APPENDIX M

Existing Utility Report

CITY OF TORONTO

Southwest Agincourt Transportation Connections Study Environmental Assessment

EXISTING SERVICING ANALYSIS

October 7th,2022

wsp

Southwest Agincourt Transportation Connections Study EA

EXISTING SERVICING ANALYSIS

CITY OF TORONTO

PROJECT NO.: 19M-01888-00
DATE: OCTOBER 2022

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Quality Management

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Signature				
Project number	19M-01888	19M-01888	19M-01888	19M-01888
Report number				
File reference				

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Appendices

1 Introduction

The City of Toronto is initiating the Southwest Agincourt Transportation Connections Study (Herein referred to as the SW Agincourt EA) to study ways to improve and expand transportation connections from Village Green Square (south of the Canadian Pacific Railway corridor), to Sheppard Avenue East and Agincourt GO Station. This connection is identified in the City of Toronto's Official Plan and Council-approved Agincourt Secondary Plan to support anticipated growth in the area. The study's Focus Area is shown in **Figure 1**.

The number of people living and working in this area has grown and will continue to grow as a result of planned developments. As the number of people using the transportation system increases, transportation infrastructure improvements will be needed to ensure that people can drive, walk, and cycle to destinations safely and efficiently.

The study Focus Area is bound by Kennedy Road to the west, Dowry Street to the north, the Stouffville GO Train Line to the east, and Village Green Square to the south.

Study Objectives:

1. Provide high quality transportation infrastructure that addresses the needs of this growing area

2. Improve street network connectivity to key destinations, particularly the Agincourt GO station, Collingwood Park and schools

3. Improve the safety of people walking, cycling, taking public transit, and driving

As part of the SW Agincourt EA, this report documents the existing conditions of the sanitary sewer, storm sewer, and water distribution network of the focus study area. Please note that this report is for the analysis of the Existing Servicing in the study area. A future report for the analysis of the Proposing Servicing in the study area will account for the known future development(s).

Figure 1: Map of Southwest Agincourt Transportation Connections Study Focus Area

2 SUE Investigation

A Subsurface Utility Engineering (SUE) Investigation of the study area was completed by T2 Utility Engineers between June and August 2020. The investigation included Quality Level 'B', 'C', and 'D'. A summary of the different quality levels of SUE can be seen below;

- Quality Level 'D' – Information derived from existing records or verbal recollections.
- Quality Level 'C' – Information obtained by surveying and plotting visible above ground utility features and by using professional judgement in correlating this information to the Quality 'D' information.
- Quality Level 'B' – Information obtained through the application of appropriate surface geophysical methods to determine the existence and appropriate horizontal position of the utilities.
- Quality Level 'A' – Precise horizontal and vertical location of utilities obtained by actual exposure and subsequent measurement of subsurface utilities.

A topographic survey was provided by IBW Surveyors which was the base of the SUE Investigation. Field verifications of utilities were completed using a combination of electromagnetic pipe and cable locate equipment. Inverts of existing sewers were confirmed by field depth measurement. The SUE drawings prepared by T2 Utility Engineers can be found in **Appendix A.**

3 Existing Sanitary Sewer

3.1 Existing Conditions

WSP Canada Inc. (WSP) analyzed the existing conditions of the sanitary sewers in the study area by reviewing the as-built plan and profiles and Digital Map Owners Group (DMOG) mapping information from the City of Toronto. The information from the City records was confirmed in the SUE analysis.

The study area for this EA falls under the City Chronic Basement Flooding Study Area 59. The Basement Flooding EA started in 2019 and is currently in progress.

There are three (3) separate sanitary sewer networks in the study area. There is an existing network of 250mm sanitary sewers on Cowdray Court which flow east and connect to the 1050mm West Highland Creek sanitary trunk sewer which runs from north to south on the eastern boundary of the study area. A separate 250mm sanitary sewer network runs north on Kennedy Road and then East on Collingwood Street, also connecting to the existing 1050mm West Highland Creek sanitary trunk sewer. The third 250mm sanitary sewer network runs north on Kennedy Road and east on Sheppard Avenue, also connecting to the 1050mm West Highland Creek sanitary trunk sewer.

These sanitary sewers service the existing residential and commercial developments in the study area, with the sanitary sewers along Kennedy Road servicing some high-density residential developments west of the study area.

3.2 Sanitary Sewer Analysis

WSP completed a sanitary sewer analysis of each of the sanitary sewer networks. The following City of Toronto design parameters we used in the analysis;

- 240 L/cap/day for the average day flow generation rate for existing residential use
- 250 L/cap/day or 180,000 L/floor ha/day for the average day flow generation rate for existing commercial and office use. The greater of the two will be used in the analysis.
- 3.5 people per Single Family House
- 400 persons / ha of lot area or 2.7 persons / unit for apartments and condos. The greater of the two will be used in the analysis.
- Commercial population: 1.1 people / 100m^2 of GFA
- Office population: 3.3 people / 100m^2 of GFA
- School/Church population: 86 people / ha of lot area
- Peaking Factor
    - Residential Harmon
    - Institutional/Commercial (included in average flow)
- Extraneous Flows;

    Groundwater = 3.0 L/s/ha (commercial and apartment buildings only)

    Infiltration = 0.26 L/s/ha (only for Dry Weather flow conditions)

    Wet Weather = 3.0 L/s/ha for first 50 ha

    Wet Weather = 2.0 L/s/ha over 50 ha

The demand and peaking factors are based on City of Toronto, Design Criteria for Sewers and Watermain, January 2021. Since this report focuses on the Existing Conditions of the study area, it is assumed that the existing buildings and infrastructures predates the City of Toronto's new Foundation drain policy which prohibits long-term groundwater system to discharge to the sanitary sewer system. It is assumed that only the commercial and apartment buildings on Sheppard Avenue East would have groundwater discharge to the existing sanitary sewer network in the area. An allowance of 3.0 L/s/ha was used for groundwater flow. As groundwater is only anticipated to be discharged to the sanitary sewer in instances where the underground structure penetrates the groundwater table, only the apartment buildings and the large commercial building on the northeast corner of Sheppard Avenue and Kennedy Road were assumed to have groundwater flow.

The City of Toronto record drawings were used to confirm the lengths, slopes, and sizes of each pipe. This information was verified by using the SUE investigation results. Both the dry and wet weather conditions were analyzed for each network. To facilitate the analysis, a Sanitary Sewer Drainage Area Plan was created and is located in **Appendix B.**

3.3 Results and Recommendations

In both the dry and wet weather scenario, the analysis demonstrates that the existing municipal sanitary sewer systems within the study area have adequate capacity to support the existing developments without surcharging in any leg. The full sanitary sewer analysis can be seen in **Appendix B**.

4 Existing Storm Sewer

4.1 Existing Conditions

WSP analyzed the existing conditions of the storm sewers in the study area by reviewing the as-built plan and profiles and DMOG mapping information from the City of Toronto. The information in the City records was confirmed in the SUE analysis.

There are three (3) separate storm sewer networks in the study area. There is an existing network of storm sewers on Cowdray Court, ranging in size from 675mm to 900mm, which flow east and discharge to West Highland Creek. A separate storm sewer network, ranging in size from 300mm to 600mm, which run north on Kennedy Road and then East on Collingwood Street, also discharges to West Highland Creek. The third storm sewer network, ranging in size from 375mm to 975mm, runs north on Kennedy Road and east on Sheppard Avenue, also discharges to West Highland Creek.

4.2 Storm Sewer Analysis

WSP completed a storm sewer analysis of each of the storm sewer networks. The analysis uses the rational method for runoff volume calculation and the IDF curve found in the City of Toronto Design Criteria for Sewers and Watermains, January 2021. The 2-year return frequency storm was analyzed as storm sewers in the City of Toronto are required to convey the 2-year storm without surcharging. For arterial roads, such as Kennedy Road and Sheppard Avenue East, the storm sewers should be designed for the 10-year storm without surcharging. Therefore, a storm sewer analysis was also conducted for the Collingwood Street and Sheppard Avenue storm sewer system for the 10-year storm event.

In addition, the 2-year and 10-year hydraulic grade line (HGL) analyses were conducted for the respective storm sewer networks. For both the 2-year and the 10-year HGL analysis, either the flood line in the creek under the respective storm event or the obvert of the downstream pipe discharging into the creek was used as the starting point of the HGL, whichever is larger.

The City of Toronto record drawings were used to confirm the lengths, slopes, and sizes of each pipe. This information was verified by using the SUE investigation results. To facilitate the analysis, a Storm Sewer Drainage Area Plan was created and is located in **Appendix C.**

4.3 Results and Recommendations

The storm sewer analysis demonstrates that the existing municipal storm sewer networks within the study area have adequate capacity to support the existing developments without surcharging in any sewer leg for the 2-year storm event. However, under the 10-year storm event, majority of the storm sewers including the sewers on the arterial roads are overcapacity, but no surcharge is expected.

For the Cowdray Court sewer network, which is not an arterial road, the capacity of the storm sewers ranges from 12-75% and the hydraulic grade line (HGL) ranges from 2.64-4.07 m below the ground surface during the 2-year storm event.

For the Collingwood Street sewer network, the capacity of the storm sewers ranges from 52-89% and the HGL ranges from 2.42-3.34 m below the ground surface during the 2-year storm event. During the 10-year storm event, the capacity of the sewers ranges from 95-164% and the HGL ranges from 0.37-3.24 m below the ground surface.

For the Sheppard Avenue sewer network, the capacity of the storm sewers ranges from 30-89% and the HGL ranges from 1.91-4.73 m below the ground surface during the 2-year storm event. During the 10-year storm event, the capacity of the sewers ranges from 56-164% and the HGL ranges from 0.04-4.24 m below the ground surface.

Therefore, the Cowdray Court sewer network has capacity to convey the 2-year pre-development flows without surcharging. While Collingwood Street and Sheppard Avenue sewer networks has the capability to convey both the 2-year and 10-year pre-development flows without surcharging. However, the hydraulic grade line for several pipes in the respective networks (highlighted in yellow on the design sheets) are less than the City of Toronto's requirement of 1.8 m below the ground surface.

City design criteria indicates that only storm sewers located within urban arterial roads (Kennedy Road & Sheppard Avenue East) are to be designed for a 10-year storm. The Cowdray Court area does not discharge storm flows to these streets so the control of flows to the 2-year storm event in the post development condition within the proposed development blocks will not reduce the flow in these sewers. Any upgrade to the storm sewers on Kennedy Road and Sheppard Avenue East would be beyond the scope of this project. The capacity issues have only been highlighted in this report as these streets are within the study area.

Since the WSP's scope for the proposed works do not impact the arterial roads within the Study Area, the civil consultants for the future developments that will discharge to the arterial roads would need to determine the upgrades and/or stormwater management facility required to ensure the existing storm network can handle the flows from the proposed developments. The full storm sewer analysis can be seen in **Appendix C**.

4.4 Major System Analysis

As part of the storm system analysis, WSP analyzed the major storm system to confirm that the study area has safe overland flow routes to a watercourse and that the allowable ponding depth as determined in the latest city standards is not exceeded. WSP reviewed in detail the record drawings provided by the City of Toronto and the topographic survey prepared by IBW Surveyors. From the analysis, it was determined that overland flow routes are provided throughout the entire study area north of the existing railway and south of Sheppard Avenue East and the majority of the ponding is less than the maximum water depth of 0.30 m and also the requirements as stated in Table 17 for the available ponding for each road classification in the City of Toronto's Design Criteria for Sewers and Watermains dated January 2021. Under a major storm event, runoff from the study area will ultimately flow towards West Highland Creek.

Overland flow from Collingwood Street and Cowdray Court will flow east into Collingwood Park and the open space east of the existing cul-de-sac on Cowdry Court, respectively, and discharge into West Highland Creek.

The two most eastern catchbasins on Collingwood Street will experience approximately 0.06 m of ponding prior to overland flow to the creek. The road width of Collingwood Street is approximately 8.0 m. Assuming a 2.0% crossfall, the depth of ponding allowable as per Table 17 in City of Toronto's guideline is 0.08 m. Therefore, the ponding depth of 0.06 m on Collingwood Street can be considered acceptable.

While it is expected that the cul-de-sac at the end of Cowdray Court will pond up to approximately 0.36 m before overland flow occurs. This area will be redeveloped as part of the road construction and subdivision development on Cowdray Court. The proposed development will provide an overland flow route to West Highland Creek and ensure ponding will not exceed 0.30 m at any location.

Overflow from Gordon Avenue and Kennedy Road will sheet drain north towards Sheppard Avenue East, which then drains east towards West Highland Creek. No ponding was identified on these streets.

4.5 Flood Flow Management Study

A technical memo dated September 29, 2020 was prepared by WSP to compare the existing Highland Creek HEC-RAS 1D model obtained from the Toronto and Region Conservation Authority (TRCA) and WSP 1D/2D coupled model for the area upstream of Sheppard Avenue and the area downstream of the railway double crossings. From the analysis, it was determined that a portion of Sheppard Avenue East west of the creek and the north half of Gordon Avenue within the study area are located within the regional floodplain under existing conditions. Please see the memo "Agincourt HEC-RAS Model Update" provided under a separate cover for more information.

5 Existing Water Distribution

5.1 Existing Conditions

WSP analyzed the existing conditions of the water distribution networks in the study area by reviewing the as-built plan and profiles and DMOG mapping information from the City of Toronto. The information in the City records was confirmed in the SUE analysis.

The study area is located in Pressure District 4. There is a 1500mm trunk watermain which runs through the study area. A transmission supply point between the transmission watermain and the local network is located at the Sheppard Avenue and Kennedy Road intersection. There are multiple connection points between the trunk watermain and the local water distribution mains. A pump was place at the following locations to simulate the connections to the feeder main:

- Sheppard Avenue and Birchmount Road
- Sheppard Avenue and Kennedy Road
- Midland Avenue and Salome Drive
- Midland Avenue and Progress Avenue

Please refer to Section 5.3 and **Appendix D** for more information.

A 300mm watermain runs along Kennedy Road and Sheppard Road East, which supplies Collingwood Street, Gordon Avenue, Cowdray Court, and Village Green Square. There is also an additional 200mm watermain located on the northeast corner of Village Green Square, to provide more looping and redundancy in the system.

Please note that as a result of framework studies for the developments within the vicinity of Kennedy Road and Sheppard Avenue, there will be a realignment of the boundaries of pressure districts 4 and 5. The realignment is expected to take place in September/October 2022. Once completed, the impacts of the realignment will be considered in the proposed servicing report prepared under a separated cover.

5.2 Field Investigation

As part of the existing water distribution network analysis, WSP completed a hydraulic field investigation that involved the completion of 7 hydrant flow tests within the study area. The tests were completed at various locations throughout the network that would help create and calibrate a water distribution model. The results of the hydrant flow tests can be seen in **Appendix D.**

5.3 Water Distribution Analysis

The computer model used to analyze the existing water distribution system was H20NET, which is an iterative node balancing type program designed to simulate distribution networks. The City of Toronto record drawings were used to confirm the length and sizes of each pipe. This information was verified by using the SUE investigation results.

A fictitious pump curve was introduced to the model based on the information obtained from on-site hydrant flow tests. Specifically, hydrant flow test No. 2 was used to set up the boundary conditions for this project as this is the one closet to the large feeder main. The pump curve has been used at each connection between a watermain and the large trunk watermain. Please refer to **Appendix D** for the hydrant flow tests and the pump curve used in the model.

The modelling criteria used to determine the capabilities of the existing distribution system is based on the City's design criteria. The C-factor has been calibrated to match the findings from field tests rather than utilizing the standard factors provided in the City of Toronto Design Criteria for Sewers and Watermains. The following criteria was used in the modelling:

- Peak Hour = 2.25 times average day
- Maximum Day = 1.50 times average day
- Average Consumption Rate = 310 litres/capita/day (Single Family)
  = 190 litres/capita/day (Apartment)
- C Factor = 70 (150mm)
  = 80 (200mm or 250mm)
  = 90 (300mm to 600mm)
- Minimum Pressure During Peak Hour = 275kPa
- Minimum Pressure During Max Day + Fire Demand = 140kPa

For the Max Day Plus Fire modelling analysis, required fire flow demand for properties within the study area were conservatively estimated. For some of the proposed developments in Village Green Square, the required fire flow was taken from available Functional Servicing Reports which were found on the City's website.

The flow and pressure in the model were calibrated using the hydrant flow test results. To facilitate the analysis, a Water Distribution Network Plan was created and is located in **Appendix E.**

5.4 Results and Recommendations

As shown in the results in **Appendix D**, under peak hour scenario the pressure in the study area ranges between 299l kPa at Node J27 to 449 kPa at Node J39. The pressures are above the City criteria of 275kPa. For the maximum day plus fire flow scenario, the residual pressures at the required fire flow rates range between -356.51 kPa at Node J36 and 438.31 kPa at Node J39. There are multiple nodes within the study area that do not provide adequate fire flow, specifically Nodes J36 and J60. It is important to note that these nodes are located at the ends of existing dead-end connections. The high-density residential development area, Village Green Square, within the study area has sufficient flow and pressure thanks to the introduction of the existing watermain network located south of Highway 401 to the model.

When the proposed condition is modelled, the potential to provide watermain looping through the proposed grade separation under the CP Rail and through the new development at Cowdray Court will be analyzed and modelled. This looping may improve the available fire flow available to service the Village Green Square development area.

6 Conclusion

In this report the existing storm, sanitary, and water distribution networks were analyzed, and the existing capacities were assessed. Based on our analyses the following was determined:

► The existing sanitary sewer networks within the study area are operating below capacity for both the dry and wet weather conditions,

► The existing storm sewer networks within the study area are operating below capacity for the 2-year storm. Under the 10-year storm event, there are multiple sewers along the arterial roads in the study area operating above capacity. Based on the HGL analysis, surcharging is not expected for all storm sewer networks during the 10-year storm event. Within the study area, multiple overland flow routes are available to convey runoff from major storm events safely to West Highland Creek. From detailed analysis, several locations of ponding were identified. Apart from the ponding located at the cul-de-sac of Cowdry Court which will be removed upon future development, ponding exceeding a depth of 0.30 m was not identified under existing conditions.

►The existing water distribution network provides adequate pressure for the peak hour scenario. Under the max day + fire flow scenario, several nodes failed to provide the minimum pressure at the required fire flow. However, it is important to note that those nodes are located at existing dead-end connections. The high-density residential development area, Village Green Square, located within the study area has adequate flows and pressures. When the proposed condition is modelled, looping will be introduced into the system which may help improve flow and pressure in the system.

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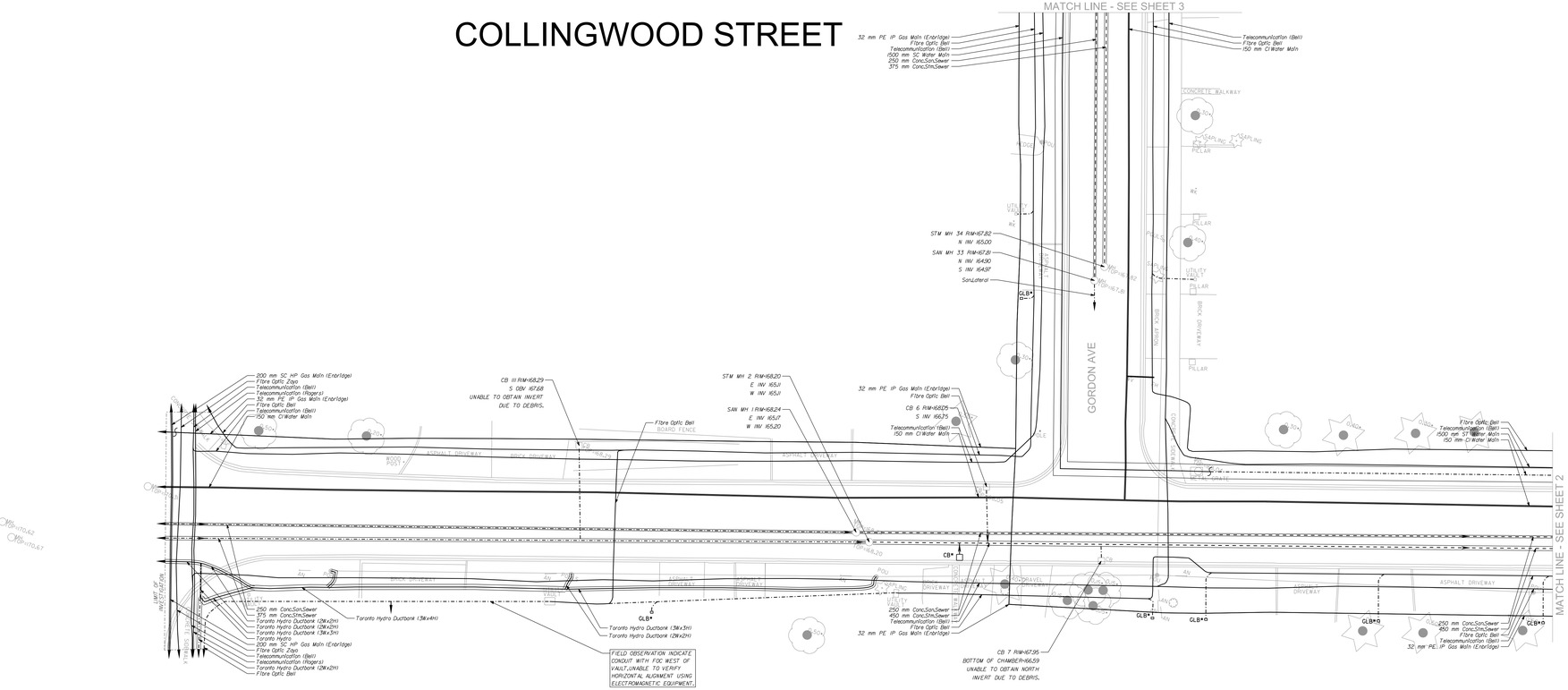
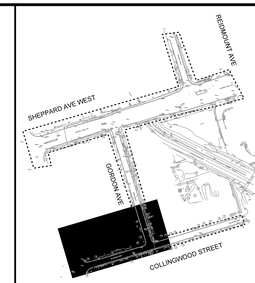
APPENDIX

A SUE INVESTIGATION

COLLINGWOOD STREET





NOT TO SCALE

GENERAL NOTES:

1. T2UE'S SUE FIELD INVESTIGATION WAS COMPLETED IN JUNE 2020. CHANGES TO UTILITIES THAT OCCURED FOLLOWING OUR INVESTIGATION MAY NOT BE SHOWN. CONSIDERATION SHOULD BE GIVEN TO UPDATING THIS PLAN PRIOR TO FINAL DESIGN AND CONSTRUCTION.

2. LIMIT OF INVESTIGATION:
AS SHOWN ON KEY PLAN.

3. STORM AND SEWER ALIGNMENTS ARE SHOWN BASED ON AVAILABLE RECORDS INFORMATION AND PROFESSIONAL JUDGEMENT.

4. FIELD VERIFICATION OF UTILITIES WAS COMPLETED USING A COMBINATION OF ELECTROMAGNETIC PIPE AND CABLE LOCATE EQUIPMENT.

5. EMPTY CONDUITS, SERVICES, LATERALS TO BUILDINGS, ABANDONED FACILITIES SUCH AS STREET LIGHT CABLES, WITHIN THE INVESTIGATION AREA MAY NOT BE SHOWN ON THE DRAWING.

6. T2UE USED AVAILABLE MEANS IN AN ATTEMPT TO DETERMINE THE LOCATION OF UNDOCUMENTED UTILITIES HOWEVER CANNOT BE RESPONSIBLE FOR FINDING ALL UNDOCUMENTED UTILITIES.

7. UTILITY MATERIAL, SIZES AND FLOW SHOWN ON DRAWING ARE BASED ON RECORDS INFORMATION RECEIVED, PROFESSIONAL JUDGEMENT AND FIELD INVESTIGATION.

8. UTILITY WIDTHS SHOWN ON DRAWING ARE BASED ON RECORDS RECEIVED. WIDTHS ARE NOT SHOWN ON UTILITIES 100mm IN DIAMETER/WIDTH OR SMALLER. UTILITIES WITH UNKNOWN SIZES ARE SHOWN AS SINGLE LINES.

9. PLANT SHOWN AS "ABANDONED (ABND)" ON THE DRAWINGS ARE BASED ON RECORD INFORMATION PROVIDED. STATUS OF THE UTILITY SHOULD BE CONFIRMED WITH THE UTILITY OWNER.

10. THE TOPOGRAPHIC SURVEY WAS PROVIDED BY IBW SURVEYORS. T2UE IS NOT RESPONSIBLE FOR IT'S ACCURACY.

11. CENTERLINE OF UTILITY SHOWN INDICATES THE QUALITY LEVEL AS PER ASCE 38-02.

NOTE

ASCE QUALITY LEVELS

THE UTILITY INFORMATION SHOWN ON THIS DRAWING WAS COLLECTED IN ACCORDANCE TO ASCE STANDARD 38-02. THE INFORMATION IS SHOWN BY QUALITY LEVEL WHICH INDICATES THE LEVEL OF EFFORT USED TO DETERMINE THE LOCATION OF THE DATA.

INCREASED QUALITY

QUALITY LEVEL "D" - INFORMATION DERIVED FROM EXISTING RECORDS OR VERBAL RECOLLECTIONS.

QUALITY LEVEL "C" - INFORMATION OBTAINED BY SURVEYING AN PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGEMENT IN CORRELATING THIS INFORMATION TO THE QUALITY LEVEL "D" INFORMATION.

QUALITY LEVEL "B" - INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF THE UTILITIES.

QUALITY LEVEL "A" - PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES.

NOTE

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

NOTE

THE ONTARIO LAND SURVEYORS SEAL HEREON IS TO CERTIFY THAT THE TOPOGRAPHIC SURVEY INFORMATION PROVIDED IS IN ACCORDANCE WITH INDUSTRY STANDARDS, COMPLETED BY J.D. BARNES ALL OTHER INFOMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

LEGEND

G.S.	GAS SERVICE		QUALITY LEVEL "B"
W.S.	WATER SERVICE		QUALITY LEVEL "C"
SAN LAT.	SANITARY LATERAL		QUALITY LEVEL "D"
STM LAT.	STORM LATERAL		
O/S	OFFSET		
T.O.N.	TOP OF NUT	*	NOT SURVEYED, LOCATION BASED ON FIELD OBSERVATION
T.O.P.	TOP OF PIPE		
	QUALITY LEVEL "A"		
	FLOW ARROW	#	NOT SURVEYED, LOCATION BASED ON RECORD OBSERVATION
	CONTINUATION ARROW		
	END CAP		
	LOSS OF SIGNAL		

T2utility engineers
1-855-222-T2UE | WWW.T2UE.COM

SURVEY(Year)	X-61001675-TOPO-1-0674-V1-2D
DESIGN	
UTILITY	61001675 - SUE.dgn
MAPPING	
STREETLINE	

DIGITAL INFORMATION

No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering and Construction Services

COLLINGWOOD STREET

TORONTO ONTARIO

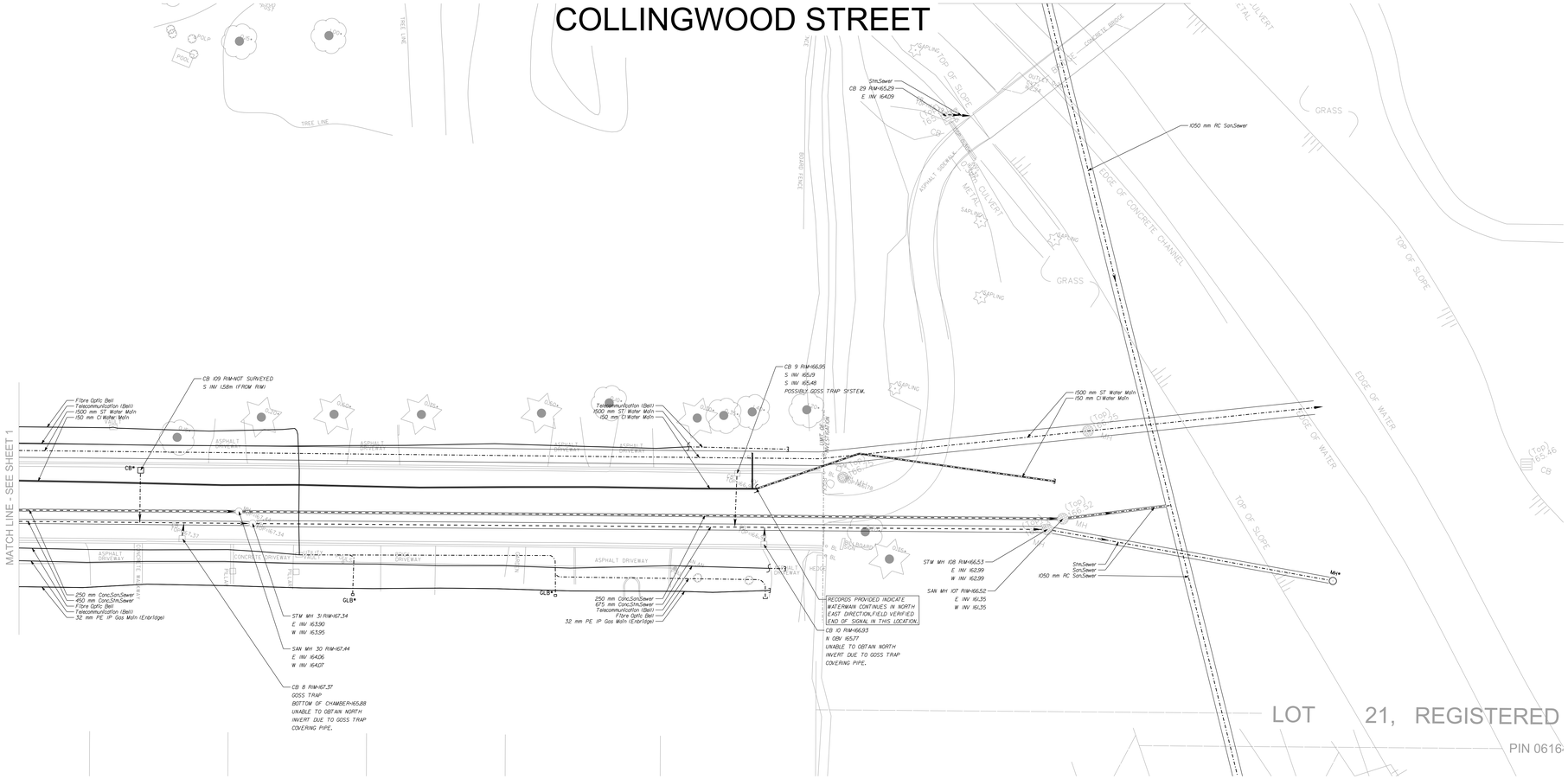
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

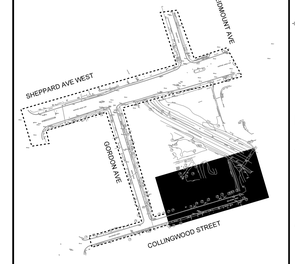
DESIGN		DRAWN	J.S.	CHECKED	D.J.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675
DATE	JULY 14, 2020				

CONTRACT No.

SHEET 1 OF 10

COLLINGWOOD STREET





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LEGEND

G.S.	GAS SERVICE		QUALITY LEVEL "B"
W.S.	WATER SERVICE		QUALITY LEVEL "C"
SAN LAT.	SANITARY LATERAL		QUALITY LEVEL "D"
STM LAT.	STORM LATERAL		
O/S	OFFSET		
T.O.N.	TOP OF NUT	*	NOT SURVEYED, LOCATION BASED ON FIELD OBSERVATION
T.O.P.	TOP OF PIPE		
	QUALITY LEVEL "A"		
	FLOW ARROW	#	NOT SURVEYED, LOCATION BASED ON RECORD OBSERVATION
	CONTINUATION ARROW		
	END CAP		
	LOSS OF SIGNAL		

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DIGITAL INFORMATION					
SURVEY(Year)	X-61001675-TOPO-1-0674-V1-2D				
DESIGN					
UTILITY	61001675 - SUE.dgn				
MAPPING					
STREETLINE					

No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering and Construction Services

COLLINGWOOD STREET
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

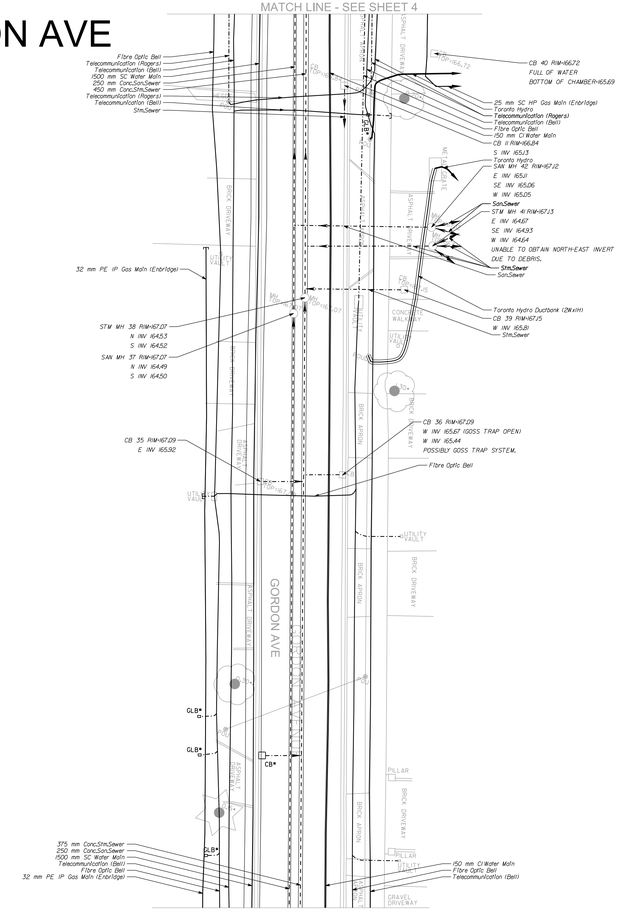
DESIGN		DRAWN	J.S.	CHECKED	D.J.
SCALE	HORIZONTAL 1:200				
DATE	JULY 14, 2020				

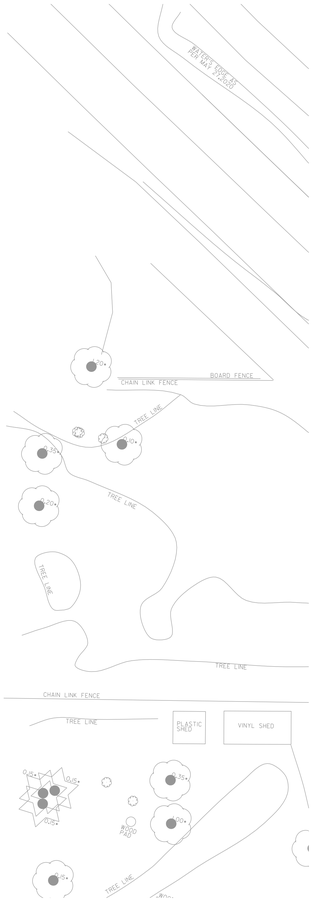
CONTRACT No.

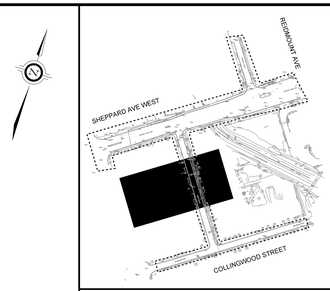
DRAWING NUMBER 61001675

SHEET 2 OF 10

GORDON AVE







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AS SHOWN ON KEY PLAN.

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	CONTINUATION ARROW		
	END CAP		
	LOSS OF SIGNAL		

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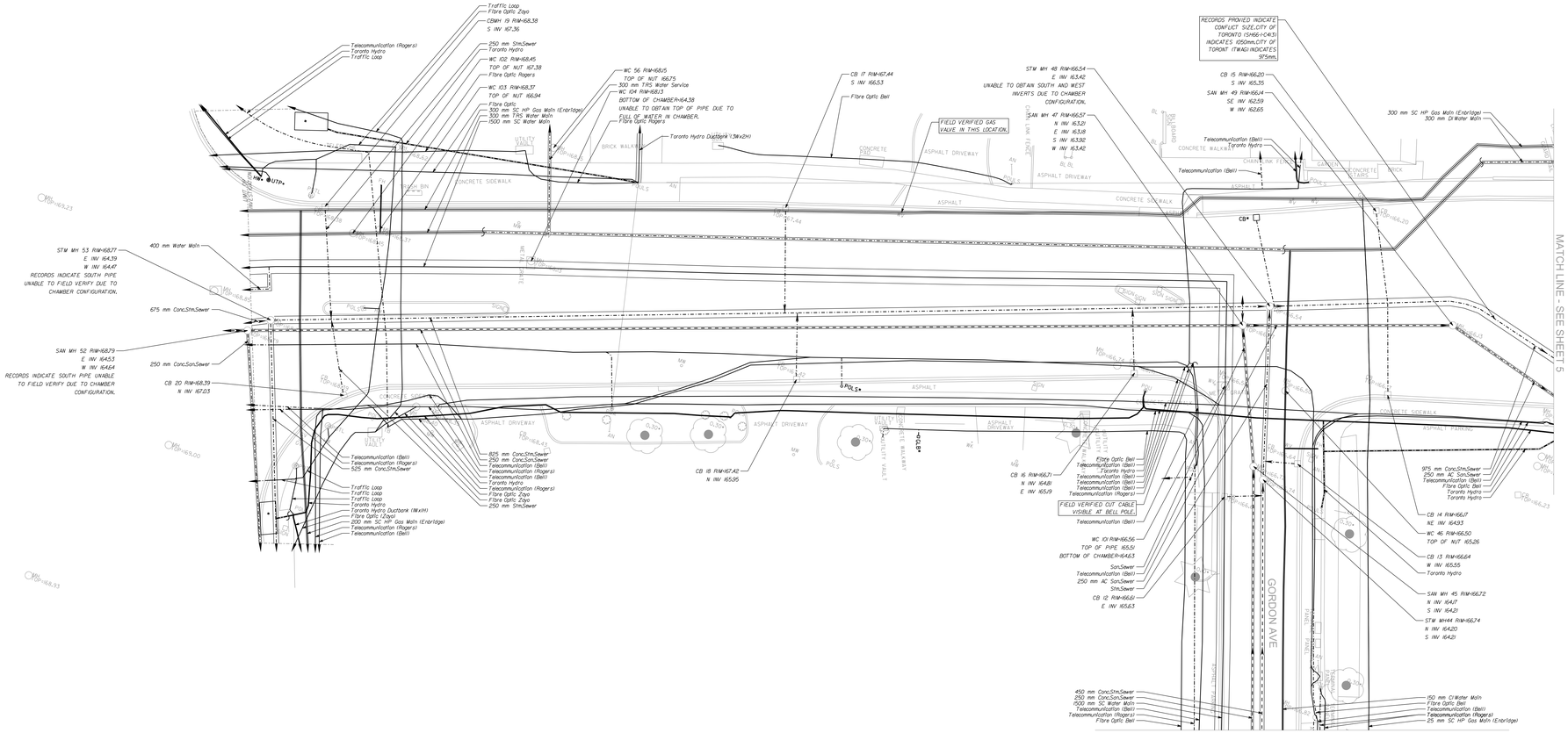
SURVEY(Year)	X-61001675-TOPO-1-0674-V1-2D				
DESIGN					
UTILITY	61001675 - SUE.dgn				
MAPPING					
STREETLINE					
DIGITAL INFORMATION		No.	DATE	REVISIONS	INITIAL / SIGNED

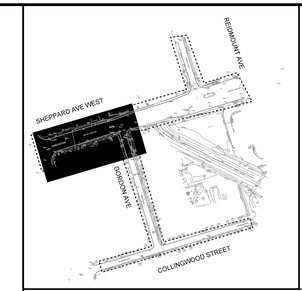
TORONTO Engineering and Construction Services

GORDON AVENUE
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

DESIGN		DRAWN	J.S.	CHECKED	D.J.	CONTRACT No.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675	SHEET 3 OF 10
DATE	JULY 14, 2020					

SHEPPARD AVENUE WEST





KEY PLAN

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W.S.	WATER SERVICE	- - - - -	QUALITY LEVEL "C"
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DIGITAL INFORMATION						
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DESIGN						
UTILITY	61001675 - SUE.dgn					
MAPPING						
STREETLINE						
		No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering and Construction Services

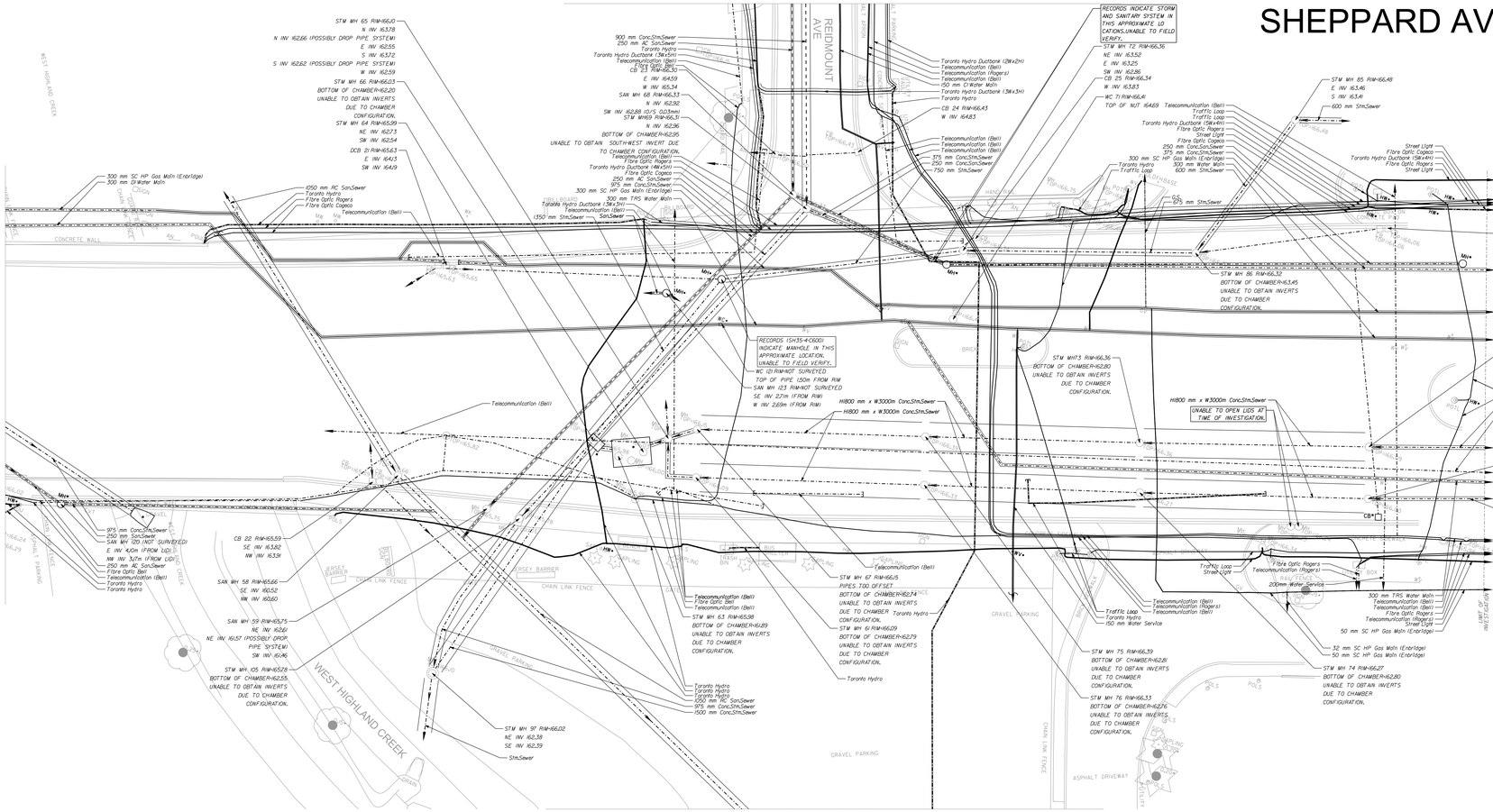
SHEPPARD AVE WEST
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

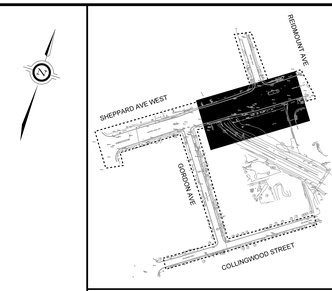
DESIGN		DRAWN	J.S.	CHECKED	D.J.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675
DATE	JULY 14, 2020				

CONTRACT No.

SHEET 4 OF 10

SHEPPARD AVENUE WEST





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SURVEY(Year)	X-61001675-TOPO-1-0674-V1-2D					
DESIGN						
UTILITY	61001675 - SUE.dgn					
MAPPING						
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DIGITAL INFORMATION		No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering and Construction Services

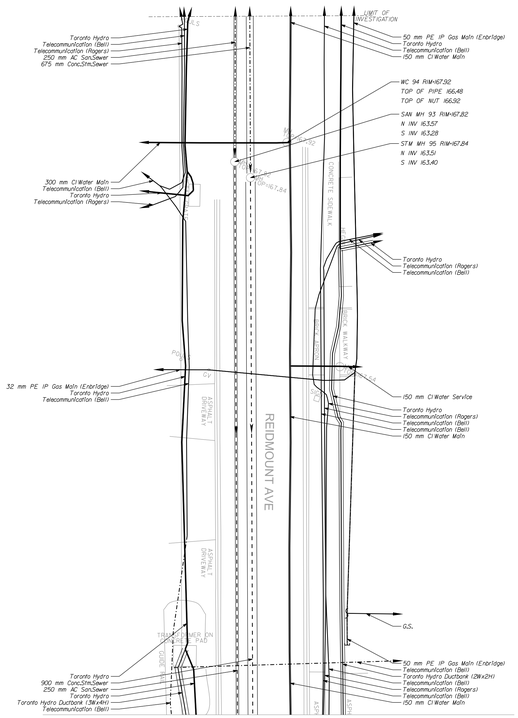
SHEPPARD AVE WEST
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

DESIGN		DRAWN	J.S.	CHECKED	D.J.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675
DATE	JULY 14, 2020				

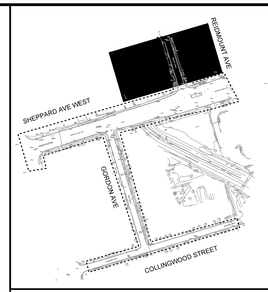
CONTRACT No.

SHEET 5 OF 10

REIDMOUNT AVENUE



MATCH LINE - SEE SHEET 5



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NOTE

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

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SURVEY(Year)	X-61001675-TOPO-1-0674-V1-2D
DESIGN	
UTILITY	61001675 - SUE.dgn
MAPPING	
STREETLINE	

DIGITAL INFORMATION

No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering and Construction Services

SHEPPARD AVE WEST

TORONTO ONTARIO

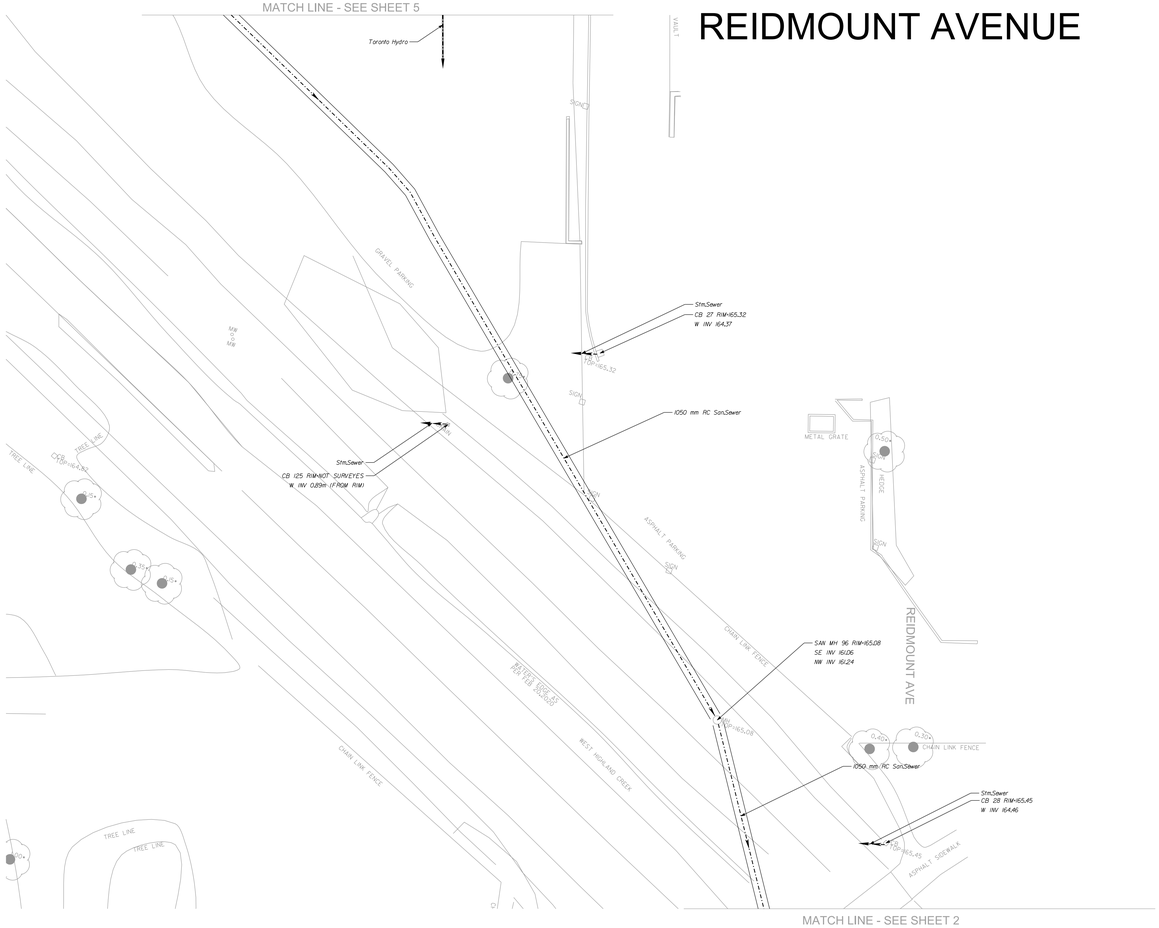
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

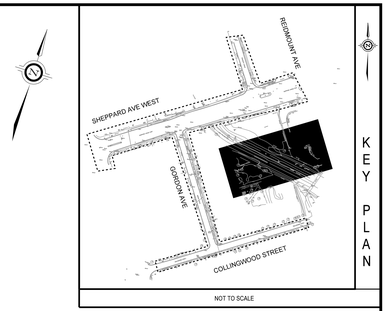
DESIGN		DRAWN	J.S.	CHECKED	D.J.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675
DATE	JULY 14, 2020				

CONTRACT No.

SHEET 6 OF 10

REIDMOUNT AVENUE





GENERAL NOTES:

1. T2UE'S SUE FIELD INVESTIGATION WAS COMPLETED IN JUNE 2020. CHANGES TO UTILITIES THAT OCCURED FOLLOWING OUR INVESTIGATION MAY NOT BE SHOWN. CONSIDERATION SHOULD BE GIVEN TO UPDATING THIS PLAN PRIOR TO FINAL DESIGN AND CONSTRUCTION.

2. LIMIT OF INVESTIGATION:
AS SHOWN ON KEY PLAN.

3. STORM AND SEWER ALIGNMENTS ARE SHOWN BASED ON AVAILABLE RECORDS INFORMATION AND PROFESSIONAL JUDGEMENT.

4. FIELD VERIFICATION OF UTILITIES WAS COMPLETED USING A COMBINATION OF ELECTROMAGNETIC PIPE AND CABLE LOCATE EQUIPMENT.

5. EMPTY CONDUITS, SERVICES, LATERALS TO BUILDINGS, ABANDONED FACILITIES SUCH AS STREET LIGHT CABLES, WITHIN THE INVESTIGATION AREA MAY NOT BE SHOWN ON THE DRAWING.

6. T2UE USED AVAILABLE MEANS IN AN ATTEMPT TO DETERMINE THE LOCATION OF UNDOCUMENTED UTILITIES HOWEVER CANNOT BE RESPONSIBLE FOR FINDING ALL UNDOCUMENTED UTILITIES.

7. UTILITY MATERIAL, SIZES AND FLOW SHOWN ON DRAWING ARE BASED ON RECORDS INFORMATION RECEIVED, PROFESSIONAL JUDGEMENT AND FIELD INVESTIGATION.

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10. THE TOPOGRAPHIC SURVEY WAS PROVIDED BY IBW SURVEYORS. T2UE IS NOT RESPONSIBLE FOR IT'S ACCURACY.

11. CENTERLINE OF UTILITY SHOWN INDICATES THE QUALITY LEVEL AS PER ASCE 38-02.

NOTE

THIS DRAWING HAS BEEN PREPARED FOR THE USE OF T2UE'S CLIENT AND MAY NOT BE USED, REPRODUCED OR RELIED UPON BY THIRD PARTIES, EXCEPT AS AGREED BY T2UE AND ITS CLIENT, AS REQUIRED BY LAW OR FOR USE BY GOVERNMENT REVIEWING AGENCIES. T2UE ACCEPTS NO RESPONSIBILITY, AND DENIES ANY LIABILITY WHATSOEVER, TO ANY PARTY THAT MODIFIES THIS DRAWING WITHOUT T2UE'S EXPRESS WRITTEN CONSENT.

ASCE QUALITY LEVELS

THE UTILITY INFORMATION SHOWN ON THIS DRAWING WAS COLLECTED IN ACCORDANCE TO ASCE STANDARD 38-02. THE INFORMATION IS SHOWN BY QUALITY LEVEL WHICH INDICATES THE LEVEL OF EFFORT USED TO DETERMINE THE LOCATION OF THE DATA.

INCREASED QUALITY

QUALITY LEVEL "D" - INFORMATION DERIVED FROM EXISTING RECORDS OR VERBAL RECOLLECTIONS.

QUALITY LEVEL "C" - INFORMATION OBTAINED BY SURVEYING AN PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGEMENT IN CORRELATING THIS INFORMATION TO THE QUALITY LEVEL "D" INFORMATION.

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LEGEND

G.S.	GAS SERVICE	———	QUALITY LEVEL "B"
W.S.	WATER SERVICE	- - - - -	QUALITY LEVEL "C"
SAN LAT.	SANITARY LATERAL		
STM LAT.	STORM LATERAL	-·-·-·-	QUALITY LEVEL "D"
O/S	OFFSET		
T.O.N.	TOP OF NUT	*	NOT SURVEYED, LOCATION BASED ON FIELD OBSERVATION
T.O.P.	TOP OF PIPE		
	QUALITY LEVEL "A"		
	FLOW ARROW	#	NOT SURVEYED, LOCATION BASED ON RECORD OBSERVATION
	CONTINUATION ARROW		
	END CAP		
	LOSS OF SIGNAL		

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SURVEY(Year)	X-61001675-TOPO-1-0674-V1-2D
DESIGN	
UTILITY	61001675 - SUE.dgn
MAPPING	
STREETLINE	
DIGITAL INFORMATION	

No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering and Construction Services

SHEPPARD AVE WEST

TORONTO ONTARIO

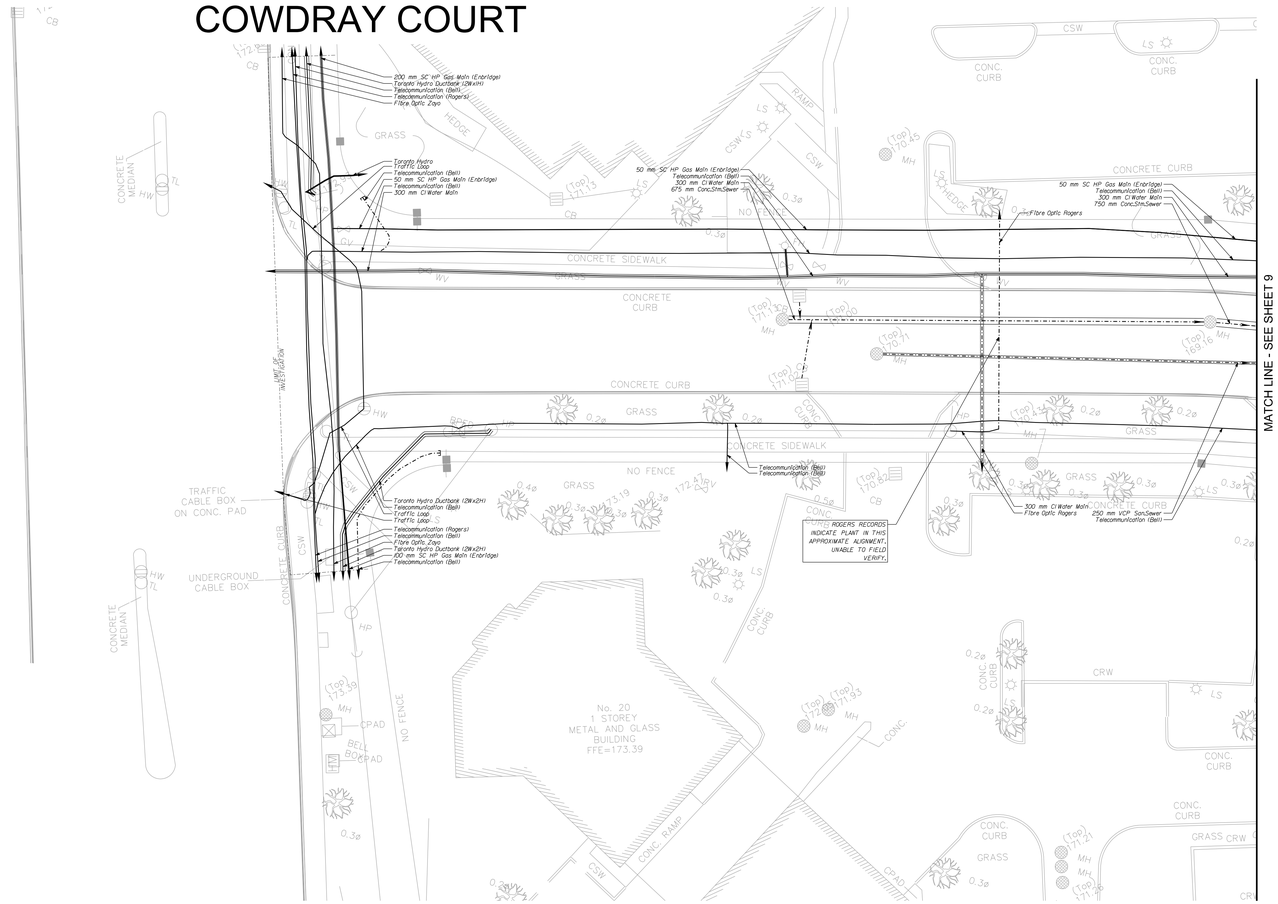
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

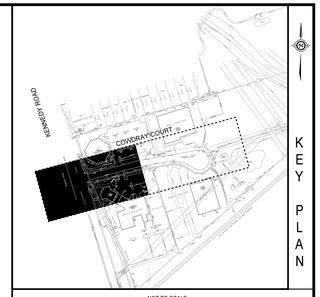
DESIGN		DRAWN	J.S.	CHECKED	D.J.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675
DATE	JULY 14, 2020				

CONTRACT No.

SHEET 6 OF 10

COWDRAY COURT





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	CONTINUATION ARROW		
	END CAP		
	LOSS OF SIGNAL		

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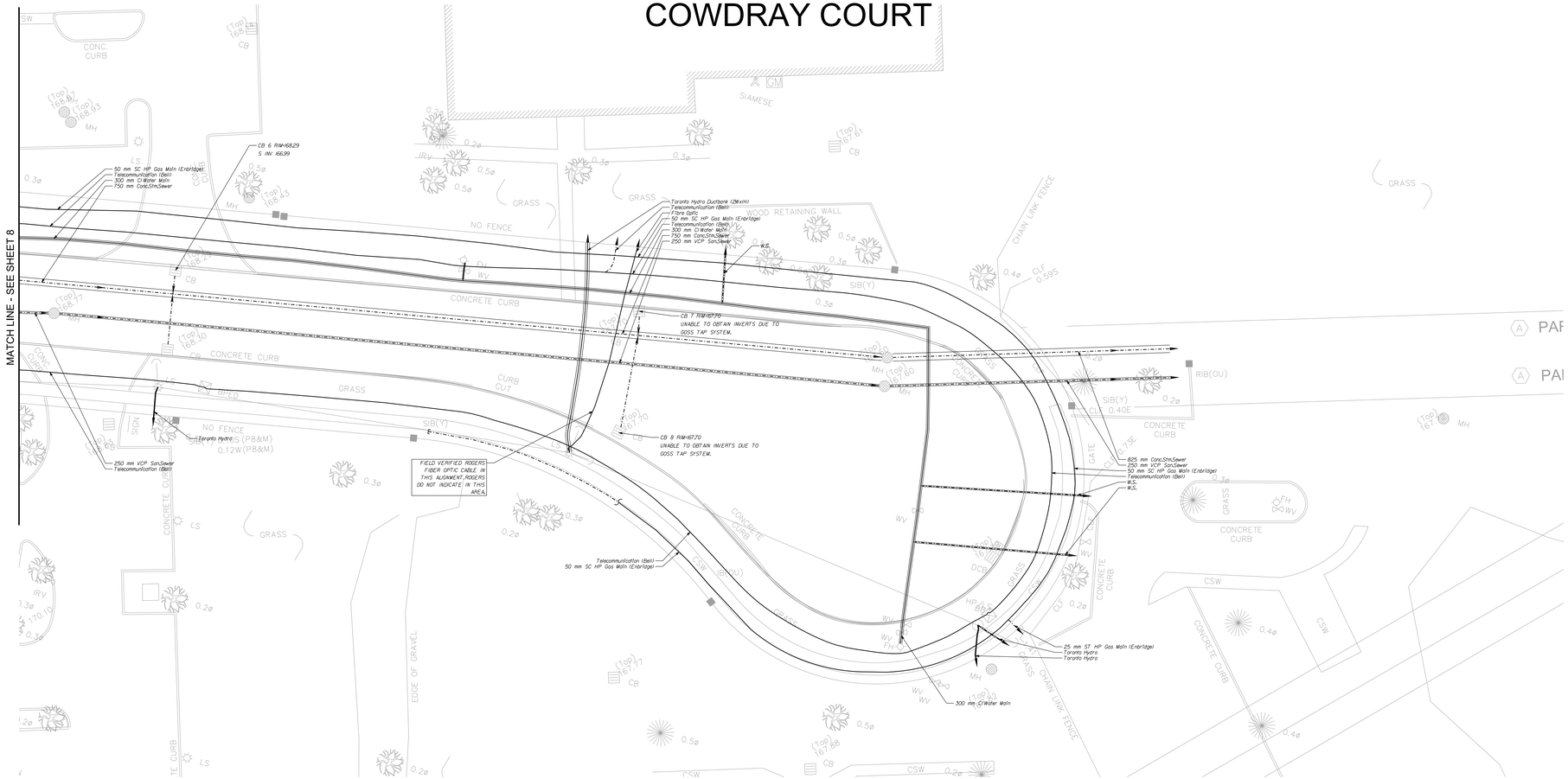
SURVEY(Year)	X-61001675-Gemterra - Cowdray Court-TOPO				
DESIGN					
UTILITY	61001675 - SUE.dgn				
MAPPING					
STREETLINE					
DIGITAL INFORMATION		No.	DATE	REVISIONS	INITIAL / SIGNED

TORONTO Engineering and Construction Services

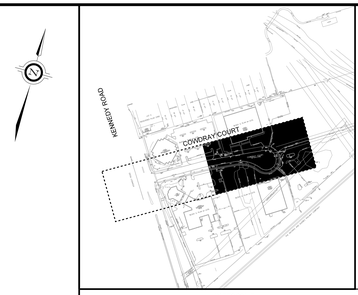
COWDRAY COURT
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

DESIGN		DRAWN	J.S.	CHECKED	D.J.	CONTRACT No.
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675	SHEET 8 OF 10
DATE	JULY 14, 2020					

COWDRAY COURT



MATCH LINE - SEE SHEET 8



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STM LAT.	STORM LATERAL	- · - · -	
O/S	OFFSET		
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	LOSS OF SIGNAL		

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SURVEY(Year)	X-61001675-Gemterra - Cowdray Court-TOPO				
DESIGN					
UTILITY	61001675 - SUE.dgn				
MAPPING					
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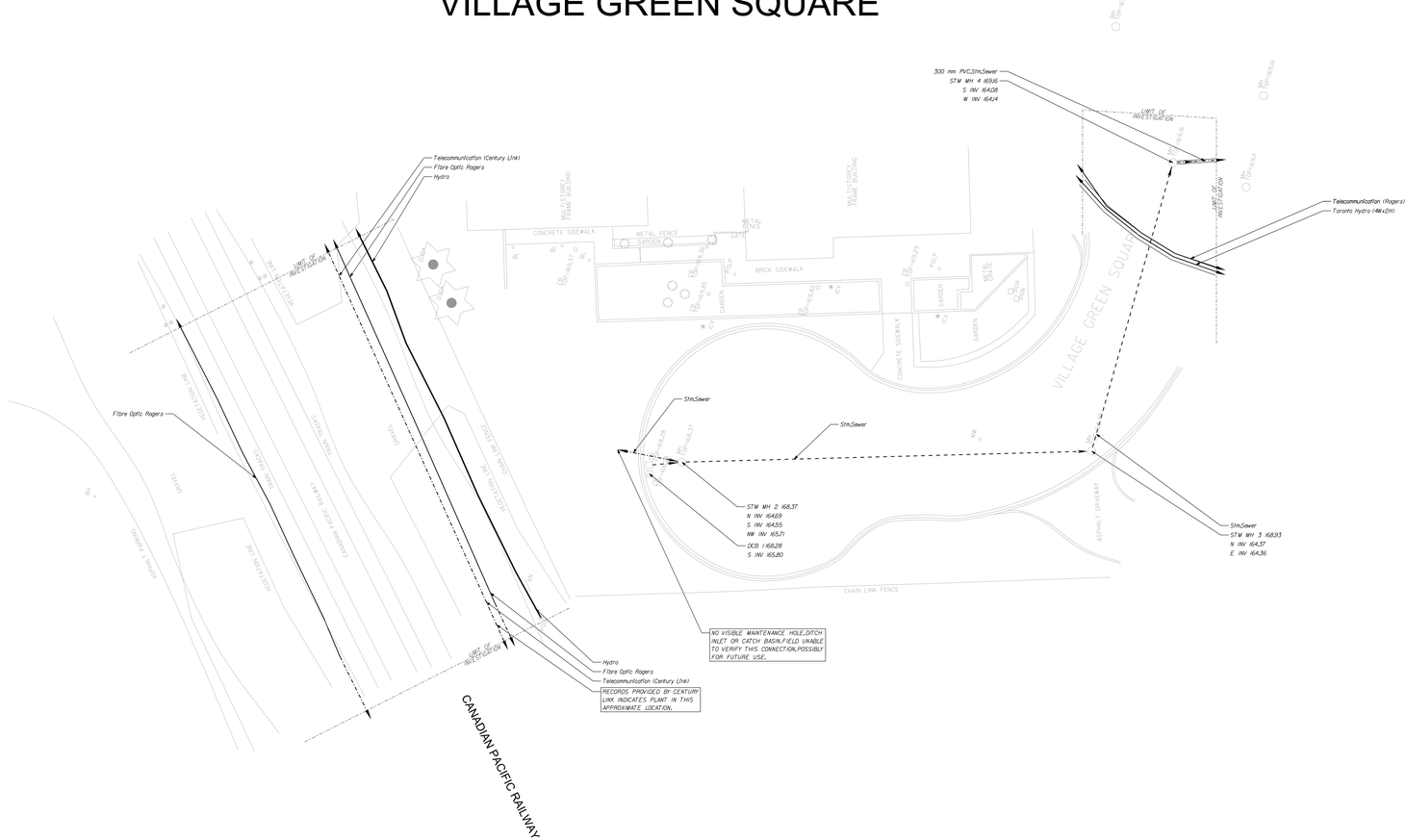
DIGITAL INFORMATION		No.	DATE	REVISIONS	INITIAL / SIGNED

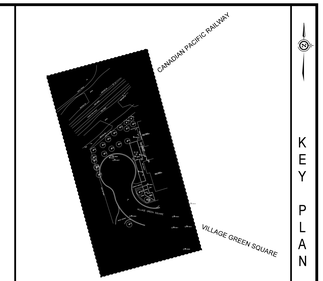
TORONTO Engineering and Construction Services

COWDRAY COURT
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

DESIGN		DRAWN	J.S.	CHECKED	D.J.	CONTRACT No.	
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675	SHEET	9 OF 10
DATE	JULY 14, 2020						

VILLAGE GREEN SQUARE





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T2utility engineers
1-855-222-T2UE | WWW.T2UE.COM

SURVEY(Year)	X - 61001675 - TOPO -1-0674-COMB-3D				
DESIGN					
UTILITY	61001675 - SUE.dgn				
MAPPING					
STREETLINE					
DIGITAL INFORMATION		No.	DATE	REVISIONS	INITIAL / SIGNED

TORONTO Engineering and Construction Services

VILLAGE GREEN SQUARE
TORONTO ONTARIO
SUBSURFACE UTILITY ENGINEERING MAPPING INVESTIGATION

DESIGN		DRAWN	S.G.	CHECKED	D.J.	CONTRACT No.	
SCALE	HORIZONTAL 1:200			DRAWING NUMBER	61001675	SHEET	10 OF 10
DATE	OCTOBER 02, 2020						

APPENDIX

B SANITARY SEWER ANALYSIS

LEGEND
EX. SAN MANHOLE
EX. SAN SEWER
DRAINAGE AREA (HA)
POPULATION SERVED
CATCHMENT ID
SITE AREA (HA)
SITE DESCRIPTION
SAN DRAINAGE BOUNDARY
SHEPPARD AVE. E.
KENNEDY RD.
GORDON AVE.
COLLINGWOOD ST.
COWDRAY CRT.
WEST HIGHLAND CREEK
1050mmØ CONC. SAN TRUNK SEWER
250mmØ SAN
AREA = 0.08 ha
OFFICE
GFA: 414 M2
AREA = 0.13 ha
COMMERCIAL
GFA: 278 M2
AREA = 0.35 ha
COM. GFA: 1512 M2
OFF. GFA: 7560 M2
AREA = 0.36 ha
RESIDENTIAL
SINGLE: 1 UNIT
WITH COMMERCIAL
GFA: 863 M2
AREA = 0.37 ha
COMMERCIAL
GFA: 309 M2
AREA = 0.14 ha
RESIDENTIAL
SINGLE: 2
UNITS
AREA = 0.13 ha
COMMERCIAL
GFA: 570 M2
AREA = 0.49 ha
RESIDENTIAL
SINGLE: 7 UNITS
AREA = 0.53 ha
RESIDENTIAL
SINGLE: 6 UNITS
AND CHURCH
WITH 7 PPL
AREA = 0.47 ha
RESIDENTIAL
SINGLE: 4 UNITS
AREA = 0.93 ha
APARTMENT
BUILDING: 422 PPL
AREA = 0.87 ha
APARTMENT
BUILDING: 389 PPL
AREA = 0.49 ha
COMMERCIAL
GFA: 2324 M2
AREA = 0.39 ha
RESIDENTIAL
SINGLE: 4 UNITS
AREA = 0.57 ha
RESIDENTIAL
SINGLE: 6 UNITS
AREA = 0.18 ha
RESIDENTIAL
SINGLE: 2 UNITS
AREA = 0.22 ha
COMMERCIAL
GFA: 810 m2
AREA = 0.61 ha
COMMERCIAL
GFA: 2520 m2
AREA = 0.71 ha
OFFICE GFA:
4962 m2
AREA = 0.25 ha
RESIDENTIAL
SINGLE: 4 UNITS
AREA = 0.36 ha
RESIDENTIAL
SINGLE: 6 UNITS
AREA = 1.05 ha
SCHOOL: 91 PPL
GFA: 1916 m2
AREA = 1.57 ha
COMMERCIAL
GFA: 2505 m2
0.20 / 192 / #1
0.34 / 119 / #2
1.11 / --- / #3
1.02 / --- / #4
0.44 / 21 / #5
0.32 / 14 / #6
0.16 / 7 / #7
0.18 / 21 / #8
0.18 / 28 / #9
0.06 / --- / #10
0.29 / 11 / #11
0.29 / 26 / #12
0.32 / 4 / #13
0.36 / 422 / #14
0.09 / 389 / #15
0.14 / --- / #16
0.17 / --- / #17
0.31 / 284 / #18
0.21 / 54 / #19
0.12 / 7 / #20
0.02 / --- / #21
0.06 / 9 / #22
0.05 / --- / #23
0.10 / --- / #24
MH1
MH2
MH3
MH4
MH5
MH6
MH7
MH8
MH9
MH10
MH11
MH12
MH13
MH14
MH15
MH16
MH17
MH18
MH19
MH20
MH21
MH22
MH23
MH24
0
30
60
Meters
4. FOURTH SUBMISSION M.M OCT 2022 A.W.
3. THIRD SUBMISSION M.M FEB 2022 A.W.
2. SECOND SUBMISSION M.M DEC 2021 A.W.
1. FIRST SUBMISSION M.M NOV 2020 A.W.
No. REVISIONS TO DRAWING BY DATE APPR.
ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED
CLIENT
CITY OF TORONTO
MUNICIPALITY
CITY OF TORONTO
PROJECT TITLE
AGINCOURT ENVIRONMENTAL ASSESSMENT
SHEET TITLE
PRE-DEVELOPMENT SANITARY DRAINAGE PLAN
CONSULTANT
wsp
STAMP
APPROVAL
DESIGNED M.M
DRAWN G.W
CHECKED M.M
SCALE 1: 1000
DATE JULY 2020
PROJECT NUMBER 19M-01888
DWG. NUMBER

APPENDIX B
SANITARY SEWER ANALYSIS - EXISTING DRY WEATHER CONDITIONS
CITY OF TORONTO

Residential S.F. Homes = 3.5 persons per unit
Residential Semi-Detached/Townhomes = 2.7 persons per unit
Apartment and condo = 400 persons per hectare
High Rise (HR2) = 2.7 persons per suite
Offices = 3.3 persons per 100m^2
Commercial = 1.1 persons per 100m^2
School/Church = 86.0 persons per hectare

Sanitary Flows
Manning's n = 0.013
Existing Residential Avg.Daily Flow = 240 L/cap/day
Commercial, Office Avg. Daily Flow = 250 L/day/person
Commercial, Office Avg. Daily Flow = 180000 L/floor ha/day

Extraneous Flows
Infiltration = 0.260 L/s/ha
Groundwater 3.0 L/s/ha

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW
CHECKED BY: MM
DESIGN SHEET NO: 1 of 2

POPULATION (See Note 4)

Location	Land Use	ID	From MH	To MH	Condo/Apartment: # of Units (Units)	Condo/Apartment: Lot Area (ha)	Condo/Apartment: Pop. Equivalent (Persons)	Condo/Apartment: Cumulative Pop. (Persons)	Residential Semi/Towns: Number of Units (Units)	Residential Semi/Towns: Pop. Equivalent (Persons)	Residential Semi/Towns: Cumulative Pop. (Persons)	Residential Single: Number of Units (Units)	Residential Single: Pop. Equivalent (Persons)	Residential Single: Cumulative Pop. (Persons)	Industrial: GFA (m2)	Industrial: Total (Persons)	Commercial: Incremental Commercial Area (m2) (1)	Commercial: Incremental Total (Persons)	Office: GFA (m2)	Office: Incremental Total (Persons)	School/Church: GFA (m2)	School/Church: Lot Area (ha)	School/Church: Incremental Total (Persons)
COWDARY COURT OUTLET																							
Cowdray Court	Mixed Use	1	MH1	MH2													2505	28	4,962	164			
Cowdray Court	Mixed Use	2	MH2	MH3													2520	28			1916	1.05	91
Cowdray Court	Mixed Use	3	MH3	MH4																			
Cowdray Court	Mixed Use	4	MH4	TRUNK																			
COLLINGWOOD STREET OUTLET																							
Kennedy Road	Residential	5	MH5	MH6								6	21	21									
Kennedy Road	Residential	6	MH6	MH7								4	14	35									
Collingwood Street	Residential	7	MH7	MH8								2	7	42									
Collingwood Street	Residential	8	MH8	MH9								6	21	63									
Collingwood Street	Residential	9	MH9	MH10								8	28	91									
Collingwood Street	Residential	10	MH10	TRUNK								0	0	91									
SHEPPARD AVENUE OUTLET																							
Kennedy Road	Residential	11	MH11	MH12													810	9					
Kennedy Road	Mixed Use	12	MH12	MH13													2324	26					
Kennedy Road	Commercial	13	MH13	MH14													309	4					
Sheppard Avenue	Residential	14	MH15	MH16	156	0.93	422	422															
Easement	Residential	15	MH17	MH16	144	0.87	389	389															
Sheppard Avenue	Commercial	16	MH16	MH18				811															
Sheppard Avenue	Commercial	17	MH18	MH14				811															
Sheppard Avenue	Mixed Use	18	MH14	MH19				811				1	4	4			2653	30	7560	250			
Gordon Avenue	Residential	19	MH20	MH21								13	46	46							224	0.08	8
Gordon Avenue	Mixed Use	20	MH21	MH22								2	7	53									
Gordon Avenue	Mixed Use	21	MH22	MH19								0	0	53									
Sheppard Avenue	Mixed Use	22	MH19	MH23				811						57			570	7	414	14			
Sheppard Avenue	Mixed Use	23	MH23	MH24				811						57									
Sheppard Avenue	Mixed Use	24	MH24	TRUNK				811						57									

SANITARY FLOW / INFILTRATION FLOW / BASED ON SUE INVESTIGATION

ID	Residential Flows: Avg. Res Flow (L/s)	Residential Flows: Peaking Factor M	Residential Flows: Peak Res Flow (L/s)	ICI Flows: Cum. Pop. (Persons)	ICI Flows: Peaking Factor M	ICI Flows: Peak ICI Flow (L/s)	Cum. ICI Flows using 180,000 L/ha/day (L/s)	**Total Peak Flow (L/s)**	Incremental Sewer Tributary Area (ha)	Cumulative Sewer Tributary Area (ha)	Groundwater Flow (1) (L/s)	Infiltration (L/s)	**TOTAL PEAK SANITARY FLOW (L/s)**	LENGTH (m)	NOMINAL PIPE SIZE (mm)	PIPE AREA (AF) (m2)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	% FULL (%)	% VELOCITY (%)	ACTUAL VELOCITY (m/s)	DEPTH OF FLOW (m)	FROUDE NUMBER (-)	FLOW REGIME (-)	Notes
1	0.00	4.50	0.00	192	4.15	2.31	1.56	**2.31**	2.48	2.48		0.64	**2.95**	40.2	250	0.05	1.74%	**78.44**	1.60	4%	41%	0.66	0.0375	1.08	SUPERCRITICAL	A Commercial GFA of 2505 m2 was measured for 20 Cowdry and a Office GFA of 4964 m2 (1241 m2 * 4 storey) for 100 Cowdry
2	0.00	4.50	0.00	311	4.07	3.66	2.48	**3.66**	2.00	4.48		1.16	**4.83**	91.7	250	0.05	0.98%	**58.87**	1.20	8%	55%	0.66	0.05	0.94	SUBCRITICAL	A Commercial GFA of 2520 m2 was measured for 80 Cowdry and a School GFA of 1916 m2 for 40 Cowdry
3	0.00	4.50	0.00	311	4.07	3.66	2.48	**3.66**	1.11	5.59		1.45	**5.12**	86.6	250	0.05	0.81%	**53.52**	1.09	10%	58%	0.63	0.055	0.86	SUBCRITICAL	
4	0.00	4.50	0.00	311	4.07	3.66	2.48	**3.66**	1.02	6.61		1.72	**5.38**	51.2	250	0.05	5.73%	**142.35**	2.90	4%	41%	1.19	0.0375	1.96	SUPERCRITICAL	
5	0.06	4.38	0.26	0	4.50	0.00	0.00	**0.26**	0.80	0.80		0.21	**0.46**	103.9	250	0.05	1.06%	**61.23**	1.25	1%	0%	0.00	0.005	0.00	SUBCRITICAL	
6	0.10	4.34	0.42	0	4.50	0.00	0.00	**0.42**	0.57	1.37		0.36	**0.78**	94.8	250	0.05	0.97%	**58.57**	1.19	1%	30%	0.36	0.005	1.62	SUPERCRITICAL	Assumed the 4 residential units on the west side of Kennedy drains to the Collingwood Street Sanitary Sewer network
7	0.12	4.33	0.51	0	4.50	0.00	0.00	**0.51**	0.34	1.71		0.44	**0.95**	90.8	250	0.05	2.12%	**86.59**	1.76	1%	30%	0.53	0.005	2.39	SUPERCRITICAL	
8	0.18	4.29	0.75	0	4.50	0.00	0.00	**0.75**	0.75	2.46		0.64	**1.39**	98.5	250	0.05	1.19%	**64.87**	1.32	2%	38%	0.50	0.015	1.31	SUPERCRITICAL	
9	0.25	4.25	1.08	0	4.50	0.00	0.00	**1.08**	1.04	3.50		0.91	**1.99**	90.6	250	0.05	1.18%	**64.60**	1.32	3%	41%	0.54	0.025	1.09	SUPERCRITICAL	
10	0.25	4.25	1.08	0	4.50	0.00	0.00	**1.08**	0.06	3.56		0.93	**2.00**	7.6	250	0.05	6.16%	**147.59**	3.01	1%	30%	0.90	0.005	4.07	SUPERCRITICAL	
11	0.00	4.50	0.00	9	4.42	0.12	0.17	**0.17**	0.51	0.51		0.13	**0.30**	81.4	250	0.05	0.76%	**51.84**	1.06	1%	0%	0.00	0.005	0.00	SUBCRITICAL	counted to be more conservative. Commercial GFAs of 152 m2, 81 m2 and 172 m2 were measured for 2219, 2221. and 2223 Kennedy respectively. All buildings are counted as two-storey
12	0.00	4.50	0.00	35	4.34	0.44	0.65	**0.65**	0.78	1.29		0.34	**0.99**	75.6	250	0.05	0.64%	**47.57**	0.97	2%	38%	0.37	0.015	0.96	SUBCRITICAL	Commercial GFAs of 118 m2, 362 m2 and 682 m2 were measured for 2229, 2235. and 2245 Kennedy respectively. All buildings are counted as two-storey.
13	0.00	4.50	0.00	39	4.34	0.49	0.72	**0.72**	0.69	1.98		0.51	**1.23**	86.0	250	0.05	0.65%	**47.94**	0.98	3%	38%	0.37	0.025	0.75	SUBCRITICAL	A Commercial GFA of 309 m2 was measured for 3905 Kennedy
																			0.00							
14	1.17	4.01	4.70	0	4.50	0.00	0.00	**4.70**	1.29	1.29	3.87	0.34	**8.91**	107.6	250	0.05	1.09%	**62.09**	1.26	14%	68%	0.86	0.065	1.08	SUPERCRITICAL	Based on Google Maps and Room layouts found online, it was assumed the building has 12 suite per floor for 13 floors. The 2.7 ppl/suite criteria was used since it provided a higher population.
	0.00																									
15	1.08	4.03	4.35	0	4.50	0.00	0.00	**4.35**	0.96	0.96	2.88	0.25	**7.48**	60.4	250	0.05	1.46%	**71.85**	1.46	10%	62%	0.91	0.055	1.24	SUPERCRITICAL	Based on Google Maps and Room layouts found online, it was assumed the building has 8 suite per floor for 18 floors. The 2.7 ppl/suite criteria was used since it provided a higher population.
16	2.25	3.86	8.69	0	4.50	0.00	0.00	**8.69**	0.14	2.39	6.75	0.62	**16.06**	32.0	250	0.05	1.17%	**64.32**	1.31	25%	82%	1.07	0.0875	1.16	SUPERCRITICAL	
17	2.25	3.86	8.69	0	4.50	0.00	0.00	**8.69**	0.17	2.56	6.75	0.67	**16.10**	66.8	250	0.05	1.96%	**83.25**	1.70	19%	75%	1.27	0.075	1.48	SUPERCRITICAL	
18	2.26	3.86	8.73	319	4.07	3.75	2.85	**12.48**	1.15	5.69	6.84	1.48	**20.80**	107.9	250	0.05	0.85%	**54.83**	1.12	38%	93%	1.04	0.1075	1.01	SUPERCRITICAL	A GFA of 9072 m2 (6 floors * 1512 m2) was measured for 4002 Sheppard with the first floor as commerical space and the upper levels as office space. A Commercial GFA of 295 m2 was measured for 4015 Sheppard. A Commercial GFA of 568 m2 (2 floors * 284 m2) was measured was 4023 Sheppard. A Commercial GFA of 278 m2 was measured for 4022 Sheppard.
	0.00																									
19	0.13	4.32	0.55	8	4.42	0.10	0.05	**0.65**	1.23	1.23	0.00	0.32	**0.97**	85.2	250	0.05	0.43%	**39.00**	0.79	2%	38%	0.30	0.015	0.79	SUBCRITICAL	A Church GFA of 224 m2 was measured for 15 Gordon
20	0.15	4.31	0.63	8	4.42	0.10	0.05	**0.74**	0.26	1.49	0.00	0.39	**1.12**	57.2	250	0.05	0.52%	**42.88**	0.87	3%	38%	0.33	0.025	0.67	SUBCRITICAL	
21	0.15	4.31	0.63	8	4.42	0.10	0.05	**0.74**	0.02	1.51	0.00	0.39	**1.13**	12.8	250	0.05	1.71%	**77.76**	1.58	1%	30%	0.48	0.005	2.15	SUPERCRITICAL	
22	2.41	3.84	9.26	348	4.05	4.08	3.10	**13.33**	0.27	7.47	6.84	1.94	**22.12**	22.0	250	0.05	2.68%	**97.35**	1.98	23%	79%	1.57	0.0825	1.74	SUPERCRITICAL	A Office GFA of 414 m2 (2 floor * 207 m2) was measured for 4028 Sheppard. A Commercial GFA of 570 m2 was measured for 4045-4053 Sheppard
23	2.41	3.84	9.26	348	4.05	4.08	3.10	**13.33**	0.05	7.52	6.84	1.95	**22.13**	19.7	250	0.05	0.66%	**48.31**	0.98	46%	97%	0.95	0.12	0.88	SUBCRITICAL	
24	2.41	3.84	9.26	348	4.05	4.08	3.10	**13.33**	0.10	7.62	6.84	1.98	**22.15**	38.3	250	0.05	3.59%	**112.67**	2.30	20%	75%	1.72	0.0775	1.97	SUPERCRITICAL	

(1) Groundwater flow only assumed from apartment buildings and commercial building on Sheppard Ave as these buildings will have underground structure penetrate groundwater table. Please note that this design sheet is for the existing/pre-development condition which is assumed to predate City of Toronto's New Foundation Drain Policy.

APPENDIX B
SANITARY SEWER ANALYSIS - EXISTING WET WEATHER CONDITION
CITY OF TORONTO

Residential S.F. Homes = 3.5 persons per unit
Residential Semi-Detached/Townhomes = 2.7 persons per unit
Apartment and condo = 400 persons per hectare
High Rise (HR2) = 2.7 persons per suite
Offices = 3.3 persons per 100m^2
Commercial = 1.1 persons per 100m^2
School/Church = 86.0 persons per hectare

Sanitary Flows

Existing Residential Avg.Daily Flow = 240 L/cap/day   Manning's n = 0.013

Commercial, Office Avg. Daily Flow = 250 L/day/person
Commercial, Office Avg. Daily Flow = 180000 L/floor ha/day

Extraneous Flows

Infiltration = 0.260 L/s/ha
Groundwater 3.0 L/s/ha
Wet Weather = 3.0 L/s/ha (First 50 ha)
Wet Weather = 2.0 L/s/ha (Over 50 ha)

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW
CHECKED BY: MM
DESIGN SHEET NO: 2 of 2

POPULATION (See Note 4)

Location	Land Use	ID	From MH	To MH	Condo/Apartment # of Units (Units)	Condo/Apartment Lot Area (ha)	Condo/Apartment Pop. Equivalent (Persons)	Condo/Apartment Cumulative Pop. (Persons)	Residential Semi/Towns Number of Units (Units)	Residential Semi/Towns Pop. Equivalent (Persons)	Residential Semi/Towns Cumulative Pop. (Persons)	Residential Single Number of Units (Units)	Residential Single Pop. Equivalent (Persons)	Residential Single Cumulative Pop. (Persons)	Industrial GFA (m2)	Industrial Total (Persons)	Commercial Incremental Commercial Area (m2) (1)	Commercial Incremental Total (Persons)	Office GFA (m2)	Office Incremental Total (Persons)	School/Church GFA (m2)	School/Church Lot Area (ha)	School/Church Incremental Total (Persons)
COWDARY COURT OUTLET																							
Cowdray Court	Mixed Use	1	MH1	MH2													2505	28	4,962	164			
Cowdray Court	Mixed Use	2	MH2	MH3													2520	28			1916	1.05	91
Cowdray Court	Mixed Use	3	MH3	MH4																			
Cowdray Court	Mixed Use	4	MH4	TRUNK																			
COLLINGWOOD STREET OUTLET																							
Kennedy Road	Residential	5	MH5	MH6								6	21	21									
Kennedy Road	Residential	6	MH6	MH7								4	14	35									
Collingwood Street	Residential	7	MH7	MH8								2	7	42									
Collingwood Street	Residential	8	MH8	MH9								6	21	63									
Collingwood Street	Residential	9	MH9	MH10								8	28	91									
Collingwood Street	Residential	10	MH10	TRUNK								0	0	91									
SHEPPARD AVENUE OUTLET																							
Kennedy Road	Residential	11	MH11	MH12													810	9					
Kennedy Road	Mixed Use	12	MH12	MH13													2324	26					
Kennedy Road	Commercial	13	MH13	MH14													309	4					
Sheppard Avenue	Residential	14	MH15	MH16	156	0.93	422	422															
Easement	Residential	15	MH17	MH16	144	0.87	389	389															
Sheppard Avenue	Commercial	16	MH16	MH18				811															
Sheppard Avenue	Commercial	17	MH18	MH14				811															
Sheppard Avenue	Mixed Use	18	MH14	MH19				811				1	4	4			2653	30	7560	250			
Gordon Avenue	Residential	19	MH20	MH21								13	46	46							224	0	8
Gordon Avenue	Mixed Use	20	MH21	MH22								2	7	53									
Gordon Avenue	Mixed Use	21	MH22	MH19								0	0	53									
Sheppard Avenue	Mixed Use	22	MH19	MH23				811						57			570	7	414	14			
Sheppard Avenue	Mixed Use	23	MH23	MH24				811						57									
Sheppard Avenue	Mixed Use	24	MH24	TRUNK				811						57									

SANITARY FLOW / INFILTRATION FLOW / TOTAL PEAK SANITARY FLOW / BASED ON SUE INVESTIGATION

ID	Residential Flows Avg. Res Flow (L/s)	Residential Flows Peaking Factor M	Residential Flows Peak Res Flow (L/s)	ICI Flows Cum. Pop. (Persons)	ICI Flows Peaking Factor M	ICI Flows Peak ICI Flow (L/s)	Cum. ICI Flows using 180,000 L/ha/day (L/s)	Total Peak Flow (L/s)	Incremental Sewer Tributary Area (ha)	Cumulative Sewer Tributary Area (ha)	Groundwater Flow (1) (L/s)	Wet Weather Flow (L/s)	TOTAL PEAK SANITARY FLOW (L/s)	LENGTH (m)	NOMINAL PIPE SIZE (mm)	PIPE AREA (AF) (m2)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	% Full	% VELOCITY (%)	ACTUAL VELOCITY (m/s)	DEPTH OF FLOW (m)	FROUDE NUMBER (-)	FLOW REGIME (-)	Notes
1	0.00	4.50	0.00	192	4.15	2.31	1.56	**2.31**	2.48	2.48		7.44	**9.75**	40.2	250	0.05	1.74%	**78.44**	1.60	12%	64%	1.02	0.06	1.33	SUPERCRITICAL	A Commercial GFA of 2505 m2 was measured for 20 Cowdry and a Office GFA of 4964 m2 (1241 m2 * 4 storey) for 100 Cowdry
2	0.00	4.50	0.00	311	4.07	3.66	2.48	**3.66**	2.00	4.48		13.44	**17.10**	91.7	250	0.05	0.98%	**58.87**	1.20	29%	85%	1.02	0.095	1.06	SUPERCRITICAL	A Commercial GFA of 2520 m2 was measured for 80 Cowdry and a School GFA of 1916 m2 for 40 Cowdry
3	0.00	4.50	0.00	311	4.07	3.66	2.48	**3.66**	1.11	5.59		16.77	**20.43**	86.6	250	0.05	0.81%	**53.52**	1.09	38%	94%	1.02	0.1075	1.00	SUBCRITICAL	
4	0.00	4.50	0.00	311	4.07	3.66	2.48	**3.66**	1.02	6.61		19.83	**23.49**	51.2	250	0.05	5.73%	**142.35**	2.90	17%	71%	2.06	0.0725	2.44	SUPERCRITICAL	
5	0.06	4.38	0.26	0	4.50	0.00	0.00	**0.26**	0.80	0.80		2.40	**2.66**	103.9	250	0.05	1.06%	**61.23**	1.25	4%	44%	0.55	0.0375	0.90	SUBCRITICAL	
6	0.10	4.34	0.42	0	4.50	0.00	0.00	**0.42**	0.57	1.37		4.11	**4.53**	94.8	250	0.05	0.97%	**58.57**	1.19	8%	54%	0.64	0.05	0.92	SUBCRITICAL	Assumed the 4 residential units on the west side of Kennedy drains to the Collingwood Street Sanitary Sewer network
7	0.12	4.33	0.51	0	4.50	0.00	0.00	**0.51**	0.34	1.71		5.13	**5.64**	90.8	250	0.05	2.12%	**86.59**	1.76	7%	52%	0.92	0.0475	1.34	SUPERCRITICAL	
8	0.18	4.29	0.75	0	4.50	0.00	0.00	**0.75**	0.75	2.46		7.38	**8.13**	98.5	250	0.05	1.19%	**64.87**	1.32	13%	64%	0.85	0.0625	1.08	SUPERCRITICAL	
9	0.25	4.25	1.08	0	4.50	0.00	0.00	**1.08**	1.04	3.50		10.50	**11.58**	90.6	250	0.05	1.18%	**64.60**	1.32	18%	72%	0.95	0.0725	1.12	SUPERCRITICAL	
10	0.25	4.25	1.08	0	4.50	0.00	0.00	**1.08**	0.06	3.56		10.68	**11.76**	7.6	250	0.05	6.16%	**147.59**	3.01	8%	54%	1.62	0.05	2.32	SUPERCRITICAL	
11	0.00	4.50	0.00	9	4.42	0.12	0.17	**0.17**	0.51	0.51		1.53	**1.70**	81.4	250	0.05	0.76%	**51.84**	1.06	3%	41%	0.43	0.025	0.87	SUBCRITICAL	to be more conservative. Commercial GFAs of 152 m2, 81 m2 and 172 m2 were measured for 2219, 2221. and 2223 Kennedy respectively. All buildings are counted as two-storey
12	0.00	4.50	0.00	35	4.34	0.44	0.65	**0.65**	0.78	1.29		3.87	**4.52**	75.6	250	0.05	0.64%	**47.57**	0.97	10%	58%	0.56	0.055	0.77	SUBCRITICAL	Commercial GFAs of 118 m2, 362 m2 and 682 m2 were measured for 2229, 2235. and 2245 Kennedy respectively. All buildings are counted as two-storey.
13	0.00	4.50	0.00	39	4.34	0.49	0.72	**0.72**	0.69	1.98		5.94	**6.66**	86.0	250	0.05	0.65%	**47.94**	0.98	14%	66%	0.64	0.065	0.81	SUBCRITICAL	A Commercial GFA of 309 m2 was measured for 3905 Kennedy
14	1.17	4.01	4.70	0	4.50	0.00	0.00	**4.70**	1.29	1.29	3.87	3.87	**12.44**	107.6	250	0.05	1.09%	**62.09**	1.26	20%	76%	0.96	0.0775	1.10	SUPERCRITICAL	Based on Google Maps and Room layouts found online, it was assumed the building has 12 suite per floor for 13 floors. The 2.7 ppl/suite criteria was used since it provided a higher population.
15	1.08	4.03	4.35	0	4.50	0.00	0.00	**4.35**	0.96	0.96	2.88	2.88	**10.11**	60.4	250	0.05	1.46%	**71.85**	1.46	14%	68%	1.00	0.065	1.25	SUPERCRITICAL	Based on Google Maps and Room layouts found online, it was assumed the building has 8 suite per floor for 18 floors. The 2.7 ppl/suite criteria was used since it provided a higher population.
16	2.25	3.86	8.69	0	4.50	0.00	0.00	**8.69**	0.14	2.39	6.75	7.17	**22.61**	32.0	250	0.05	1.17%	**64.32**	1.31	35%	91%	1.19	0.1025	1.19	SUPERCRITICAL	
17	2.25	3.86	8.69	0	4.50	0.00	0.00	**8.69**	0.17	2.56	6.75	7.68	**23.12**	66.8	250	0.05	1.96%	**83.25**	1.70	28%	84%	1.42	0.0925	1.50	SUPERCRITICAL	
18	2.26	3.86	8.73	319	4.07	3.75	2.85	**12.48**	1.15	5.69	6.84	17.07	**36.39**	107.9	250	0.05	0.85%	**54.83**	1.12	66%	107%	1.20	0.15	0.99	SUBCRITICAL	A GFA of 9072 m2 (6 floors * 1512 m2) was measured for 4002 Sheppard with the first floor as commerical space and the upper levels as office space. A Commercial GFA of 295 m2 was measured for 4015 Sheppard. A Commercial GFA of 568 m2 (2 floors * 284 m2) was measured was 4023 Sheppard. A Commercial GFA of 278 m2 was measured for 4022 Sheppard.
													0.00													
19	0.13	4.32	0.55	8	4.42	0.10	0.05	**0.65**	1.23	1.23		3.69	**4.34**	85.2	250	0.05	0.43%	**39.00**	0.79	11%	63%	0.50	0.0575	0.67	SUBCRITICAL	A Church GFA of 224 m2 was measured for 15 Gordon
20	0.15	4.31	0.63	8	4.42	0.10	0.05	**0.74**	0.26	1.49		4.47	**5.21**	57.2	250	0.05	0.52%	**42.88**	0.87	12%	64%	0.56	0.06	0.73	SUBCRITICAL	
21	0.15	4.31	0.63	8	4.42	0.10	0.05	**0.74**	0.02	1.51		4.52	**5.25**	12.8	250	0.05	1.71%	**77.76**	1.58	7%	52%	0.82	0.0475	1.21	SUPERCRITICAL	
22	2.41	3.84	9.26	348	4.05	4.08	3.10	**13.33**	0.27	7.47	6.84	22.40	**42.57**	22.0	250	0.05	2.68%	**97.35**	1.98	44%	96%	1.90	0.1175	1.77	SUPERCRITICAL	A Office GFA of 414 m2 (2 floor * 207 m2) was measured for 4028 Sheppard. A Commercial GFA of 570 m2 was measured for 4045-4053 Sheppard
23	2.41	3.84	9.26	348	4.05	4.08	3.10	**13.33**	0.05	7.52	6.84	22.55	**42.72**	19.7	250	0.05	0.66%	**48.31**	0.98	88%	115%	1.13	0.1825	0.85	SUBCRITICAL	
24	2.41	3.84	9.26	348	4.05	4.08	3.10	**13.33**	0.10	7.62	6.84	22.85	**43.02**	38.3	250	0.05	3.59%	**112.67**	2.30	38%	94%	2.16	0.1075	2.10	SUPERCRITICAL	

(1) Groundwater flow only assumed from apartment buildings and commercial building on Sheppard Ave as these buildings will have underground structure penetrate groundwater table. Please note that this design sheet is for the existing/pre-development condition which is assumed to predate City of Toronto's New Foundation Drain Poli

APPENDIX

C STORM SEWER ANLAYSIS

LEGEND

- EX. STM MANHOLE
- EX. STM SEWER
- EX. CATCHBASIN
- DRAINAGE AREA (HA) (0.89)
- RUNOFF COEFFICIENTS (-) (C=0.60)
- STM DRAINAGE BOUNDARY
- HEADWALL (HW)
- OVERLAND FLOW ROUTE
- APPROX. PONDING AREA
- APPROX. HIGH POINT (HP)
- APPROX. LOW POINT (LP)

No.	REVISIONS TO DRAWING	BY	DATE	APPR.
4.	FOURTH SUBMISSION	M.M	OCT 2022	A.W.
3.	THIRD SUBMISSION	M.M	FEB 2022	A.W.
2.	SECOND SUBMISSION	M.M	DEC 2021	A.W.
1.	FIRST SUBMISSION	M.M	NOV 2020	A.W.

ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED

CLIENT: CITY OF TORONTO

MUNICIPALITY: CITY OF TORONTO

PROJECT TITLE: AGINCOURT ENVIRONMENTAL ASSESSMENT

SHEET TITLE: PRE-DEVELOPMENT STORM DRAINAGE PLAN

CONSULTANT: wsp

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

STAMP | APPROVAL

DESIGNED	DRAWN	CHECKED
M.M	G.W	M.M

SCALE	DATE
1: 1000	JULY 2020

PROJECT NUMBER	DWG. NUMBER
19M-01888	

I= AT^C

C= -0.78

A= 21.8

Q= 2.78* CIA

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS
PRE-DEVELOPMENT 2 YEAR STORM

WSP

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 1 of 7

Street	From	To	LENGTH (m)	AREA[1] (ha)	CUMULATIVE AREA (ha)	RUN-OFF COEF.	CA	CUMULATIVE CA (ha)	INTENSITY (I_2) (mm/hr)	FLOW (Q) (m^3/s)	PIPE DIAMETER (mm)	ACTUAL PIPE DIAMETER (mm)	SLOPE (%)	CAPACITY (m^3/s)	FULL FLOW VELOCITY (m/s)	SECTION TIME (min)	INLET TIME (min)	CUMULATIVE TIME (min)	CAPACITY (% FULL)
COWDRAY COURT OUTLET																			
100 Cowdray Court	SITE	MH1		0.71	0.71	0.75	0.53	0.53	88.19	0.131							10.00		
Cowdray Court	MH1	MH2	41.4	0.18	0.89	0.90	0.16	0.69	88.19	0.170	675	675	2.87	1.42	3.98	0.17	10.00	10.17	12%
20 Cowdray Court	SITE	MH2		1.57	1.57	0.80	1.26	1.26	88.19	0.308							10.00		
80 Cowdray Court	SITE	MH2		0.61	0.61	0.80	0.49	0.49	88.19	0.120							10.00		
Cowdray Court	MH2	MH3	100.6	0.37	3.44	0.90	0.33	2.77	87.01	0.670	750	750	0.99	1.11	2.51	0.67	10.17	10.84	61%
40 Cowdray Court	SITE	MH3		1.05	1.05	0.75	0.79	0.79	88.19	0.193							10.00		
Cowdray Court	MH3	MH4	98.8	0.99	5.48	0.50	0.50	4.05	82.80	0.933	825	825	0.76	1.25	2.34	0.70	10.84	11.55	75%
Cowdray Court	MH4	CREEK	73.2	1.14	6.62	0.50	0.57	4.62	78.84	1.013	900	900	0.58	1.38	2.17	0.56	11.55	12.11	74%
COLLINGWOOD STREET OUTLET																			
Kennedy Road	MH5	MH6	103.9	0.34	0.34	0.70	0.24	0.24	88.19	0.058	300	300	0.96	0.09	1.34	1.29	10.00	11.29	62%
Kennedy Road	MH6	MH7	91.7	0.23	0.57	0.70	0.16	0.40	80.22	0.089	300	300	1.06	0.10	1.41	1.09	11.29	12.38	89%
Collingwood Street	MH7	MH8	91.4	0.41	0.98	0.60	0.25	0.65	74.67	0.134	375	375	2.16	0.26	2.33	0.65	12.38	13.03	52%
Collingwood Street	MH8	MH9	98.5	0.89	1.87	0.60	0.53	1.18	71.74	0.235	450	450	1.16	0.31	1.93	0.85	13.03	13.88	77%
Collingwood Street	MH9	MH10	87.2	0.69	2.56	0.60	0.41	1.59	68.29	0.302	525	525	0.98	0.43	1.97	0.74	13.88	14.62	71%
Collingwood Street	MH10	CREEK	33.5		2.56		0.00	1.59	65.58	0.290	600	600	0.66	0.50	1.76	0.32	14.62	14.94	58%

I= AT^C

C= -0.78

A= 21.8

Q= 2.78* CIA

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS
PRE-DEVELOPMENT 2 YEAR STORM

WSP

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 1 of 7

Street	From	To	LENGTH (m)	AREA[1] (ha)	CUMULATIVE AREA (ha)	RUN-OFF COEF.	CA	CUMULATIVE CA (ha)	INTENSITY (I_2) (mm/hr)	FLOW (Q) (m^3/s)	PIPE DIAMETER (mm)	ACTUAL PIPE DIAMETER (mm)	SLOPE (%)	CAPACITY (m^3/s)	FULL FLOW VELOCITY (m/s)	SECTION TIME (min)	INLET TIME (min)	CUMULATIVE TIME (min)	CAPACITY (% FULL)
SHEPPARD AVENUE OUTLET																			
Kennedy Road	MH11	MH12	81.4	0.47	0.47	0.70	0.33	0.33	88.19	0.081	300	300	0.89	0.09	1.29	1.05	10.00	11.05	88%
Kennedy Road	MH12	MH13	75.6	0.56	1.03	0.85	0.48	0.81	81.57	0.183	450	450	0.64	0.23	1.43	0.88	11.05	11.93	80%
Kennedy Road	MH13	MH14	86.9	0.56	1.59	0.85	0.48	1.28	76.85	0.274	525	525	0.63	0.34	1.58	0.92	11.93	12.85	80%
Sheppard Avenue	MH15	MH16	107.6	1.60	1.60	0.65	1.04	1.04	88.19	0.255	675	675	1.01	0.84	2.36	0.76	10.00	10.76	30%
EASEMENT	MH17	MH16	63.1	0.69	0.69	0.65	0.45	0.45	88.19	0.110	375	375	1.40	0.21	1.88	0.56	10.00	10.56	53%
Sheppard Avenue	MH16	MH18	32.6	0.21	2.50	0.85	0.18	1.67	83.29	0.386	675	675	1.36	0.98	2.74	0.20	10.76	10.96	39%
Sheppard Avenue	MH18	MH14	67.4	0.36	2.86	0.90	0.32	1.99	82.12	0.455	675	675	2.02	1.19	3.34	0.34	10.96	11.29	38%
Sheppard Avenue	MH14	MH19	108.2	0.79	5.24	0.85	0.67	3.94	72.53	0.795	825	825	0.79	1.28	2.39	0.76	12.85	13.60	62%
Gordon Avenue	MH20	MH21	85.2	0.75	0.75	0.55	0.41	0.41	88.19	0.101	375	375	0.42	0.11	1.03	1.38	10.00	11.38	89%
Gordon Avenue	MH21	MH22	54.3	0.51	1.26	0.60	0.31	0.72	79.73	0.159	450	450	0.62	0.22	1.41	0.64	11.38	12.02	71%
Gordon Avenue	MH22	MH19	12.8		1.26			0.72	76.40	0.153	450	450	1.78	0.38	2.39	0.09	12.02	12.11	40%
Sheppard Avenue	MH19	CREEK	43.2	0.17	6.67	0.85	0.14	4.81	69.37	0.927	975	975	1.68	2.90	3.89	0.19	13.60	13.79	32%

Notes
(1). Storm flow parameters and equations obtained from City of Toronto Design Criteria for Sewers and Watermains, January 2021.
(2). Existing pipe information obtained from plan & profile drawings from the City of Toronto, and Dorsch Model.
(3). See attached proposed storm sewer layout for more details.

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS - PRE-DEVELOPMENT 2-YEAR HGL ANALYSIS (COWDRAY COURT)
2 YEAR STORM

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 2 of 7

LOCATION	FROM MH	TO MH	TOTAL FLOW (m^3/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (m^3/sec)	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)	%Full	%Velocity	Velocity U/S (V_u) (m/sec)	Velocity D/S (V_d) (m/sec)	D/S Invert (m)	Pipe Friction Slope (%)	Pipe Friction Loss (H_f) (m)	Velocity Head Loss at D/S MH (H_v) (m)	Total Losses in D/S MH (H_v+H_b) (m)	Depth of Flow (%)	Depth of Flow (m)	Flow Depth Elev. at D/S (m)	Flow Depth Elev. at U/S (m)	HGL Elev at D/S (HGL_1) (m)	HGL Elev at U/S (HGL_1+H_f) (m)	Obvert Elev at D/S (m)	Obvert Elev at U/S (m)	Top of MH Elev at U/S (m)	Depth of HGL at U/S (m)	Froude Number (-)	Notes (-)
Cowdray Court	MH1	MH2	0.170	41.4	2.87	675	1.424	3.98	2.55	12.0%	64%	2.55	2.66	165.80	0.04	0.02	0.03	0.03	24%	0.16	165.96	167.15	166.48	167.15	166.48	167.66	171.22	**4.07**	2.02	SUPERCRITICAL
Cowdray Court	MH2	MH3	0.670	100.6	0.99	750	1.108	2.51	2.66	61.0%	106%	2.66	2.60	164.59	0.36	0.36	-0.02	0.00	57%	0.43	165.02	166.01	165.34	166.01	165.34	166.34	169.21	**3.20**	1.30	SUPERCRITICAL
Cowdray Court	MH3	MH4	0.933	98.8	0.76	825	1.251	2.34	2.60	75.0%	111%	2.60	2.41	163.75	0.42	0.42	-0.05	0.00	66%	0.54	164.29	165.05	164.58	165.05	164.58	165.33	167.69	**2.64**	1.12	SUPERCRITICAL
Cowdray Court	MH4	CREEK	1.013	73.2	0.58	900	1.379	2.17	2.41	74.0%	111%	2.41	0.00	163.17	0.31	0.23	-0.29	0.00	65%	0.59	163.76	164.18	**164.07**	164.30	164.07	164.49	167.06	**2.76**	1.00	CRITICAL

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS - PRE-DEVELOPMENT 2-YEAR HGL ANALYSIS (COLLINGWOOD STREET)
2 YEAR STORM

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 3 of 7

LOCATION	FROM MH	TO MH	TOTAL FLOW (m^3/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (m^3/sec)	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)	%Full	%Velocity	Velocity U/S (V_u) (m/sec)	Velocity D/S (V_d) (m/sec)	D/S Invert (m)	Pipe Friction Slope (%)	Pipe Friction Loss (H_f) (m)	Velocity Head Loss at D/S MH (H_v) (m)	Total Losses in D/S MH (H_v+H_b) (m)	Depth of Flow (%)	Depth of Flow (m)	Flow Depth Elev. at D/S (m)	Flow Depth Elev. at U/S (m)	HGL Elev at D/S (HGL_1) (m)	HGL Elev at U/S (HGL_1+H_f) (m)	Obvert Elev at D/S (m)	Obvert Elev at U/S (m)	Top of MH Elev at U/S (m)	Depth of HGL at U/S (m)	Froude Number (-)	Notes (-)
Kennedy Road	MH5	MH6	0.058	103.9	0.96	300	0.095	1.34	1.42	62.0%	106%	1.42	1.62	169.34	0.36	0.38	0.03	0.03	58%	0.17	169.51	170.51	169.64	170.51	169.64	170.64	172.93	**2.42**	1.09	SUPERCRITICAL
Kennedy Road	MH6	MH7	0.089	91.7	1.06	300	0.100	1.41	1.62	89.0%	115%	1.62	2.38	168.35	0.85	0.78	0.15	0.15	74%	0.22	168.57	169.54	168.65	169.54	168.65	169.62	172.52	**2.98**	1.10	SUPERCRITICAL
Collingwood Street	MH7	MH8	0.134	91.4	2.16	375	0.258	2.33	2.38	52.0%	102%	2.38	2.14	165.13	0.58	0.53	-0.05	0.00	52%	0.20	165.33	167.30	165.51	167.30	165.51	167.48	170.64	**3.34**	1.72	SUPERCRITICAL
Collingwood Street	MH8	MH9	0.235	98.5	1.16	450	0.307	1.93	2.14	77.0%	111%	2.14	2.14	163.93	0.68	0.67	0.00	0.00	67%	0.30	164.23	165.37	164.38	165.37	164.38	165.52	168.20	**2.83**	1.25	SUPERCRITICAL
Collingwood Street	MH9	MH10	0.302	87.2	0.98	525	0.426	1.97	2.14	71.0%	109%	2.14	1.85	163.01	0.49	0.43	-0.06	0.00	63%	0.33	163.34	164.20	163.54	164.20	163.54	164.39	167.34	**3.14**	1.19	SUPERCRITICAL
Collingwood Street	MH10	CREEK	0.290	33.5	0.66	600	0.499	1.76	1.85	58.0%	105%	1.85	0.00	162.76	0.22	0.08	-0.17	0.00	55%	0.33	163.09	163.31	**163.36**	163.44	163.36	163.58	166.16	**2.72**	1.03	SUPERCRITICAL

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS - PRE-DEVELOPMENT 2-YEAR HGL ANALYSIS (SHEPPARD AVENUE)
2 YEAR STORM

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 4 of 7

LOCATION	FROM MH	TO MH	TOTAL FLOW (m^3/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (m^3/sec)	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)	%Full	%Velocity	Velocity U/S (V_u) (m/sec)	Velocity D/S (V_d) (m/sec)	D/S Invert (m)	Pipe Friction Slope (%)	Pipe Friction Loss (H_f) (m)	Velocity Head Loss at D/S MH (H_v) (m)	Total Losses in D/S MH (H_v+H_b) (m)	Depth of Flow (%)	Depth of Flow (m)	Flow Depth Elev. at D/S (m)	Flow Depth Elev. at U/S (m)	HGL Elev at D/S (HGL_1) (m)	HGL Elev at U/S (HGL_1+H_f) (m)	Obvert Elev at D/S (m)	Obvert Elev at U/S (m)	Top of MH Elev at U/S (m)	Depth of HGL at U/S (m)	Froude Number (-)	Notes (-)
Kennedy Road	**MH11**	**MH12**	0.081	81.4	0.89	300	0.091	1.29	1.48	88.0%	115%	1.48	1.61	166.06	0.70	0.57	0.02	0.02	73%	0.22	166.28	167.00	166.36	167.00	166.36	167.08	171.73	**4.73**	1.01	SUPERCRITICAL
Kennedy Road	**MH12**	**MH13**	0.183	75.6	0.64	450	0.228	1.43	1.61	80.0%	112%	1.61	1.77	165.40	0.41	0.31	0.03	0.03	69%	0.31	165.71	166.19	165.85	166.19	165.85	166.33	170.23	**4.04**	0.92	SUBCRITICAL
Kennedy Road	**MH13**	**MH14**	0.274	86.9	0.63	525	0.341	1.58	1.77	80.0%	112%	1.77	2.53	164.80	0.40	0.35	0.17	0.17	69%	0.36	165.16	165.71	165.33	165.71	165.33	165.87	169.23	**3.52**	0.94	SUBCRITICAL
Sheppard Avenue	**MH15**	**MH16**	0.255	107.6	1.01	675	0.845	2.36	2.03	30.0%	86%	2.03	2.58	166.61	0.09	0.10	0.13	0.13	38%	0.26	166.87	167.95	167.29	167.95	167.29	168.37	171.60	**3.65**	1.28	SUPERCRITICAL
EASEMENT	**MH17**	**MH16**	0.110	63.1	1.40	375	0.207	1.88	1.92	53.0%	102%	1.92	2.58	166.89	0.39	0.25	0.15	0.15	52%	0.20	167.09	167.97	167.27	167.97	167.27	168.15	172.21	**4.24**	1.39	SUPERCRITICAL
Sheppard Avenue	**MH16**	**MH18**	0.386	32.6	1.36	675	0.980	2.74	2.58	39.0%	94%	2.58	3.14	166.00	0.21	0.07	0.16	0.16	44%	0.30	166.30	166.74	166.68	166.74	166.68	167.12	170.81	**4.07**	1.51	SUPERCRITICAL
Sheppard Avenue	**MH18**	**MH14**	0.455	67.4	2.02	675	1.195	3.34	3.14	38.0%	94%	3.14	2.53	164.57	0.29	0.20	-0.18	0.00	43%	0.29	164.86	166.22	165.25	166.22	165.25	166.61	170.01	**3.79**	1.86	SUPERCRITICAL
Sheppard Avenue	**MH14**	**MH19**	0.795	108.2	0.79	825	1.276	2.39	2.53	62.0%	106%	2.53	3.42	163.48	0.31	0.33	0.27	0.27	58%	0.48	163.96	164.81	164.31	164.81	164.31	165.16	168.66	**3.85**	1.17	SUPERCRITICAL
Gordon Road	**MH20**	**MH21**	0.101	85.2	0.42	375	0.114	1.03	1.18	89.0%	115%	1.18	1.54	164.47	0.33	0.28	0.05	0.05	74%	0.28	164.75	165.11	165.08	165.36	164.85	165.20	167.82	**2.46**	0.72	SUBCRITICAL
Gordon Road	**MH21**	**MH22**	0.159	54.3	0.62	450	0.224	1.41	1.54	71.0%	109%	1.54	2.25	164.14	0.31	0.17	0.14	0.14	63%	0.28	164.42	164.76	164.86	165.03	164.59	164.93	167.07	**2.04**	0.92	SUBCRITICAL
Gordon Road	**MH22**	**MH19**	0.153	12.8	1.78	450	0.380	2.39	2.25	40.0%	94%	2.25	3.42	163.89	0.29	0.04	0.34	0.34	45%	0.20	164.09	164.72	164.34	164.72	164.34	164.57	166.63	**1.91**	1.60	SUPERCRITICAL
Sheppard Avenue	**MH19**	**CREEK**	0.927	43.2	1.68	975	2.905	3.89	3.42	32.0%	88%	3.42	0.00	162.63	0.17	0.07	-0.60	0.00	40%	0.39	163.02	163.75	**163.61**	163.75	163.61	164.33	166.54	**2.79**	1.75	SUPERCRITICAL

I= AT^C

C= -0.8

A= 38.7

Q= 2.78* CIA

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS
PRE-DEVELOPMENT 10 YEAR STORM

WSP

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 5 of 7

Street	From	To	LENGTH (m)	AREA[1] (ha)	CUMULATIVE AREA (ha)	RUN-OFF COEF.	CA	CUMULATIVE CA (ha)	INTENSITY (I_{10}) (mm/hr)	FLOW (Q) (m^3/s)	PIPE DIAMETER (mm)	ACTUAL PIPE DIAMETER (mm)	SLOPE (%)	CAPACITY (m^3/s)	FULL FLOW VELOCITY (m/s)	SECTION TIME (min)	INLET TIME (min)	CUMULATIVE TIME (min)	CAPACITY (% FULL)
COLLINGWOOD STREET OUTLET																			
Kennedy Road	MH5	MH6	103.9	0.34	0.34	0.70	0.24	0.24	162.27	0.107	300	300	0.96	0.09	1.34	1.29	10.00	11.29	113%
Kennedy Road	MH6	MH7	91.7	0.23	0.57	0.70	0.16	0.40	147.24	0.163	300	300	1.06	0.10	1.41	1.09	11.29	12.38	164%
Collingwood Street	MH7	MH8	91.4	0.41	0.98	0.60	0.25	0.65	136.82	0.245	375	375	2.16	0.26	2.33	0.65	12.38	13.03	95%
Collingwood Street	MH8	MH9	98.5	0.89	1.87	0.60	0.53	1.18	131.30	0.430	450	450	1.16	0.31	1.93	0.85	13.03	13.88	140%
Collingwood Street	MH9	MH10	87.2	0.69	2.56	0.60	0.41	1.59	124.83	0.553	525	525	0.98	0.43	1.97	0.74	13.88	14.62	130%
Collingwood Street	MH10	CREEK	33.5		2.56		0.00	1.59	119.76	0.530	600	600	0.66	0.50	1.76	0.32	14.62	14.94	106%
SHEPPARD AVENUE OUTLET																			
Kennedy Road	MH11	MH12	81.4	0.47	0.47	0.70	0.33	0.33	162.27	0.148	300	300	0.89	0.09	1.29	1.05	10.00	11.05	163%
Kennedy Road	MH12	MH13	75.6	0.56	1.03	0.85	0.48	0.81	149.80	0.335	450	450	0.64	0.23	1.43	0.88	11.05	11.93	147%
Kennedy Road	MH13	MH14	86.9	0.56	1.59	0.85	0.48	1.28	140.90	0.502	525	525	0.63	0.34	1.58	0.92	11.93	12.85	147%
Sheppard Avenue	MH15	MH16	107.6	1.60	1.60	0.65	1.04	1.04	162.27	0.469	675	675	1.01	0.84	2.36	0.76	10.00	10.76	56%
EASEMENT	MH17	MH16	63.1	0.69	0.69	0.65	0.45	0.45	162.27	0.202	375	375	1.40	0.21	1.88	0.56	10.00	10.56	98%
Sheppard Avenue	MH16	MH18	32.6	0.21	2.50	0.85	0.18	1.67	153.04	0.709	675	675	1.36	0.98	2.74	0.20	10.76	10.96	72%
Sheppard Avenue	MH18	MH14	67.4	0.36	2.86	0.90	0.32	1.99	150.82	0.835	675	675	2.02	1.19	3.34	0.34	10.96	11.29	70%
Sheppard Avenue	MH14	MH19	108.2	0.79	5.24	0.85	0.67	3.94	132.79	1.456	825	825	0.79	1.28	2.39	0.76	12.85	13.60	114%
Gordon Avenue	MH20	MH21	85.2	0.75	0.75	0.55	0.41	0.41	162.27	0.186	375	375	0.42	0.11	1.03	1.38	10.00	11.38	164%
Gordon Avenue	MH21	MH22	54.3	0.51	1.26	0.60	0.31	0.72	146.32	0.292	450	450	0.62	0.22	1.41	0.64	11.38	12.02	130%
Gordon Avenue	MH22	MH19	12.8		1.26			0.72	140.05	0.280	450	450	1.78	0.38	2.39	0.09	12.02	12.11	74%
Sheppard Avenue	MH19	CREEK	43.2	0.17	6.67	0.85	0.14	4.81	126.85	1.695	975	975	1.68	2.90	3.89	0.19	13.60	13.79	58%

Notes
(1). Storm flow parameters and equations obtained from City of Toronto Design Criteria for Sewers and Watermains, January 2021.
(2). Existing pipe information obtained from plan & profile drawings from the City of Toronto, and Dorsch Model.
(3). See attached proposed storm sewer layout for more details.

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS - PRE-DEVELOPMENT 10-YEAR HGL ANALYSIS (COLLINGWOOD STREET)
10 YEAR STORM

DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 6 of 7

LOCATION	FROM MH	TO MH	TOTAL FLOW 2-YR (m^3/sec)	TOTAL FLOW 10-YR (m^3/sec)	Block or Road or SCB	TOTAL NUMBER OF CB LEADS	TOTAL NUMBER OF DCBS	CB CAPTURE CAPACITY	CB CAPTURE CAPACITY (m^3/sec)	FLOW USED IN HGL (m^3/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (m^3/sec)	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)	%Full	%Velocity	Velocity U/S (V_u) (m/sec)	Velocity D/S (V_d) (m/sec)	D/S Invert (m)	Pipe Friction Slope (%)	Pipe Friction Loss (H_f) (m)	Velocity Head Loss at D/S MH (H_v) (m)	Total Losses in D/S MH (H_v+H_b) (m)	Depth of Flow (%)	Depth of Flow (m)	Flow Depth Elev. at D/S (m)	Flow Depth Elev. at U/S (m)	HGL Elev at D/S (HGL_1) (m)	HGL Elev at U/S (HGL_1+H_f) (m)	Obvert Elev at D/S (m)	Obvert Elev at U/S (m)	Top of MH Elev at U/S (m)	Depth of HGL at U/S (m)	Froude Number (-)	Notes (-)
Kennedy Road	**MH5**	**MH6**	0.058	0.107		2		0.120	0.120	0.107	103.9	0.96	300	0.095	1.34	1.50	113.0%	112%	1.50	1.58	169.34	1.23	1.28	0.01	0.01	94%	0.28	169.62	170.62	171.28	172.56	169.64	170.64	172.93	**0.37**	0.90	SUBCRITICAL
Kennedy Road	**MH6**	**MH7**	0.089	0.163		3		0.180	0.180	0.163	91.7	1.06	300	0.100	1.41	1.58	164.0%	112%	1.58	2.71	168.35	2.85	2.62	0.25	0.25	94%	0.28	168.63	169.60	168.65	171.27	168.65	169.62	172.52	**1.25**	0.95	SUBCRITICAL
Collingwood Street	**MH7**	**MH8**	0.134	0.245		0		0.000	0.000	0.134	91.4	2.16	375	0.258	2.33	2.71	95.0%	116%	2.71	2.16	165.13	0.58	0.53	-0.13	0.00	78%	0.29	165.42	167.40	165.64	167.40	165.51	167.48	170.64	**3.24**	1.60	SUPERCRITICAL
Collingwood Street	**MH8**	**MH9**	0.235	0.430		4		0.240	0.240	0.240	98.5	1.16	450	0.307	1.93	2.16	140.0%	112%	2.16	2.20	163.93	0.71	0.70	0.01	0.01	94%	0.42	164.35	165.50	164.95	165.64	164.38	165.52	168.20	**2.56**	1.06	SUPERCRITICAL
Collingwood Street	**MH9**	**MH10**	0.302	0.553		2		0.120	0.120	0.302	87.2	0.98	525	0.426	1.97	2.20	130.0%	112%	2.20	1.99	163.01	0.49	0.43	-0.04	0.00	94%	0.49	163.50	164.36	164.51	164.94	163.54	164.39	167.34	**2.40**	1.00	CRITICAL
Collingwood Street	**MH10**	**CREEK**	0.290	0.530		0		0.000	0.000	0.290	33.5	0.66	600	0.499	1.76	1.99	106.0%	113%	1.99	0.00	162.76	0.22	0.08	-0.20	0.00	89%	0.53	163.29	163.52	**164.43**	164.51	163.36	163.58	166.16	**1.65**	0.87	SUBCRITICAL

CITY OF TORONTO
Agincourt EA
DOWNSTREAM STORM SEWER ANALYSIS - PRE-DEVELOPMENT 10-YEAR HGL ANALYSIS (SHEPPARD AVENUE)
10 YEAR STORM

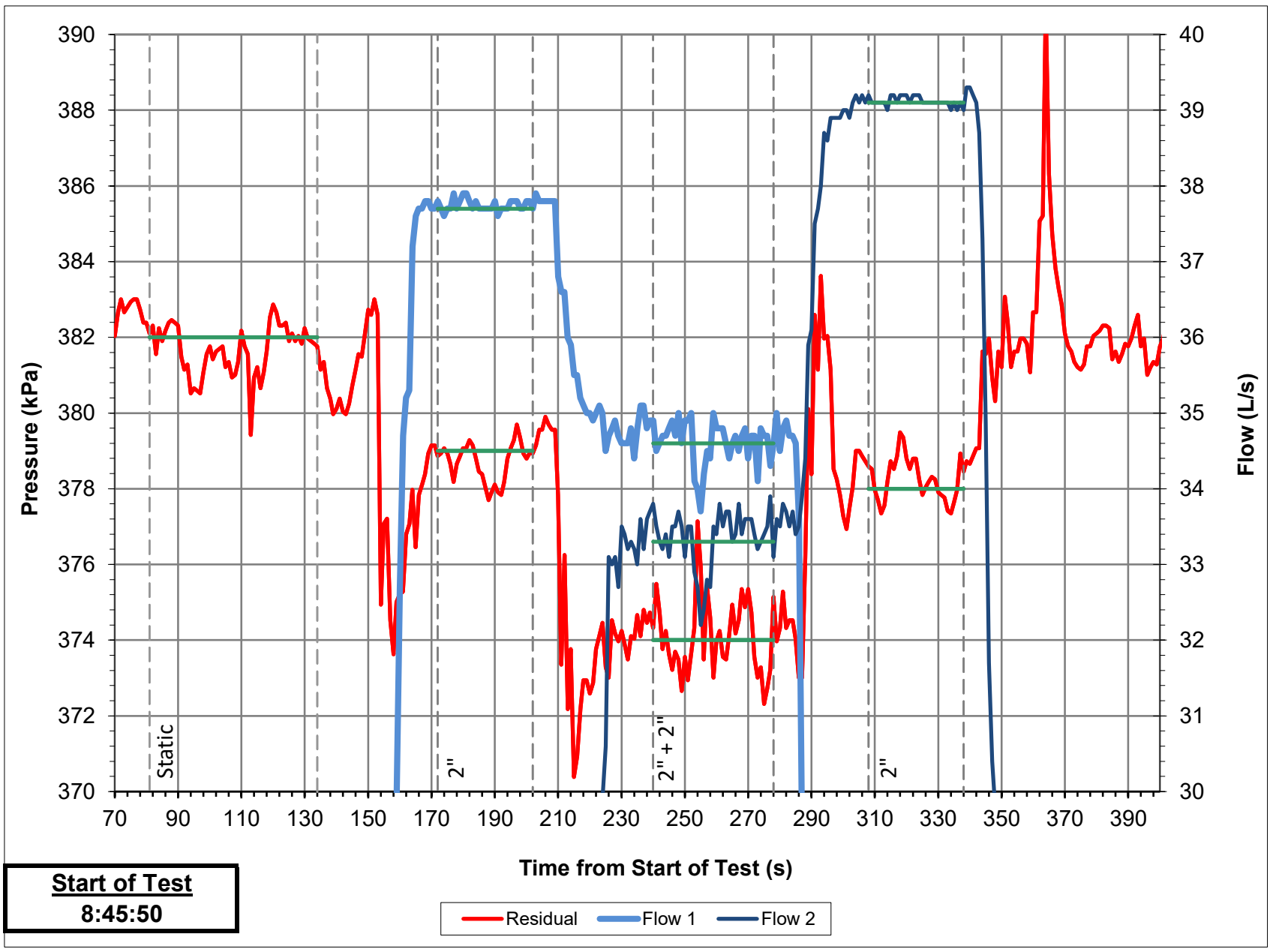
DATE REVISED: 2022-10-07
PROJECT NO: 19M-01888
DESIGNED BY: GW/LZ
CHECKED BY: MM
DESIGN SHEET NO: 7 of 7

LOCATION	FROM MH	TO MH	TOTAL FLOW 2-YR (m^3/sec)	TOTAL FLOW 10-YR (m^3/sec)	Block or Road or SCB	TOTAL NUMBER OF CB LEADS	TOTAL NUMBER OF DCBS	CB CAPTURE CAPACITY (m^3/sec)	FLOW USED IN HGL (m^3/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (m^3/sec)	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)	%Full	%Velocity	Velocity U/S (V_u) (m/sec)	Velocity D/S (V_d) (m/sec)	D/S Invert (m)	Pipe Friction Slope (%)	Pipe Friction Loss (H_f) (m)	Velocity Head Loss at D/S MH (H_v) (m)	Total Losses in D/S MH (H_v+H_b) (m)	Depth of Flow (%)	Depth of Flow (m)	Flow Depth Elev. at D/S (m)	Flow Depth Elev. at U/S (m)	HGL Elev at D/S (HGL_1) (m)	HGL Elev at U/S (HGL_1+H_f) (m)	Obvert Elev at D/S (m)	Obvert Elev at U/S (m)	Top of MH Elev at U/S (m)	Depth of HGL at U/S (m)	Froude Number (-)	Notes (-)
Kennedy Road	MH11	MH12	0.081	0.148		1		0.060	0.081	81.4	0.89	300	0.091	1.29	1.45	163.0%	112%	1.45	1.61	166.06	0.70	0.57	0.02	0.02	73%	0.22	166.28	167.00	168.42	168.98	166.36	167.08	171.73	**2.75**	0.99	SUBCRITICAL
Kennedy Road	MH12	MH13	0.183	0.335		4		0.240	0.240	75.6	0.64	450	0.228	1.43	1.61	147.0%	112%	1.61	1.77	165.40	0.71	0.54	0.03	0.03	88%	0.40	165.80	166.28	167.85	168.39	165.85	166.33	170.23	**1.84**	0.81	SUBCRITICAL
Kennedy Road	MH13	MH14	0.274	0.502		4	2	0.440	0.440	86.9	0.63	525	0.341	1.58	1.77	147.0%	112%	1.77	2.67	164.80	1.05	0.91	0.21	0.21	94%	0.49	165.29	165.84	166.92	167.83	165.33	165.87	169.23	**1.40**	0.80	SUBCRITICAL
Sheppard Avenue	MH15	MH16	0.255	0.469		2		0.120	0.255	103.9	0.96	675	0.845	2.36	2.43	56.0%	103%	2.43	3.01	166.61	0.09	0.10	0.16	0.16	38%	0.26	166.87	167.86	167.34	167.86	167.29	168.28	171.60	**3.74**	1.53	SUPERCRITICAL
EASEMENT	MH17	MH16	0.110	0.202		0		0.000	0.110	63.1	1.40	375	0.207	1.88	2.18	98.0%	116%	2.18	3.01	166.89	0.39	0.25	0.22	0.22	52%	0.20	167.09	167.97	167.40	167.97	167.27	168.15	172.21	**4.24**	1.58	SUPERCRITICAL
Sheppard Avenue	MH16	MH18	0.386	0.709		1		0.060	0.386	32.6	1.36	675	0.980	2.74	3.01	72.0%	110%	3.01	3.61	166.00	0.21	0.07	0.20	0.20	44%	0.30	166.30	166.74	167.11	167.18	166.68	167.12	170.81	**3.63**	1.77	SUPERCRITICAL
Sheppard Avenue	MH18	MH14	0.455	0.835		2		0.120	0.455	67.4	2.02	675	1.195	3.34	3.61	70.0%	108%	3.61	2.67	164.57	0.29	0.20	-0.30	0.00	43%	0.29	164.86	166.22	166.71	166.91	165.25	166.61	170.01	**3.10**	2.14	SUPERCRITICAL
Sheppard Avenue	MH14	MH19	0.795	1.456		5		0.300	0.795	108.2	0.79	825	1.276	2.39	2.67	114.0%	112%	2.67	4.09	163.48	0.31	0.33	0.49	0.49	58%	0.48	163.96	164.81	166.38	166.71	164.31	165.16	168.66	**1.95**	1.23	SUPERCRITICAL
Gordon Road	MH20	MH21	0.101	0.186		3		0.180	0.180	85.2	0.42	375	0.114	1.03	1.15	164.0%	112%	1.15	1.58	164.47	1.05	0.90	0.06	0.06	94%	0.35	164.82	165.18	166.88	167.78	164.85	165.20	167.82	**0.04**	0.62	SUBCRITICAL
Gordon Road	MH21	MH22	0.159	0.292		1		0.060	0.159	54.3	0.62	450	0.224	1.41	1.58	130.0%	112%	1.58	2.65	164.14	0.31	0.17	0.23	0.23	63%	0.28	164.42	164.76	166.65	166.82	164.59	164.93	167.07	**0.25**	0.95	SUBCRITICAL
Gordon Road	MH22	MH19	0.153	0.280		1		0.060	0.153	12.8	1.78	450	0.380	2.39	2.65	74.0%	111%	2.65	4.09	163.89	0.29	0.04	0.49	0.49	45%	0.20	164.09	164.72	166.39	166.42	164.34	164.57	166.63	**0.21**	1.88	SUPERCRITICAL
Sheppard Avenue	MH19	CREEK	0.927	1.695		2		0.120	0.927	43.2	1.68	975	2.905	3.89	4.09	58.0%	105%	4.09	0.00	162.63	0.17	0.07	-0.85	0.00	40%	0.39	163.02	163.75	**165.82**	165.89	163.61	164.33	166.54	**0.65**	2.09	SUPERCRITICAL

APPENDIX

D WATER DISTRIBUTION NETWORK ANALYSIS

Test 1 - 3905 SHEPPARD AVE E (HY135743)



Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		Material:		Residual Hydrant:	HY135743
Area:	N/A			Flow Hydrant:	HY135737

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY135737)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	81	134	382	55.4	0.0	0	0.0	0	0.0	0	N/A
2"	172	202	379	55.0	37.7	598	0.0	0	37.7	598	N/A
2"	308	338	378	54.8	0.0	0	39.1	620	39.1	620	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	240	278	374	54.2	34.6	548	33.3	528	67.9	1076	N/A

3905 SHEPPARD AVE E (HY135743)

HYDRANT FLOW TEST RESULTS

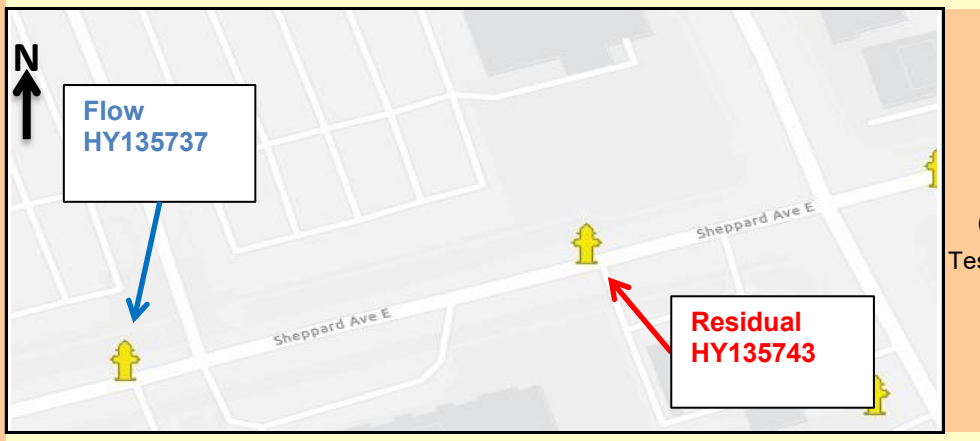
Date: 05-Aug-20 Time: 8:45 (hh/mm)

Municipality: City of Toronto

Operator: Dias

Tested By: Sen

Test No: 1



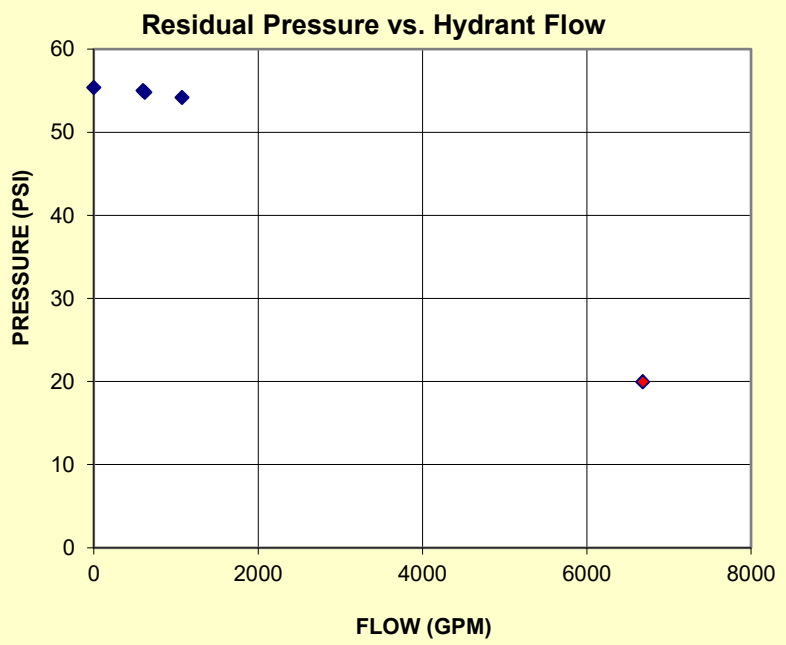
Conditions before Test (STATIC)

Residual Hydrant:	55.4 psi	382 kPa
Hydrant that will Flow:	55.4 psi	382 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	2% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	55.4	55.4				
Single Port Tests									
2	14.7	598.0	37.7	55.0	55.0	20	6691	422	NO
2	15.8	620.0	39.1	54.8	54.8	20	5584	352	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	11.5	528.0	33.3	54.2	54.2	20	6679	421	YES
2	12.3	548.0	34.6						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
55.4	382	6700	423

* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

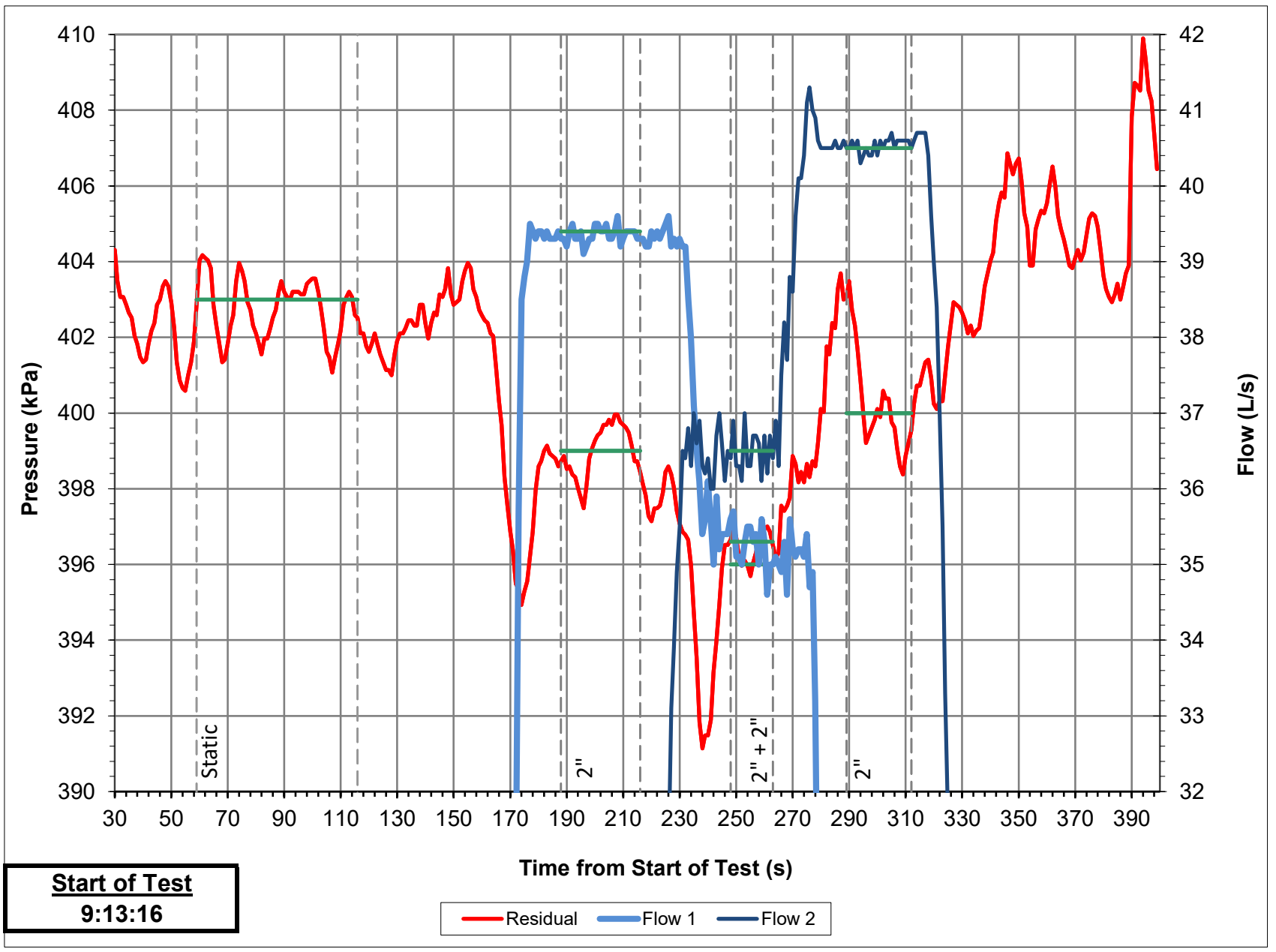
Water Discharged During Test:	9700 L

Rounded up to closest 100L

DISCLAIMER FOR FIRE FLOW TESTS

While WSP makes every effort to ensure that the information contained herein is accurate and up to date, WSP is not responsible for unintended or incorrect use of the data and information described and/or contained herein. The user must make his/her own determination as to its accuracy and suitability. The information is representative for a dynamic water system that may change over time.

Test 2 - 4068 SHEPPARD AVE E (HY135747)



Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		**Material:**		**Residual Hydrant:**	HY135747
Area:	N/A			**Flow Hydrant:**	HY31391

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY31391)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	59	116	403	58.5	0.0	0	0.0	0	0.0	0	N/A
2"	188	216	399	57.9	39.4	625	0.0	0	39.4	625	N/A
2"	289	312	400	58.0	0.0	0	40.5	642	40.5	642	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	248	263	396	57.4	35.3	560	36.5	579	71.8	1138	N/A

4068 SHEPPARD AVE E (HY135747)

HYDRANT FLOW TEST RESULTS

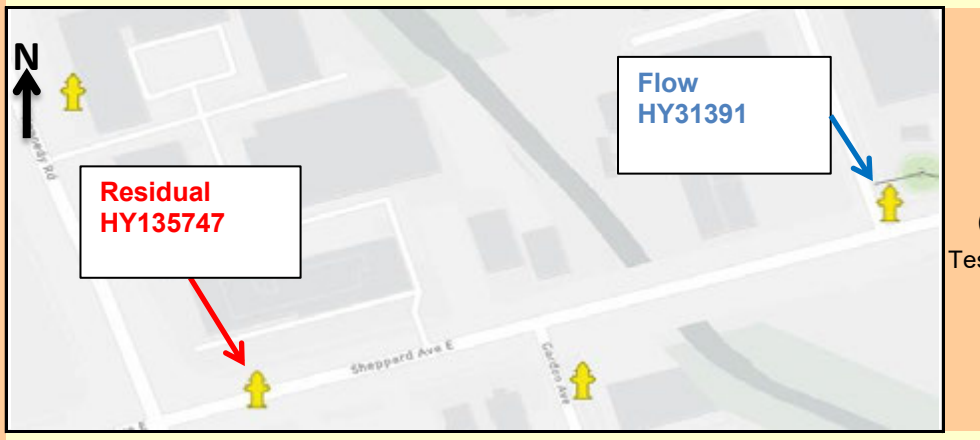
Date: 05-Aug-20 Time: 9:13 (hh/mm)

Tested By: Sen

Municipality: City of Toronto

Operator: Dias

Test No: **2**



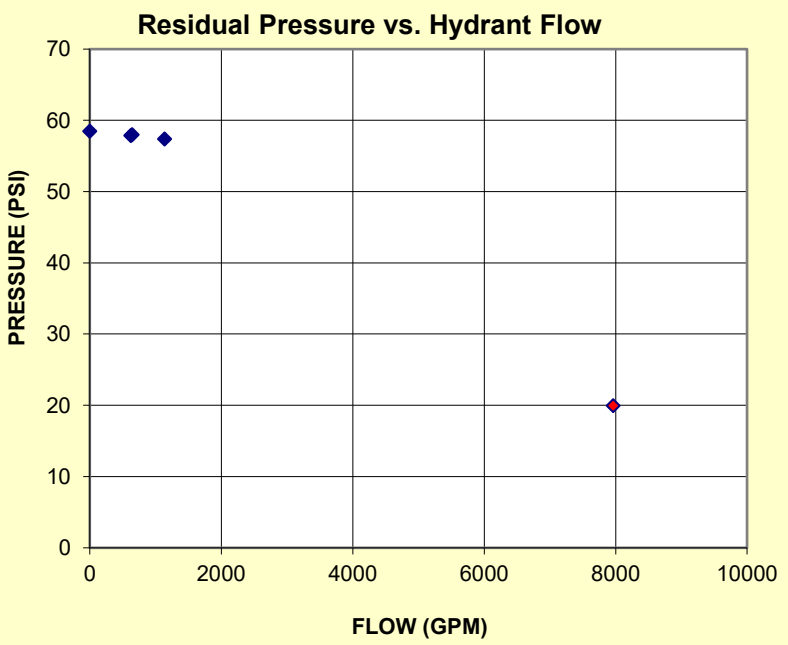
Conditions before Test (STATIC)

Residual Hydrant:	58.5 psi	403 kPa
Hydrant that will Flow:	58.5 psi	403 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	1.6% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	58.5	58.5				
Single Port Tests									
2	16.1	625.0	39.4	57.9	57.9	20	6192	391	NO
2	16.9	642.0	40.5	58	58.0	20	7088	447	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	12.9	560.0	35.3	57.4	57.4	20	7959	502	YES
2	13.8	579.0	36.5						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
58.5	403	8000	505

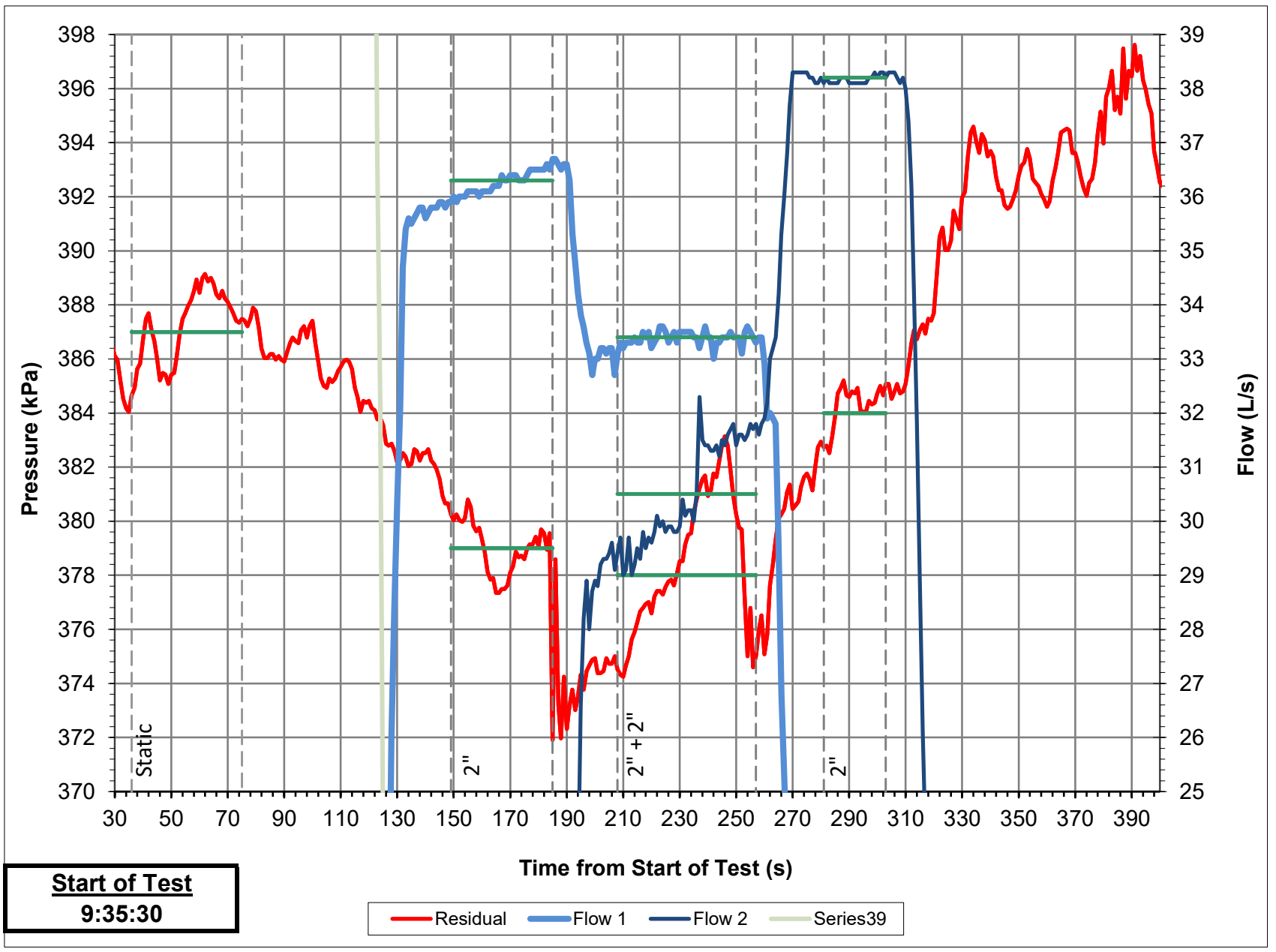
* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	8400 L

Rounded up to closest 100L

Test 3 - 2250 KENNEDY RD (HY135313)



Start of Test
9:35:30

Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		**Material:**		**Residual Hydrant:**	HY135313
Area:	N/A			**Flow Hydrant:**	HY136170

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY136170)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	36	75	387	56.1	0.0	0	0.0	0	0.0	0	N/A
2"	149	185	379	55.0	36.3	575	0.0	0	36.3	575	N/A
2"	281	303	384	55.7	0.0	0	38.2	605	38.2	605	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	208	257	378	54.8	33.4	529	30.5	483	63.9	1013	N/A

2250 KENNEDY RD (HY135313)

HYDRANT FLOW TEST RESULTS

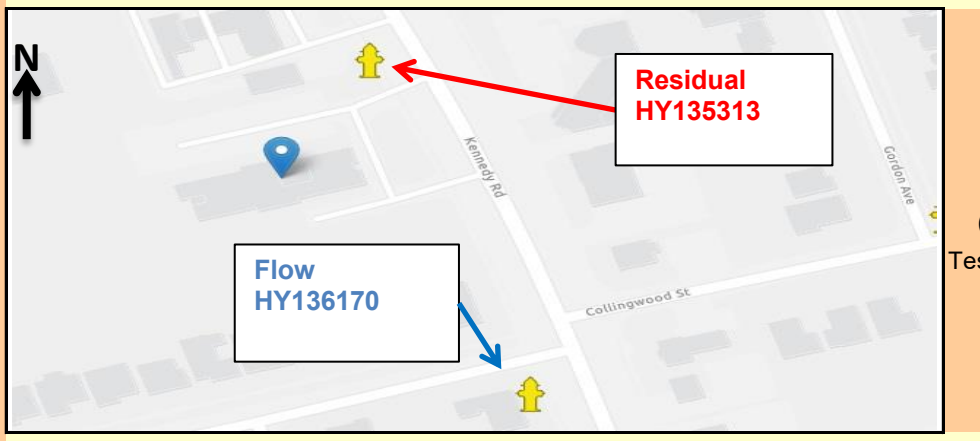
Date: 05-Aug-20 Time: 9:35 (hh/mm)

Municipality: City of Toronto

Operator: Dias

Tested By: Sen

Test No: 3



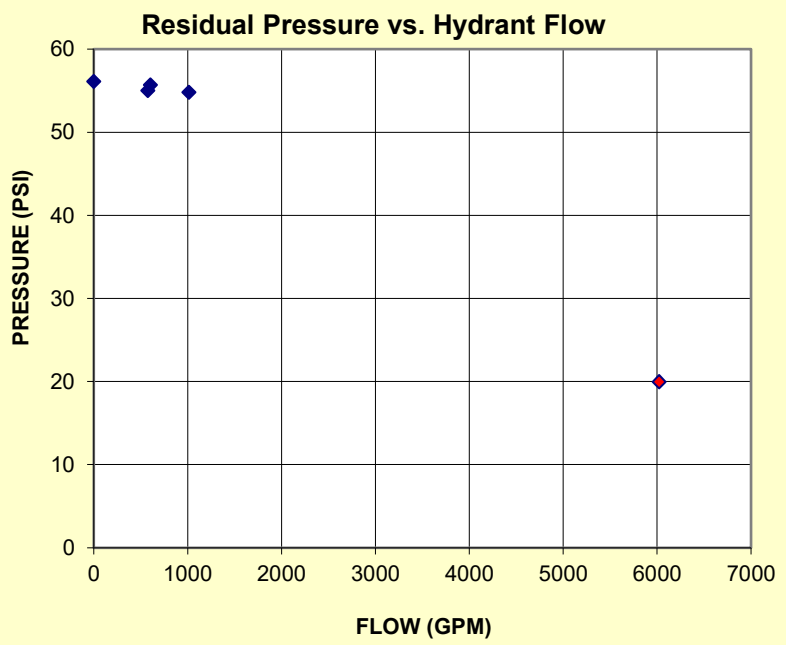
Conditions before Test (STATIC)

Residual Hydrant:	56.1 psi	387 kPa
Hydrant that will Flow:	56.1 psi	387 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	2.3% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	56.1	56.1				
Single Port Tests									
2	13.6	575.0	36.3	55.0	55.0	20	3735	236	NO
2	15.0	605.0	38.2	55.7	55.7	20	6624	418	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	9.6	483.0	30.5	54.8	54.8	20	6020	380	YES
2	11.5	529.0	33.4						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
56.1	387	6000	379

* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	9200 L

Rounded up to closest 100L

DISCLAIMER FOR FIRE FLOW TESTS

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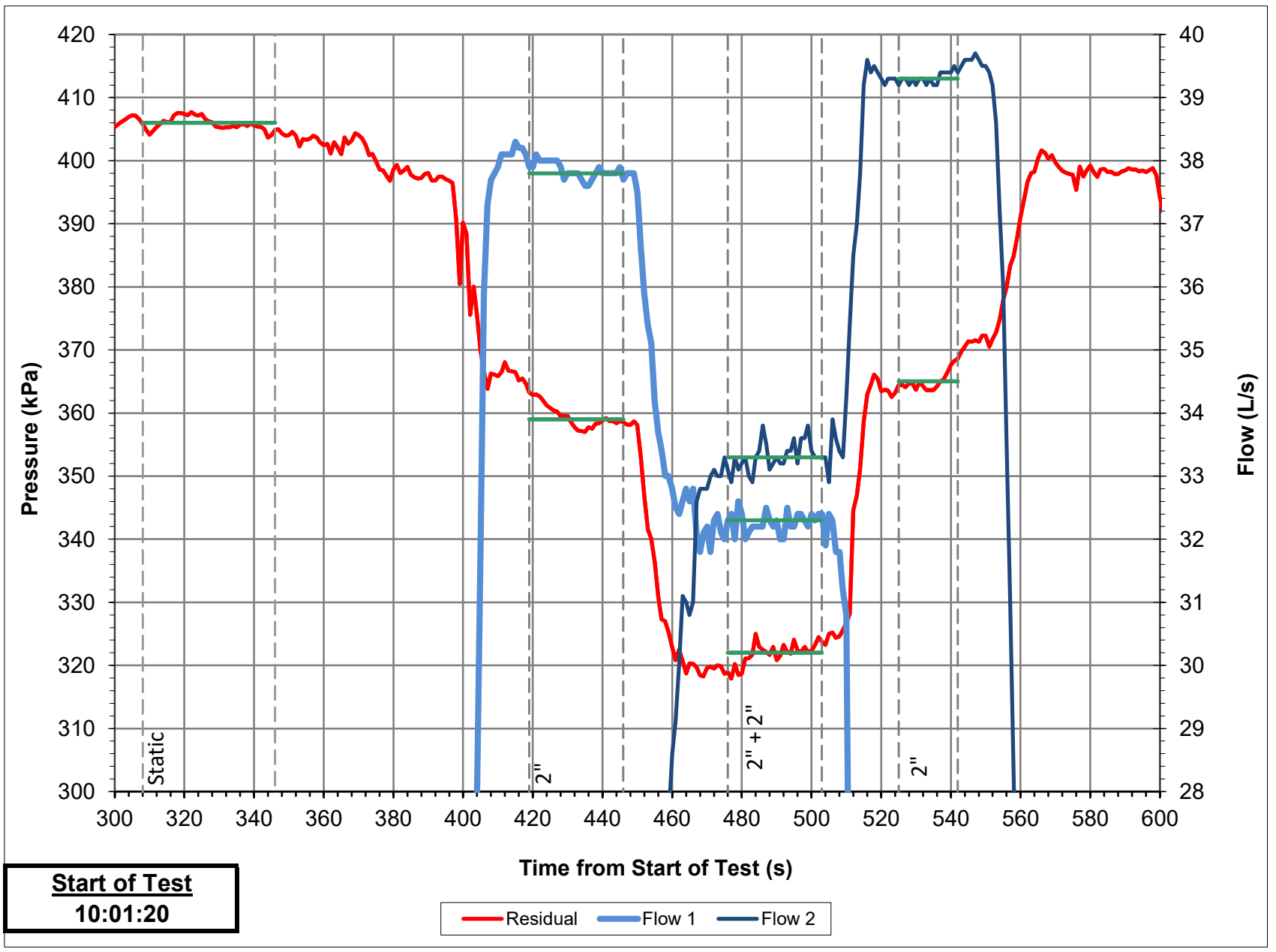
Test 4 - 1 GORDON AVE (HY135911)



Start of Test
10:01:20

Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		**Material:**		**Residual Hydrant:**	HY135911
Area:	N/A			**Flow Hydrant:**	HY135909

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY135909)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	308	346	406	58.9	0.0	0	0.0	0	0.0	0	N/A
2"	419	446	359	52.1	37.8	599	0.0	0	37.8	599	N/A
2"	525	542	365	52.9	0.0	0	39.3	623	39.3	623	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	476	503	322	46.7	32.3	512	33.3	528	65.6	1040	N/A

1 GORDON AVE (HY135911)

HYDRANT FLOW TEST RESULTS

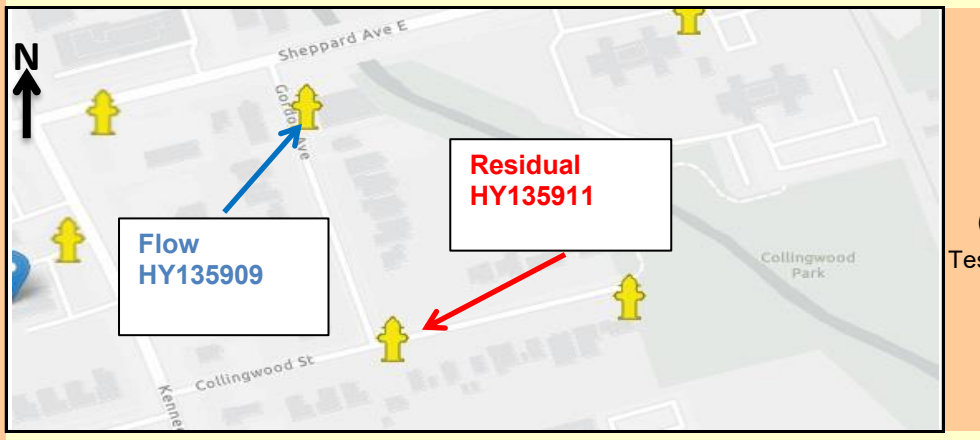
Date: 05-Aug-20 Time: 10:01 (hh/mm)

Municipality: City of Toronto

Operator: Dias

Tested By: Sen

Test No: **4**



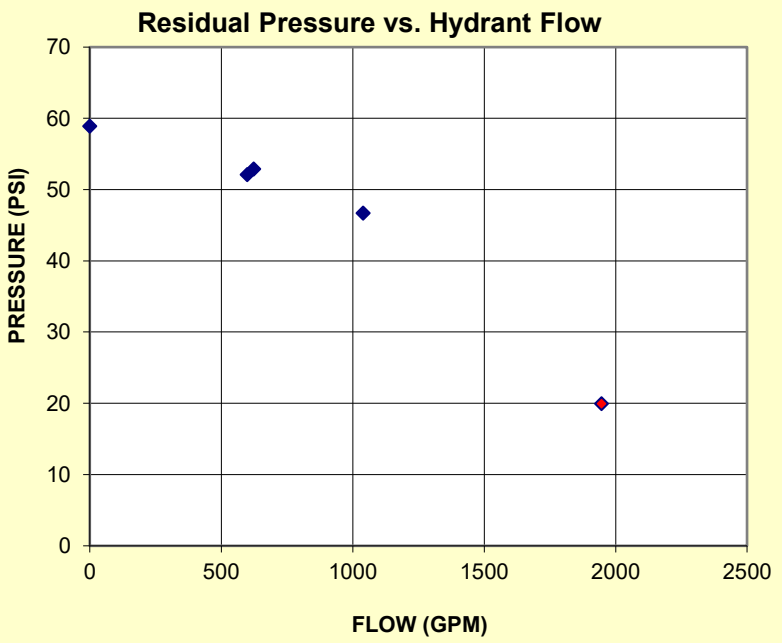
Conditions before Test (STATIC)

Residual Hydrant:	58.9 psi	406 kPa
Hydrant that will Flow:	58.9 psi	406 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	20% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	58.9	58.9				
Single Port Tests									
2	14.7	599.0	37.8	52.1	52.1	20	1538	97	NO
2	15.9	623.0	39.3	52.9	52.9	20	1711	108	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	10.8	512.0	32.3	46.7	46.7	20	1946	123	YES
2	11.5	528.0	33.3						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
58.9	406	1900	120

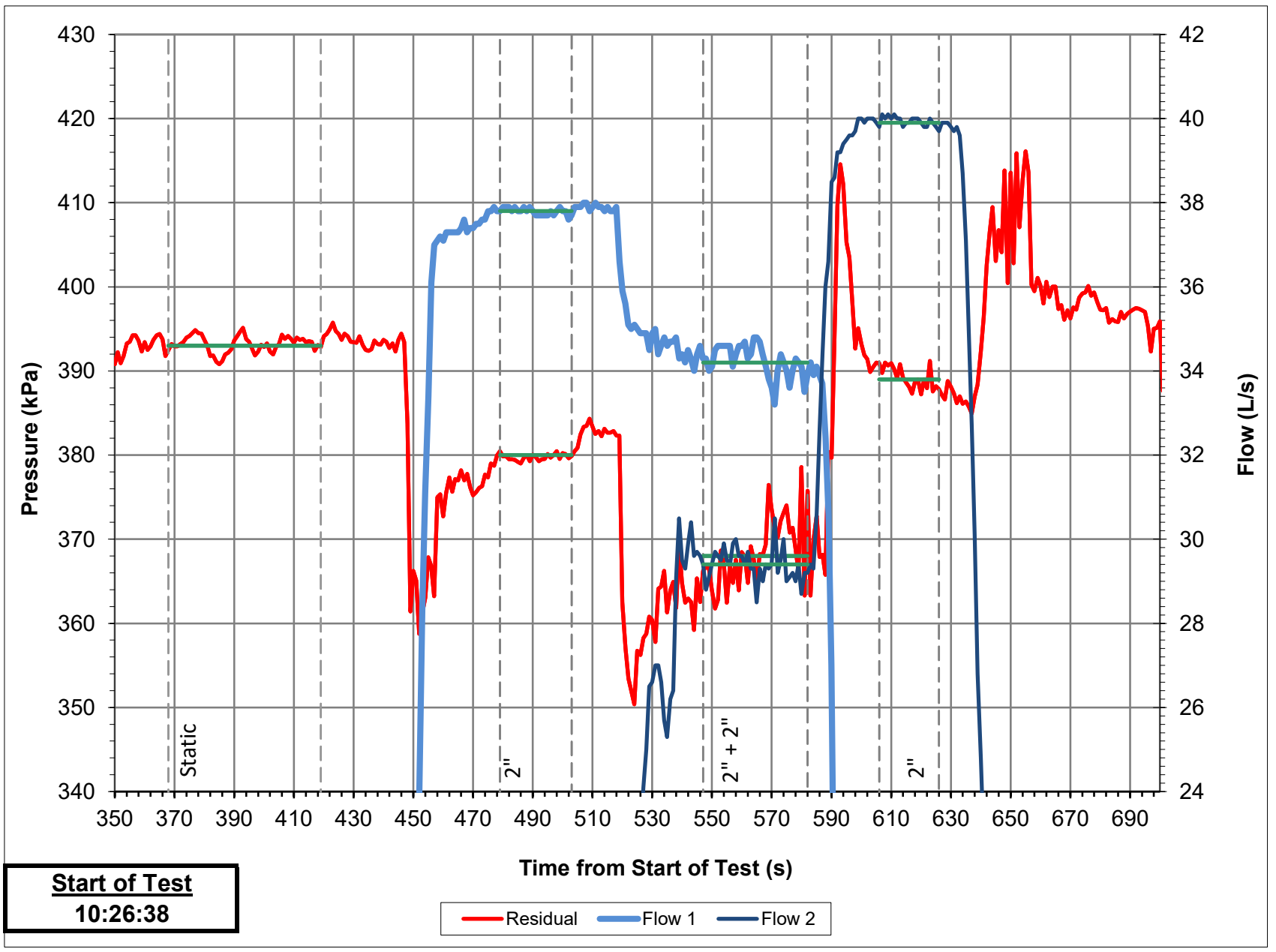
* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	7700 L

Rounded up to closest 100L

Test 5 - 80 COWDRAY CRT (HY136198)



Start of Test
10:26:38

Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		**Material:**		**Residual Hydrant:**	HY136198
Area:	N/A			**Flow Hydrant:**	HY136231

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY136231)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	368	419	393	57.0	0.0	0	0.0	0	0.0	0	N/A
2"	479	503	380	55.1	37.8	599	0.0	0	37.8	599	N/A
2"	606	626	389	56.4	0.0	0	39.9	632	39.9	632	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	547	582	368	53.4	34.2	542	29.4	466	63.6	1008	N/A

80 COWDRAY CRT (HY136198)

HYDRANT FLOW TEST RESULTS

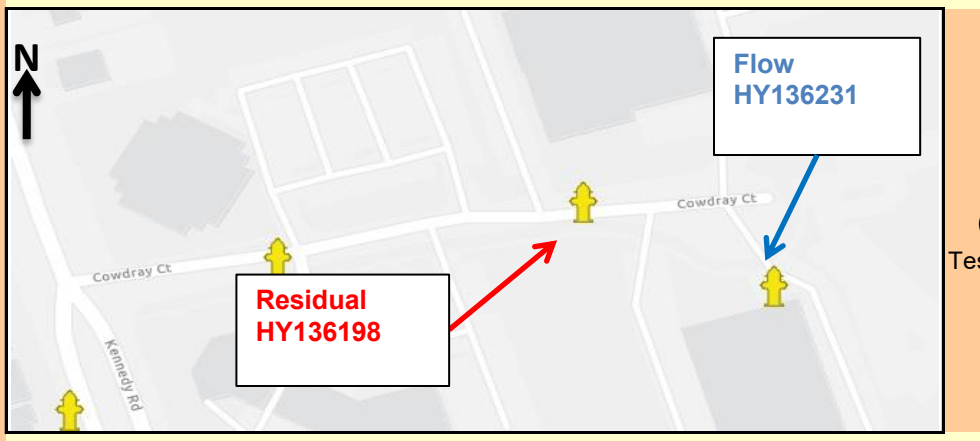
Date: 05-Aug-20 Time: 10:26 (hh/mm)

Municipality: City of Toronto

Operator: Dias

Tested By: Sen

Test No: **5**



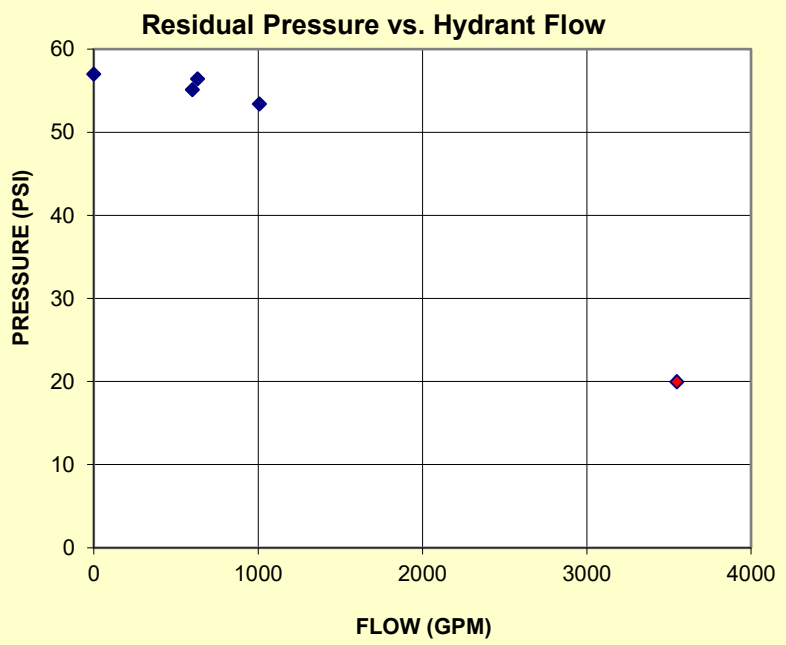
Conditions before Test (STATIC)

Residual Hydrant:	57.0 psi	393 kPa
Hydrant that will Flow:	57.0 psi	393 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	6% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	57.0	57.0				
Single Port Tests									
2	14.7	599.0	37.8	55.1	55.1	20	2977	188	NO
2	16.4	632.0	39.9	56.4	56.4	20	5853	369	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	8.9	466.0	29.4	53.4	53.4	20	3547	224	YES
2	12.1	542.0	34.2						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
57.0	393	3500	221

* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	9100 L

Rounded up to closest 100L

DISCLAIMER FOR FIRE FLOW TESTS

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Test 6 - Village Green Sq (HY136410)

Start of Test
10:56:53

Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		**Material:**		**Residual Hydrant:**	HY136410
Area:	N/A			**Flow Hydrant:**	HY136412

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY136412)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	115	195	346	50.2	0.0	0	0.0	0	0.0	0	N/A
2"	240	280	328	47.6	35.3	560	0.0	0	35.3	560	N/A
2"	363	383	335	48.6	0.0	0	37.3	591	37.3	591	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	304	336	306	44.4	31.8	504	32.4	514	64.2	1018	N/A

Village Green Sq (HY136410)

HYDRANT FLOW TEST RESULTS

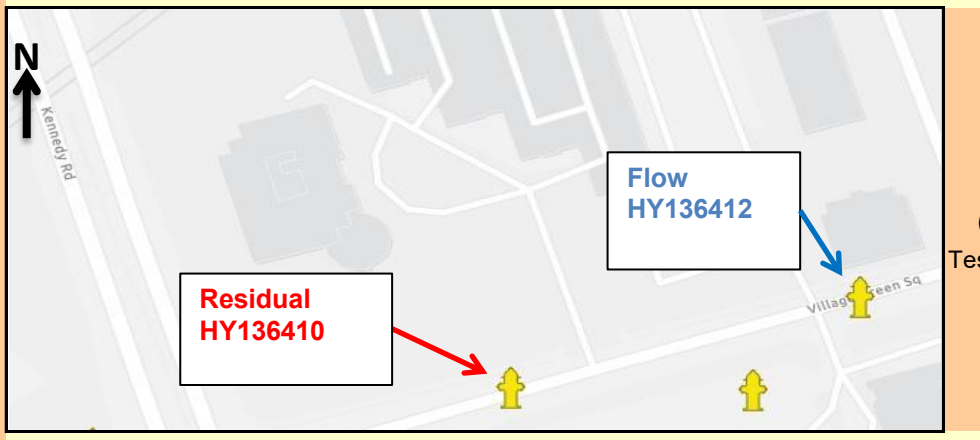
Date: 05-Aug-20 Time: 10:56 (hh/mm)

Municipality: City of Toronto

Operator: Dias

Tested By: Sen

Test No: **6**



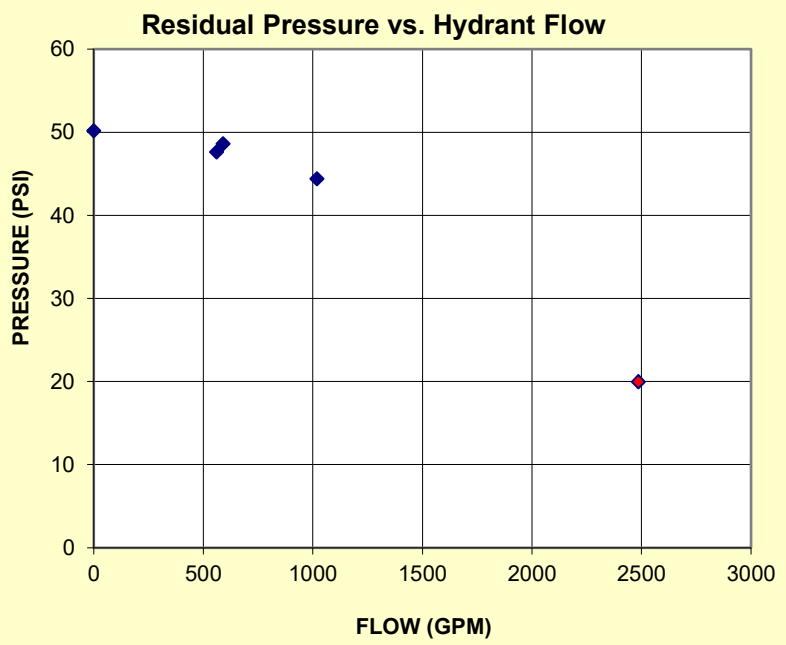
Conditions before Test (STATIC)

Residual Hydrant:	50.2 psi	346 kPa
Hydrant that will Flow:	50.2 psi	346 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	11% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	50.2	50.2				
Single Port Tests									
2	12.9	560.0	35.3	47.6	47.6	20	2112	133	NO
2	14.4	591.0	37.3	48.6	48.6	20	2904	183	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	10.4	504.0	31.8	44.4	44.4	20	2485	157	YES
2	10.9	514.0	32.4						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
50.2	346	2500	158

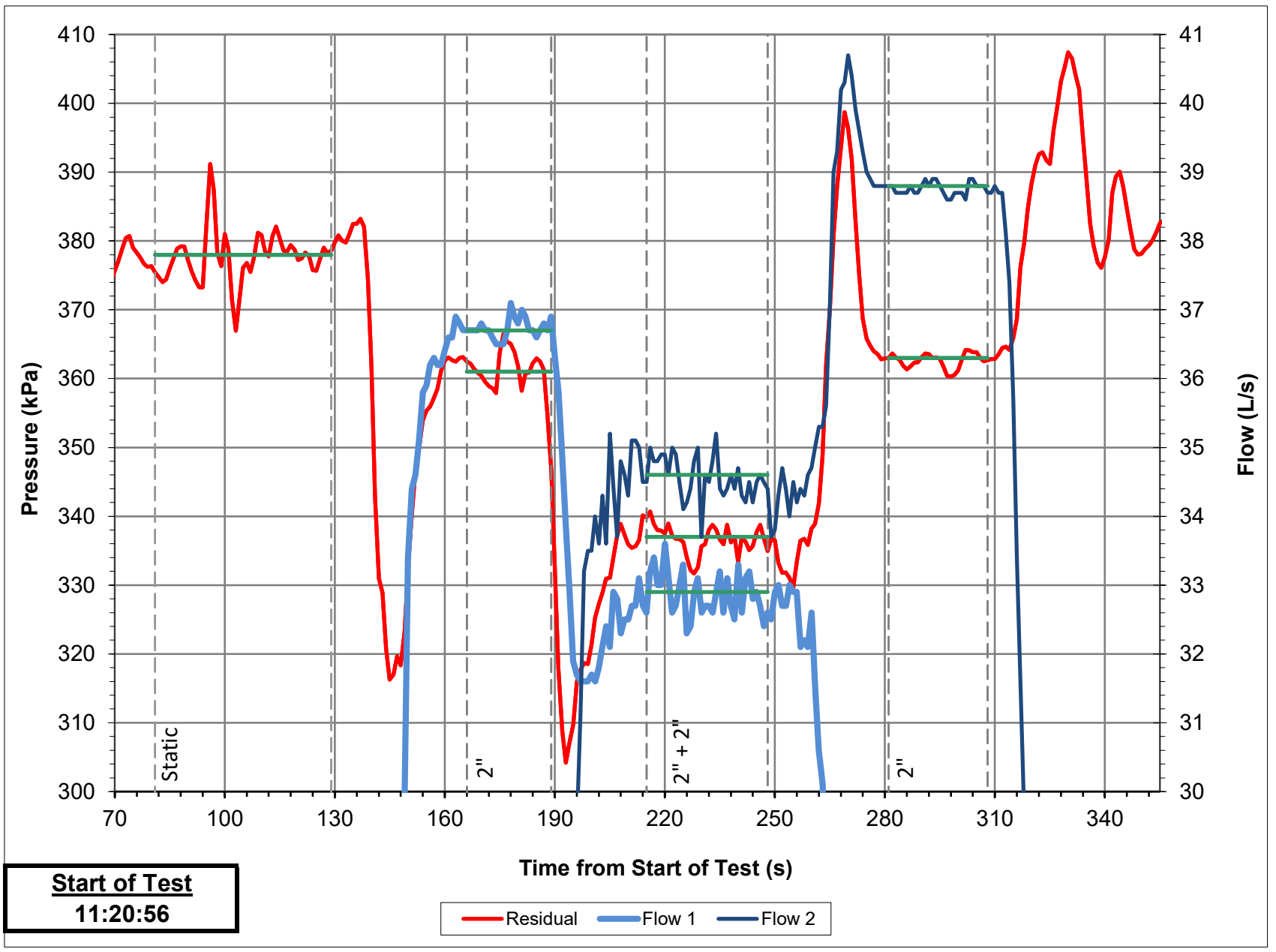
* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	8400 L

Rounded up to closest 100L

Test 7 - 255 Village Green Sq (HY31392)



Start of Test
11:20:56

Subject Watermain Details				Subject Hydrant & Valve Details	
Diameter:		**Material:**		**Residual Hydrant:**	HY31392
Area:	N/A			**Flow Hydrant:**	HY9990100

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual		Flow Hydrant (HY9990100)				Total Flow		Velocity
			on Residual Hydra		Port 1 (S1)		Port 2 (S2)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	81	129	378	54.8	0.0	0	0.0	0	0.0	0	N/A
2"	166	189	361	52.4	36.7	582	0.0	0	36.7	582	N/A
2"	281	308	363	52.6	0.0	0	38.8	615	38.8	615	N/A
1" + 2"			0	0.0	0.0	0	0.0	0	0.0	0	N/A
2" + 2"	215	248	337	48.9	32.9	521	34.6	548	67.5	1070	N/A

255 Village Green Sq (HY31392)

HYDRANT FLOW TEST RESULTS

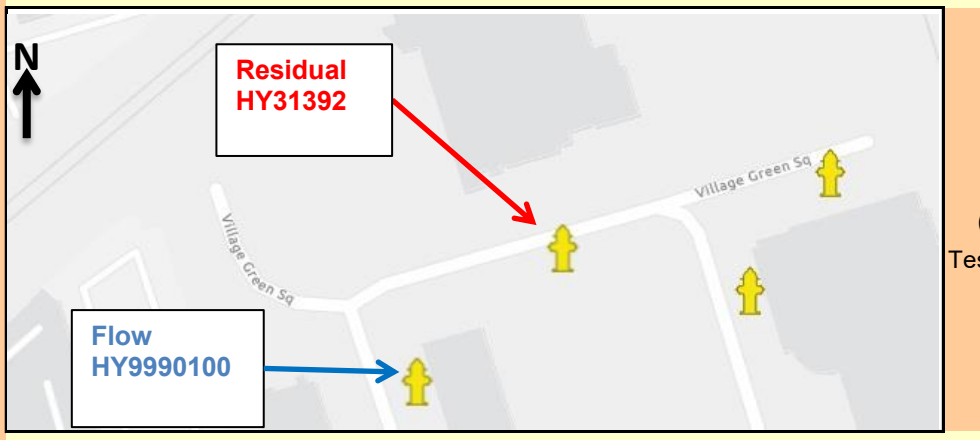
Date: 05-Aug-20 Time: 11:20 (hh/mm)

Municipality: City of Toronto

Operator: Dias

Tested By: Sen

Test No: 7



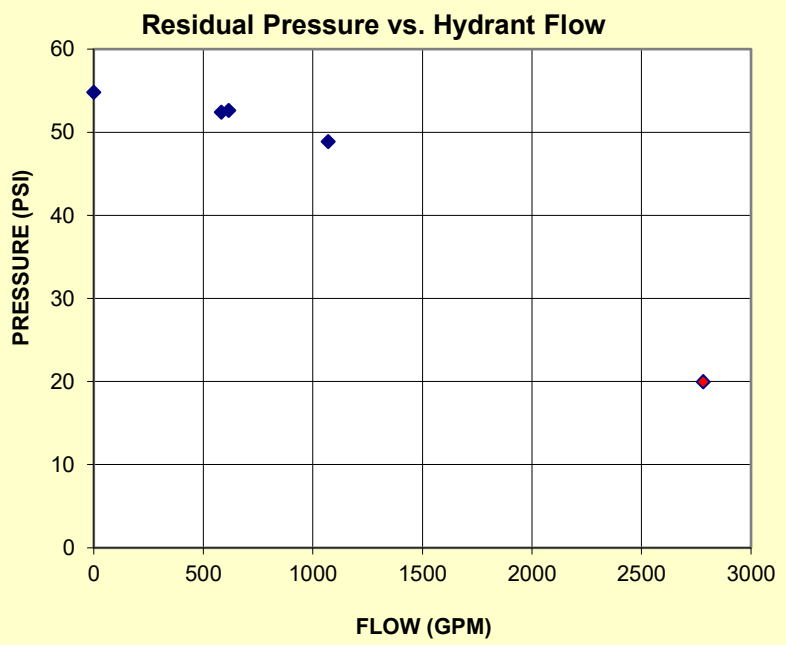
Conditions before Test (STATIC)

Residual Hydrant:	54.8 psi	378 kPa
Hydrant that will Flow:	54.8 psi	378 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	10% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	54.8	54.8				
Single Port Tests									
2	13.9	582.0	36.7	52.4	52.4	20	2454	155	NO
2	15.5	615.0	38.8	52.6	52.6	20	2717	171	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	11.2	521.0	32.9	48.9	48.9	20	2782	176	YES
2	12.3	548.0	34.6						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
54.8	378	2800	177

* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

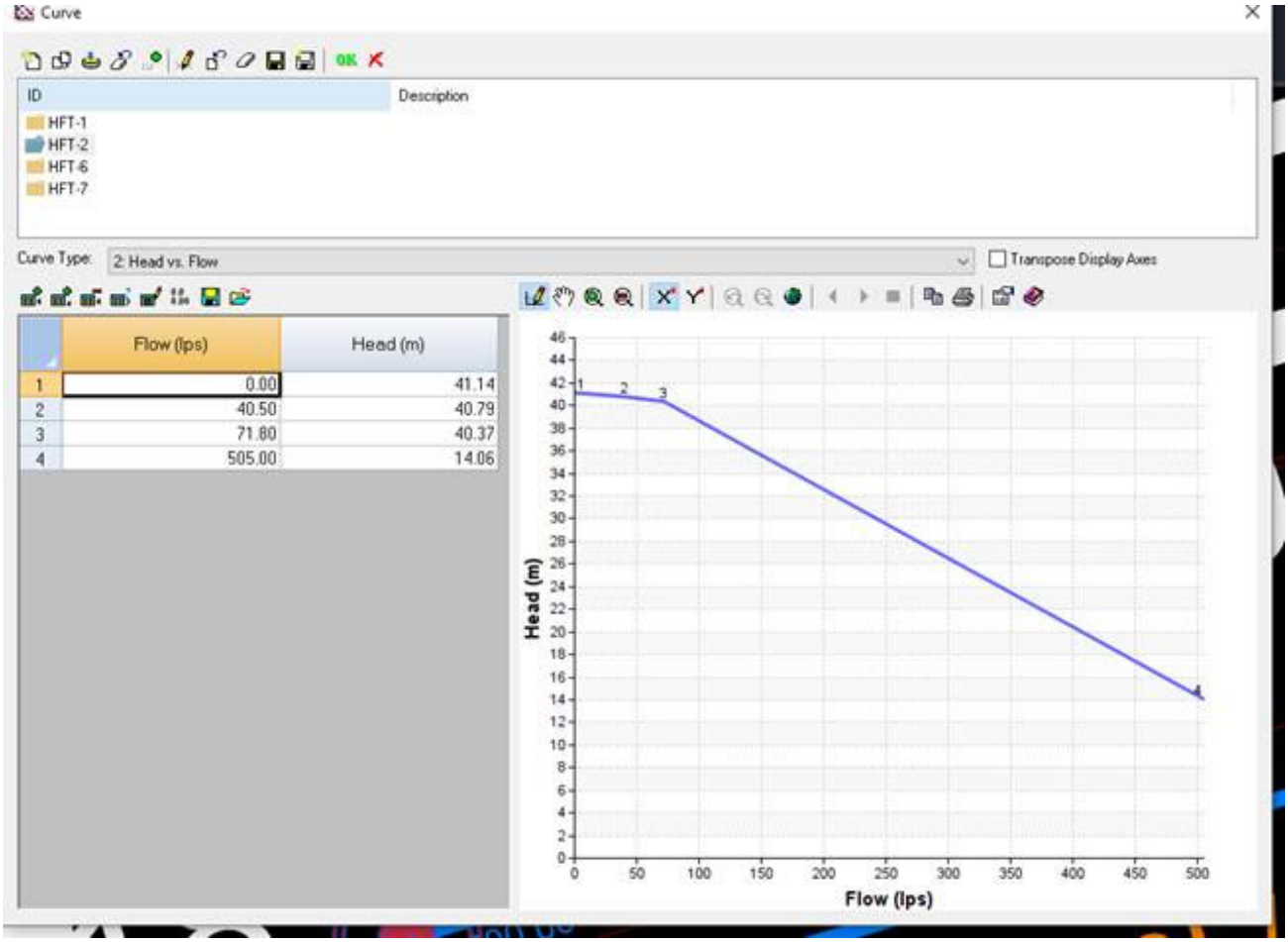
Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	8900 L

Rounded up to closest 100L

															Residential	Commercial	Apartments
Rate	310	LCD		1 Bed Apartment	1.4		Single Family =	3.5	unit				Max Day	1.50	1.10	1.30
	0.00359	L/s		2 Bed Apartment	2.1		Townhouse =	2.7	unit				Peak Hour	2.25	1.20	2.50
High-rise	190	LCD		3 Bed Apartment	3.1		Apartments =	400	ppl/ha				Min Hour	0.80	0.84	0.84
	0.0022	L/s					ICI =	1.1	$100m^2$							
							Office =	3.3	$100m^2$							

	Notes	Single Family	Townhouse	Apartments	1 Bed Apartments	2 Bed Apartments	3 Bed Apartments	Residential Population	Office	ICI	Non-res Pop	Average	Min	Max	Peak
ID		unit	unit	ha	unit	unit	unit		ha	ha					
J12															
J14															
J16															
J18															
J20		15						53		0.4	44	0.35	0.28	0.46	0.62
J22				7.35				2940	1.82	0.02	603	12.71	10.26	18.20	26.33
J24															
J26								0		0.76	84	0.30	0.25	0.33	0.36
J28			80					216		0.73	81	1.07	0.86	1.48	2.09
J30					371	427		1417	0.06	0.04	25	5.17	4.14	7.72	11.55
J32				0.18				72		0.6	66	0.50	0.41	0.65	0.87
J34		11						39			0	0.14	0.11	0.21	0.31
J36		10						35			0	0.13	0.10	0.19	0.28
J38		10						35	0.59		195	0.83	0.69	0.96	1.12
J40	20 Cowdary Ct.				1649	445	206	3882		0.25	28	14.03	11.23	21.00	31.46
J42										0.19	21	0.08	0.06	0.08	0.09
J44															
J46															
J48										0.31	35	0.13	0.11	0.14	0.15
J50										5.75	633	2.27	1.91	2.50	2.73
J51	50 Village Green Sq.				558	279	93	1656	0.06	0.07	28	6.04	4.84	9.02	13.49
J52															
J54	2035 Kennedy Rd.				972	372	71	2363	0.70	0.04	237	9.33	7.50	13.65	20.10
J56															
J58	135 Village Green Sq.				415	395	30	1504			0	5.40	4.32	8.09	12.14
J60															
J62	THs - Village Green Sq.		89					241			0	0.86	0.69	1.30	1.95
J64	275 Village Green Sq.				415	395	30	1504			0	5.40	4.32	8.09	12.14
J66	255 Village Green Sq.				415	395	30	1504			0	5.40	4.32	8.09	12.14
J68															
J70	181 Village Green Sq.				188	94	31	559				2.01	1.60	3.01	4.51
												72.1	58.0	105.2	154.4



WSP Fictious Pump Curve based on Hydrant Flow Test No. 2

WATER MODELLING RESULTS - EXISTING

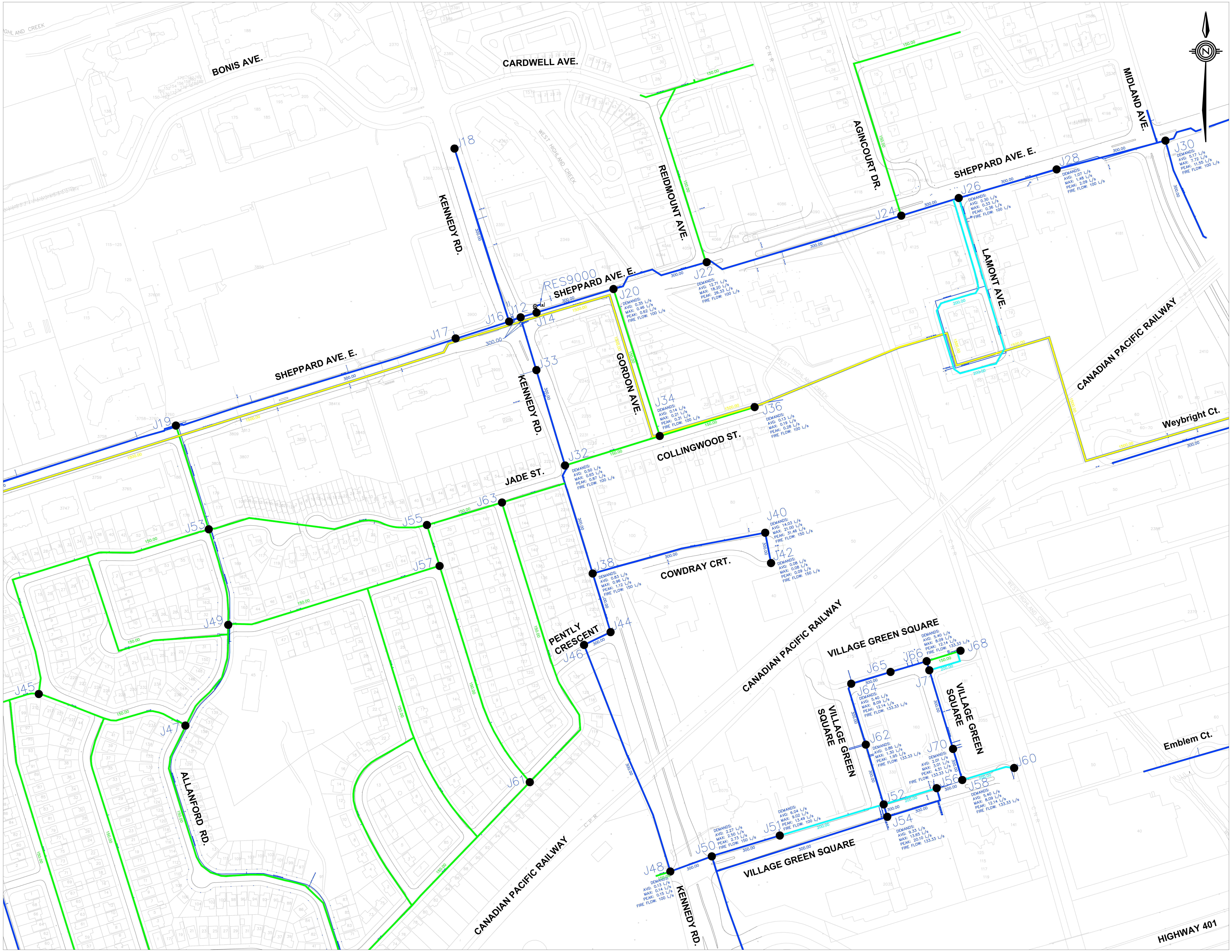
Project: Agincourt EA
Job No.: 19M-01888
Date: 2022-02-08

Peak Hour

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
J12	0	168.89	208.59	389
J14	0	168.37	208.64	395
J16	0	169.23	208.59	386
J17	0	169	208.61	388
J18	0	170	208.59	378
J19	0	174	208.71	340
J20	0.62	166	208.48	416
J21	0	177	208.86	312
J22	26.33	166.3	208.35	412
J23	0	177	208.77	311
J24	0	170	208.35	376
J25	0	171	208.64	369
J26	0.36	171	208.35	366
J27	0	178	208.55	299
J28	2.09	172	208.35	356
J29	0	173	208.51	348
J30	11.55	175	208.35	327
J31	0	167	208.43	406
J32	0.87	170.2	207.84	369
J33	0	170	208.32	376
J34	0.31	167.96	208.06	393
J35	0	167	208.43	406
J36	0.28	166.95	208.06	403
J37	0	165	208.68	428
J38	1.12	173.15	207.08	333
J39	0	163	208.85	449
J40	31.46	167.8	206.68	381
J41	0	178	208.8	302
J42	0.09	167.8	206.68	381
J43	0	172	208.57	358
J44	0	172.65	206.97	336
J45	0	173	208.65	349
J46	0	173	206.91	332
J47	0	170	208.58	378
J48	0.15	170	206.46	357
J49	0	173	208.56	348
J50	2.73	170	206.37	356
J51	13.49	172	205.78	331
J52	0	169	205.47	357
J53	0	176	208.59	319
J54	20.1	169	205.48	357
J55	0	173	208.36	347
J56	0	169	205.45	357
J57	0	173	208.39	347
J58	12.14	169	205.31	356
J59	0	168	208.55	397
J60	0	169	205.31	356
J61	0	171	208.38	366
J62	1.95	170	205.39	347
J63	0	173	208.14	344
J64	12.14	170	205.32	346
J65	0	170	205.31	346
J66	12.14	170	205.3	346
J67	0	175	208.19	325
J68	0	170	205.3	346
J69	0	175	208.3	326
J70	4.51	170	205.3	346
J71	0	170	205.3	346
J73	0	167	208.3	405
J75	0	167	208.3	405
J77	0	167	208.31	405
J79	0	168	208.15	393
J81	0	169	207.96	382
J83	0	170.2	207.74	368
J85	0	170	208.93	382

Max Day plus Fire

ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
J12	0	392	208.91	100	374.17	674.36	140
J14	0	398	208.94	100	380.31	751.68	140
J16	0	389	208.91	100	370.32	613.91	140
J17	0	391	208.92	100	370.69	499.98	140
J18	0	381	208.91	100	335.01	264.48	140
J19	0	342	208.94	100	321.74	369.40	140
J20	0.46	420	208.86	100	394.46	481.84	140
J21	0	313	208.98	100	303.49	512.01	140
J22	18.2	416	208.78	100	380.31	380.99	140
J23	0	313	208.94	100	289.68	294.84	140
J24	0	380	208.78	100	333.05	269.12	140
J25	0	371	208.88	100	330.01	258.8	140
J26	0.33	370	208.78	100	320.71	253.26	140
J27	0	302	208.83	100	251.41	192.09	140
J28	1.48	360	208.78	100	307.26	236.2	140
J29	0	351	208.81	100	277.67	181.23	140
J30	7.72	331	208.78	100	274.87	215.53	140
J31	0	409	208.77	100	358.17	259.78	140
J32	0.65	376	208.54	100	344.21	391.41	140
J33	0	380	208.78	100	355.48	483.43	140
J34	0.21	399	208.65	100	188.65	112.51	140
J35	0	409	208.77	100	375.15	336.43	140
J36	0.19	409	208.65	100	-356.51	56.67	140
J37	0	430	208.88	100	391.83	311.43	140
J38	0.96	343	208.16	150	269.08	289.84	140
J39	0	450	208.96	100	438.31	802.55	140
J40	21	394	207.97	150	230.18	218.5	140
J41	0	303	208.96	100	269.31	235.58	140
J42	0.08	394	207.97	150	217.75	188.37	140
J43	0	361	208.87	100	306.62	221.84	140
J44	0	347	208.1	100	301.89	275	140
J45	0	352	208.89	100	152.14	103.3	140
J46	0	344	208.07	100	296.57	265.36	140
J47	0	381	208.86	100	111.22	94.02	140
J48	0.14	371	207.84	100	313.96	255.31	140
J49	0	351	208.86	100	120.04	95.18	140
J50	2.5	370	207.8	150	267.13	254.86	140
J51	9.02	348	207.51	100	249.16	171.27	140
J52	0	376	207.37	133.33	239.52	191.81	140
J53	0	322	208.87	100	172.89	111.63	140
J54	13.65	376	207.37	133.33	240.84	206.7	140
J55	0	350	208.77	100	145.82	101.57	140
J56	0	376	207.36	133.33	232.57	185.44	140
J57	0	351	208.78	100	112.99	93.6	140
J58	8.09	375	207.29	133.33	212.39	178.06	140
J59	0	400	208.84	100	18.23	81.14	140
J60	0	375	207.29	133.33	86.36	117.65	140
J61	0	370	208.78	100	2.22	77.41	140
J62	1.3	366	207.33	133.33	217.23	177.43	140
J63	0	349	208.67	100	179.17	112.19	140
J64	8.09	365	207.3	133.33	209.25	178.22	140
J65	0	365	207.29	133.33	206.15	167.9	140
J66	8.09	365	207.29	133.33	203.96	174.46	140
J67	0	330	208.65	100	284.72	237.62	140
J68	0	365	207.29	133.33	191.06	157.72	140
J69	0	330	208.71	100	286.72	241.05	140
J70	3.01	365	207.29	133.33	202.32	168.19	140
J71	0	365	207.29	133	204.31	166.2	140
J73	0	409	208.71	100	378.51	385.08	140
J75	0	409	208.71	100	378.55	385.88	140
J77	0	409	208.71	100	379.12	386.93	140
J79	0	398	208.64	100	364.04	354.15	140
J81	0	388	208.55	100	351.43	344.07	140
J83	0	375	208.49	100	342.30	377.44	140
J85	0	382	209.01	100	372.95	599.53	140



LEGEND

- NODE AND NODE ID (J30)
- EX. 150mm WATERMAIN
- EX. 200mm WATERMAIN
- EX. 250mm WATERMAIN
- EX. 300mm WATERMAIN
- EX. 400mm WATERMAIN
- EX. 600mm WATERMAIN
- EX. 900mm WATERMAIN
- EX. 1200mm WATERMAIN
- EX. 1500mm WATERMAIN
- EX. RESERVOIR
- EX. PUMP
- EX. OTHER WATER LINES

0 50 100 Meters

No.	REVISIONS TO DRAWING	BY	DATE	APPR.
4.	FOURTH SUBMISSION	M.M	OCT 2022	A.W.
3.	THIRD SUBMISSION	M.M	FEB 2022	A.W.
2.	SECOND SUBMISSION	M.M	DEC 2021	A.W.
1.	FIRST SUBMISSION	M.M	NOV 2020	A.W.

ALL PREVIOUS ISSUES OF THIS DRAWING ARE SUPERSEDED

CLIENT: CITY OF TORONTO

MUNICIPALITY: CITY OF TORONTO

PROJECT TITLE: AGINCOURT ENVIRONMENTAL ASSESSMENT

SHEET TITLE: EXISTING WATER MODEL RESULTS

CONSULTANT: wsp

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

STAMP

APPROVAL

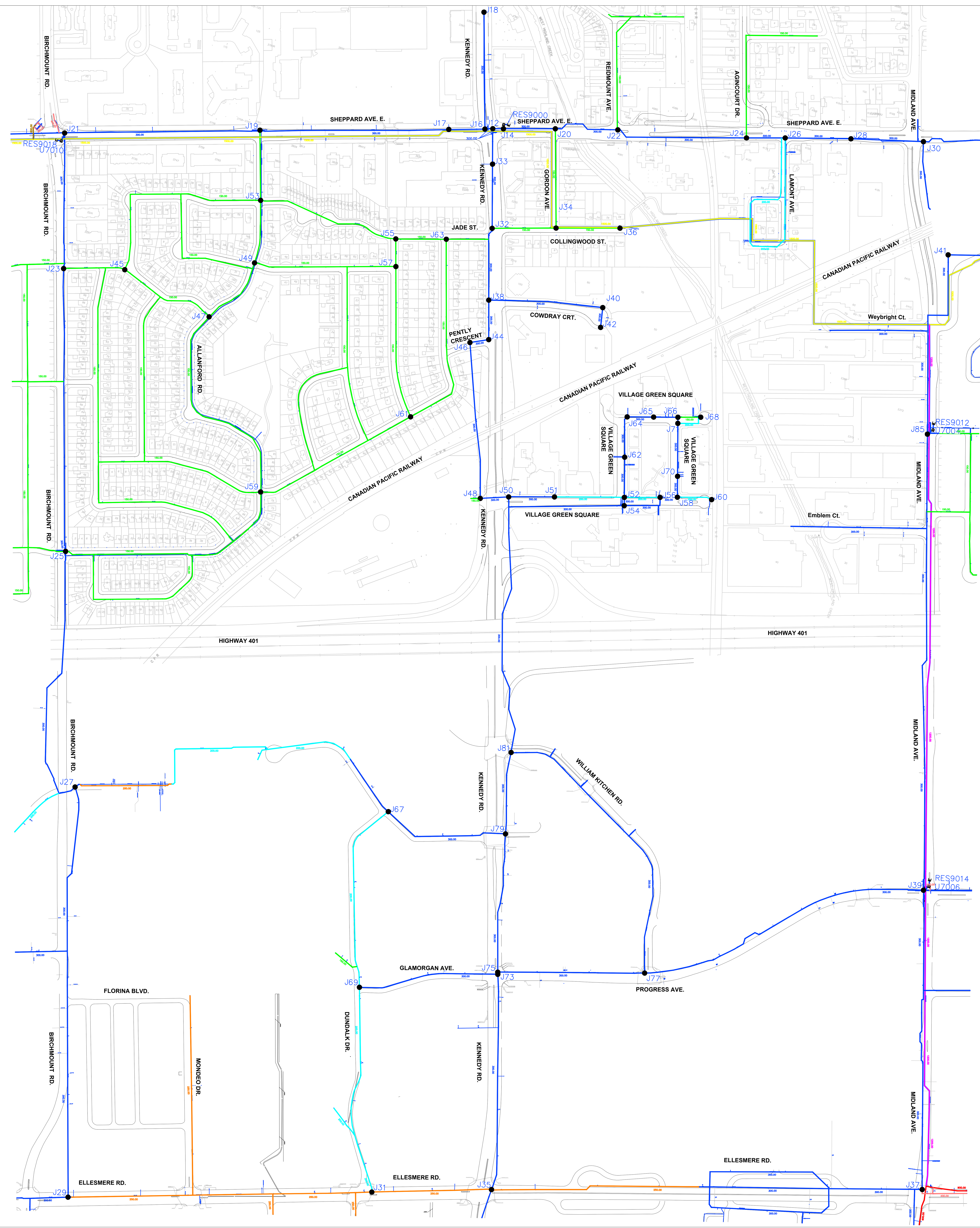
DESIGNED	DRAWN	CHECKED
M.M	G.W	M.M

SCALE: 1:2000

DATE: JULY 2020

PROJECT NUMBER: 19M-01888

DWG. NUMBER:



LEGEND

- NODE AND NODE ID
- EX. 150mm WATERMAIN
- EX. 200mm WATERMAIN
- EX. 250mm WATERMAIN
- EX. 300mm WATERMAIN
- EX. 400mm WATERMAIN
- EX. 600mm WATERMAIN
- EX. 900mm WATERMAIN
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CLIENT
CITY OF TORONTO

MUNICIPALITY
CITY OF TORONTO

PROJECT TITLE
AGINCOURT ENVIRONMENTAL ASSESSMENT

SHEET TITLE
EXISTING OVERALL WATER DISTRIBUTION NETWORK MAP

CONSULTANT
WSP
100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
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STAMP

APPROVAL

DESIGNED	DRAWN	CHECKED
M.M	G.W	M.M

SCALE 1:5000

DATE JULY 2020

PROJECT NUMBER 19M-01888

DWG. NUMBER