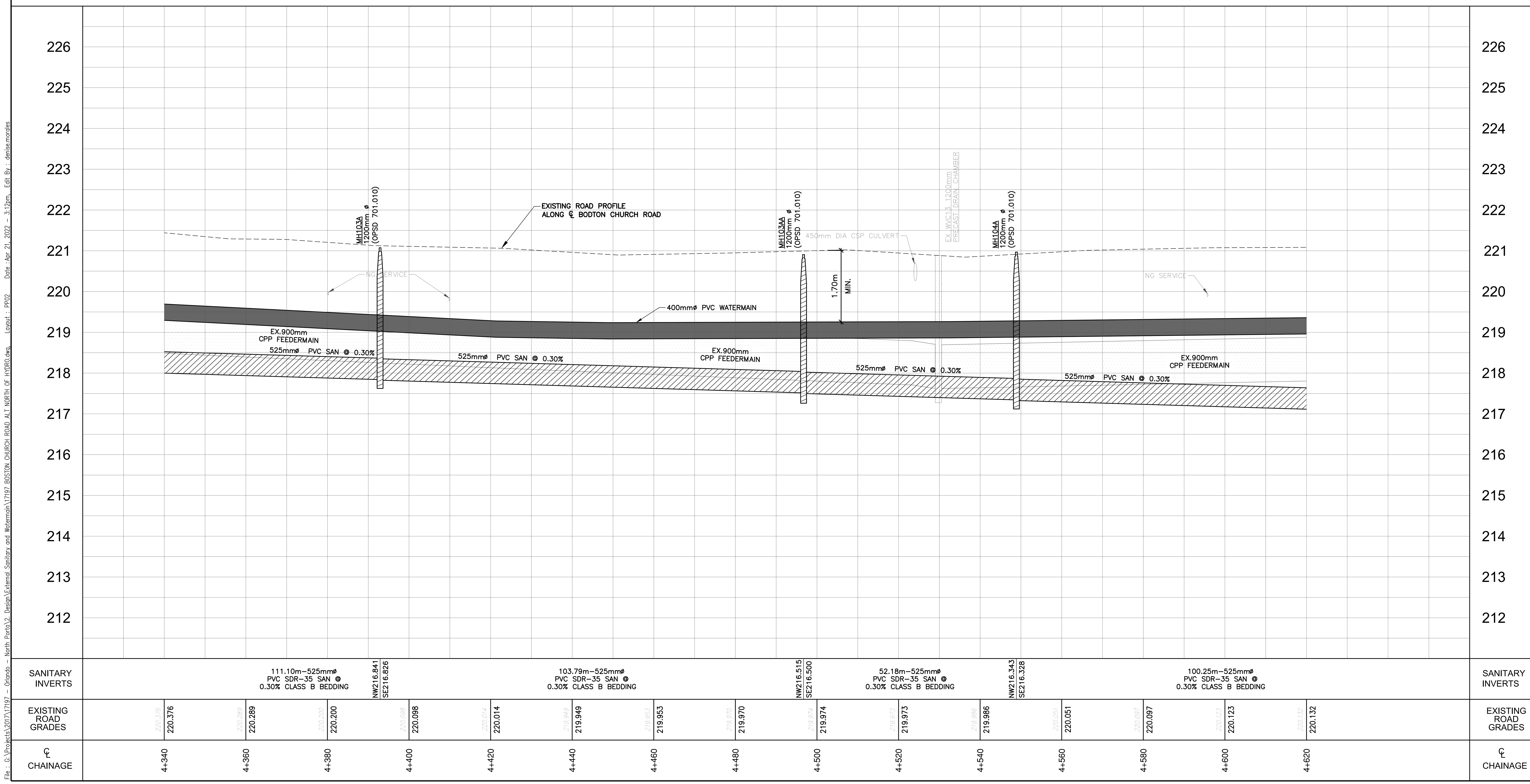
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE



NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY: APPROVED BY:

TYLin
8800 Dufferin Street, Suite 200
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p: 905.738.5700
f: 905.738.0065

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MISSISSAUGA ON L4V1E3
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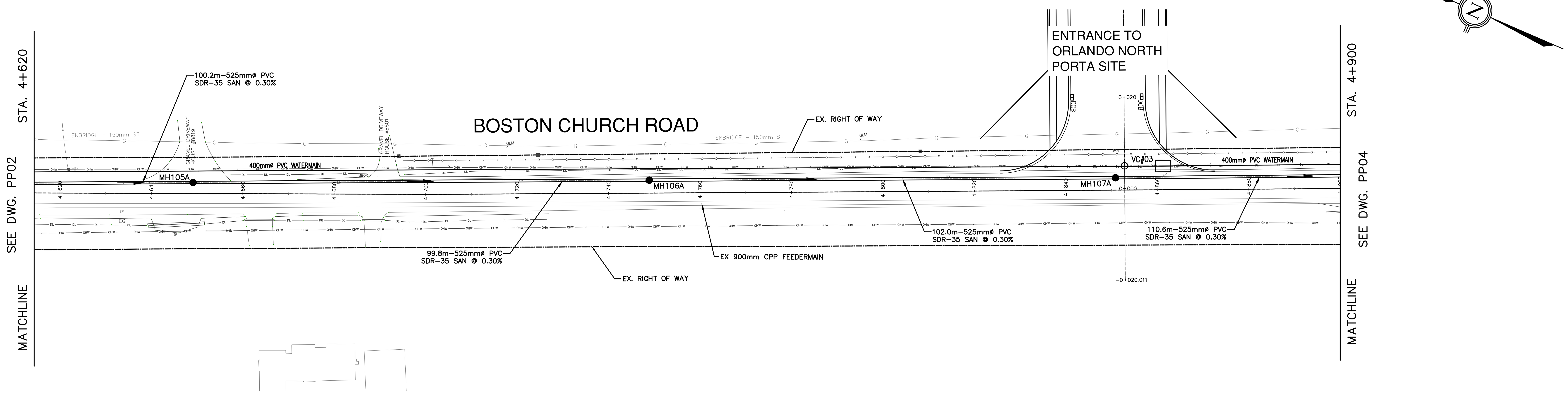
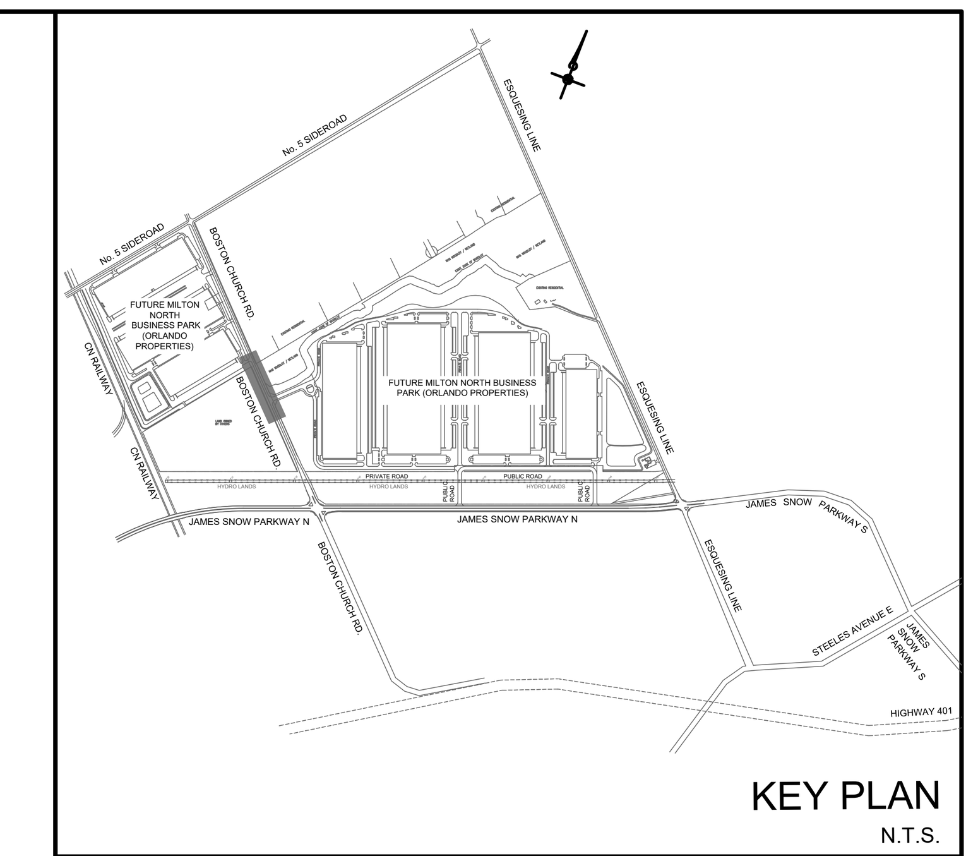
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

BOSTON CHURCH ROAD
FROM STA. 4+340 TO STA. 4+620

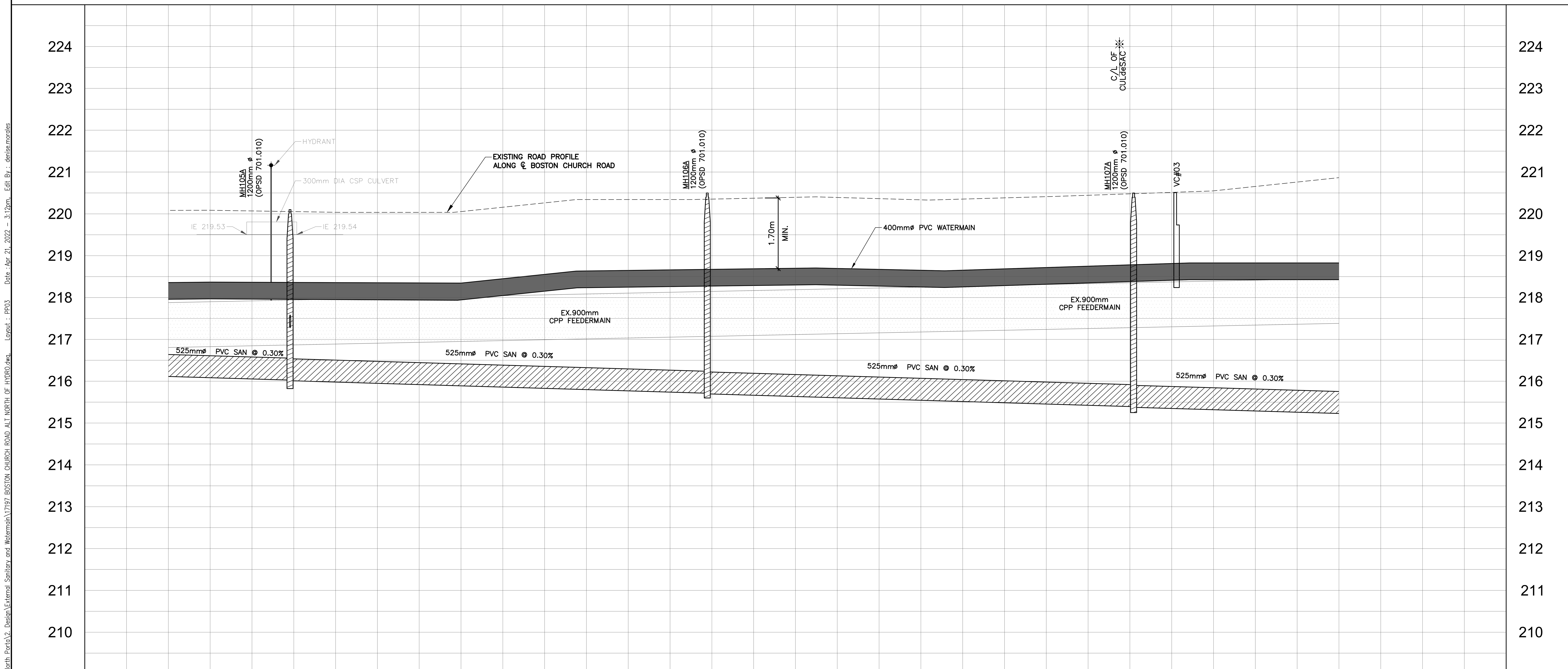
Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP02
Checked By:			
Date:	FEBRUARY 2022		





LEGEND:

- ● PROPOSED SANITARY MANHOLE
- O PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- ST EXISTING STORM
- G EXISTING MAIN GAS
- GV EXISTING GAS VALVE
- B EXISTING BELL
- OHW EXISTING OVERHEAD HYDRO WIRE
- TL EXISTING TRAFFIC LINE
- SW EXISTING SWALE CENTERLINE
- DL EXISTING DITCH CENTERLINE
- X EXISTING FENCE



SANITARY INVERTS	100.25m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING	NW216.027 SE216.012	99.78m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING	NW215.713 SE215.698	101.97m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING	NW215.392 SE215.377	110.60m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING								
EXISTING ROAD GRADES	(220.132) 220.132	(220.148) 220.148	(220.155) 220.155	(220.272) 220.272	(220.289) 220.289	(220.500) 220.500	(220.500) 220.500	(220.500) 220.500	(220.500) 220.500	(220.278) 220.278	(220.307) 220.307	(220.500) 220.500	(220.500) 220.500	(220.500) 220.500	(220.500) 220.500
℄ CHAINAGE	4+620	4+640	4+660	4+680	4+700	4+720	4+740	4+760	4+780	4+800	4+820	4+840	4+860	4+880	4+900

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

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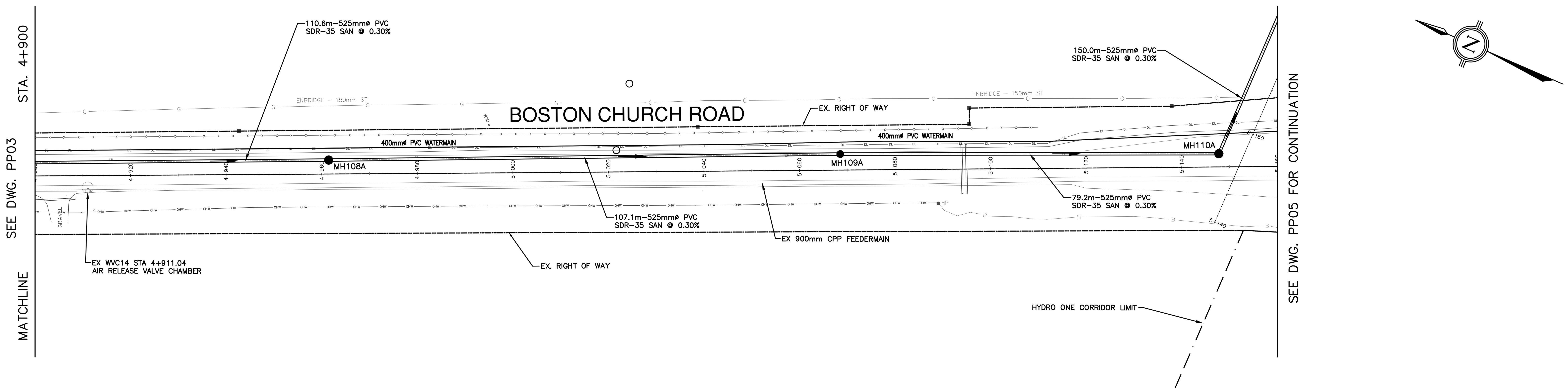
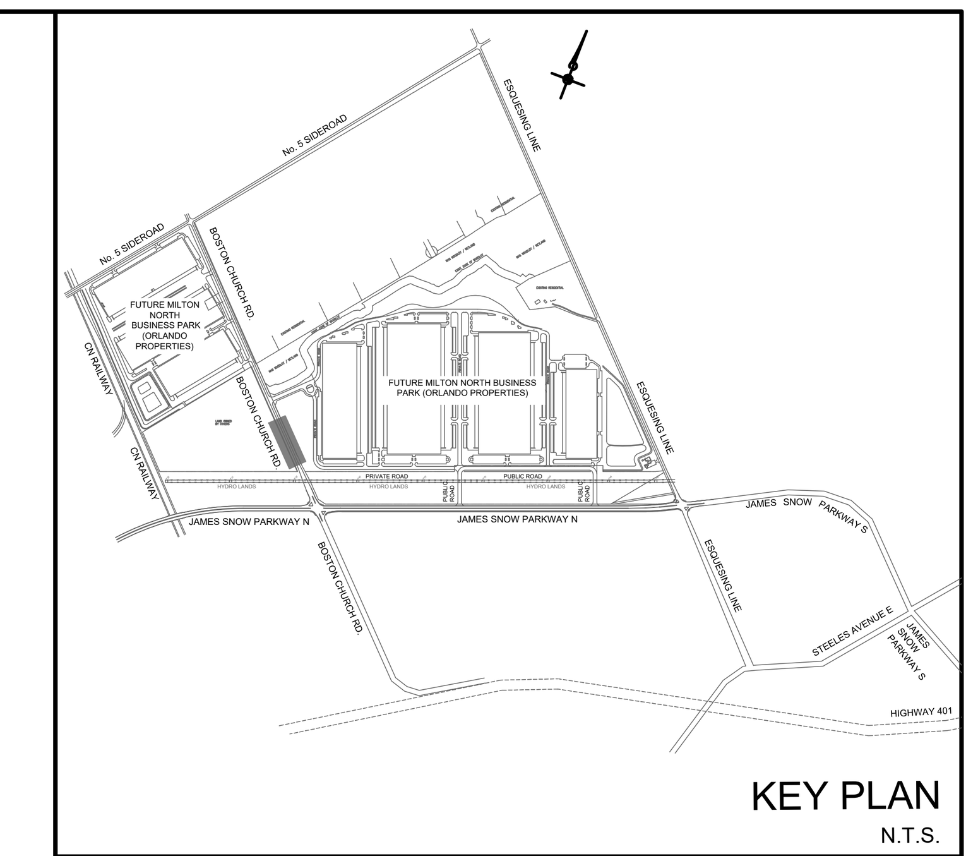
f: 905.677.2824

MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

BOSTON CHURCH ROAD
FROM STA. 4+620 TO STA. 4+900

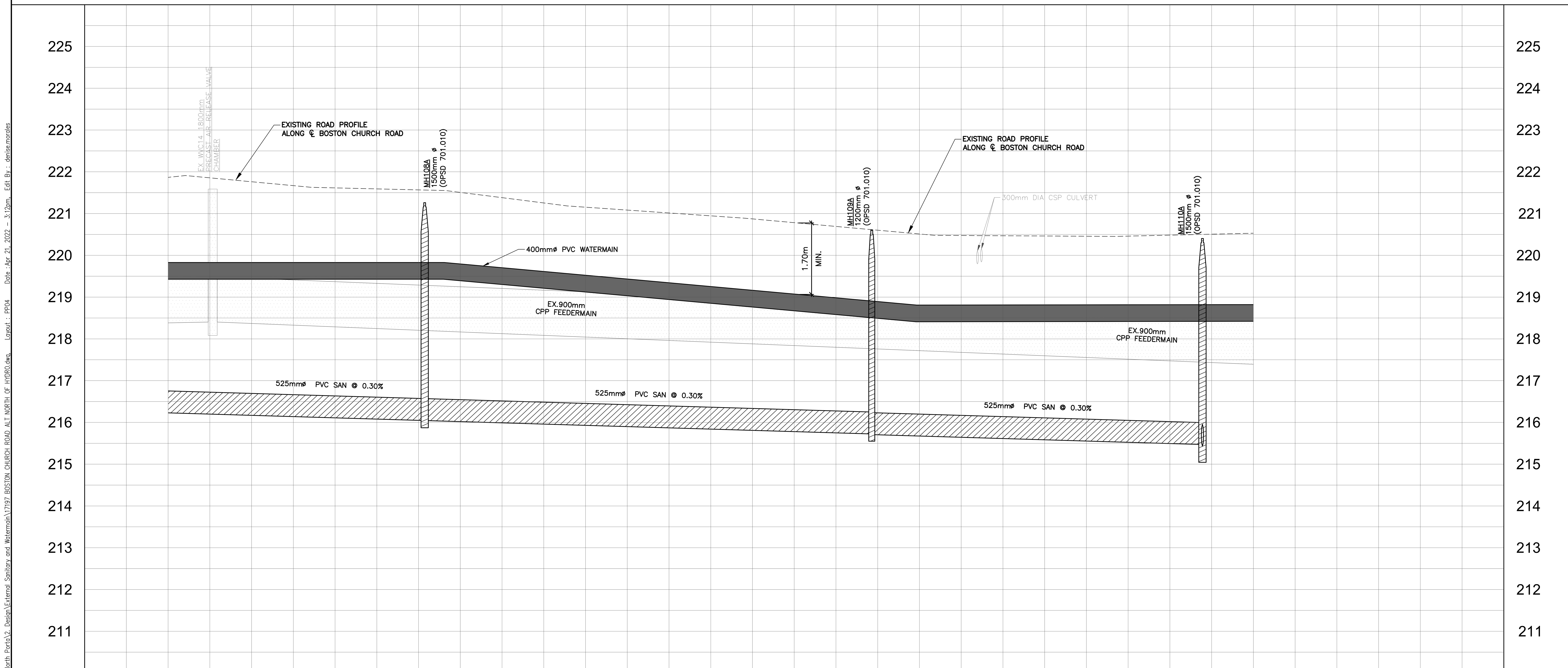
Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP03
Checked By:			
Date:	FEBRUARY 2022		





LEGEND:

- ● PROPOSED SANITARY MANHOLE
- ○ PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE



SANITARY INVERTS	168.84m–450mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING			NW215.045 SE215.045	107.10m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING				NW214.724 SE214.709	79.22m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING			NW214.471 E214.430	
EXISTING ROAD GRADES	220.500	220.500	220.500	220.278	220.253	220.013	219.765	219.682	219.504	219.503	219.502	219.500	219.498	219.505
℄ CHAINAGE	4+900	4+920	4+940	4+960	4+980	5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+140	5+160

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

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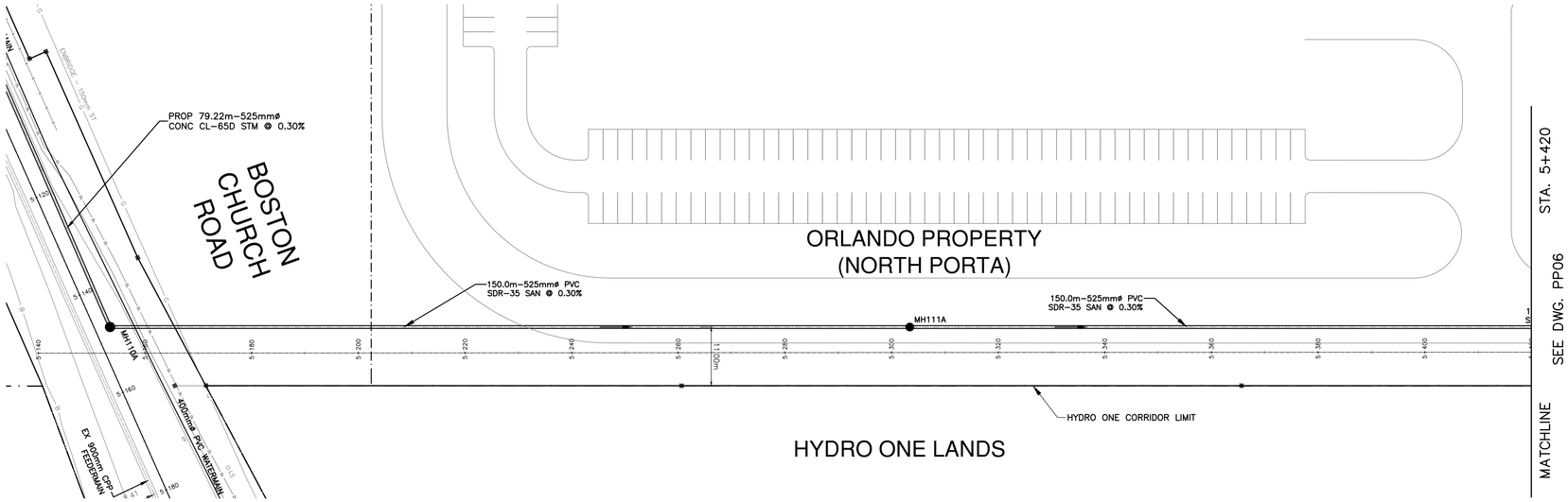
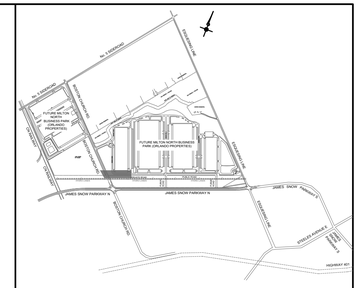
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

BOSTON CHURCH ROAD
FROM STA. 4+900 TO STA. 5+160

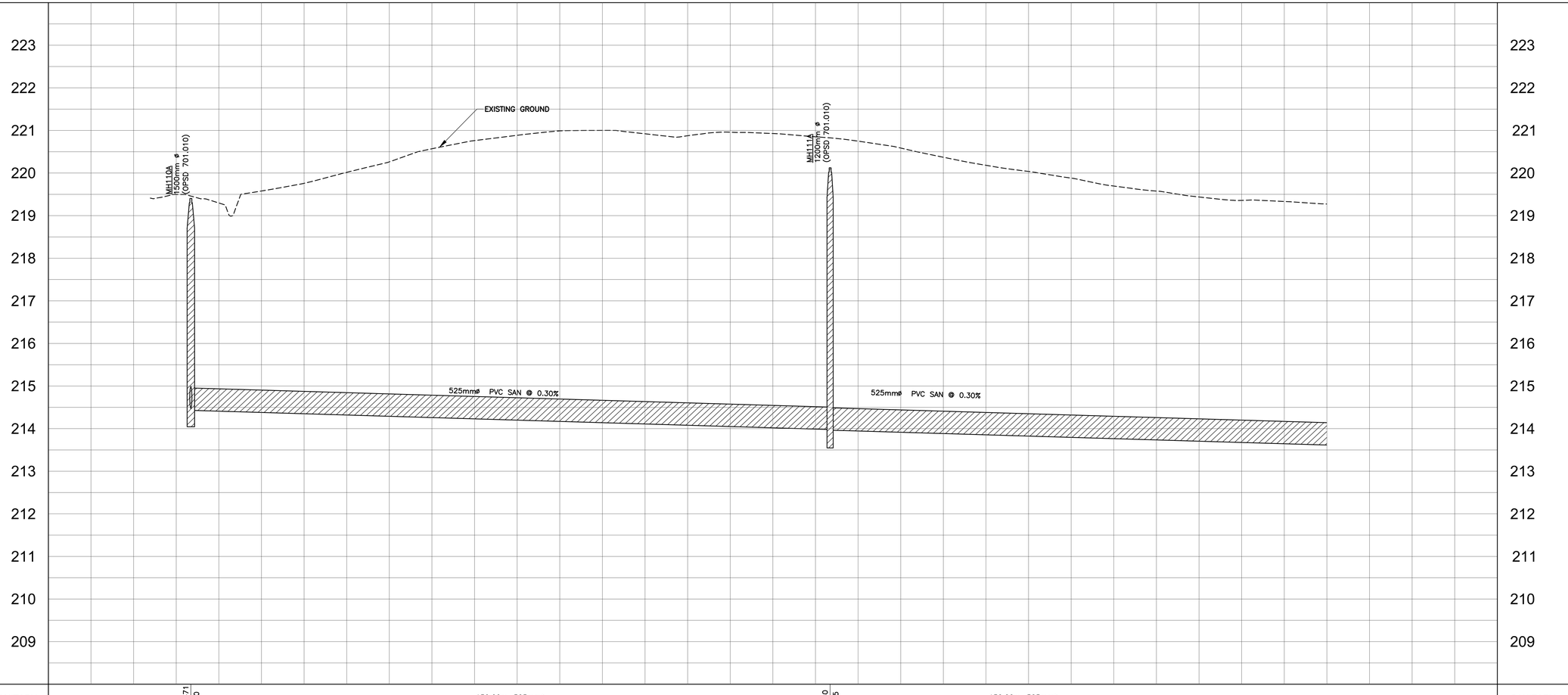
Scale:	HORIZ. 1:500 VERT. 1:50
Drawn By:	K.K.
Designed By:	D.H.
Checked By:	
Date:	FEBRUARY 2022
Project No.	17197
Drawing No.	PP04





LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- ST EXISTING STORM
- G EXISTING MAIN GAS
- GV EXISTING GAS VALVE
- B EXISTING BELL
- OHW EXISTING OVERHEAD HYDRO WIRE
- TL EXISTING TRAFFIC LINE
- SW EXISTING SWALE CENTERLINE
- DL EXISTING DITCH CENTERLINE
- X EXISTING FENCE



NOTE:
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NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

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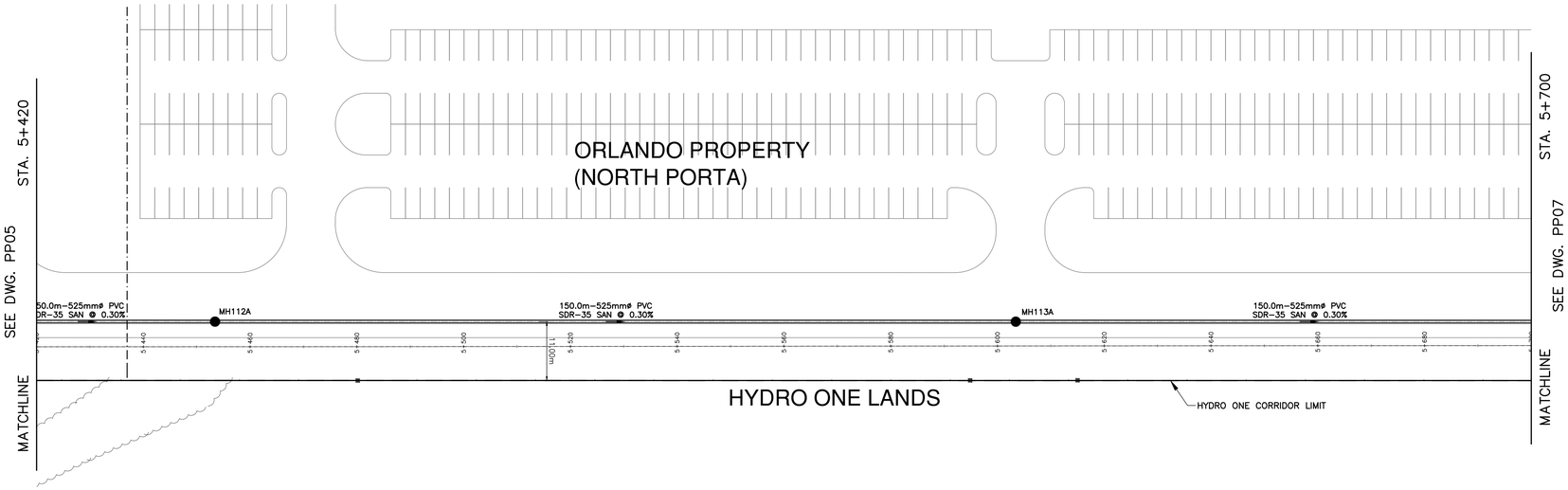
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

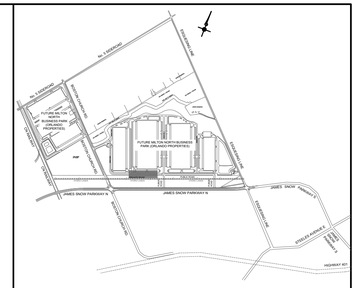
JAMES SNOW PARKWAY
FROM STA. 5+140 TO STA. 5+420

Scale:	HORIZ. 1:500 VERT. 1:50
Drawn By:	K.K.
Designed By:	D.H.
Checked By:	
Date:	FEBRUARY 2022

Project No. 17197

Drawing No. PP05





LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- ST EXISTING STORM
- G EXISTING MAIN GAS
- GV EXISTING GAS VALVE
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- OHW EXISTING OVERHEAD HYDRO WIRE
- TL EXISTING TRAFFIC LINE
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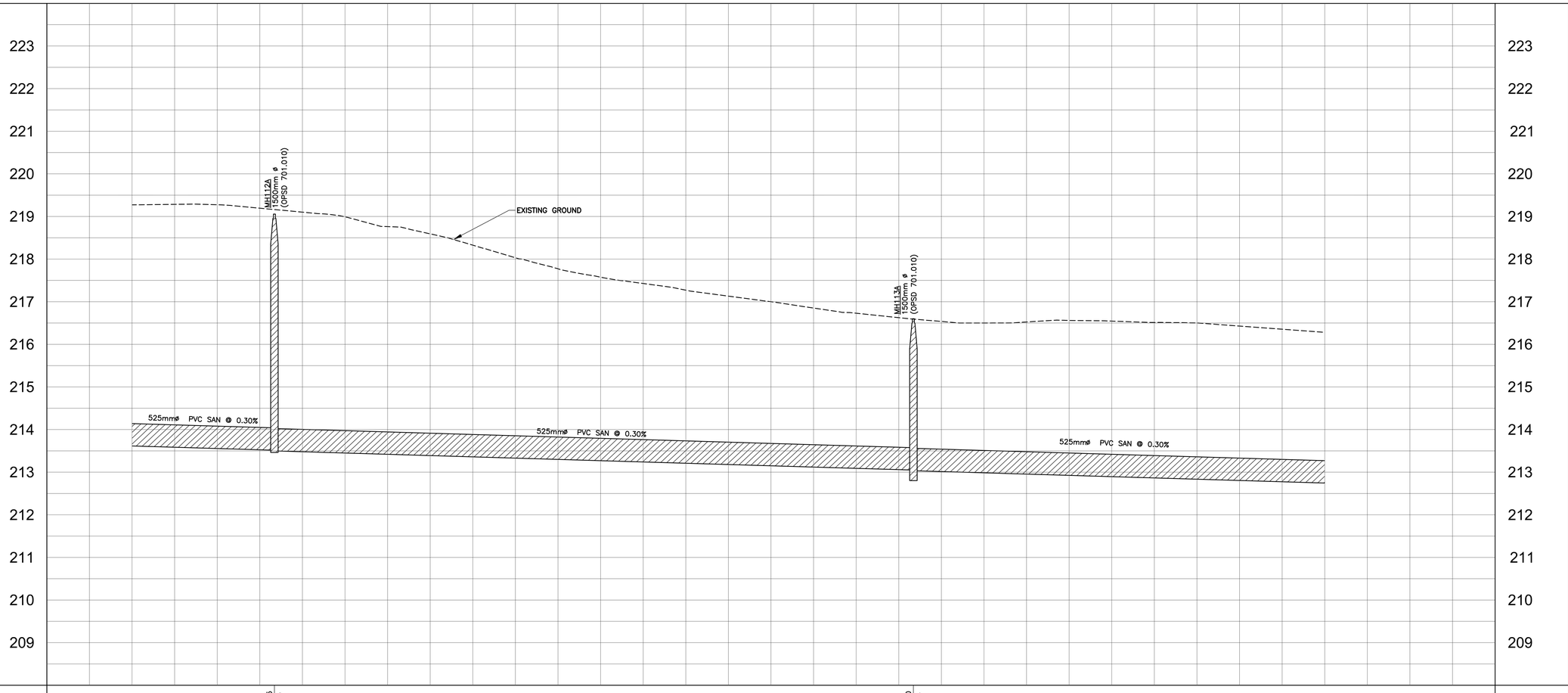
- DL EXISTING DITCH CENTERLINE
- X EXISTING FENCE



SANITARY INVERTS	150.00m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING		W213.515 E213.500	150.00m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING								W213.050 E213.035	150.00m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING								SANITARY INVERTS
EXISTING ROAD GRADES	219.337	219.273	219.339	219.275	219.165	219.102	218.826	218.763	218.390	218.327	217.835	217.772	217.490	217.427	217.194	217.131	216.857	216.851	216.625	216.625	216.500	216.500	216.560	216.560	216.513	216.513	216.428	216.428	216.281	216.281	EXISTING ROAD GRADES
℄ CHAINAGE	5+420		5+440		5+460		5+480		5+500		5+520		5+540		5+560		5+580		5+600		5+620		5+640		5+660		5+680		5+700		℄ CHAINAGE

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

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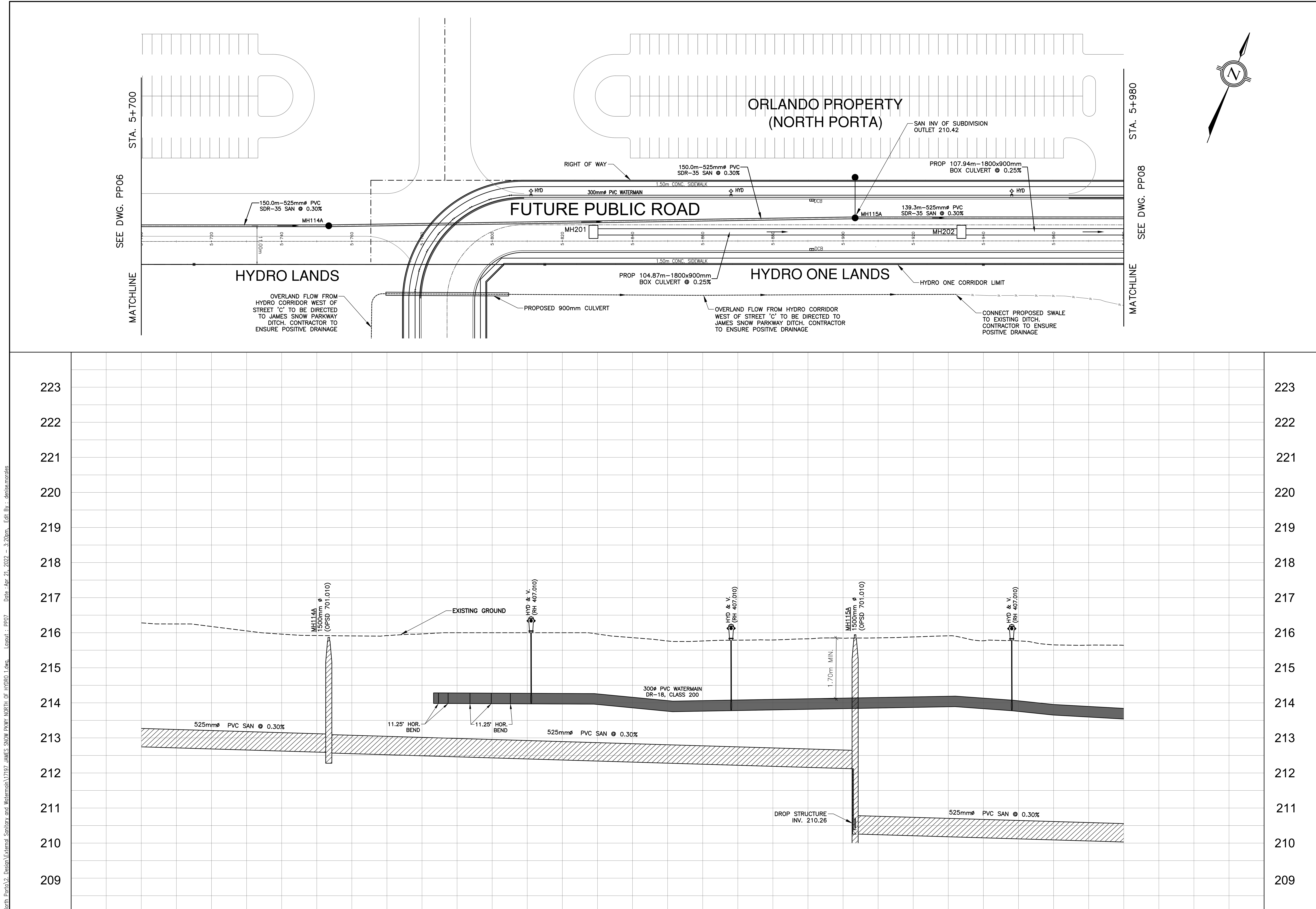
f: 905.677.2824

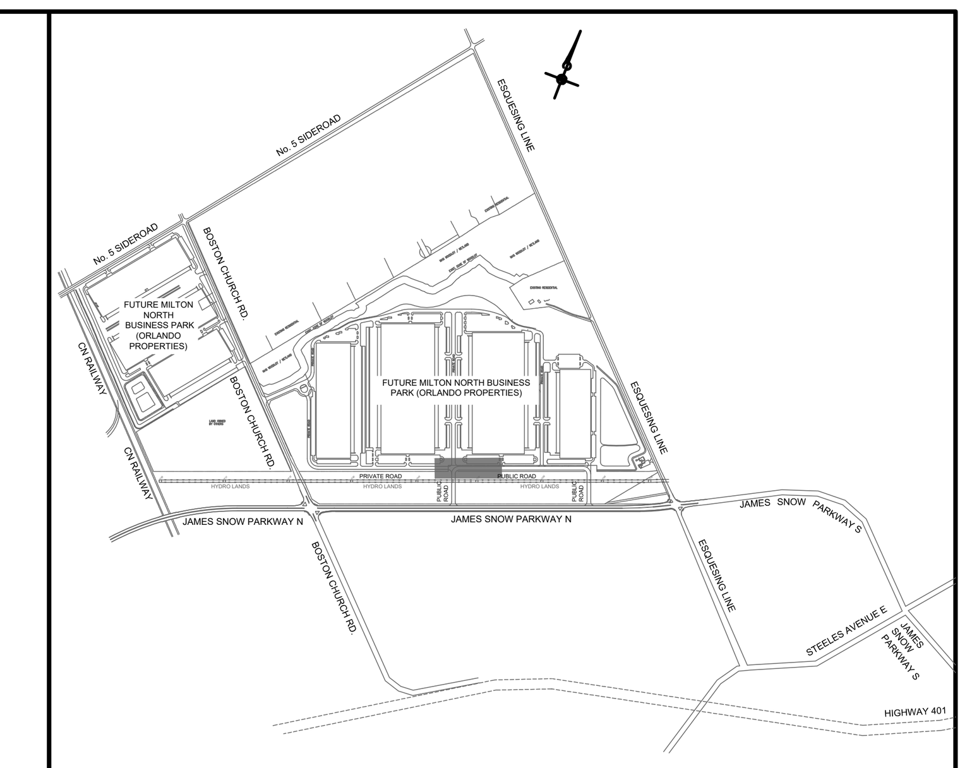
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 5+420 TO STA. 5+700

Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP06
Checked By:			
Date:	FEBRUARY 2022		



SANITARY INVERTS	150.00m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING		W212.585 E212.570		150.02m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING						W212.120 N210.420 E210.260	139.34m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING			
EXISTING ROAD GRADES	216.281	216.177	215.960	215.909	215.966	216.000	216.000	215.859	215.765	215.793	215.844	215.879	215.772	215.654	215.641
℄ CHAINAGE	5+700	5+720	5+740	5+760	5+780	5+800	5+820	5+840	5+860	5+880	5+900	5+920	5+940	5+960	5+980



KEY PLAN
N.T.S.

LEGEND:
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY: APPROVED BY:

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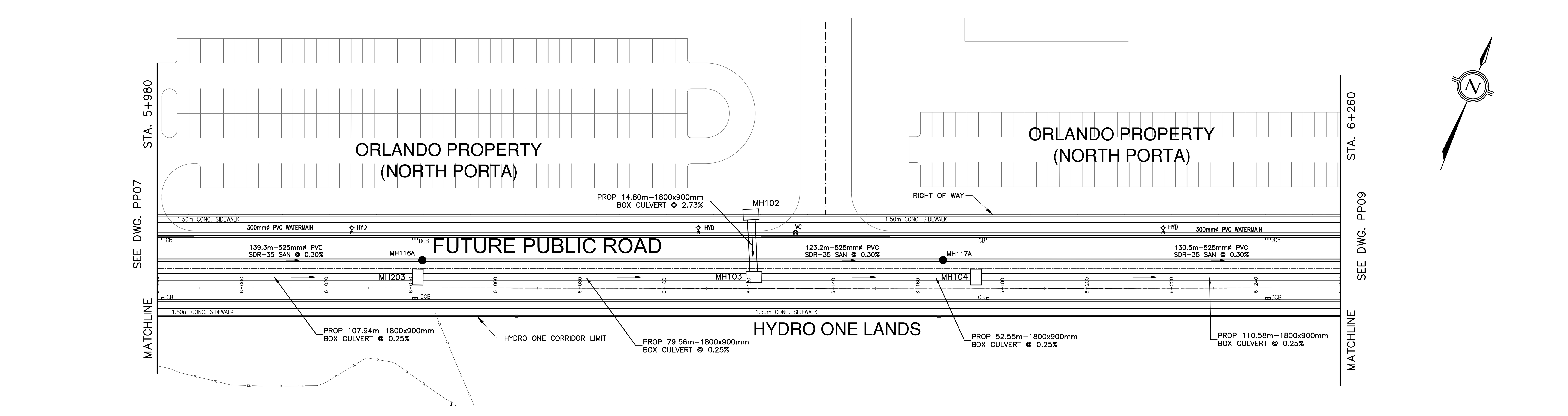
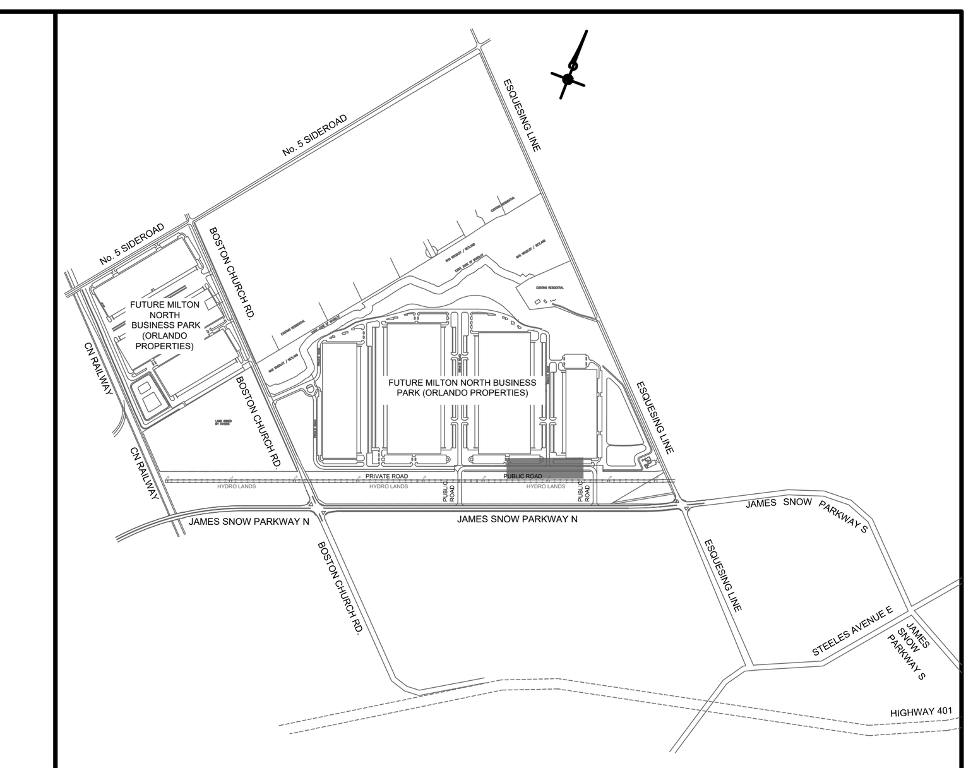
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 5+700 TO STA. 5+980

Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP07
Checked By:			
Date:	FEBRUARY 2022		

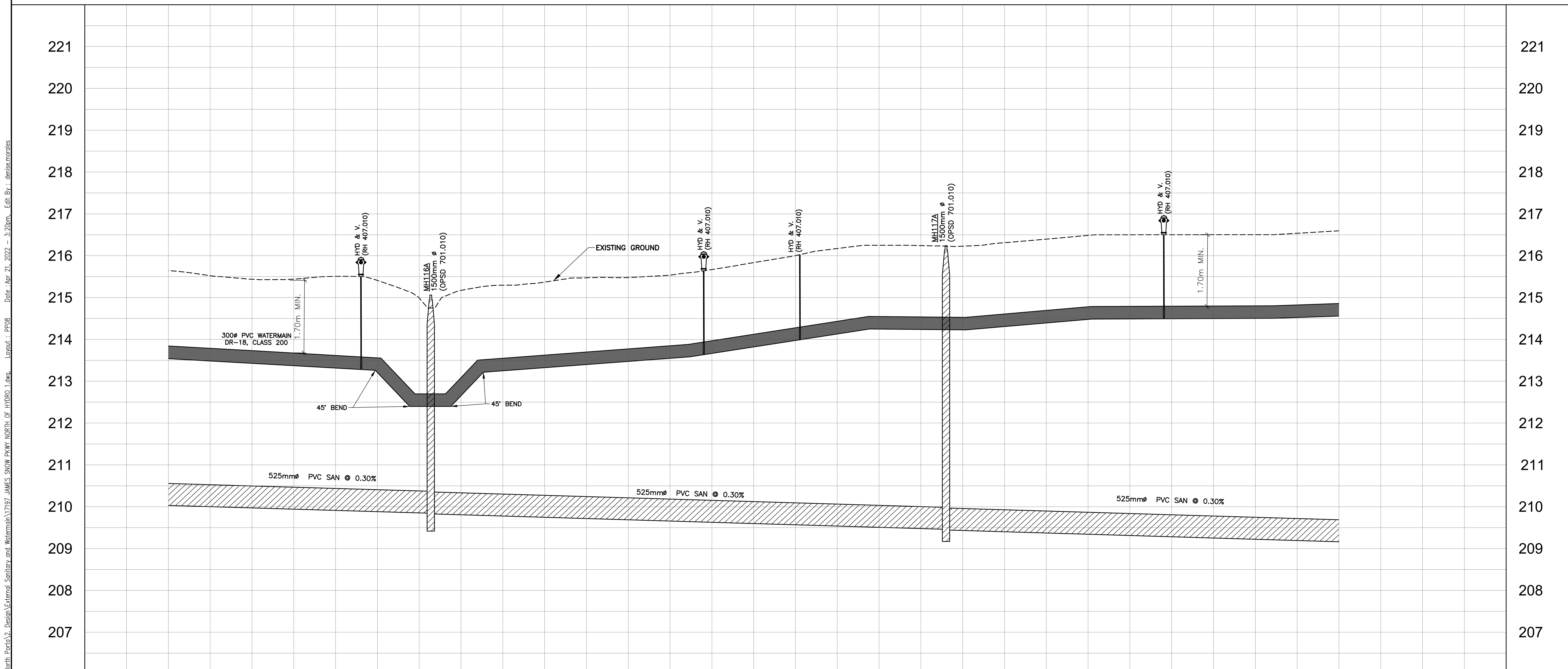




KEY PLAN
N.T.S.

LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE



SANITARY INVERTS	139.34m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING			W209.845 E209.830	123.22m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING					W209.460 E209.445	130.47m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING				
EXISTING ROAD GRADES	215.641	215.437	215.506	214.991	215.296	215.473	215.534	215.835	216.172	216.242	216.311	216.485	216.502	216.503	216.595
℄ CHAINAGE	5+980	6+000	6+020	6+040	6+060	6+080	6+100	6+120	6+140	6+160	6+180	6+200	6+220	6+240	6+260

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY: APPROVED BY:

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MISSISSAUGA ON L4V1E3
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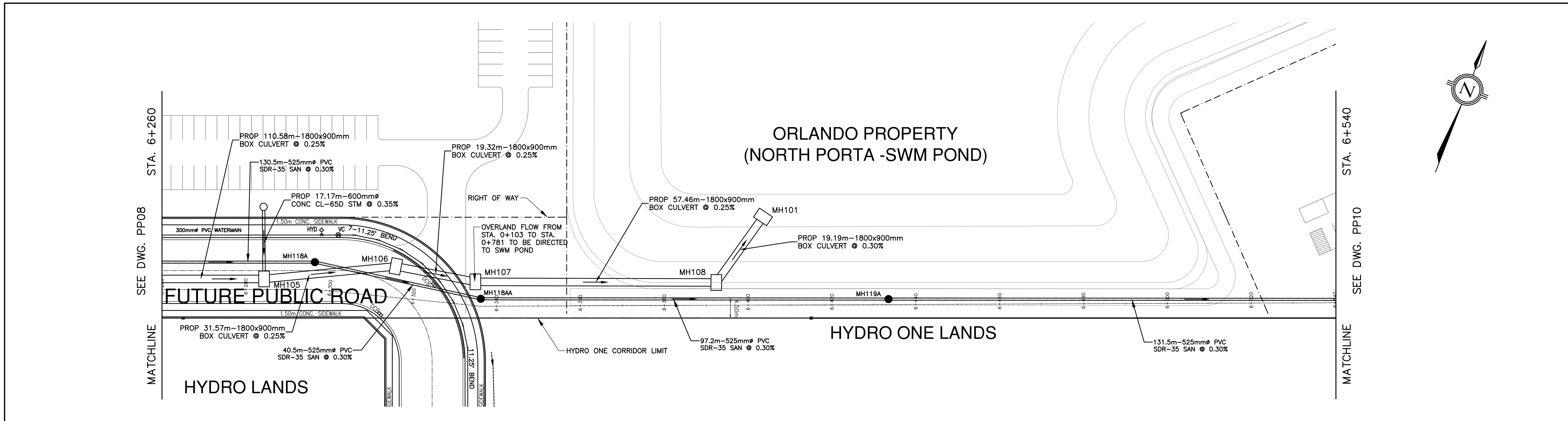
f: 905.677.2824

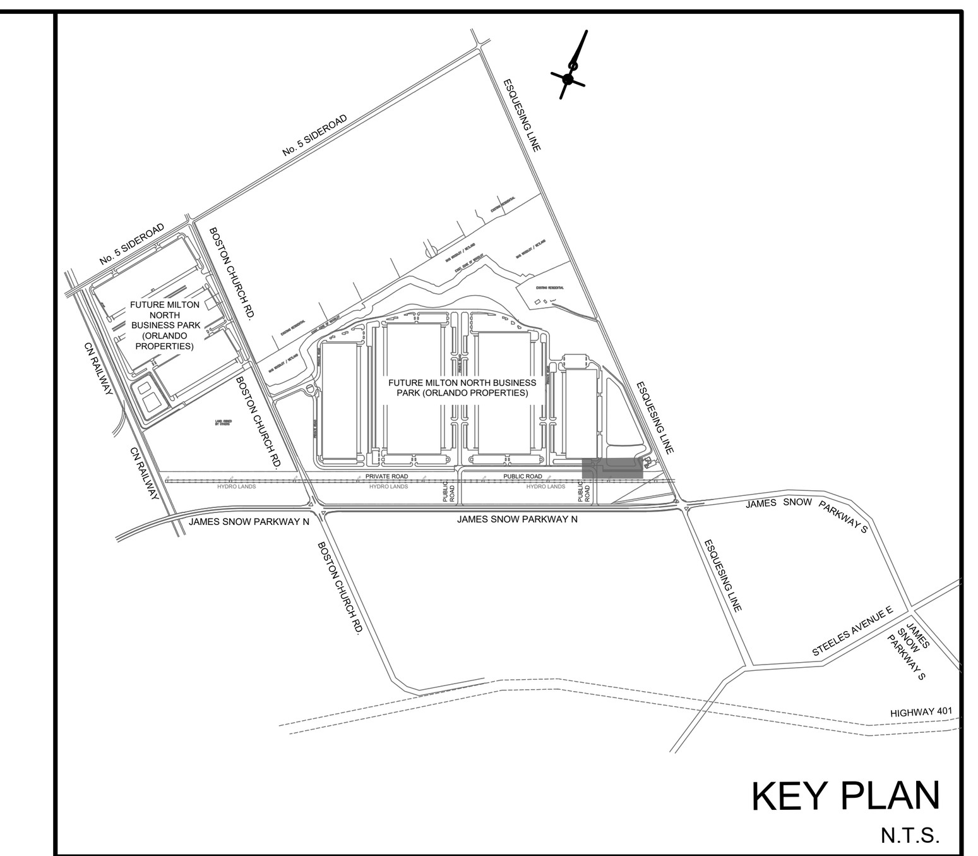
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 5+980 TO STA. 6+260

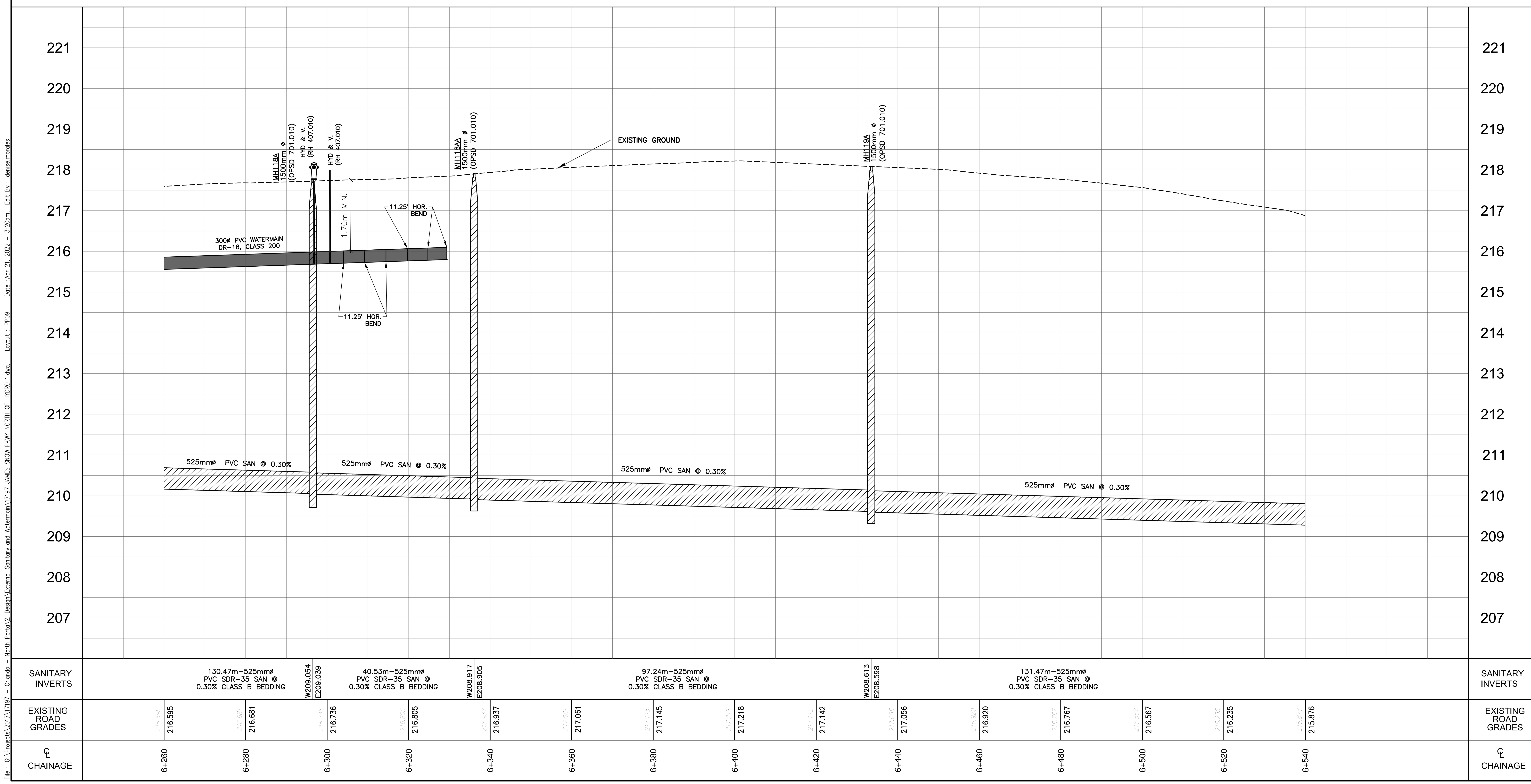
Scale:	HORIZ. 1:500 VERT. 1:50	Project No. 17197
Drawn By:	K.K.	
Designed By:	D.H.	Drawing No. PP08
Checked By:		
Date:	FEBRUARY 2022	

File : G:\Projects\2017\17197 – Orlando – North Porta\2. Design\External Sanitary and Watermain\17197 JAMES SNOW PKWY NORTH OF HYDRO 1.dwg Layout : PP08 Date :Apr 21, 2022 – 3:20pm Edit By : denise.morales





LEGEND:
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE



NOTE:
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NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY: | APPROVED BY:

TYLin
8800 Dufferin Street, Suite 200
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f: 905.738.0065

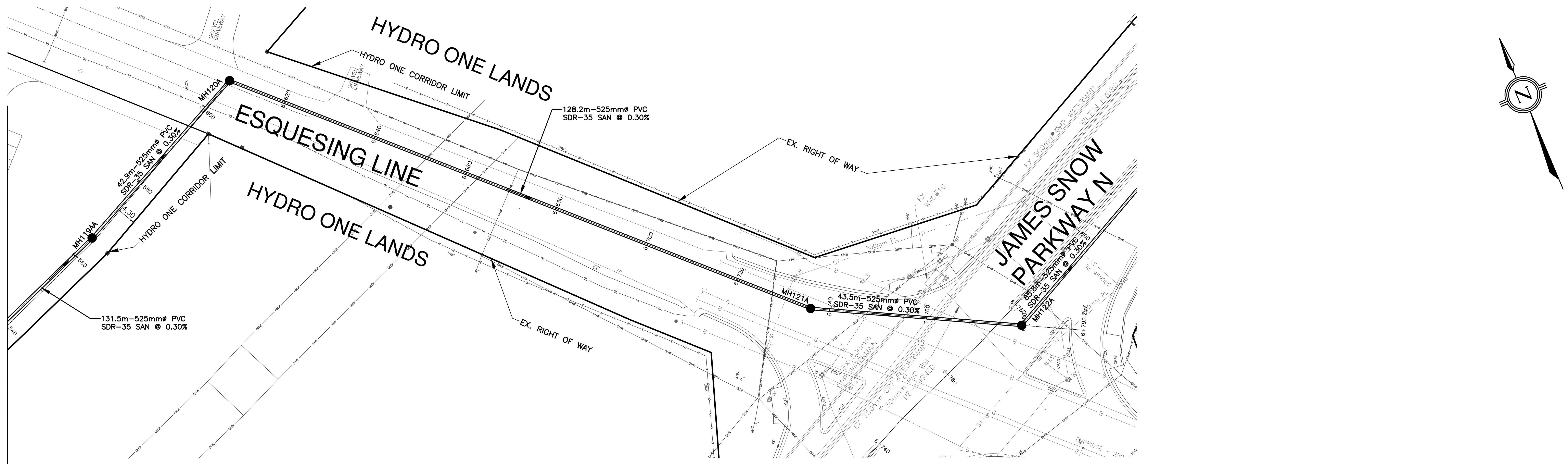
6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
p: 905.677.5480
f: 905.677.2824

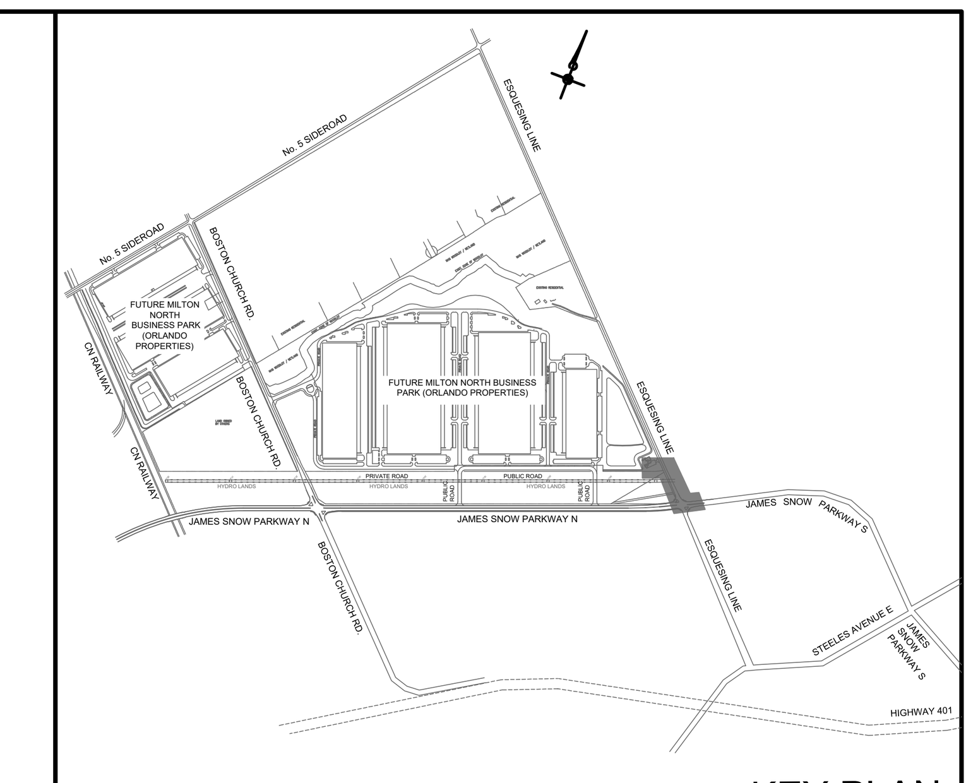
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 6+260 TO STA. 5+540

Scale:	HORIZ. 1:500 VERT. 1:50	Project No. 17197
Drawn By:	K.K.	
Designed By:	D.H.	Drawing No. PP09
Checked By:		
Date:	FEBRUARY 2022	

File : G:\Projects\2017\17197 – Orlando – North Porta\2. Design\External Sanitary and Watermain\17197_JAMES SNOW PKWY NORTH OF HYDRO 1.dwg Layout : PP09 Date : Apr 21, 2022 – 3:20pm Edit By : denise.morales





LEGEND:

- ● PROPOSED SANITARY MANHOLE
- ○ PROPOSED STORM MANHOLE
- □ CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- ⊗ PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
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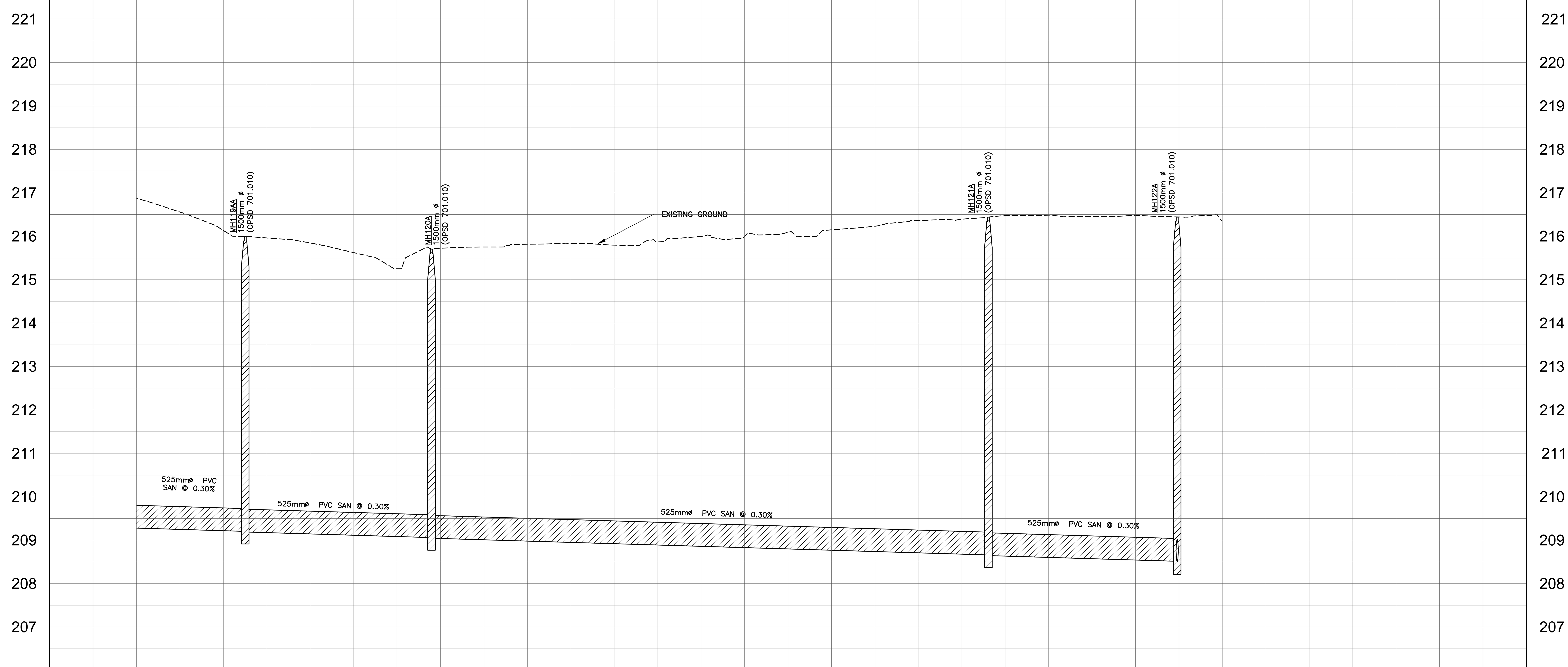
- TL EXISTING TRAFFIC LINE
- SW EXISTING SWALE CENTERLINE
- DL EXISTING DITCH CENTERLINE
- X EXISTING FENCE



SANITARY INVERTS	
6+540 – 6+564	131.47m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
MH119AA	W208.204 / NE208.189
6+564 – 6+607	42.90m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
MH120A	SW208.060 / SE208.045
6+607 – 6+736	128.19m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
MH121A	NW207.660 / SE207.645
6+736 – 6+780	43.47m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
MH122A	NW207.515 / NE207.500

℄ CHAINAGE	EXISTING ROAD GRADES
6+540	215.876
6+560	215.134
6+580	214.845
6+600	214.250
6+620	214.751
6+640	214.828
6+660	214.868
6+680	214.992
6+700	215.147
6+720	215.359
6+740	215.473
6+760	215.453
6+780	215.444
6+800	

NOTE:
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NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY: APPROVED BY:

TYLin

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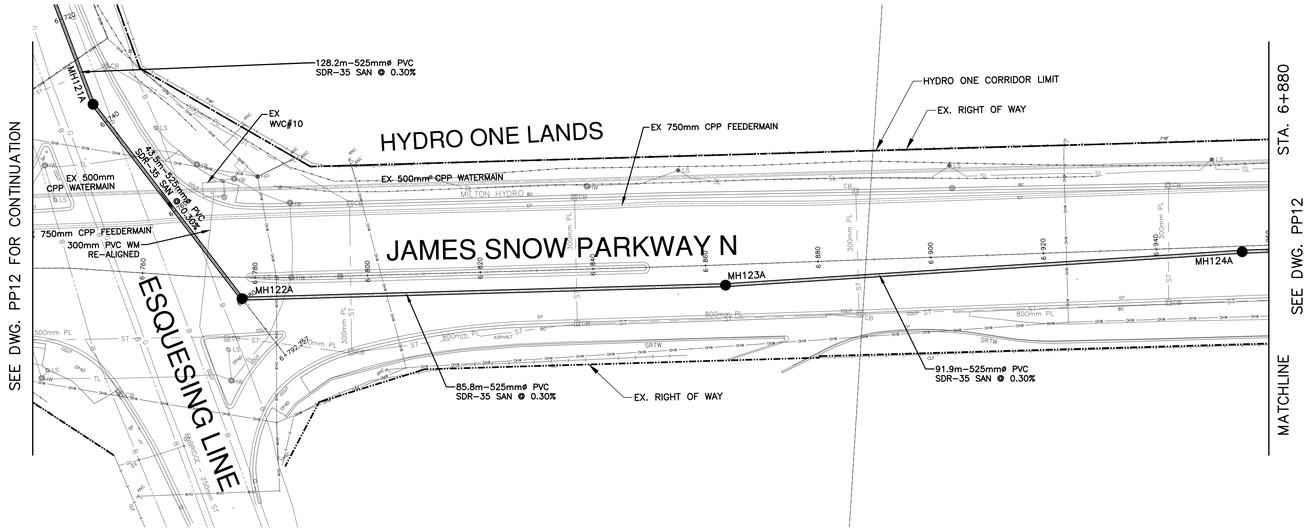
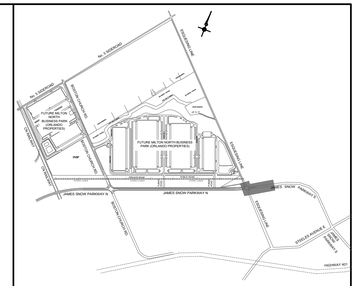
f: 905.738.0065

6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
p: 905.677.5480
f: 905.677.2824

MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN
JAMES SNOW PARKWAY AND ESQUISING LINE
FROM STA. 6+540 TO STA. 6+780

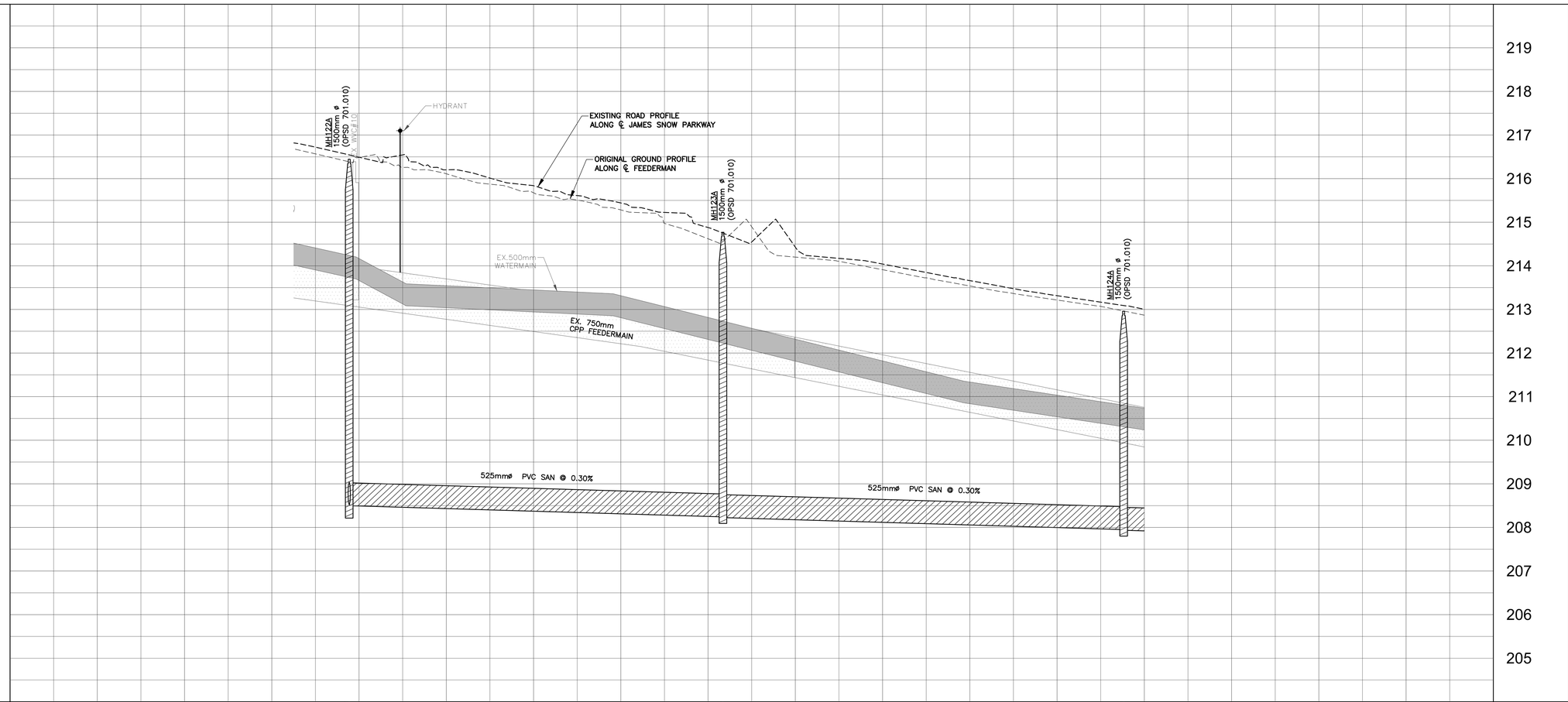
Scale:	HORIZ. 1:500 VERT. 1:50	Project No. 17197
Drawn By:	K.K.	
Designed By:	D.H.	Drawing No. PP10
Checked By:		
Date:	FEBRUARY 2022	





LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- ST EXISTING STORM
- G EXISTING MAIN GAS
- GV EXISTING GAS VALVE
- B EXISTING BELL
- OHW EXISTING OVERHEAD HYDRO WIRE
- TL EXISTING TRAFFIC LINE
- SW EXISTING SWALE CENTERLINE
- DL EXISTING DITCH CENTERLINE
- X EXISTING FENCE



NOTE:
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NO.	DESCRIPTION	BY	DATE
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2			
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UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

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f: 905.738.0065

6205 AIRPORT RD
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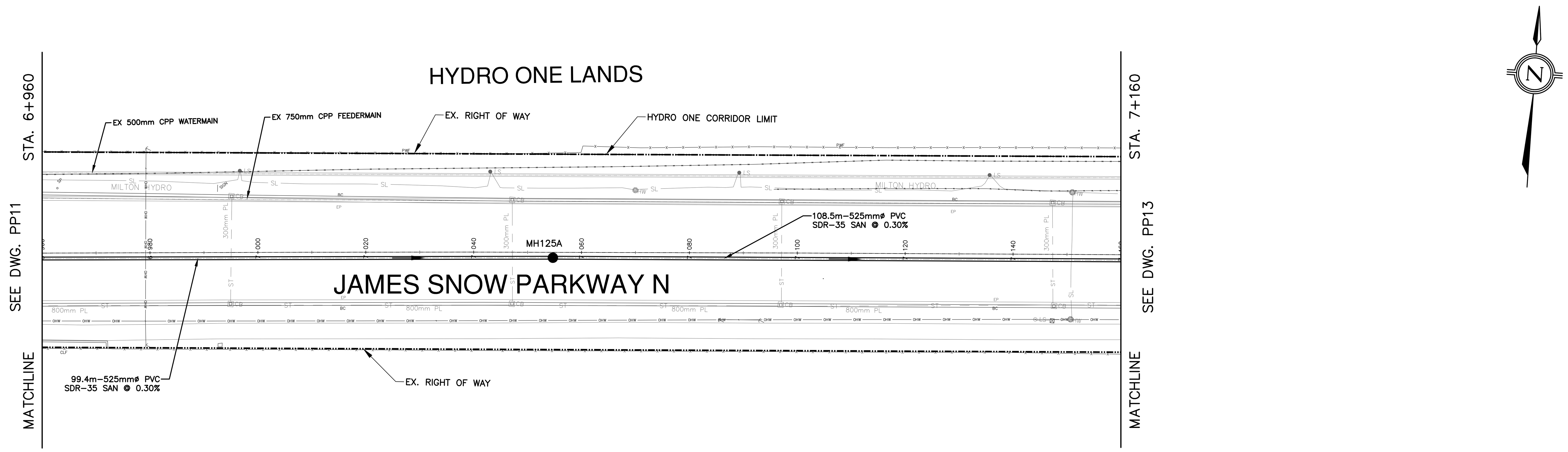
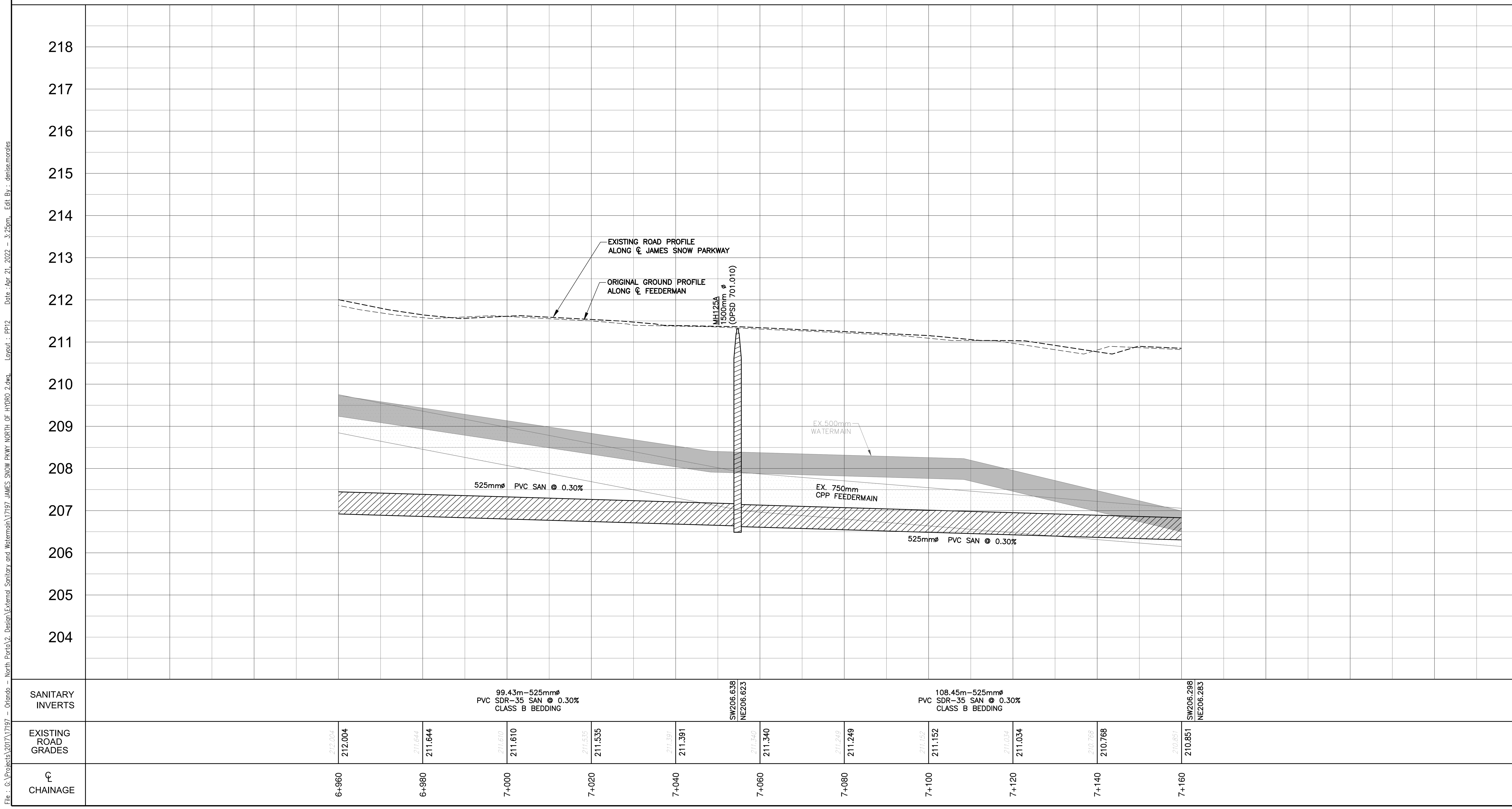
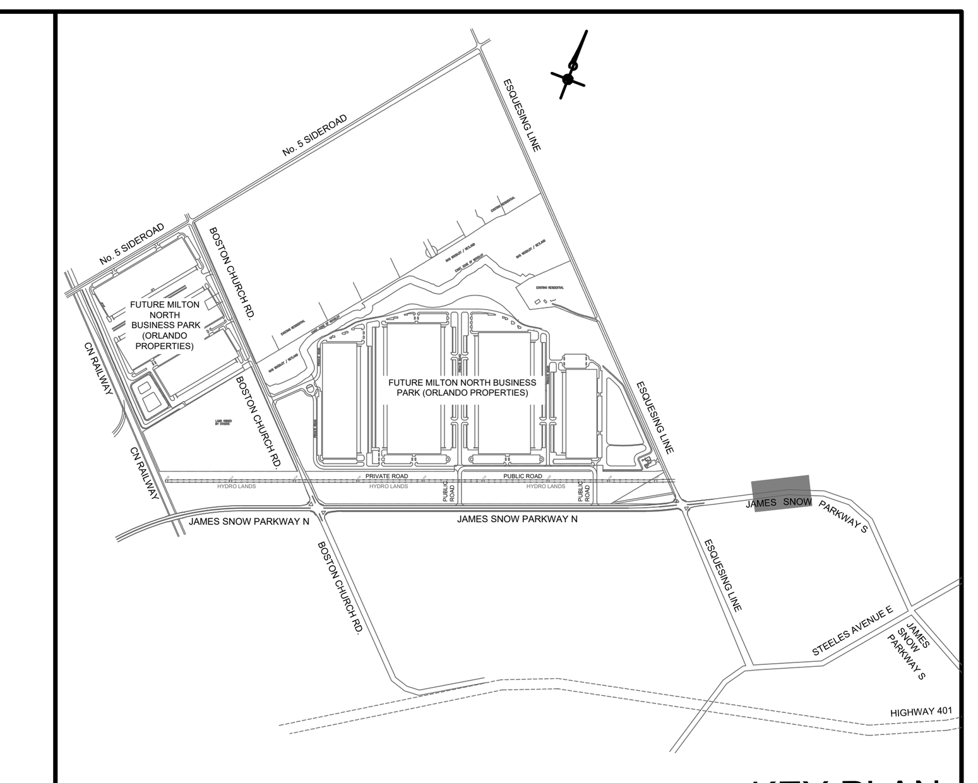
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 6+760 TO STA. 7+060

Scale:	HORIZ. 1:500 VERT. 1:50
Drawn By:	K.K.
Designed By:	D.H.
Checked By:	
Date:	FEBRUARY 2022
Project No.	17197
Drawing No.	PP11







KEY PLAN
N.T.S.

LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
- EXISTING BELL
- EXISTING OVERHEAD HYDRO WIRE
- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
- EXISTING DITCH CENTERLINE
- EXISTING FENCE

NOTE:
ALL EXISTING UTILITY ELEVATIONS ASSUMED TO BE 0.9m BELOW GRADE UNLESS OTHERWISE INDICATED. CONTRACTOR TO VERIFY ON SITE

NO.	DESCRIPTION	BY	DATE
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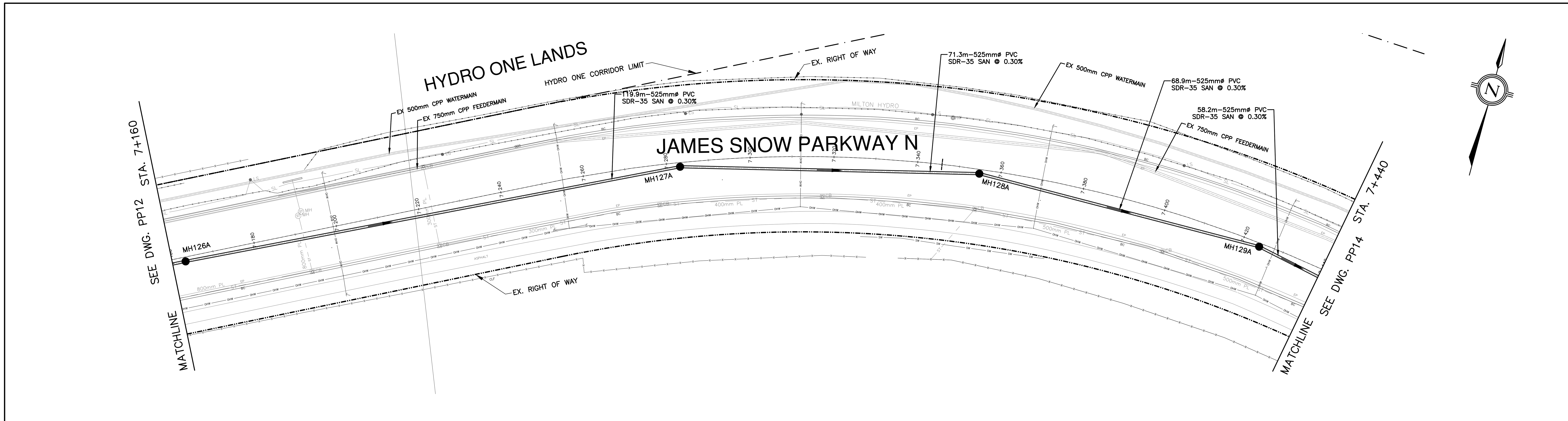
f: 905.677.2824

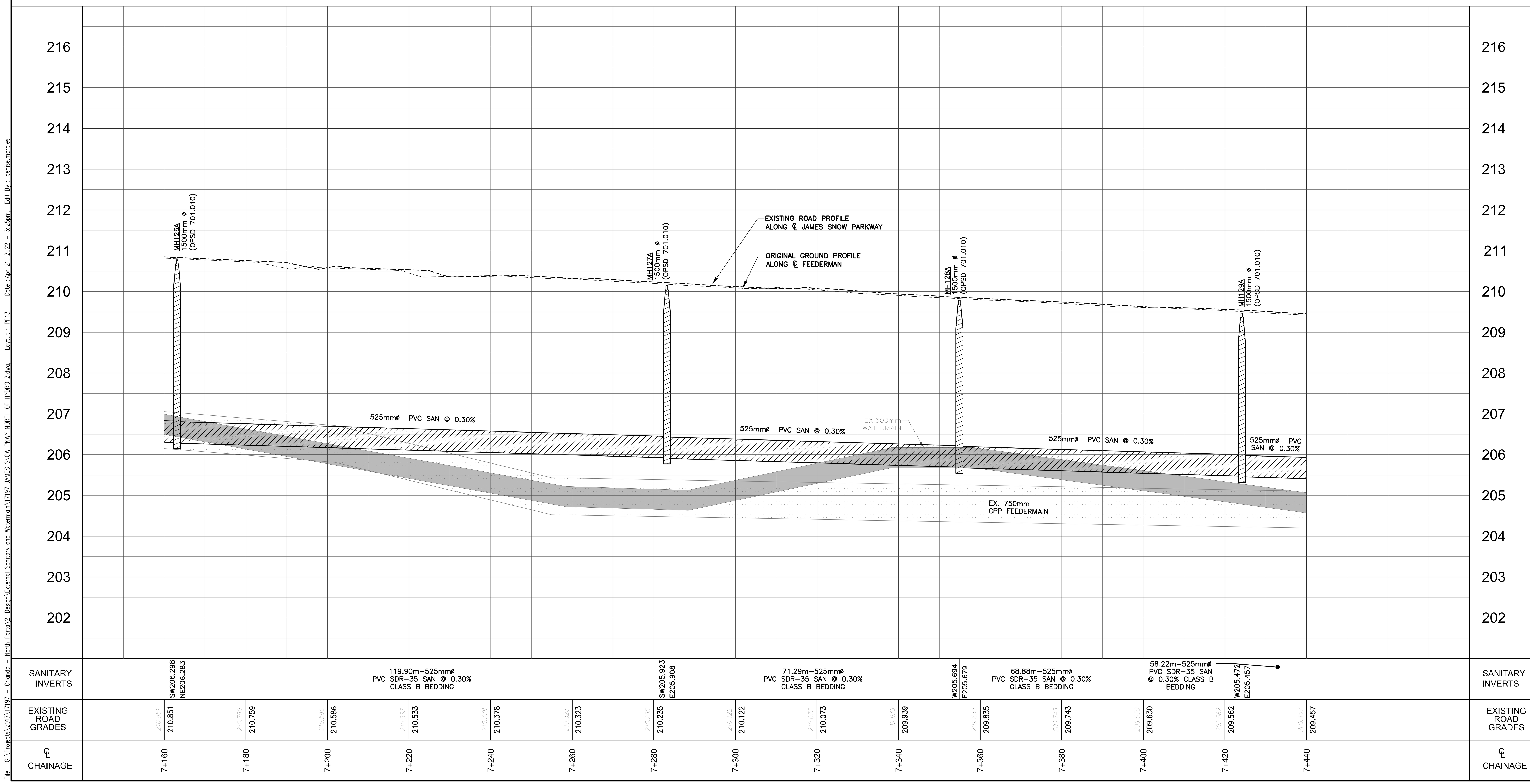
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 6+880 TO STA. 7+160

Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP12
Checked By:			
Date:	FEBRUARY 2022		

File : G:\Projects\2017\17197 – Orlando – North Porta\2. Design\External Sanitary and Watermain\17197 JAMES SNOW PKWY NORTH OF HYDRO 2.dwg Layout : PP12 Date :Apr 21, 2022 – 3:25pm Edit By : denise.morales





KEY PLAN
N.T.S.

LEGEND:

- ● PROPOSED SANITARY MANHOLE
- ○ PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
- VB PROPOSED VALVE & BOX
- HYD PROPOSED HYDRANT & VALVE
- TEMP HYDRANT COMPLETE WITH VALVE
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- EXISTING FENCE

NOTE:
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1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:
APPROVED BY:

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6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
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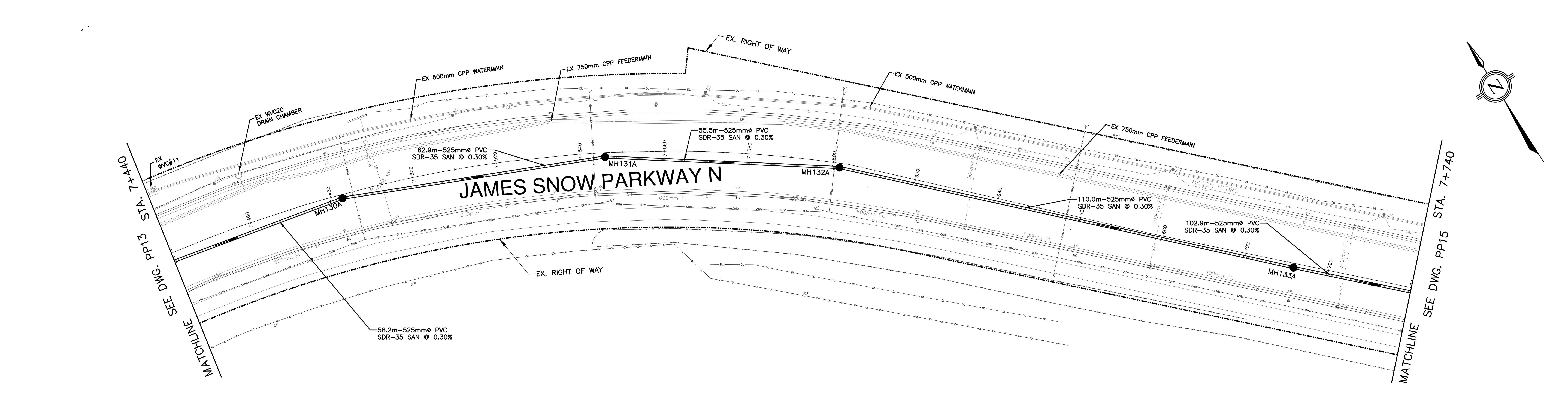
f: 905.677.2824

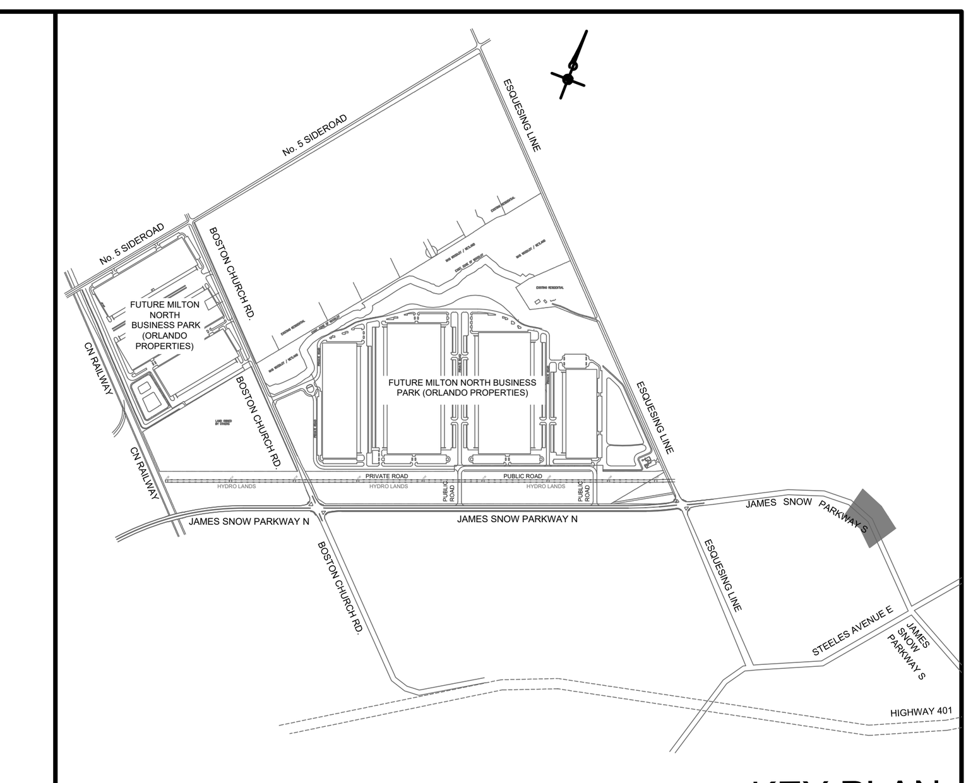
MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 7+160 TO STA. 7+440

Scale:	HORIZ. 1:500 VERT. 1:50	Project No. 17197
Drawn By:	K.K.	
Designed By:	D.H.	Drawing No. PP13
Checked By:		
Date:	FEBRUARY 2022	

File : G:\Projects\2017\17197 – Orlando – North Porta\2. Design\External Sanitary and Watermain\17197 JAMES SNOW PKWY NORTH OF HYDRO 2.dwg Layout : PP13 Date :Apr 21, 2022 – 3:29pm Edit By : denise.morales

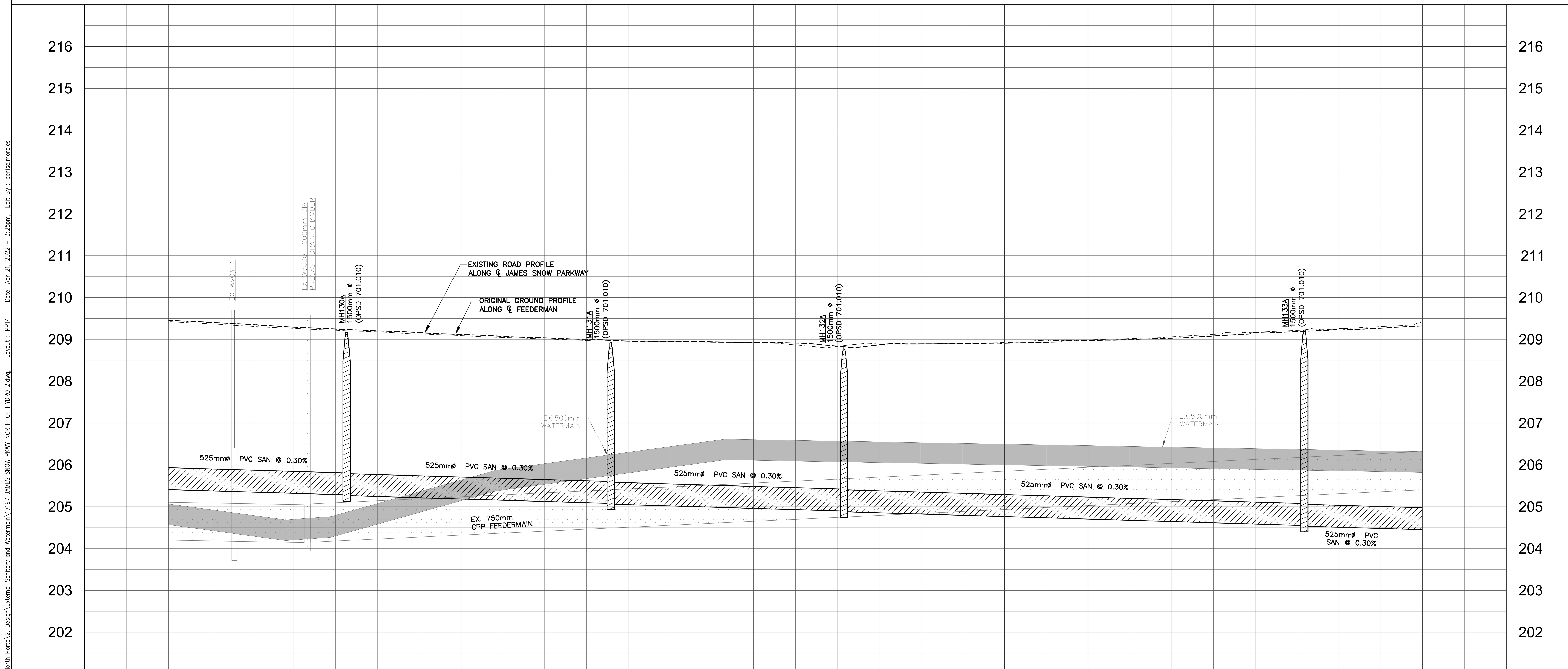




KEY PLAN
N.T.S.

LEGEND:

●	PROPOSED SANITARY MANHOLE
○	PROPOSED STORM MANHOLE
□ CB	PROPOSED CATCHBASIN
DCB	PROPOSED CATCHBASIN
⊗	PROPOSED VALVE & CHAMBER
VB	PROPOSED VALVE & BOX
HYD	PROPOSED HYDRANT & VALVE
	TEMP HYDRANT COMPLETE WITH VALVE
ST	EXISTING STORM
G	EXISTING MAIN GAS
GV	EXISTING GAS VALVE
B	EXISTING BELL
OHW	EXISTING OVERHEAD HYDRO WIRE
TL	EXISTING TRAFFIC LINE
SW	EXISTING SWALE CENTERLINE
DL	EXISTING DITCH CENTERLINE
X	EXISTING FENCE



SANITARY INVERTS:
- 58.22m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
- W205.282 / SE205.267
- 62.88m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
- NW205.078 / SE205.063
- 55.53m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
- NW204.896 / SE204.881
- 110.02m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING
- NW204.551 / SE204.536
- 102.94m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING

℄ CHAINAGE	EXISTING ROAD GRADES
7+440	209.457
7+460	209.352
7+480	209.248
7+500	209.162
7+520	209.075
7+540	208.997
7+560	208.949
7+580	208.928
7+600	208.838
7+620	208.892
7+640	208.908
7+660	208.978
7+680	209.029
7+700	209.165
7+720	209.253
7+740	209.324

NOTE:
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UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

TYLin

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6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
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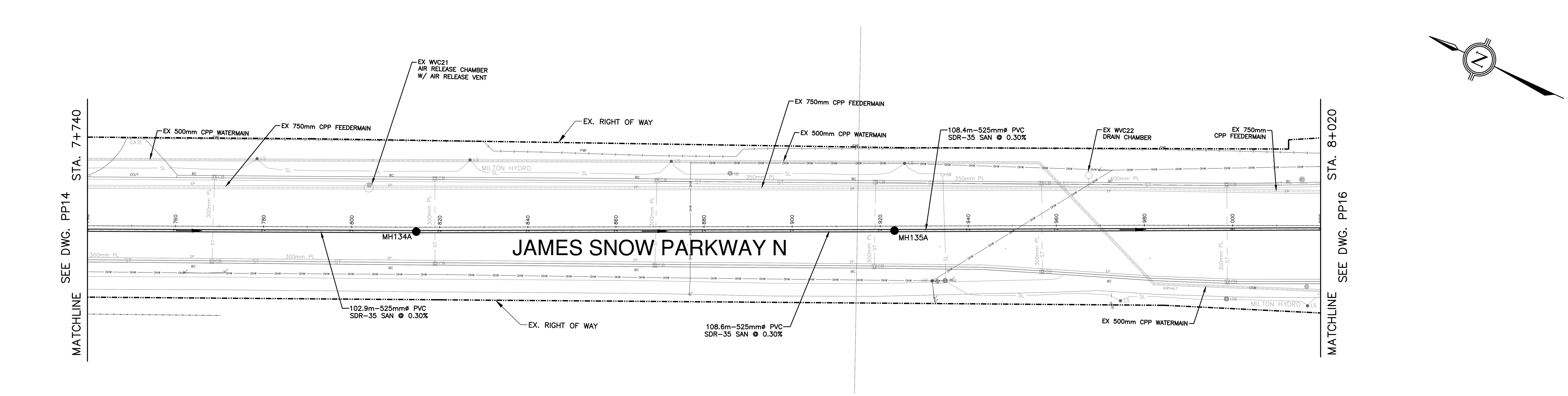
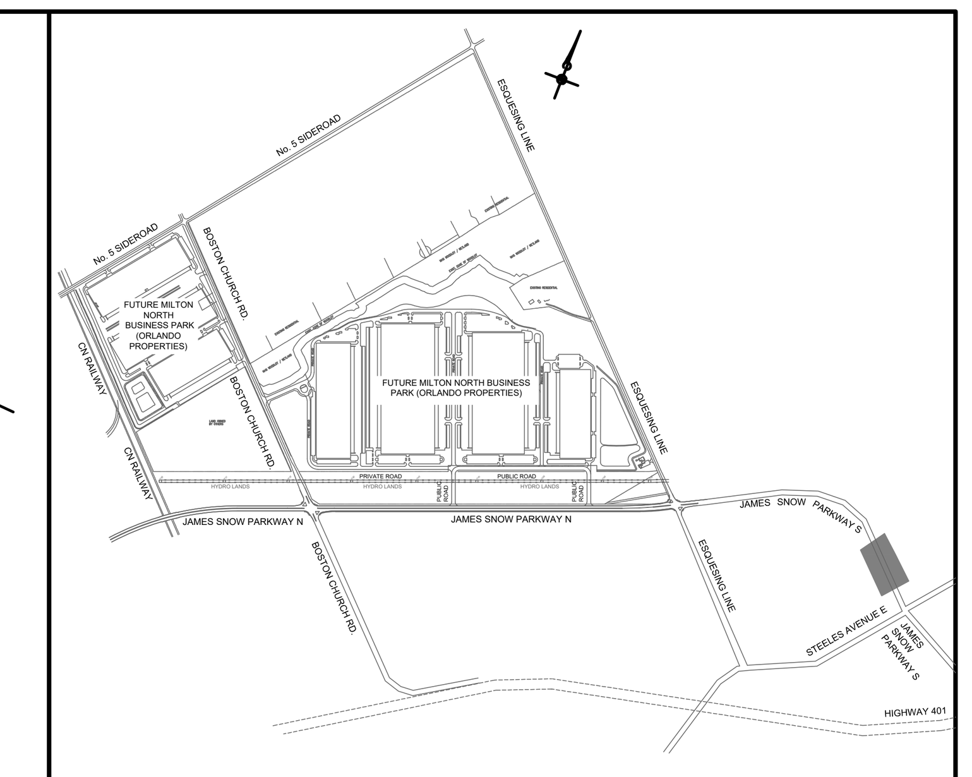
f: 905.677.2824

MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 7+440 TO STA. 7+740

Scale:	HORIZ. 1:500 VERT. 1:50	Project No.	17197
Drawn By:	K.K.		
Designed By:	D.H.	Drawing No.	PP14
Checked By:			
Date:	FEBRUARY 2022		





LEGEND:

- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
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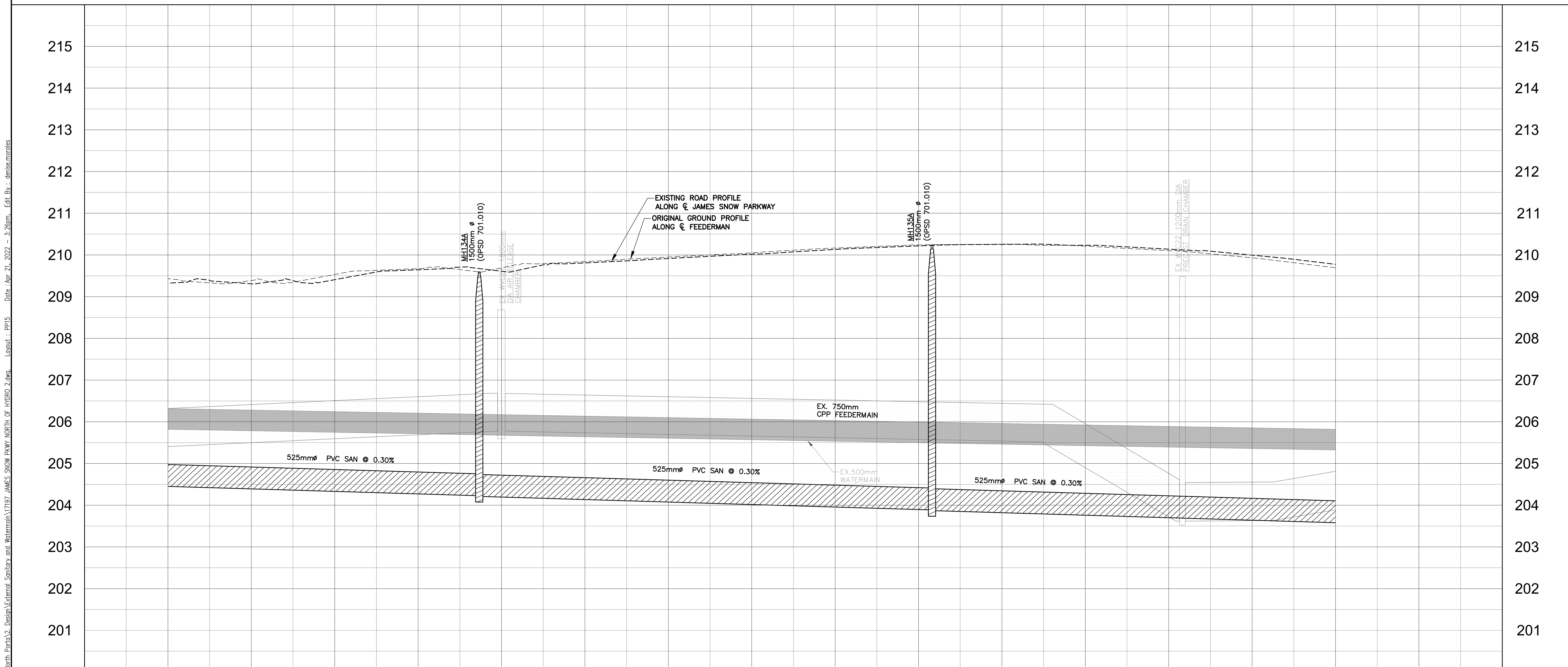

SANITARY INVERTS	102.94m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING				NW204.227 SE204.212	108.58m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING					NW203.886 SE203.871	108.35m–525mmø PVC SDR–35 SAN @ 0.30% CLASS B BEDDING				SANITARY INVERTS
EXISTING ROAD GRADES	209.324	209.308	209.406	209.644	209.610	209.809	209.915	210.020	210.132	210.217	210.253	210.231	210.138	209.995	209.774	EXISTING ROAD GRADES
℄ CHAINAGE	7+740	7+760	7+780	7+800	7+820	7+840	7+860	7+880	7+900	7+920	7+940	7+960	7+980	8+000	8+020	℄ CHAINAGE

NOTE:
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NO.	DESCRIPTION	BY	DATE
5			
4			
3			
2			
1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

TYLin
8800 Dufferin Street, Suite 200
Vaughan, ON
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f: 905.738.0065

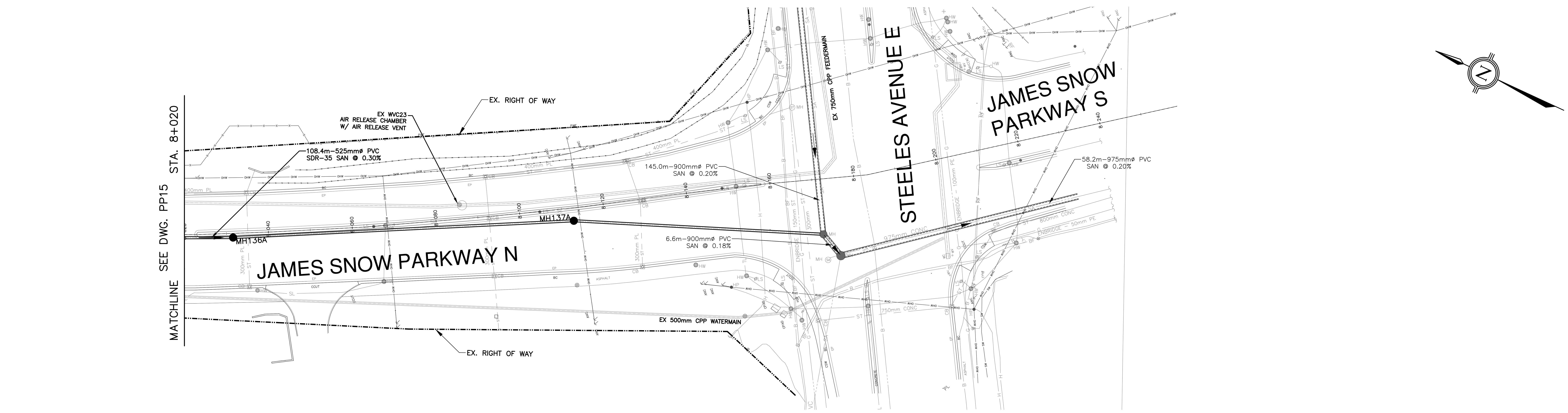
6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
p: 905.677.5480
f: 905.677.2824

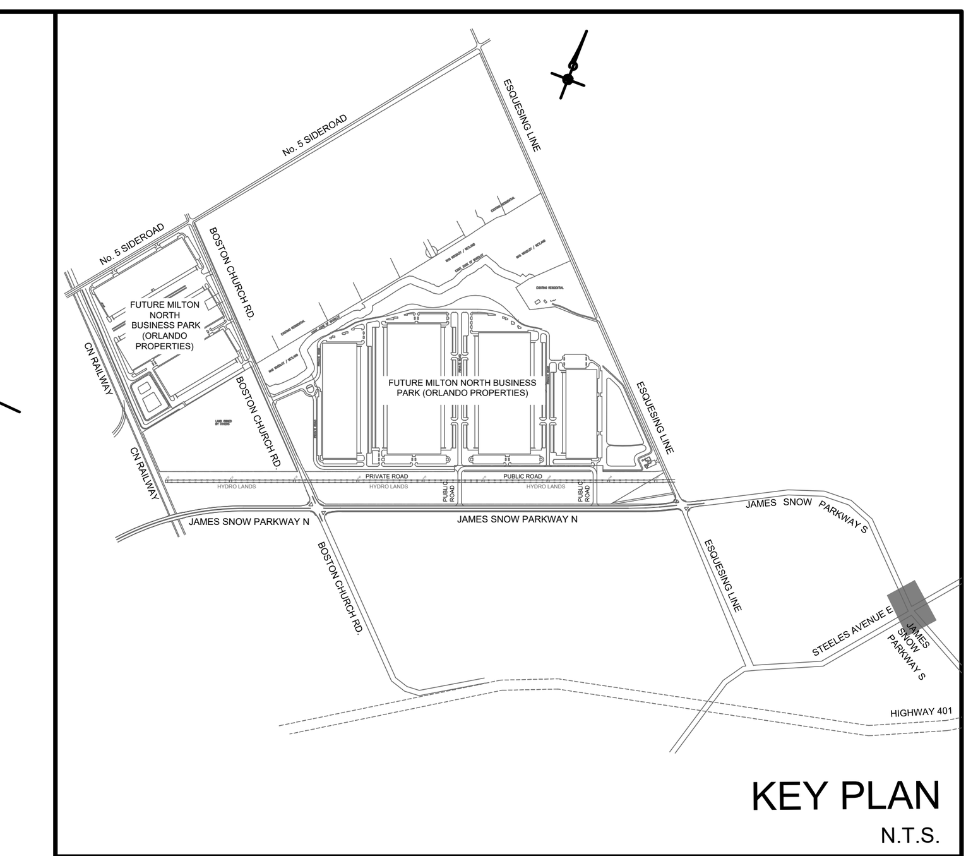
MILTON NORTH PORTA EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY

FROM STA. 7+740 TO STA. 8+020

Scale:	HORIZ. 1:500 VERT. 1:50	Project No. 17197
Drawn By:	K.K.	
Designed By:	D.H.	Drawing No. PP15
Checked By:		
Date:	FEBRUARY 2022	





LEGEND:
- ● PROPOSED SANITARY MANHOLE
- ○ PROPOSED STORM MANHOLE
- CB PROPOSED CATCHBASIN
- DCB PROPOSED CATCHBASIN
- PROPOSED VALVE & CHAMBER
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- EXISTING STORM
- EXISTING MAIN GAS
- EXISTING GAS VALVE
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- EXISTING TRAFFIC LINE
- EXISTING SWALE CENTERLINE
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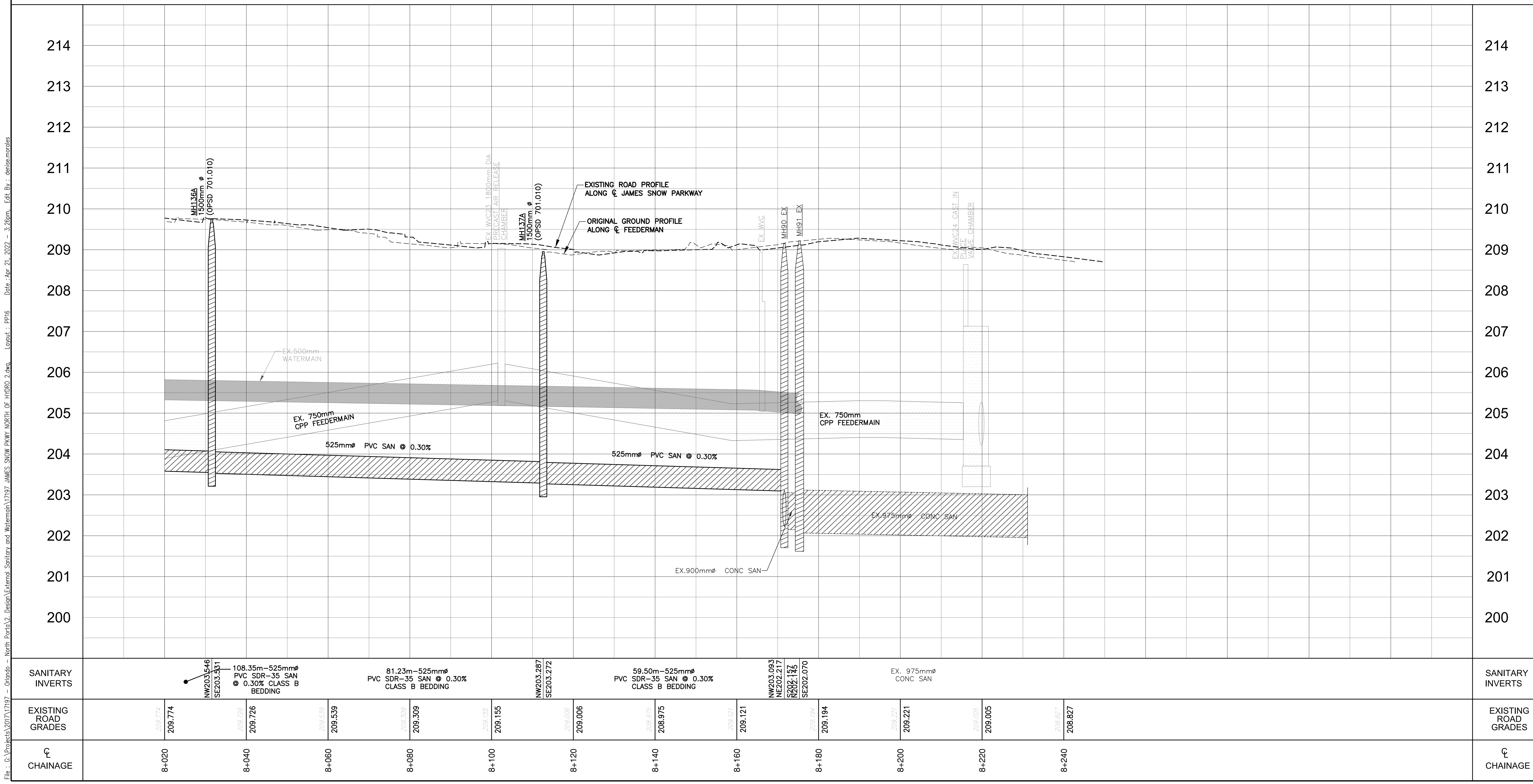
- EXISTING FENCE



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NO.	DESCRIPTION	BY	DATE
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1	ISSUED FOR 30% SUBMISSION		MAR 2021

UPDATES & REVISIONS

DESIGNED BY:

APPROVED BY:

TYLin

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Suite 200
Vaughan, ON
L4K 0C5
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f: 905.738.0065

6205 AIRPORT RD
MISSISSAUGA ON L4V1E3
p: 905.677.5480
f: 905.677.2824

MILTON NORTH PORTA
EXTERNAL SANITARY AND WATERMAIN

JAMES SNOW PARKWAY
FROM STA. 8+020 TO STA. 8+240

Scale:	HORIZ. 1:500 VERT. 1:50	Project No. 17197
Drawn By:	K.K.	
Designed By:	D.H.	Drawing No.
Checked By:		PP15
Date:	FEBRUARY 2022	

File : G:\Projects\2017\17197 – Orlando – North Porta\2_Design\External Sanitary and Watermain\17197_JAMES SNOW PKWY NORTH OF HYDRO 2.dwg   Layout : PP16   Date :Apr 21, 2022 – 3:26pm   Edit By : denise.morales

APPENDIX E

Cost Estimates

OPTION 1 - PRELIMINARY CONSTRUCTION COST ESTIMATE

Section		Quantity	Unit	Unit Cost		Total Cost
1	525mm Dia. Conc. Sewer, Open Cut in Roadway, 5.5m deep average	417	m	$ 1,000.00		$ 417,000.00
	4xMHs (1500mm Dia.)	4	LS	$ 16,500.00		$ 66,000.00
	Restoration	1251	m2	$ 90.00		$ 112,590.00
2	525mm Dia. Conc. Sewer, Open Cut in Roadway, 6.0m deep average	420	m	$ 1,050.00		$ 441,000.00
	4xMHs (1500mm Dia.)	4	LS	$ 18,000.00		$ 72,000.00
	Restoration	1260	m2	$ 90.00		$ 113,400.00
3	525mm Dia. Conc. Sewer, Open Cut in Roadway, 7m deep average	270	m	$ 1,100.00		$ 297,000.00
	2xMHs (1500mm Dia.)	2	LS	$ 21,000.00		$ 42,000.00
	Restoration	810	m2	$ 90.00		$ 72,900.00
4	525mm Dia. Conc. Sewer, Open Cut in Open Field/Roadway, 7.5m deep average	47	m	$ 1,150.00		$ 54,050.00
	Restoration	71	m2	$ 90.00		$ 6,345.00
5	900 Conc. Sewer, Microtunnel	103	m	$ 7,000.00		$ 721,000.00
	8m deep exit shaft + MH	1	LS	$ 200,000.00		$ 200,000.00
6	900 Conc. Sewer, Microtunnel	239	m	$ 7,000.00		$ 1,673,000.00
	10m deep microtunnel shaft+MH	1	LS	$ 500,000.00		$ 500,000.00
	Intermediate Shaft+MH	1	LS	$ 200,000.00		$ 200,000.00
	Exit Shaft + MH	1	LS	$ 200,000.00		$ 200,000.00
7	525mm Dia. Conc. Sewer, Open Cut in Roadway, 9m deep average	942	m	$ 1,300.00		$ 1,224,600.00
	8xMHs (1500mm Dia.)	8	LS	$ 27,000.00		$ 216,000.00
	Restoration	2826	m2	$ 90.00		$ 254,340.00
8	525 Conc. Sewer, Open Cut in Roadway, 6.5m deep average	506	m	$ 1,050.00		$ 531,300.00
	5xMHs (1500mm Dia.)	5	LS	$ 19,500.00		$ 97,500.00
	Restoration	1518	m2	$ 90.00		$ 136,620.00
9	525 Conc. Sewer, Open Cut in Roadway, 4.5m deep average	314	m	$ 900.00		$ 282,600.00
	5xMHs (1500mm Dia.)	5	LS	$ 13,500.00		$ 67,500.00
	Restoration	942	m2	$ 90.00		$ 84,780.00
10	525 Conc. Sewer, Open Cut in Roadway, 5.5m deep average	571	m	$ 1,000.00		$ 571,000.00
	7xMHs (1500mm Dia.)	7	LS	$ 16,500.00		$ 115,500.00
	Restoration	1713	m2	$ 90.00		$ 154,170.00

Notes

The unit price are assumed to include costs of traffic management, excavation shoring and dewatering

Subtotal - Baseline Pipe Construction Cost $ 8,924,195.00

+5% Mobilization/Demobilization, Bonding and Insurance $ 446,209.75

+20% Contingencies for Unknown Conditions $ 1,784,839.00

Total Project Cost $ 11,155,243.75

OPTION 2 - PRELIMINARY CONSTRUCTION COST ESTIMATE

Section		Quantity	Unit	Unit Cost	Total Cost
1	525mm Dia. Conc. Sewer, Open Cut in Roadway, 5.5m deep average	417	m	$ 1,000.00	$ 417,000.00
	4xMHs (1500mm Dia.)	4	LS	$ 16,500.00	$ 66,000.00
	Restoration	1251	m2	$ 90.00	$ 112,590.00
2	525mm Dia. Conc. Sewer, Open Cut in Roadway, 6.0m deep average	302	m	$ 1,050.00	$ 317,100.00
	3xMHs (1500mm Dia.)	3	LS	$ 18,000.00	$ 54,000.00
	Restoration	906	m2	$ 90.00	$ 81,540.00
3	525mm Dia. Conc. Sewer, Open Cut in Open Field, 6.0m deep average	327	m	$ 550.00	$ 179,850.00
	3xMHs (1500mm Dia.)	3	LS	$ 12,000.00	$ 36,000.00
4	525mm Dia. Conc. Sewer, Open Cut in Open Field, 7.5m deep average	363	m	$ 650.00	$ 235,950.00
	3xMHs (1500mm Dia.)	3	LS	$ 15,000.00	$ 45,000.00
5	525mm Dia. Conc. Sewer, Open Cut in Open Field, 5.5m deep average	470	m	$ 500.00	$ 235,000.00
	4xMHs (1500mm Dia.)	4	LS	$ 11,000.00	$ 44,000.00
6	525mm Dia. Conc. Sewer, Open Cut in Open Field, 7.5m deep average	553	m	$ 650.00	$ 359,450.00
	6xMHs (1500mm Dia.)	6	LS	$ 15,000.00	$ 90,000.00
7	525 Conc. Sewer, Open Cut in Roadway, 7.0m deep average	187	m	$ 1,100.00	$ 205,700.00
	3xMHs (1500mm Dia.)	3	LS	$ 21,000.00	$ 63,000.00
	Restoration	561	m2	$ 90.00	$ 50,490.00
8	525 Conc. Sewer, Open Cut in Roadway, 6.5m deep average	506	m	$ 1,050.00	$ 531,300.00
	5xMHs (1500mm Dia.)	5	LS	$ 19,500.00	$ 97,500.00
	Restoration	1518	m2	$ 90.00	$ 136,620.00
9	525 Conc. Sewer, Open Cut in Roadway, 4.5m deep average	314	m	$ 900.00	$ 282,600.00
	5xMHs (1500mm Dia.)	5	LS	$ 13,500.00	$ 67,500.00
	Restoration	942	m2	$ 90.00	$ 84,780.00
10	525 Conc. Sewer, Open Cut in Roadway, 5.5m deep average	571	m	$ 1,000.00	$ 571,000.00
	7xMHs (1500mm Dia.)	7	LS	$ 16,500.00	$ 115,500.00
	Restoration	1713	m2	$ 90.00	$ 154,170.00

Notes

The unit price are assumed to include costs of traffic management, excavation shoring and dewatering

For the open cut in open Field no excavation shoring is assumed to be needed.

Subtotal - Baseline Pipe Construction Cost	**$**	**4,633,640.00**
+5% Mobilization/Demobilization, Bonding and Insurance	**$**	**231,682.00**
+10% Contingencies for Unknown Conditions	**$**	**463,364.00**
Total Project Cost	**$**	**5,328,686.00**

APPENDIX F

Hydraulic Gradeline of Sewers

Figure F-1 - Hydraulic Gradeline of Sewers in Option 1

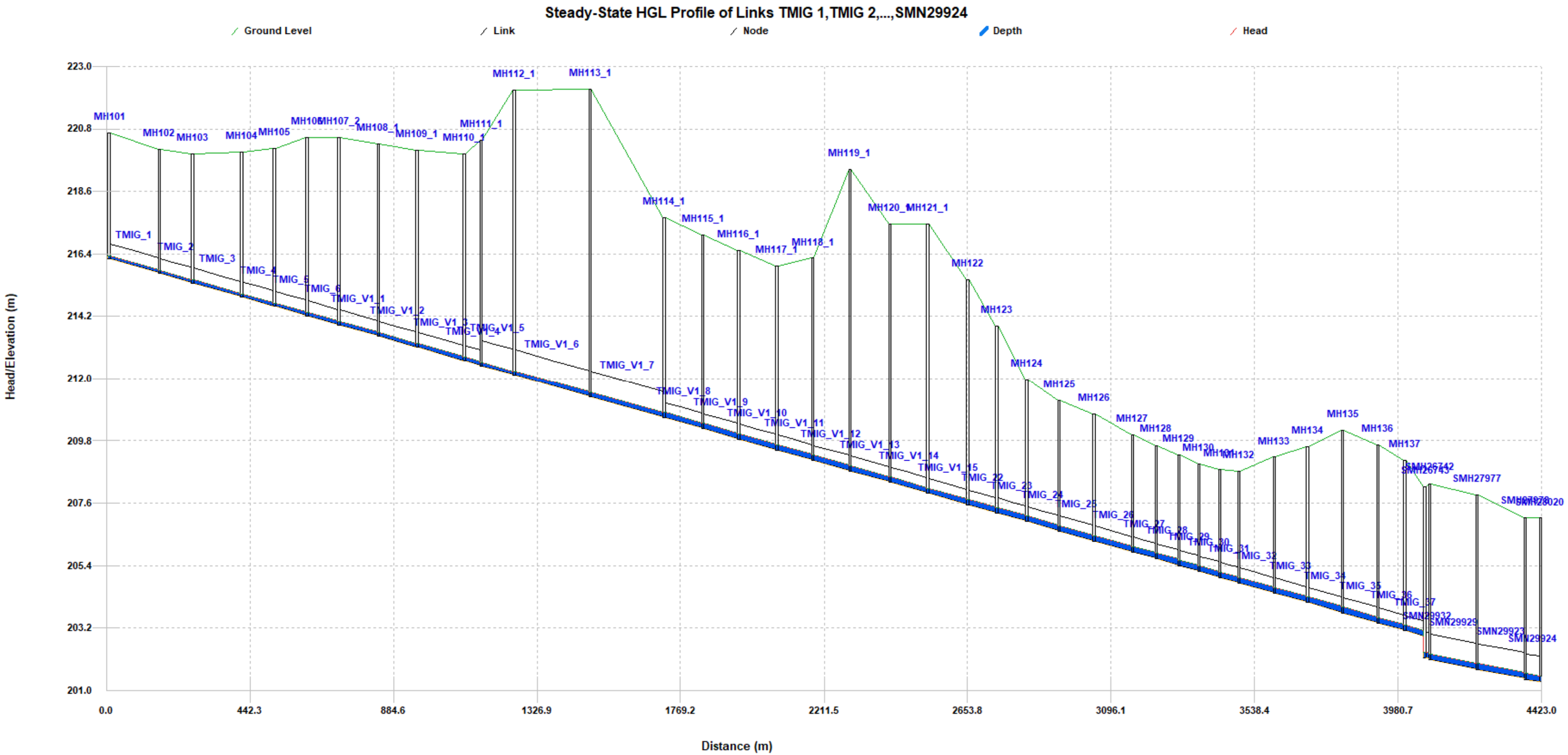

FIGURE F-2 - Hydraulic Gradeline of Sewers in Option 2