

FUNCTIONAL WATER SERVICING REPORT

Proposed Industrial Subdivision
1665 Scotch Line Road
Elmira, Ontario

6 March 2025



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SBM-23-2603

Table of Contents

1. INTRODUCTION	4
2. EXISTING WATER SERVICING	4
3. PROPOSED SERVICING	4
4. WATER SYSTEM DISTRIBUTION MODELLING	5
4.2. Design Criteria	5
4.3. Design Software.....	5
4.4. Design Assumptions	5
4.5. Industrial Water Demand	6
4.6. Water Supply for Fire-Fighting Protection	6
4.7. Modelling Design Results.....	6
4.7.1. <i>Average Day Demand</i>	<i>7</i>
4.7.2. <i>Maximum Hour Demand</i>	<i>7</i>
4.7.3. <i>Maximum Day + Fire Flow Demand</i>	<i>7</i>
5. CONCLUSION	7
6. LIMITATIONS	8
7. CLOSURE	8
APPENDIX A.....	9
APPENDIX B.....	14
APPENDIX C.....	25
APPENDIX D	30
APPENDIX E.....	35

Appendices List

APPENDIX A

“Elmira Industrial TWP Road 27” Drawing No. L8904036-PP4, by Progressive Engineering Services Ltd., dated September, 1997
“St. Jacobs – Elmira Water Transmission Main” drawing No. P12 – AR, by Conestoga-Rovers & Associates Consulting Engineers, dated January 26, 1994
“St. Jacobs – Elmira Water Transmission Main” drawing No. P11 – AR by Conestoga-Rovers & Associates Consulting Engineers, dated January 26, 1994
“Plan of Survey Showing Topographic Information”, by SBMG, dated December 24, 2024

APPENDIX B

Water Demand Calculations
Fire-Fighting Flow For Sprinkler System NFPA #13
NFPA #13 Flow Demand Requirements
Region of Waterloo Water Modeling Results dated February 7, 2025

APPENDIX C

Average Day Demand EPANET Water Model Results
Average Day Demand EPANET Water Model Report

APPENDIX D

Maximum Hour Demand EPANET Water Model Results
Maximum Hour Demand EPANET Water Model Report

APPENDIX E

Maximum Hour Demand + Fire Flow Demand EPANET Water Model Results
Maximum Hour Demand + Fire Flow Demand EPANET Water Model Report

1. INTRODUCTION

This Functional Water Servicing Report (Report) has been prepared by Strik, Baldinelli, Moniz Ltd. (SBM) to address the requirements of the Township of Woolwich and the Region of Waterloo for the proposed industrial Draft Plan of Subdivision.

This Report is intended to represent a component of the overall Draft Plan of the Subdivision application and should be read in conjunction with all other submitted documents. The subject site is located at 1665 Scotch Line Road in the Town of Elmira and the following, along with the Preliminary Engineering Drawings (provided separately), have been prepared to address the Township's and the Region's requirements.

The 55 ha subject site borders the South Field Drive (Township Road 26) Right of Way (R.O.W.) to the north, industrial/ commercial lands to the west, and farmlands/open space to the east and south. The proposed industrial subdivision will include 11 industrial blocks, 1 stormwater management block, 1 open space block, a sanitary pumping station block, and 3 future development blocks. Refer to the Draft Plan of Subdivision, provided separately.

Design requirements have been based on the Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS) dated February 2024, and the Ministry of Environment, Conservation, and Parks (MECP) Design Guidelines for Drinking Water Systems 2016 (DGDWS).

2. EXISTING WATER SERVICING

As shown on the "Elmira Industrial TWP Road 27" drawing No. L8904036-PP4 by Progressive Engineering Services Ltd., provided in Appendix A along with the subsequent referenced drawings, there is a 300 mm diameter watermain that reduces to a 150 mm diameter watermain within the South Field Drive (Township Road 26) R.O.W.

As shown on the "St. Jacobs – Elmira Water Transmission Main" drawing No. P12 – AR by Conestoga-Rovers & Associates Consulting Engineers, there is an existing 300 mm diameter watermain within the Arthur Street South, formerly Highway 86, R.O.W. This watermain runs south within the Arthur Street South R.O.W. from Listowel Road, referenced as the former "Highway No. 86 (Elmira Bypass)" in drawing No. P12 – AR, towards Scotch Line Road. From the "St. Jacobs – Elmira Water Transmission Main" drawing No. P11 – AR by Conestoga-Rovers & Associates Consulting Engineers, the 300 mm watermain connects to a 600 mm diameter DI watermain at main station 4+283. With reference to an email from the Region it is known that the 300 mm watermain is cut and capped at approximately station 4+283. From the Township's pre-consultation comments (Document No. 4709449, dated September 11, 2023) the existing 300 mm watermain is in poor condition, and to be used in emergency only.

3. PROPOSED SERVICING

The development is proposed to be serviced via a looped watermain system. One connection point will be at the existing 300 mm watermain in the South Field Drive R.O.W. near its intersection with Union Street. The other connection point will be at the existing 300 mm watermain in the Arthur Street South (Hwy 85) R.O.W. south of its intersection with Union Street. Please refer to the Preliminary Watermain Distribution drawing prepared by SBM, provided separately. It is proposed to replace the existing 150 mm watermain within the South Field Drive R.O.W with a 300 mm watermain and install it east along the South Field Drive to the east intersection with Street A, servicing the development from the north. A new 300 mm local watermain is proposed to be installed

within the Arther Street South (Hwy 85) R.O.W., replacing the existing 300 mm diameter watermain section in poor condition, and extending it up to and along Scotch Line Road (Township Road 26) R.O.W. to the subject site.

4. WATER SYSTEM DISTRIBUTION MODELLING

4.2. Design Criteria

The design parameters used for the design of the proposed water distribution system outlined below are based on the Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS), and the Ministry of Environment DGDWS:

- Heavy industrial demand of 55.0 m³ per hectare per day (0.64 L/s/ha) (DGDWS)
- Minimum preferred water pressures to be maintained in the distribution system of:
 - Minimum of 140 kPa (20 psi) at maximum day demand flow plus fire flow (DGSSMS)
 - Minimum of 275 kPa (40 psi) at maximum hourly demand flow (DGSSMS)
 - Minimum of 275 kPa (40 psi) at average day demand flow (DGSSMS)
- Maximum preferred residual pressure in the distribution system should not exceed 550 kPa (80 psi) under average and maximum day scenarios (DGSSMS)
- Maximum static pressure in the watermain system should not exceed 700 kPa (100 psi) under any scenario (DGSSMS)
- Peaking factors of 2 for maximum day and 4 for maximum hour for industrial water demands (MOE DGDWS)
- Maximum 5.0 m/s velocity under all flow conditions (DGSSMS)
- Minimum 300 mm diameter watermain size for industrial areas (DGSSMS)
- Hazen Williams pipe roughness coefficient (C-factor) of 150 for PVC/PVCO pipes (DGSSMS)
- Water distribution system should be designed to maximize water turnover and to minimize retention times and water age (DGDWS)

4.3. Design Software

The modeling software, EPANET V2, was used to calculate the hydraulic loads and aging of the system. In this simplified model, the network consists of pipes (links), nodes (pipe junctions), sources (reservoirs and pumps) to conservatively model the development. The network map displaying the nodes, links, and sources (Water Distribution Layout) for the industrial subdivision is provided in Appendix B. The Hazen-Williams formula was used within the model for head loss calculations, and to address water quality concerns, the EPANET quality parameter was set to age, and the analysis runtime was set to a conservative 72 hours with analysis report results being displayed at the 72-hour mark. EPANET calculates the flow rate and velocity of water in each pipe and the pressure at each node based on the total head at the connection points (sources) and the assigned design demands of each node.

4.4. Design Assumptions

Existing infrastructure information within the South Field Drive R.O.W. and the Arthur Street South R.O.W. were obtained from existing as-built drawings, included in Appendix A, and include information such as pipe elevations, watermain lengths, and watermain pipe sizes. A topographic survey of the subject site and surrounding lands was conducted by SBM Geomatics to develop the Preliminary Subdivision Grading Plan, and subsequent pipe elevation of the watermain distribution for the development. It is noted that topographic survey information was not available for the entirety of the offsite watermain extension alignment. Survey for these

areas will be undertaken as part of the detailed design process and incorporated into the watermain model at that time.

Reservoir 1 and Reservoir 2 are the proposed connection points to the existing watermain infrastructure and serve as the watermain boundary conditions for the model. These boundary conditions, provided as the Hydraulic Grade Line (HGL) of the existing watermain system at these locations, were obtained from the Region's water modeling results dated February 7, 2024 (provided in Appendix B). The watermain boundary conditions were applied as Reservoir 1, and Reservoir 2, HGL parameters in the model. The Region's engineer noted that the model experienced issues under the max day scenario, therefore only average day HGL values were available and were used for Reservoir 1 and Reservoir 2 HGL parameters in all modeling scenarios.

4.5. Industrial Water Demand

The average daily water demand was determined based on the area of each industrial block multiplied by the average day heavy industrial demand per hectare (0.64 L/s/ha). The maximum day and maximum hour industrial flows were determined by multiplying the average daily water demand by the established peaking factors, 2 and 4, respectively. The average day, maximum hour, and maximum day water demands for the proposed subdivision are 26.08 L/s, 104.32 L/s, and 52.16 L/s, respectively. Please refer to the Water Demand Calculations, provided in Appendix B. It is noted that the demand criteria are based on MECP design criteria and are not reflective of every type of industrial use which could occur within the development. For example, warehouse developments could have significantly lower demands, while food processing facilities could have higher demands. Should any high-demand uses be proposed which exceed the criteria considered in this analysis, the watermain modeling would need to be updated to verify the increased demand could be supported.

4.6. Water Supply for Fire-Fighting Protection

Each industrial block of the subdivision is assumed to be developed with buildings requiring sprinkler systems for fire protection. Since the specific use of each block is currently unknown, the Extra 2 (refer to Annex A – Section A.5.3.2 of the NFPA 13, provided in Appendix B) was selected for the supply flow rate for fire fighting demands; this category covers various types of processing and facilities which could occur within the development. Therefore, a supply flow rate of 1500 USGPM (94.63 L/s) is required as per NFPA 13. Please note this flow rate is considered preliminary and will be verified as part of detailed design for Site Plan Approval and Building Permit for each block, and will be determined by each block's fire protection consultant/sprinkler system designer. The Region of Waterloo's watermain modeling results (provided in Appendix B) indicated a maximum day plus fire flow of 231.8 L/s could be supported by the watermain system while meeting pressure, therefore this net fire flow ($231.8 \text{ L/s} - 54.51 \text{ L/s} = 117.29 \text{ L/s}$) has been used in the watermain modeling. It is recommended that each block be designed to require a fire flow less than 117.29 L/s.

Based on Section B.2.7.1 of the DGSSMS, the maximum spacing between fire hydrants for industrial areas should be 90 m. Hydrant locations will be proposed as part of the detailed design process and are not shown on the Preliminary Engineering Drawings since they do not impact servicing feasibility. A hydrant has been included in the EPANET model at the highest elevation with the proposed Street A R.O.W. (as identified on the Preliminary Subdivision Grading Plan, provided separately).

4.7. Modelling Design Results

The network map with nodes and links are included in Appendices C, D, and E. The EPANET results for average day, maximum hour, and maximum day plus fire flow demand @ 20 psi scenarios are presented in Appendices C, D, and E.

4.7.1. Average Day Demand

The average day demand flow results show that the proposed water distribution system has a minimum pressure in the system of 61.79 m (87.86 psi) at node Hydrant which is greater than the minimum required pressure of 275 kPa (40 psi). The maximum pressure in the system is 66.77 m (94.94 psi) at node Junction5 which exceeds the maximum preferred pressure of 500 kPa (80 psi) but is less than the absolute maximum allowable pressure of 700 kPa (100 psi). Pressure reducing valves (PRV) may be implemented in consultation with the Region to reduce pressures to within the preferred range, as the maximum pressure determined from modeling is close to the maximum allowable pressure. PRV will be considered as part of the detailed design phase. The results show that the maximum age of water in the system (excluding the hydrant) is 1.78-hours at Node Junction13. Please refer to the model results and reports provided in Appendix C.

4.7.2. Maximum Hour Demand

The maximum hour demand flow results show that the proposed water distribution system has a minimum pressure in the system of 60.62 m (86.20 psi) at node Hydrant which is greater than the minimum required pressure of 275 kPa (40 psi). The maximum pressure in the system is 65.60 m (93.28 psi) at node Junction5 which exceeds the maximum allowable pressure of 700 kPa (100 psi). Pressure reducing valves (PRV) may be implemented as described in section 4.7.1 of this Report. The maximum velocity during the maximum hour demand is 1.20 m/s at link Pipe1, which is less than the maximum allowable velocity of 5.0 m/s (per Section B2.3.4 of the DGSSMS). Please refer to the model layout and reports provided in Appendix D.

4.7.3. Maximum Day + Fire Flow Demand

A maximum day + fire flow scenario was modeled by inputting the maximum flow (117.29 L/s at the Hydrant node as described in section 4.6 of this Report, while applying the maximum day demands at other applicable nodes) that could be drawn by the water distribution system as indicated by the Region of Waterloo modeling results (240.0 L/s at Reservoir 1, 231.8 L/s at Reservoir 2, not simultaneously). Results show that the node Hydrant has a pressure of 539.91 kPa (55.07 m, 79.30 psi) which meets the minimum pressure of 140 kPa (20 psi), with all velocities less than the maximum allowable velocity of 5.0 m/s (per Section B2.3.4 of the DGSSMS). Please refer to the model layout and reports provided in Appendix E.

5. CONCLUSION

Based on the domestic water demand + fire flow scenarios modeled, the proposed water distribution system meets the various pressure and velocity requirements as outlined by the DGSSMS. PRV may be required and will be reviewed as part of detailed design. The existing municipal water distribution network as well as the conceptually designed water distribution system are adequate to service the proposed development. The model will be updated as necessary through the detailed design process following Draft Plan Approval.

6. LIMITATIONS

This Report was prepared by SBM for 1000525725 Ontario Inc., the Township of Woolwich, and the Region of Waterloo. Use of this Report by any third party, or any reliance upon its findings, is solely the responsibility of that party. SBM accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions undertaken as a result of this Report. Third party use of this Report, without the express written consent of the Consultant, denies any claims, whether in contract, tort, and/or any other cause of action in law, against the Consultant.

All findings and conclusions presented in this Report are based on information as it appeared during the design period. This Report is not intended to be exhaustive in scope, or to imply a risk-free facility. It should be recognized that the passage of time may alter the designs, opinions, conclusions, and/or recommendations provided herein.

The design was limited to the documents referenced herein. SBM accepts no responsibility for the accuracy of the information provided by others. All designs, opinions, conclusions, and/or recommendations presented in this Report are based on the information available at the time of the review.

This document is deemed to be the intellectual property of SBM in accordance with Canadian copyright law.

7. CLOSURE

We trust this Report meets your satisfaction and current needs. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

Strik, Baldinelli, Moniz Ltd.

Planning • Civil • Structural • Mechanical • Electrical



Ben Hyland, P.Eng., PMP
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Associate I



Jacob Jamnicky, EIT
Civil Engineering Trainee I

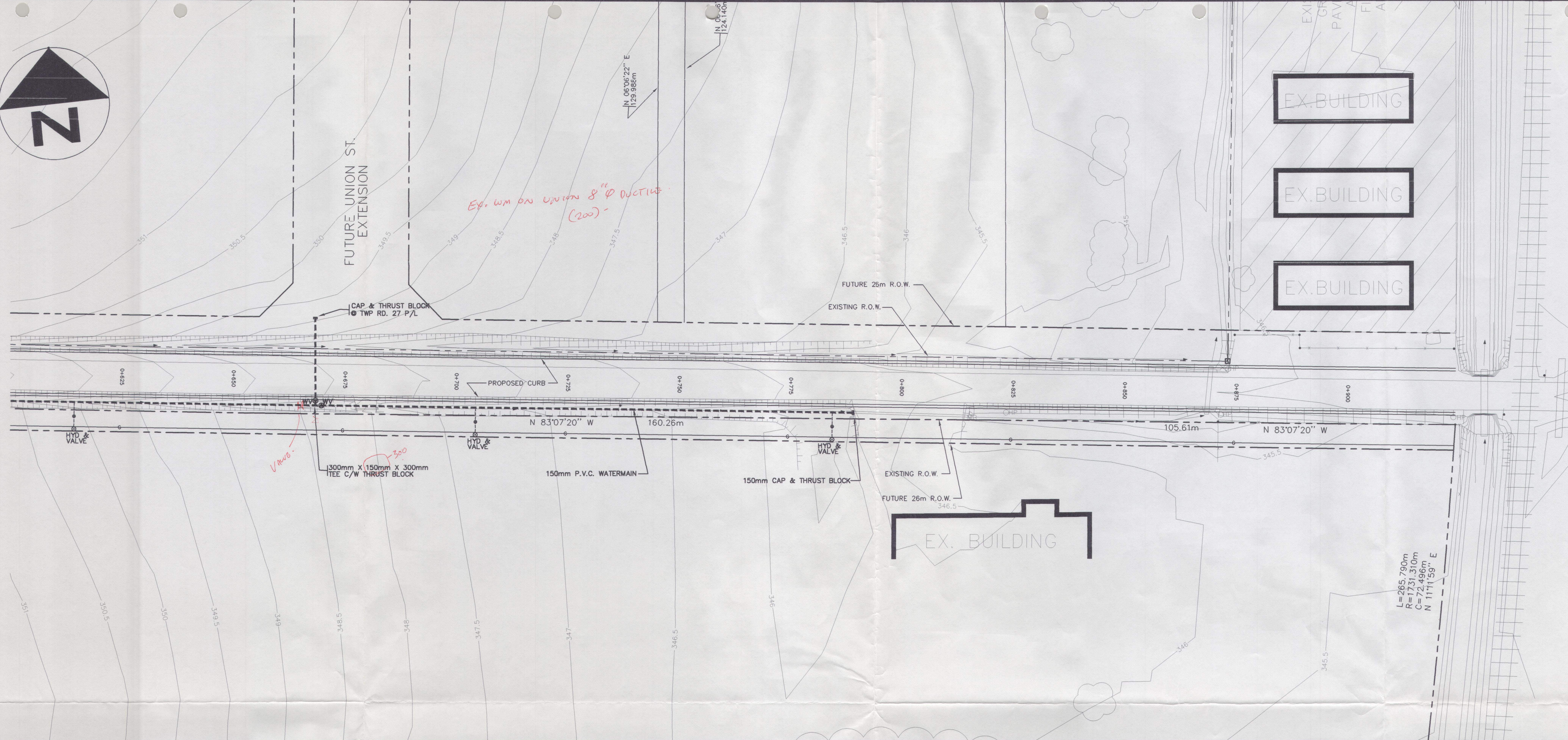
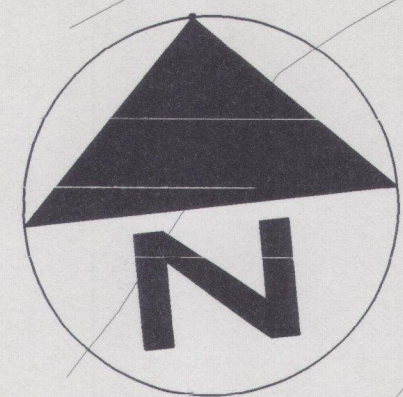
APPENDIX A

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“Plan of Survey Showing Topographic Information”, by SBMG, dated December 24, 2024



LEGEND	
	PROP. CONC. CURB
	PROP. WATERMAIN
	PROPERTY BOUNDARY
	HYD - FIRE HYDRANT
	WV - WATER VALVE
	1 - WATERMAIN CAP
	0 - EXIST. GAS MAIN

NOTES:
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH
DRAWING L8904036-PP3.

DESIGN APPROVED SUBJECT TO DETAIL
CONSTRUCTION CONFORMING TO THE
TOWNSHIP OF WOOLWICH STANDARD
OF SPECIFICATIONS.

MANAGER OF ENGINEERING OPERATIONS	DATE
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COPYRIGHT 1997, PROGRESSIVE ENGINEERING SERVICES LTD.

DATE ISSUED:

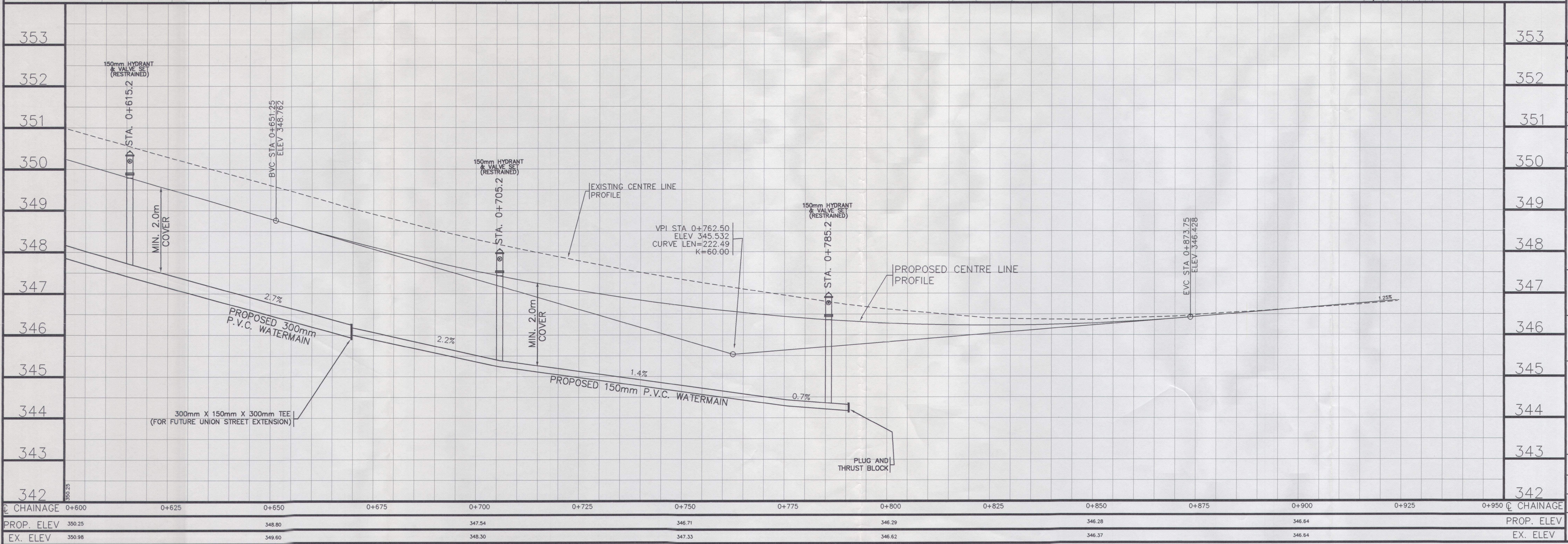
NO.	REVISIONS	BY	DATE
1	AS PER TWP OF WOOLWICH COMMENTS RECEIVED OCT.2/97	D.L.	26/11/97

Progressive Engineering
Services Ltd.
Consulting Engineers
196 McIntyre Dr. Kitchener Ont. N2R 1H4 (519)748-0101

ELMIRA INDUSTRIAL
TWP ROAD 27
ELMIRA ONTARIO

WATERMAIN DESIGN
STA 0+600 TO 0+922

DRAWN BY:	D.L.	CONTRACT NO.	L8904036
CHECKED BY:	G.K.N.	DRAWING NO.	L8904036-PP4
DATE:	AUGUST 1997	SCALE:	HOR=1:500 VER=1:50
PROP. ELEV		EX. ELEV	



north



The position of pole lines, conduits, watermains, sewers and other underground and above ground utilities and structures are not necessarily shown on the contract drawings, and where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting work, the Contractor shall inform himself of the exact location of all such utilities and structures, and shall assume all liability for damage to them.

notes

1. E.M. 85-204
LAT. 43-33.1 LONG. 80-33.2
ONE STOREY BEIGE BRICK HOUSE (RESIDENCE OF BARBARA FRANKLIN) ON EAST SIDE OF WATERLOO REGION RD. 8, 0.6km NORTH OF CONESTOGA RIVER IN ST. JACOBS, 0.3km SOUTH OF THE ACT. OF WATERLOO REGION RD. 8 AND HWY. 85, AND 26.7m EAST OF CENTRELINE OF WATERLOO REGION RD. 8. TABLET IS SET HORIZONTALLY IN SOUTH FACE OF CONCRETE FOUNDATION, 24cm OF SOUTHEAST CORNER AND 82cm BELOW BRICKWORK.
2. SITE SURVEY BASED UPON 8' UTM COORDINATE SYSTEM, UTILIZING SCALING FACTOR OF 0.99958. TRANSMISSION MAIN LENGTHS ARE TRUE PLANE DISTANCES AND THEREFORE DO NOT COINCIDE EXACTLY WITH COORDINATE DISTANCES.

NO.	REVISION	BY	DATE
1	AS RECORDED	RFM	JANUARY 1994

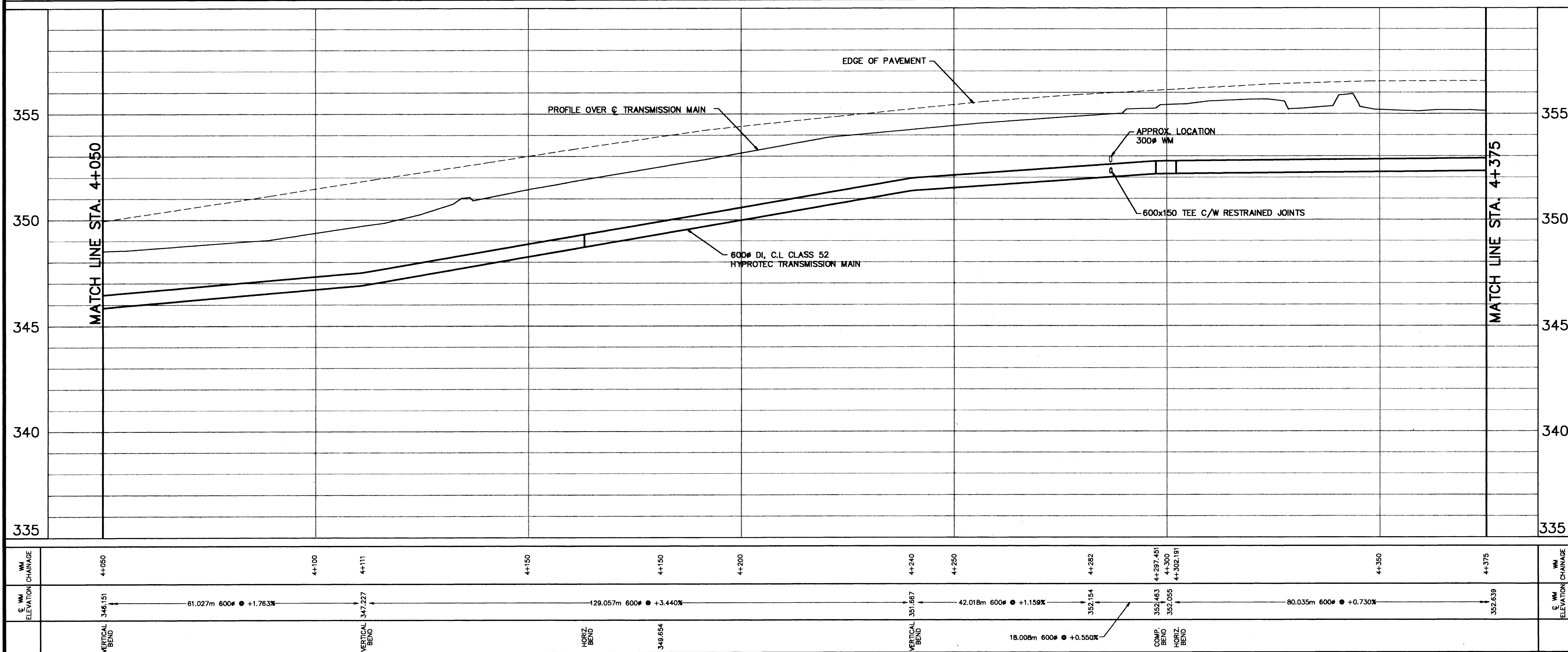
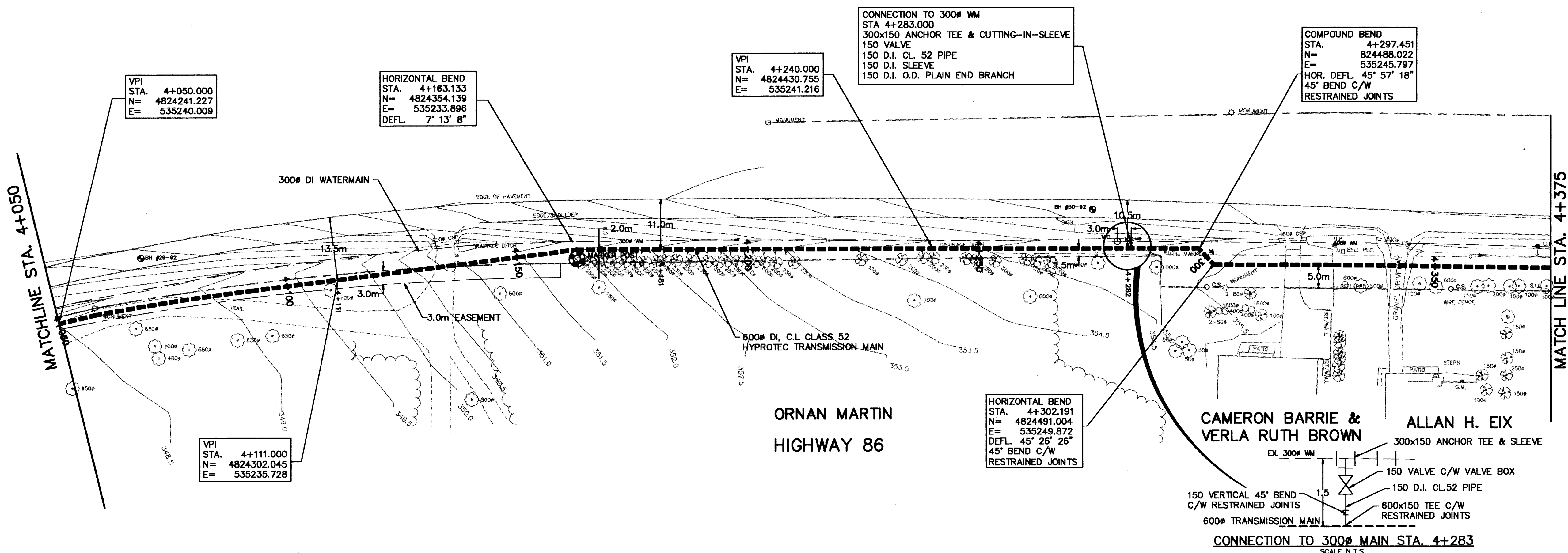


CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada

ST. JACOBS - ELMIRA
WATER
TRANSMISSION MAIN

TRANSMISSION MAIN
STATION 4+050 TO 4+375

DWN. BY: BMM	CHK'D BY: MG	CONTRACT NO.
PROJECT No: 5094		93006
DATE: JAN 26/94(W)		DRAWING NO.
		P11-AR
SCALE: HORIZ. 1:500 VERT. 1:100	SHEET	13 of 20



1 WITH THE EXCEPTION OF SURVEY INVENTS, ALL BURNED RESOURCES WERE DERIVED FROM FIELD LOCATIONS. POINT
2 LOCATIONS OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY EXPRESSED.
3 THE EXISTENCE OR LOCATION OF UNDERGROUND FEATURES WAS NOT DETERMINED BY THIS SURVEY. ALL SERVICES, IN USE OR
4 NOT IN USE, ARE SHOWN AS LOCATED BASED ON THE BEST AVAILABLE INFORMATION AND CONSIDERED TO BE IN THE
5 BEST INTEREST OF THE PROJECT.
6 NOT ELEVATIONS ARE FROZEN ON LAYER 00-SBANK-SURF.
7 SITE BENCHMARKS ESTABLISHED USING RTK, PPM, TOTAL STATION AND THE HT50 GEODOL MODEL.
8 ELEVATIONS ARE BASED ON THE NAVD83 DATUM. THE DATUM IS BASED ON THE MEAN SEA LEVEL (MSL) OF THE
9 VERTICAL CONTROL, ON SITE (E. REFERENCE A MINIMUM OF TWO BENCHMARKS AT ALL TIMES) AND REPORT
10 TO THE USER AS THE DATUM USED FOR THIS PROJECT.
11 SURVEY INFORMATION DERIVED FROM SLOPED MEASUREMENTS PERFORMED AT THE SURFACE. STRUCTURES
12 AND ELEVATIONS ARE CALCULATED USING THE TIMMOTHY INTERPOLATION OF SURVED DATA TO A
13 CONTINUOUS SURFACE. B. THE SURFACE IS BASED ON THE MEAN SEA LEVEL (MSL) OF THE MEAN SEA LEVEL (MSL)
14 WORK. SURFACE THROUGH BUILDINGS HAS BEEN APPROXIMATED.
15 SURFACE INFORMATION IS BASED ON THE MEAN SEA LEVEL (MSL) OF THE MEAN SEA LEVEL (MSL) OF THE
16 PURPOSES. NOT THE TAGGING OR LANDSCAPE DOCUMENTATION WAS PERFORMED.
17 SURFACE INFORMATION IS BASED ON THE MEAN SEA LEVEL (MSL) OF THE MEAN SEA LEVEL (MSL) OF THE
18 ADJACENT CONSERVATIVE (E. SMALLER) DAMKINS PROVIDED WHEN INVERTS AND OVERBANK LACK
19 DAYLIGHTING INVERTS CALCULATED BY TAKING THE ELEVATION OF THE INVERTS AND SUBTRACTING THE
20 PIPE SIZES MEASURED IN THE ADJACENT STRUCTURE. NO GUARANTEE TO THEIR ACCURACY.
21 NON-BOUNDARY TREES SHOWN WITH A WOODED OUTLINE. TREE INVENTORY INFORMATION NOT SHOWN ON
22 THIS MAP.

	DENOTES EXISTING SPOT ELEVATION
	DENOTES EXISTING CONTOUR ELEVATION
	DENOTES EXISTING CATCH BASIN
	DENOTES EXISTING MAINTENANCE HOLE
	DENOTES EXISTING STORM SEWER LOCATES
	DENOTES EXISTING SANITARY SEWER LOCATES
	DENOTES EXISTING WATERMAIN LOCATES
	DENOTES EXISTING GASLINE LOCATES
	DENOTES EXISTING HYDRANT LOCATES
	DENOTES EXISTING BELL LOCATES
	DENOTES EXISTING OVERHEAD WIRES
	DENOTES EXISTING FIRE HYDRANT
	DENOTES EXISTING WATER VALVE
	DENOTES EXISTING BUILDING ENTRANCE
	DENOTES EXISTING BUILDING
	DENOTES EXISTING CONIFEROUS TREE
	DENOTES EXISTING DECIDUOUS TREE
	DENOTES EXISTING SHRUB
	DENOTES EXISTING SAPLING
	DENOTES EXISTING HYDRANT POLE
	DENOTES EXISTING ANCHOR
	DENOTES EXISTING GATE
	DENOTES EXISTING BOLLARD
	DENOTES EXISTING FIRE DEPARTMENT CONNECTION
	DENOTES EXISTING LAMP STANDARD
	DENOTES EXISTING SITE BENCHMARK
	DENOTES EXISTING FENCE
	DENOTES EXISTING WOODS OUTLINE
	DENOTES EXISTING POLE
	DENOTES EXISTING STUMP
	DENOTES EXISTING GAS METER
	DENOTES EXISTING ELECTRIC METER
	DENOTES EXISTING WATER SERVICE VALVE
	DENOTES EXISTING CULVERT

MONUMENT TYPE: CANSEL CAN-NET NETWORK G.N.S.S. RTK BASE STATION GLP2
LOCATION: GUELPH, ONTARIO
NAD-1983:CSRS:CBNV6-2010.0, ORTHOMETRIC ELEVATION: 315.541m

BENCHMARK #1:
MONUMENT TYPE: METAL PIN
LOCATION: NORTH OF BUILDINGS, ADJACENT TO FENCE POST
GEODETTIC ELEVATION (HTv2.0): 352.28m

BENCHMARK #2:
MONUMENT TYPE: METAL PIN
LOCATION: NORTH SIDE OF SUBJECT SITE, ADJACENT TO DRIVEWAY
GEODETTIC ELEVATION (HTv2.0): 352.51m

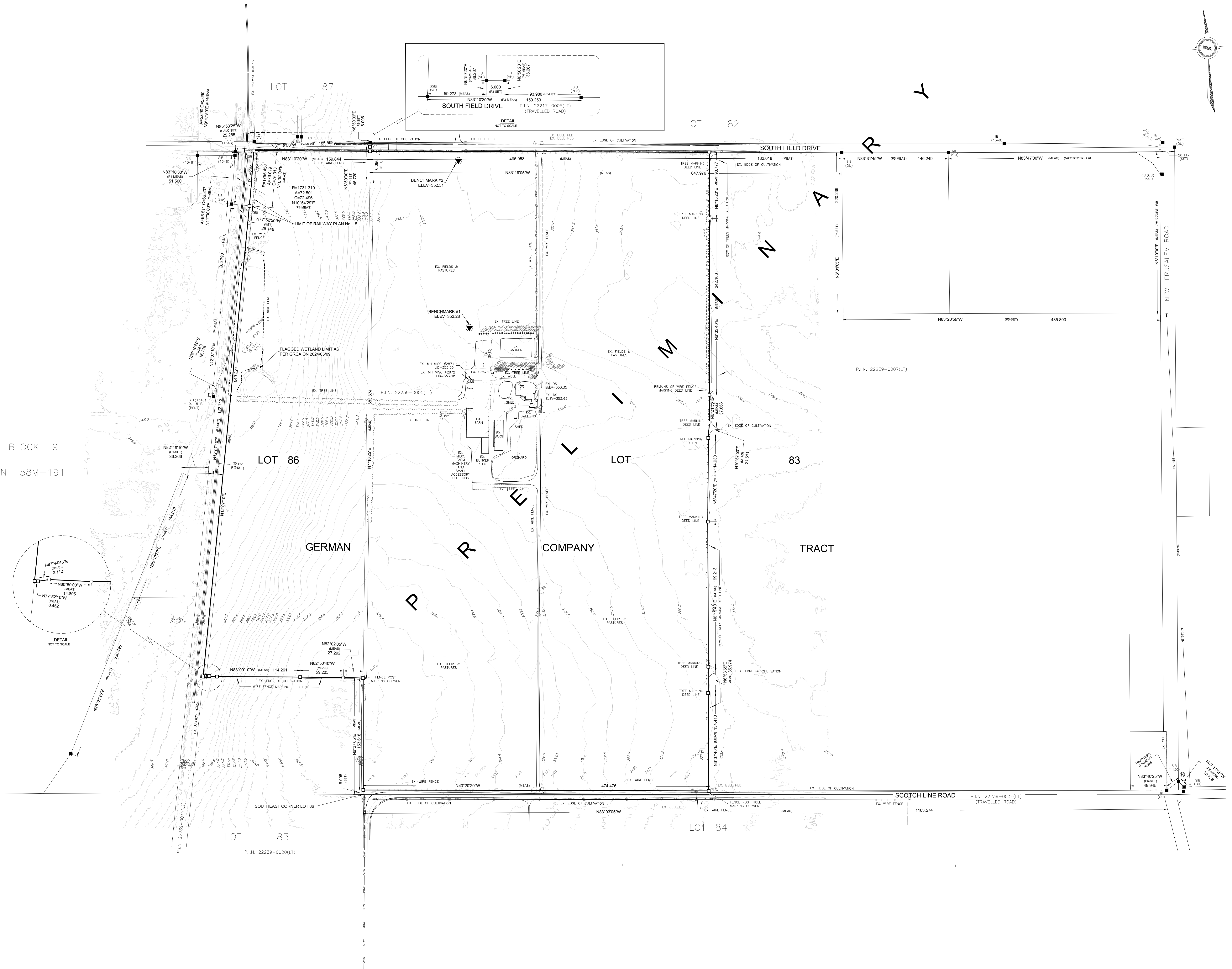
IN THE
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF WATERLOO

SCALE - 1:2000



20.0 40.0 80.0 120.0m

SBM GEOMATICS LTD
ONTARIO LAND SURVEYORS



B	DENOTES SURVEY MONUMENT SET
B	DENOTES SURVEY MONUMENT FOUND
CC	DENOTES CORNER
CS	DENOTES IRON BARS
P	DENOTES IRON PIPE
GU	DENOTES GROUND UNKNOWN
RBB	DENOTES 16MM DIAMETER ROUND IRON
SCP	DENOTES SPECIFIC CONTROL POINT
RBB	DENOTES 1/2" STANDARD IRON BAR
SSB	DENOTES SHORT STANDARD IRON BAR
WT	DENOTES WITNESS
WM	DENOTES WIRE (CABLE, C.L.S.)
706	DENOTES J. HOWE, O.L.S.
1114	DENOTES JOHN MITZ, O.L.S.
1342	DENOTES WAYNE D. TURPEL, O.L.S.
VH	DENOTES VAN HARTEN SURVEYING INC., O.L.S.
P.F.N.	DENOTES PROPERTY IDENTIFY NUMBER
R.F.P.	DENOTES REGISTERED PLAN
R.C.P.B	DENOTES REGISTERED COMPASS
B	DENOTES BURIED
MEAS	DENOTES MEASURED
SET	DENOTES SET
P1	DENOTES 50M-11
P2	DENOTES 50M-605
P3	DENOTES 50M-1151
P4	DENOTES 50M-1151
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P124	DENOTES 50M-1151
P125	DENOTES 50M-1151
P126	DENOTES 50M-1151
P127	DENOTES 50M-1

- 1) BEARINGS ARE GRID UTM ZONE 17 NAD83 (CSRS) (V7 EPOCH 2010.0). DERIVED FROM G.N.S.S. OBSERVATIONS FROM THE CANSEL CAN-NET RTN AND ARE REFERRED TO THE CENTRAL MERIDIAN 81°00' WEST LONGITUDE, ZONE 17.
- 2) DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9999566608417.
- 3) FOR BEARING COMPARISONS, NO ROTATION WAS APPLIED TO 58R-21169 AS THEY MATCHED.

ALL COORDINATES ARE DERIVED FROM Q.N.S.S. OBSERVATIONS USING THE CANSEL CAN-NET RTHN AND ARE REFERRED TO UTM ZONE 17, NAD83 (CSRS) (v7 EPOCH 2010.0) TO AN URBAN ACCURACY PER SEC. 14(2) OF O.R.E.G 216/10

POINT ID	NORTHING	EASTING
CAN-NET RTHN RTK BASE GLP2	4821156.75	556066.79
ORP A	4825673.34	536289.09
ORP B	4824662.29	537450.49

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

I CERTIFY THAT:

(1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEY'S ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.

(2) THE SURVEY WAS COMPLETED ON THE 24th DAY OF DECEMBER, 2024.

PRELIMINARY

DATE _____

GAVIN P.T. SEAMAN
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO ACLS PLAN SUBMISSION FORM NUMBER XXXXXX.



SURVEY BY: JAHJLD	DRAWN BY: JAHJRM	FILE NO.: 55MG-23-0095	PLAN NO.: 55MG-23-0095
-------------------	------------------	------------------------	------------------------

METRIC: DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO INTERNATIONAL FEET BY DIVIDING BY 0.3048

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APPENDIX B

Water Demand Calculations
NFPA #13 Flow Demand Requirements
Region of Waterloo Water Modeling Results dated February 7, 2025

WATER DEMAND CALCULATION

DATE: March 6, 2025

JOB No.: SBM-23-2603

Client: 1000525725 Ontario Inc.

Project: Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, ON

DEMAND CALCULATION

*Heavy Industry Avg. Day Demand = 55.0 m³/(ha*day)

= 0.64 L/ha/s

*Max. Day Peaking Factor = 2

*Max. Hour Peaking Factor = 4

Node	**Area (ha)	Avg. Day (L/s)	Max. Hour (L/s)	Max. Day (L/s)	Fire Flow (L/s)	** Surface Elevation (m)
Reservoir 1						
Reservoir 2						
Junction 1 (Tee)						352.69
Junction 2 – Block 10	1.63	1.04	4.15	2.08		352.13
Junction 3 – Block 9	2.52	1.60	6.42	3.21		351.94
Junction 4 – Block 7	2.49	1.59	6.34	3.17		351.47
Junction 5 – Block 6	2.51	1.60	6.39	3.20		351.34
Junction 6 – Block 5	2.67	1.70	6.80	3.40		351.65
Junction 7 – Block 11	3.68	2.34	9.37	4.69		352.84
Junction 8 – Block 3	2.50	1.59	6.37	3.18		353.99
Junction 9 – Block 8	2.23	1.42	5.68	2.84		351.91
Junction 10 – Block 1	9.80	6.24	24.95	12.48		352.56
Junction 11 – Block 4	2.67	1.70	6.80	3.40		352.37
Junction 12 – Block 17	3.65	2.32	9.29	4.65		353.47
Junction 13 – Block 2	4.62	2.94	11.76	5.88		354.73
Junction 14 (Tee)						355.28
Hydrant					177.29***	
Industrial Subdivision Total	40.97	26.08	104.32	52.16		

* Refer to Section 3.4.4 of the MECP "The Design Guidelines for Drinking-Water Systems" (2016)

** Refer to Draft Plan of Subdivision prepared by SBM, provided seperately

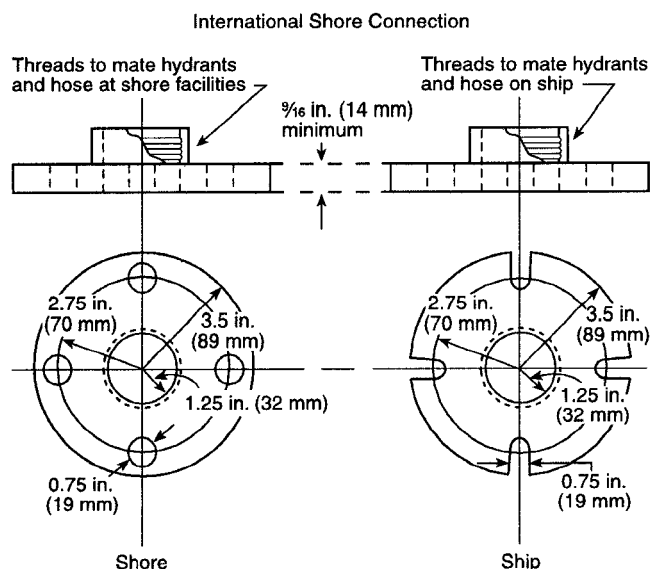
*** Based on the Region of Waterloo Water Modeling results dated February 7, 2025, provided seperately

NFPA # 13 FLOW DEMAND REQUIREMENTS

HAZARD	SPRINKLER FLOW	HYDRANT ALLOWANCE	TOTAL FLOW
Light	175 GPM	100 GPM	275 GPM
Ordinary 1	250 GPM	250 GPM	500 GPM
Ordinary 2	350 GPM	250 GPM	600 GPM
Extra 1	750 GPM	500 GPM	1250 GPM
Extra 2	1000 GPM	500 GPM	1500 GPM

Warehousing Varies too much to come up with a generic water demand

The pressures range on each of these flows and would be generally be 35 PSI - 80 PSI Requirements,
but this information can't truly be given until final layouts and calculations are complete



Material: Any suitable for 150 psi (10.3 bar) service (shore)
 Flange surface: Flat face
 Gasket material: Any suitable for 150 psi (10.3 bar) service
 Bolts: Four 1/2 in. (16 mm) minimum diameter, 2 in. (51 mm) long, threaded to within 1 in. (25.4 mm) of bolt head
 Nuts: Four, to fit bolts
 Washers: Four, to fit bolts

Material: Brass or bronze suitable for 150 psi (10.3 bar) service (ship)

FIGURE A.3.10.7 International Shore Fire Connection.

A.5.1 Occupancy examples in the listings as shown in the various hazard classifications are intended to represent the norm for those occupancy types. Unusual or abnormal fuel loadings or combustible characteristics and susceptibility for changes in these characteristics, for a particular occupancy, are considerations that should be weighed in the selection and classification.

The light hazard classification is intended to encompass residential occupancies; however, this is not intended to preclude the use of listed residential sprinklers in residential occupancies or residential portions of other occupancies.

A.5.2 Light hazard occupancies include occupancies having uses and conditions similar to the following:

- Animal shelters
- Churches
- Clubs
- Eaves and overhangs, if of combustible construction with no combustibles beneath
- Educational
- Hospitals, including animal hospitals and veterinary facilities
- Institutional
- Kennels
- Libraries, except large stack rooms
- Museums
- Nursing or convalescent homes
- Offices, including data processing
- Residential
- Restaurant seating areas

Theaters and auditoriums, excluding stages and prosceniums
 Unused attics

Note that it is not the committee's intent to automatically equate library bookshelves with ordinary hazard occupancies or with library stacks. Typical library bookshelves of approximately 8 ft (2.4 m) in height, containing books stored vertically on end, held in place in close association with each other, with aisles wider than 30 in. (762 mm) can be considered to be light hazard occupancies. Similarly, library stack areas, which are more akin to shelf storage or record storage, as defined in NFPA 232, *Standard for the Protection of Records*, should be considered to be ordinary hazard occupancies.

A.5.3 For purposes of these definitions, Class I, Class II, Class III, and Class IV commodities would be considered to have moderate rates of heat release, while Group A plastics would be considered to have high rates of heat release. Stockpiles are considered to include display merchandise (mercantile) and arrangements of combustibles ancillary to operations within the occupancy as opposed to dedicated storage areas where the fire loading is generally more severe.

A.5.3.1 Ordinary hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

- Automobile parking and showrooms
- Bakeries
- Beverage manufacturing
- Canneries
- Dairy products manufacturing and processing
- Electronic plants
- Glass and glass products manufacturing
- Laundries
- Restaurant service areas

A.5.3.2 Ordinary hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

- Agricultural facilities
- Barns and stables
- Cereal mills
- Chemical plants — ordinary
- Confectionery products
- Distilleries
- Dry cleaners
- Exterior loading docks

Note that exterior loading docks only used for loading and unloading of ordinary combustibles should be classified as OH2. For the handling of flammable and combustible liquids, hazardous materials, or where utilized for storage, exterior loading docks and all interior loading docks should be protected based upon the actual occupancy and the materials handled on the dock, as if the materials were actually stored in that configuration.

- Feed mills
- Horse stables
- Leather goods manufacturing
- Libraries — large stack room areas
- Machine shops
- Metal working
- Mercantile
- Paper and pulp mills
- Paper process plants
- Piers and wharves



Plastics fabrication, including blow molding, extruding, and machining; excluding operations using combustible hydraulic fluids

Post offices

Printing and publishing

Racetrack stable/kennel areas, including those stable/kennel areas, barns, and associated buildings at state, county, and local fairgrounds

Repair garages

Resin application area

Stages

Textile manufacturing

Tire manufacturing

Tobacco products manufacturing

Wood machining

Wood product assembly

A.5.4.1 Extra hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Aircraft hangars (except as governed by NFPA 409, *Standard on Aircraft Hangars*)

Combustible hydraulic fluid use areas

Die casting

Metal extruding

Plywood and particleboard manufacturing

Printing [using inks having flash points below 100°F (38°C)]

Rubber reclaiming, compounding, drying, milling, vulcanizing

Saw mills

Textile picking, opening, blending, garnetting, or carding, combining of cotton, synthetics, wool shoddy, or burlap

Upholstering with plastic foams

A.5.4.2 Extra hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Asphalt saturating

Flammable liquids spraying

Flow coating

Manufactured home or modular building assemblies (where finished enclosure is present and has combustible interiors)

Open oil quenching

Plastics manufacturing

Solvent cleaning

Varnish and paint dipping

A.5.5 Other NFPA standards contain design criteria for fire control or fire suppression (see Section 5.5 and Chapter 2). While these can form the basis of design criteria, this standard describes the methods of design, installation, fabrication, calculation, and evaluation of water supplies that should be used for the specific design of the system.

Other NFPA standards contain sprinkler system design criteria for fire control or suppression of specific hazards. This information has been either referenced or copied into Chapter 21 using NFPA's extract policy.

A.5.6 Specification of the type, amount, and arrangement of combustibles for any commodity classification is essentially an attempt to define the potential fire severity, based on its burning characteristics, so the fire can be successfully controlled by the prescribed sprinkler protection for the commodity class. In actual storage situations, however, many storage arrays do not fit

precisely into one of the fundamental classifications; therefore, the user needs to make judgments after comparing each classification to the existing storage conditions. Storage arrays consist of thousands of products, which make it impossible to specify all the acceptable variations for any class. As an alternative, a variety of common products are classified in this annex based on judgment, loss experience, and fire test results.

Table A.5.6 provides examples of commodities not addressed by the classifications in Section 5.6.

Table A.5.6.3 is an alphabetized list of commodities with corresponding classifications.

Table A.5.6.3.1 through Table A.5.6.3.4 and Table A.5.6.4.1 provide examples of commodities within a specific class.

Table A.5.6 Examples of Commodities Not Addressed by the Classifications in Section 5.6

Boat Storage
- Stored on racks
Boxes, Crates
- Empty, wood slatted*
Lighters (butane)
- Loose in large containers (Level 3 aerosol)
Storage Container
- Large container storage of household goods

*Should be treated as idle pallets.

A.5.6.1.1 Commodity classification is governed by the types and amounts of materials (e.g., metal, paper, wood, plastics) that are a part of a product and its primary packaging. However, in a storage or warehousing situation, classification is also affected by such factors as the primary storage or shipping container material, the amount of air space, and the location of the more hazardous materials within the container. For example, a Group A plastic product enclosed in a five- or six-sided metal container can be considered Class II, while a ceramic product heavily wrapped in tissue paper and placed in a corrugated carton could be Class III.

A.5.6.2.2 For example, Class III will become Class IV, and Class IV will become a cartoned unexpanded Group A plastic commodity.

A.5.6.2.3 For example, Class II will become Class IV, and Class III and Class IV will become a cartoned unexpanded Group A plastic commodity.

A.5.6.3 See Table A.5.6.3.

Table A.5.6.3 Alphabetized Listing of Commodity Classes

Commodity	Commodity Class
Aerosols	
Cartoned or uncartoned — Level 1	Class III
Alcoholic Beverages	
Cartoned or uncartoned	
- Up to 20 percent alcohol in metal, glass, or ceramic containers	Class I
- Up to 20 percent alcohol in wood containers	Class II





ENGINEERING AND ENVIRONMENTAL SERVICES

Water and Wastewater Services

150 Frederick Street 7th Floor
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400; TTY: 519-575-4608
Email: waterservices@regionofwaterloo.ca
www.regionofwaterloo.ca/water

Ben Hyland
Strik, Baldinelli, Moniz
bhyland@sbmltd.ca

Date: February 7, 2025

Dear: Ben Hyland

Re: 1665 Scotch Line Road

Please find the results of the modeling simulations for boundary conditions requested on December 20, 2024. The results include a figure showing the location of the node from the Region's model. Attached are a series of spreadsheets containing results for Average Day, Maximum Day demands and available fire flows for node JCT_05205 located South Field Drive & Union Street and node JCT_05380 located on Arthur Street South. The diurnal 24-hour demand distribution accounts for the minimum hour and peak hour peaking factors. The maximum pressure on the average day represents the minimum hour, and the minimum pressure on the maximum day represents the peak hour.

Table 1 – Modeling Results

Node	Elevation (mASL)	Demand		Fire Flow Results	
		Ave Day (L/s)	Max Day (L/s)	Design Flow (L/s)	Design Pressure (m)
JCT_05205	348.0	27.26	54.51	240.0	28.8
JCT_05380	355.0	27.26	54.51	231.8	18.3

A fire flow analysis shows the maximum flow available at a node with an associated design pressure during the maximum day scenario while maintaining the minimum design pressure of 14 m (140 kPa) at all nodes within the pressure zone.

If you have any questions, please contact me

A handwritten signature in black ink, appearing to read "KD", with a long horizontal line extending to the right.

Kevin Dolishny P.Eng.
Senior Engineer, Water Services
c. 226.751.4551
e. kdolishny@regionofwaterloo.ca

Elmira West

South Field Dr & Union St

JCT_05205 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	9.09	419.94	71.94
01:00 hrs	9.51	419.62	71.62
02:00 hrs	10.19	419.26	71.26
03:00 hrs	10.61	418.95	70.95
04:00 hrs	10.88	418.67	70.67
05:00 hrs	13.78	417.90	69.90
06:00 hrs	16.39	416.81	68.81
07:00 hrs	17.08	417.20	69.20
08:00 hrs	17.36	417.29	69.29
09:00 hrs	17.22	417.44	69.44
10:00 hrs	18.73	417.28	69.28
11:00 hrs	16.94	417.76	69.76
12:00 hrs	17.22	417.87	69.87
13:00 hrs	18.18	417.84	69.84
14:00 hrs	17.77	418.08	70.08
15:00 hrs	16.26	418.50	70.50
16:00 hrs	15.57	418.76	70.76
17:00 hrs	14.60	419.04	71.04
18:00 hrs	12.95	419.44	71.44
19:00 hrs	11.43	419.83	71.83
20:00 hrs	10.47	420.18	72.18
21:00 hrs	10.88	420.36	72.36
22:00 hrs	8.95	420.07	72.07
23:00 hrs	8.82	419.91	71.91

Average Day HGL:

418.67

Minimum Hour:

420.36

JCT_05205 Maximum Day 24 Hour Simulation

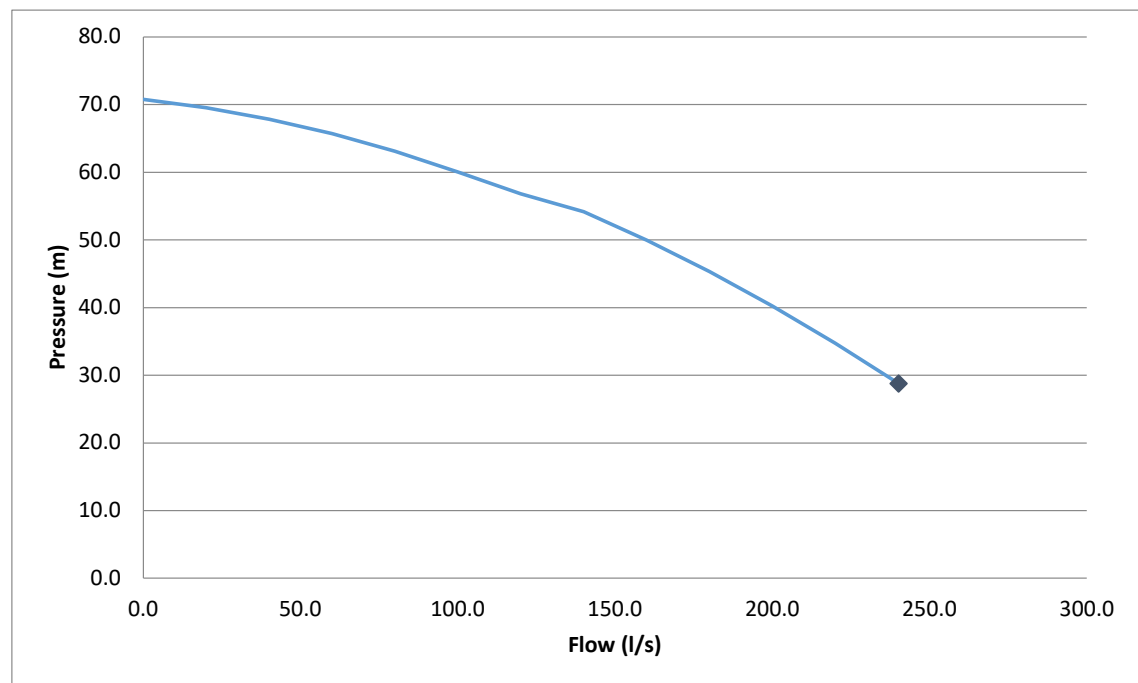
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01:00 hrs	#N/A	#N/A	#N/A
02:00 hrs	#N/A	#N/A	#N/A
03:00 hrs	#N/A	#N/A	#N/A
04:00 hrs	#N/A	#N/A	#N/A
05:00 hrs	#N/A	#N/A	#N/A
06:00 hrs	#N/A	#N/A	#N/A
07:00 hrs	#N/A	#N/A	#N/A
08:00 hrs	#N/A	#N/A	#N/A
09:00 hrs	#N/A	#N/A	#N/A
10:00 hrs	#N/A	#N/A	#N/A
11:00 hrs	#N/A	#N/A	#N/A
12:00 hrs	#N/A	#N/A	#N/A
13:00 hrs	#N/A	#N/A	#N/A
14:00 hrs	#N/A	#N/A	#N/A
15:00 hrs	#N/A	#N/A	#N/A
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17:00 hrs	#N/A	#N/A	#N/A
18:00 hrs	#N/A	#N/A	#N/A
19:00 hrs	#N/A	#N/A	#N/A
20:00 hrs	#N/A	#N/A	#N/A
21:00 hrs	#N/A	#N/A	#N/A
22:00 hrs	#N/A	#N/A	#N/A
23:00 hrs	#N/A	#N/A	#N/A

Maximum Day HGL:

#N/A

Peak Hour:

#N/A



Elmira West

Arthur St S

JCT_05380 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	9.00	419.93	64.93
01:00 hrs	9.41	420.07	65.07
02:00 hrs	10.09	419.63	64.63
03:00 hrs	10.50	419.23	64.23
04:00 hrs	10.77	418.87	63.87
05:00 hrs	13.64	417.70	62.70
06:00 hrs	16.23	416.13	61.13
07:00 hrs	16.92	415.26	60.26
08:00 hrs	17.19	415.72	60.72
09:00 hrs	17.05	415.80	60.80
10:00 hrs	18.55	415.35	60.35
11:00 hrs	16.78	415.98	60.98
12:00 hrs	17.05	415.97	60.97
13:00 hrs	18.00	415.74	60.74
14:00 hrs	17.59	415.95	60.95
15:00 hrs	16.09	416.49	61.49
16:00 hrs	15.41	416.77	61.77
17:00 hrs	14.46	417.09	62.09
18:00 hrs	12.83	417.62	62.62
19:00 hrs	11.33	418.12	63.12
20:00 hrs	10.37	418.51	63.51
21:00 hrs	10.78	418.62	63.62
22:00 hrs	8.87	419.28	64.28
23:00 hrs	8.73	419.65	64.65

Average Day HGL:

417.48

Minimum Hour:

420.07

JCT_05380 Maximum Day 24 Hour Simulation

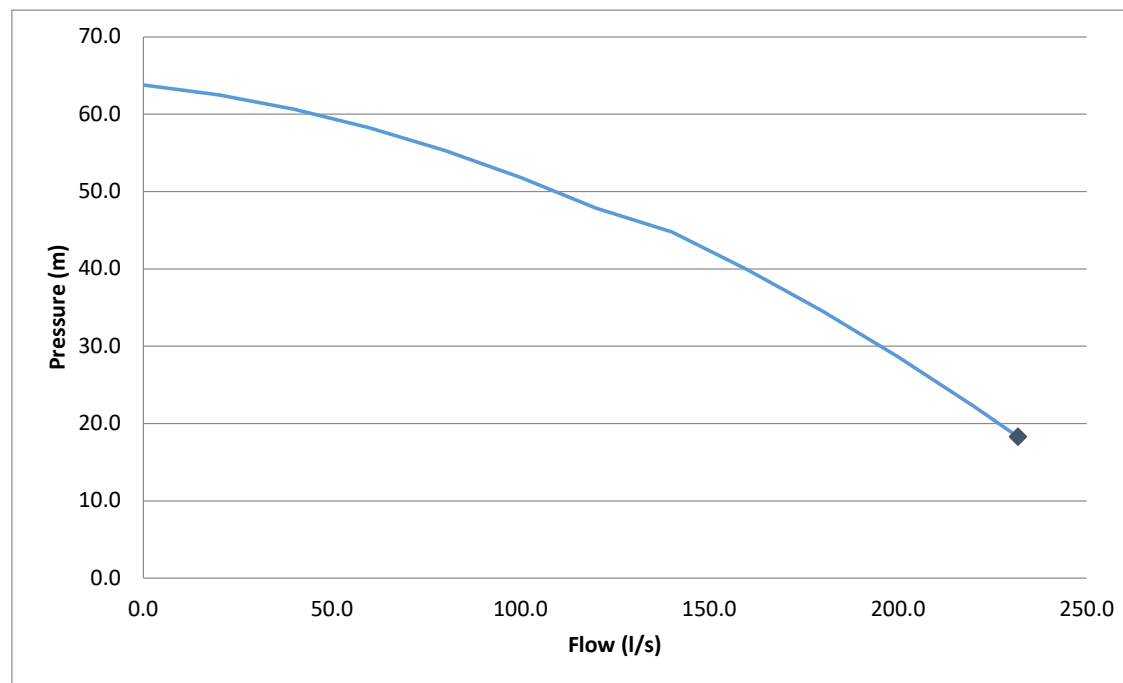
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01:00 hrs	#N/A	#N/A	#N/A
02:00 hrs	#N/A	#N/A	#N/A
03:00 hrs	#N/A	#N/A	#N/A
04:00 hrs	#N/A	#N/A	#N/A
05:00 hrs	#N/A	#N/A	#N/A
06:00 hrs	#N/A	#N/A	#N/A
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13:00 hrs	#N/A	#N/A	#N/A
14:00 hrs	#N/A	#N/A	#N/A
15:00 hrs	#N/A	#N/A	#N/A
16:00 hrs	#N/A	#N/A	#N/A
17:00 hrs	#N/A	#N/A	#N/A
18:00 hrs	#N/A	#N/A	#N/A
19:00 hrs	#N/A	#N/A	#N/A
20:00 hrs	#N/A	#N/A	#N/A
21:00 hrs	#N/A	#N/A	#N/A
22:00 hrs	#N/A	#N/A	#N/A
23:00 hrs	#N/A	#N/A	#N/A

Maximum Day HGL:

#N/A

Peak Hour:

#N/A

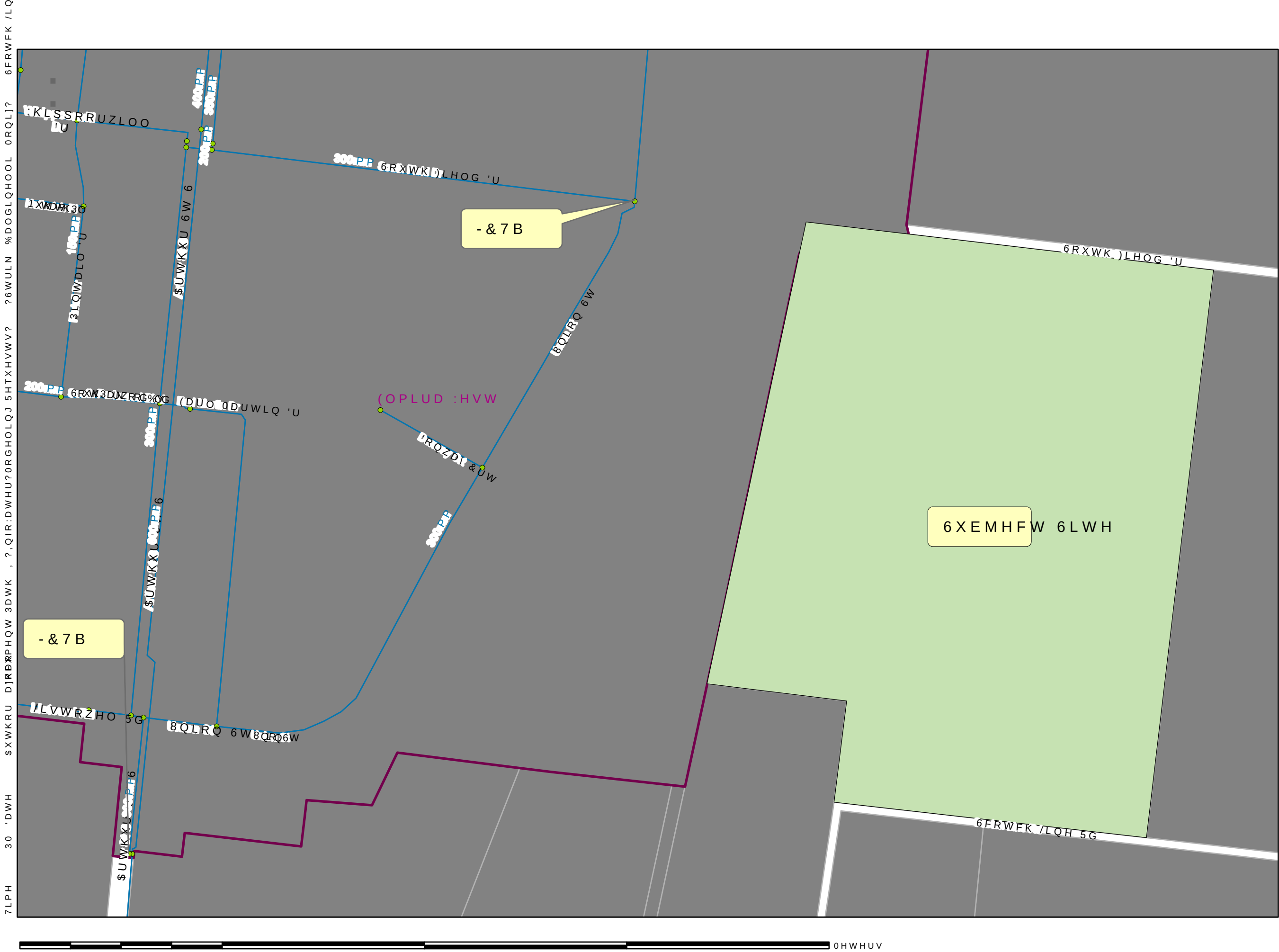




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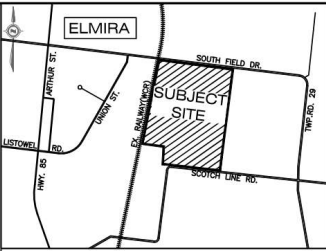
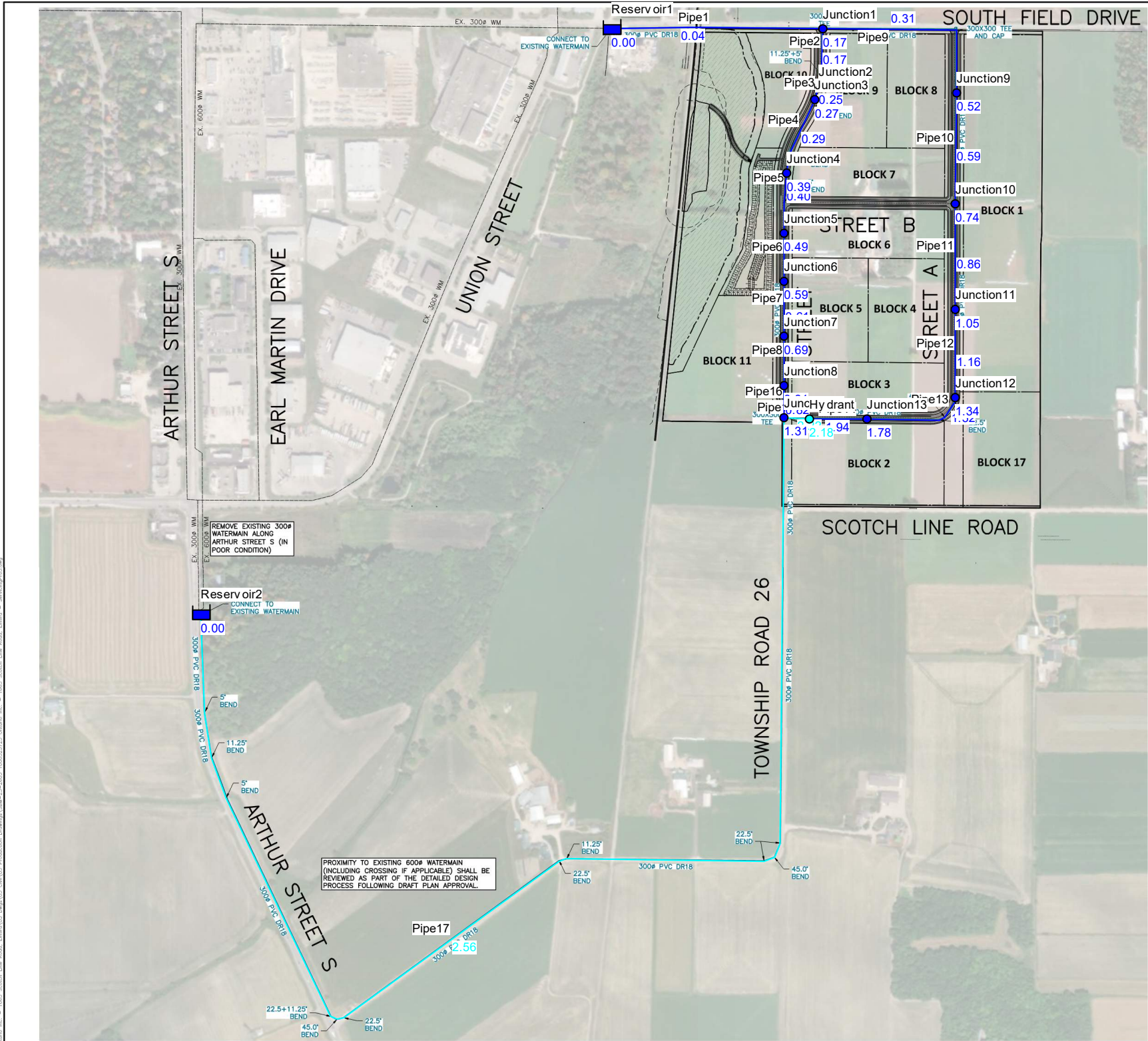
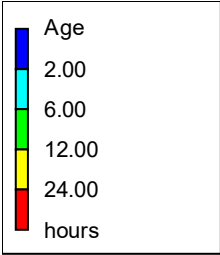


APPENDIX C

Average Day Demand EPANET Model Results
Average Day Demand EPANET Model Report

EPANET Water Distribution Model — Average Day Demand Results

Day 4, 12:00 AM



KEY PLAN
N.T.S.

LEGAL INFORMATION

PART OF
LOT 83 & 86, GERMAN
COMPANY TRACT
IN THE
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF
WATERLOO

BENCHMARK:

MONUMENT TYPE: CANSEL CAN-NET NETWORK G.N.S.S.
RTK BASE STATION GLP2.
LOCATION: GUELPH, ONTARIO
GEODETIC ELEVATION: 315.541m
(NAD-1983:CSRS:CBNV6-20210.0)

SITE BENCHMARKS:

BENCHMARK #1
MONUMENT TYPE: METAL PIN
LOCATION: NORTH OF BUILDINGS, ADJACENT TO FENCE
POST
GEODETIC ELEVATION: 352.28m
BENCHMARK #2
MONUMENT TYPE: METAL PIN
LOCATION: NORTH SIDE OF SUBJECT SITE, ADJACENT
TO DRIVEWAY.
GEODETIC ELEVATION: 352.51m
(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)

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*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.2                                *
*****

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Input File: SBM-23-2603 1665 Scotch Line - Avg Day Demand - 2025-03-06.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
Pipe1	Reservoir1	Junction1	387.10	300
Pipe2	Junction1	Junction2	101.09	300
Pipe3	Junction2	Junction3	27.11	300
Pipe4	Junction3	Junction4	131.49	300
Pipe5	Junction4	Junction5	113.75	300
Pipe6	Junction5	Junction6	92.65	300
Pipe7	Junction6	Junction7	95.34	300
Pipe8	Junction7	Junction8	92.59	300
Pipe9	Junction1	Junction9	361.02	300
Pipe10	Junction9	Junction10	203.73	300
Pipe11	Junction10	Junction11	200.04	300
Pipe12	Junction11	Junction12	157.74	300
Pipe13	Junction12	Junction13	185.62	300
Pipe14	Junction13	Hydrant	109.89	300
Pipe15	Hydrant	Junction14	44.82	300
Pipe16	Junction8	Junction14	59.49	300
Pipe17	Junction14	Reservoir2	2511.01	300

Node Results at 0:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Junction1	0.00	418.23	65.54	0.00
Junction2	1.04	418.19	66.06	0.00
Junction3	1.60	418.19	66.25	0.00
Junction4	1.59	418.14	66.67	0.00
Junction5	1.60	418.11	66.77	0.00
Junction6	1.70	418.09	66.44	0.00
Junction7	2.34	418.07	65.23	0.00
Junction8	1.59	418.06	64.07	0.00
Junction9	1.42	418.14	66.23	0.00
Junction10	6.24	418.10	65.54	0.00

Junction11	1.70	418.08	65.71	0.00
Junction12	2.32	418.07	64.60	0.00
Junction13	2.94	418.06	63.33	0.00
Junction14	0.00	418.05	62.77	0.00



Page 2

Node Results at 0:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Hydrant	0.00	418.05	61.79	0.00
Reservoir1	-45.10	418.67	0.00	0.00 Reservoir
Reservoir2	19.02	417.48	0.00	0.00 Reservoir

Link Results at 0:00 Hrs:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
Pipe1	45.10	0.64	1.13	Open
Pipe2	25.07	0.35	0.38	Open
Pipe3	24.03	0.34	0.35	Open
Pipe4	22.43	0.32	0.31	Open
Pipe5	20.84	0.29	0.27	Open
Pipe6	19.24	0.27	0.23	Open
Pipe7	17.54	0.25	0.20	Open
Pipe8	15.20	0.21	0.15	Open
Pipe9	20.03	0.28	0.25	Open
Pipe10	18.61	0.26	0.22	Open
Pipe11	12.37	0.18	0.10	Open
Pipe12	10.67	0.15	0.08	Open
Pipe13	8.35	0.12	0.05	Open
Pipe14	5.41	0.08	0.02	Open
Pipe15	5.41	0.08	0.02	Open
Pipe16	13.61	0.19	0.12	Open
Pipe17	19.02	0.27	0.23	Open

Node Results at 72:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Junction1	0.00	418.23	65.54	0.17
Junction2	1.04	418.19	66.06	0.25
Junction3	1.60	418.19	66.25	0.27
Junction4	1.59	418.14	66.67	0.39
Junction5	1.60	418.11	66.77	0.49
Junction6	1.70	418.09	66.44	0.59

Junction7	2.34	418.07	65.23	0.69
Junction8	1.59	418.06	64.07	0.81
Junction9	1.42	418.14	66.23	0.52
Junction10	6.24	418.10	65.54	0.74
Junction11	1.70	418.08	65.71	1.05
Junction12	2.32	418.07	64.60	1.34
Junction13	2.94	418.06	63.33	1.78
Junction14	0.00	418.05	62.77	1.31
Hydrant	0.00	418.05	61.79	2.18



Page 3

Node Results at 72:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Reservoir1	-45.10	418.67	0.00	0.00 Reservoir
Reservoir2	19.02	417.48	0.00	0.00 Reservoir

Link Results at 72:00 Hrs:

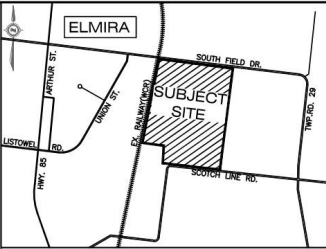
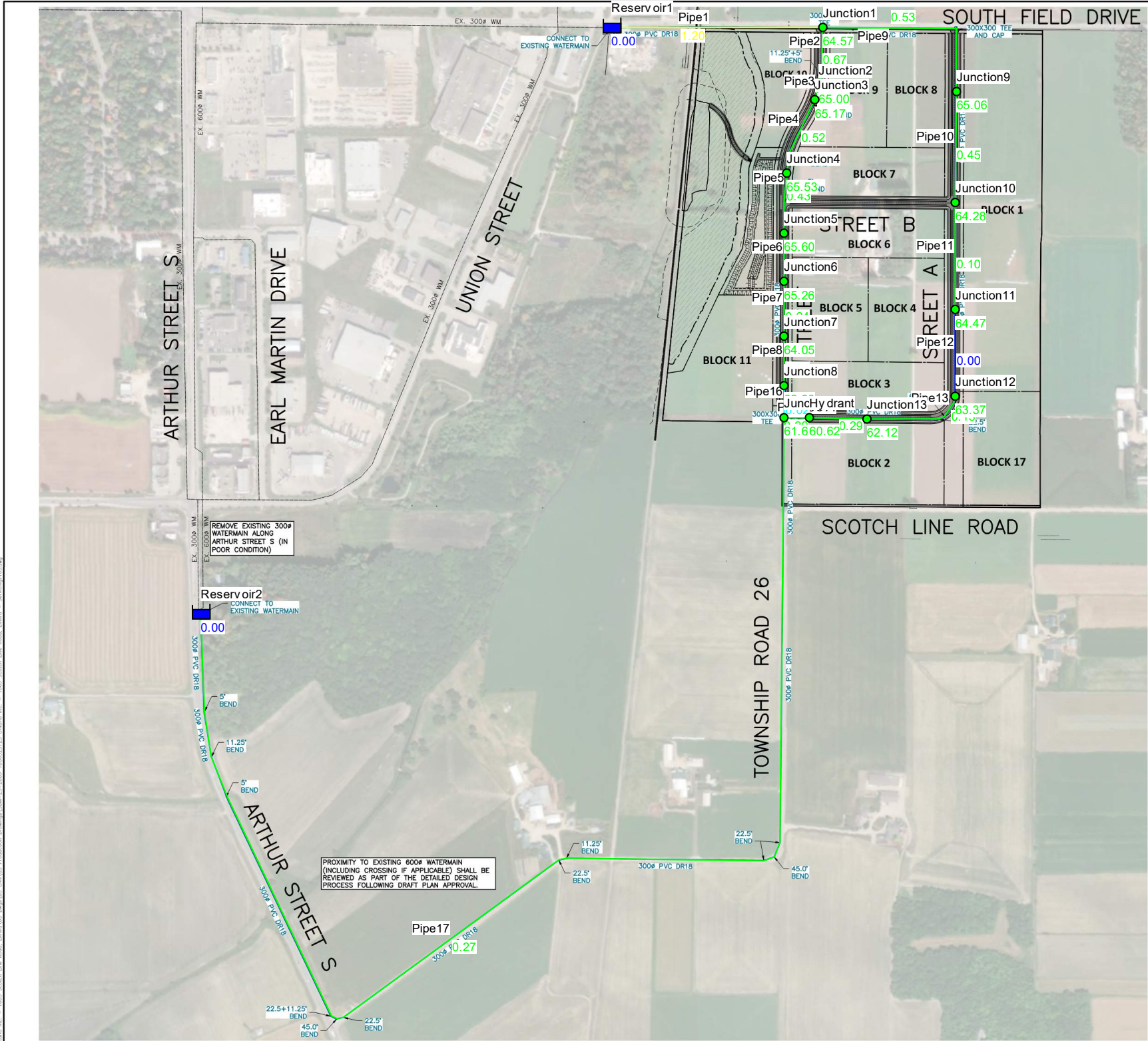
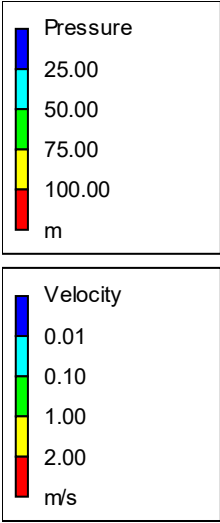
Link ID	Flow LPS	Velocity m/s	Headloss m/km	Status
Pipe1	45.10	0.64	1.13	Open
Pipe2	25.07	0.35	0.38	Open
Pipe3	24.03	0.34	0.35	Open
Pipe4	22.43	0.32	0.31	Open
Pipe5	20.84	0.29	0.27	Open
Pipe6	19.24	0.27	0.23	Open
Pipe7	17.54	0.25	0.20	Open
Pipe8	15.20	0.21	0.15	Open
Pipe9	20.03	0.28	0.25	Open
Pipe10	18.61	0.26	0.22	Open
Pipe11	12.37	0.18	0.10	Open
Pipe12	10.67	0.15	0.08	Open
Pipe13	8.35	0.12	0.05	Open
Pipe14	5.41	0.08	0.02	Open
Pipe15	5.41	0.08	0.02	Open
Pipe16	13.61	0.19	0.12	Open
Pipe17	19.02	0.27	0.23	Open

APPENDIX D

Maximum Hour Demand EPANET Model Results
Maximum Hour Demand EPANET Model Report

EPANET Water Distribution Model — Maximum Hour Demand Results

Day 4, 12:00 AM



KEY PLAN
N.T.S.

LEGAL INFORMATION

PART OF
LOT 83 & 86, GERMAN
COMPANY TRACT
IN THE
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF
WATERLOO

BENCHMARK:

MONUMENT TYPE: CANSEL CAN-NET NETWORK G.N.S.S.
RTK BASE STATION GLP2.
LOCATION: GUELPH, ONTARIO
GEODETIC ELEVATION: 315.541m
(NAD-1983/CSRS:CBNV6-20210.0)

SITE BENCHMARKS:

BENCHMARK #1
MONUMENT TYPE: METAL PIN
LOCATION: NORTH OF BUILDINGS, ADJACENT TO FENCE POST
GEODETIC ELEVATION: 352.28m
BENCHMARK #2
MONUMENT TYPE: METAL PIN
LOCATION: NORTH SIDE OF SUBJECT SITE, ADJACENT TO DRIVEWAY.
GEODETIC ELEVATION: 352.51m
(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)

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*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.2                                *
*****

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Input File: SBM-23-2603 1665 Scotch Line - Max HR Demand - 2025-03-06.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
Pipe1	Reservoir1	Junction1	387.10	300
Pipe2	Junction1	Junction2	101.09	300
Pipe3	Junction2	Junction3	27.11	300
Pipe4	Junction3	Junction4	131.49	300
Pipe5	Junction4	Junction5	113.75	300
Pipe6	Junction5	Junction6	92.65	300
Pipe7	Junction6	Junction7	95.34	300
Pipe8	Junction7	Junction8	92.59	300
Pipe9	Junction1	Junction9	361.02	300
Pipe10	Junction9	Junction10	203.73	300
Pipe11	Junction10	Junction11	200.04	300
Pipe12	Junction11	Junction12	157.74	300
Pipe13	Junction12	Junction13	185.62	300
Pipe14	Junction13	Hydrant	109.89	300
Pipe15	Hydrant	Junction14	44.82	300
Pipe16	Junction8	Junction14	59.49	300
Pipe17	Junction14	Reservoir2	2511.01	300

Node Results at 0:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Junction1	0.00	417.26	64.57	0.00
Junction2	4.16	417.13	65.00	0.00
Junction3	6.40	417.11	65.17	0.00
Junction4	6.36	417.00	65.53	0.00
Junction5	6.40	416.94	65.60	0.00
Junction6	6.80	416.91	65.26	0.00
Junction7	9.36	416.89	64.05	0.00
Junction8	6.36	416.89	62.90	0.00
Junction9	5.68	416.97	65.06	0.00
Junction10	24.96	416.84	64.28	0.00

Junction11	6.80	416.84	64.47	0.00
Junction12	9.28	416.84	63.37	0.00
Junction13	11.76	416.85	62.12	0.00
Junction14	0.00	416.89	61.61	0.00



Page 2

Node Results at 0:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Hydrant	0.00	416.88	60.62	0.00
Reservoir1	-84.97	418.67	0.00	0.00 Reservoir
Reservoir2	-19.35	417.48	0.00	0.00 Reservoir

Link Results at 0:00 Hrs:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
Pipe1	84.97	1.20	3.65	Open
Pipe2	47.25	0.67	1.23	Open
Pipe3	43.09	0.61	1.04	Open
Pipe4	36.69	0.52	0.77	Open
Pipe5	30.33	0.43	0.54	Open
Pipe6	23.93	0.34	0.35	Open
Pipe7	17.13	0.24	0.19	Open
Pipe8	7.77	0.11	0.04	Open
Pipe9	37.71	0.53	0.81	Open
Pipe10	32.03	0.45	0.60	Open
Pipe11	7.07	0.10	0.04	Open
Pipe12	0.27	0.00	0.00	Open
Pipe13	-9.01	0.13	0.06	Open
Pipe14	-20.77	0.29	0.27	Open
Pipe15	-20.77	0.29	0.27	Open
Pipe16	1.41	0.02	0.00	Open
Pipe17	-19.35	0.27	0.24	Open

Node Results at 72:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Junction1	0.00	417.26	64.57	0.09
Junction2	4.16	417.13	65.00	0.13
Junction3	6.40	417.11	65.17	0.14
Junction4	6.36	417.00	65.53	0.21
Junction5	6.40	416.94	65.60	0.29
Junction6	6.80	416.91	65.26	0.36

Junction7	9.36	416.89	64.05	0.47
Junction8	6.36	416.89	62.90	0.71
Junction9	5.68	416.97	65.06	0.28
Junction10	24.96	416.84	64.28	0.40
Junction11	6.80	416.84	64.47	0.96
Junction12	9.28	416.84	63.37	3.30
Junction13	11.76	416.85	62.12	2.62
Junction14	0.00	416.89	61.61	2.48
Hydrant	0.00	416.88	60.62	2.52



Page 3

Node Results at 72:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
Reservoir1	-84.97	418.67	0.00	0.00	Reservoir
Reservoir2	-19.35	417.48	0.00	0.00	Reservoir

Link Results at 72:00 Hrs:

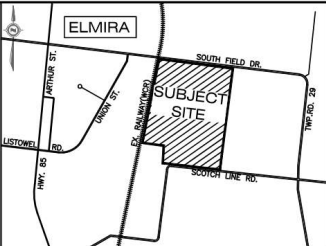
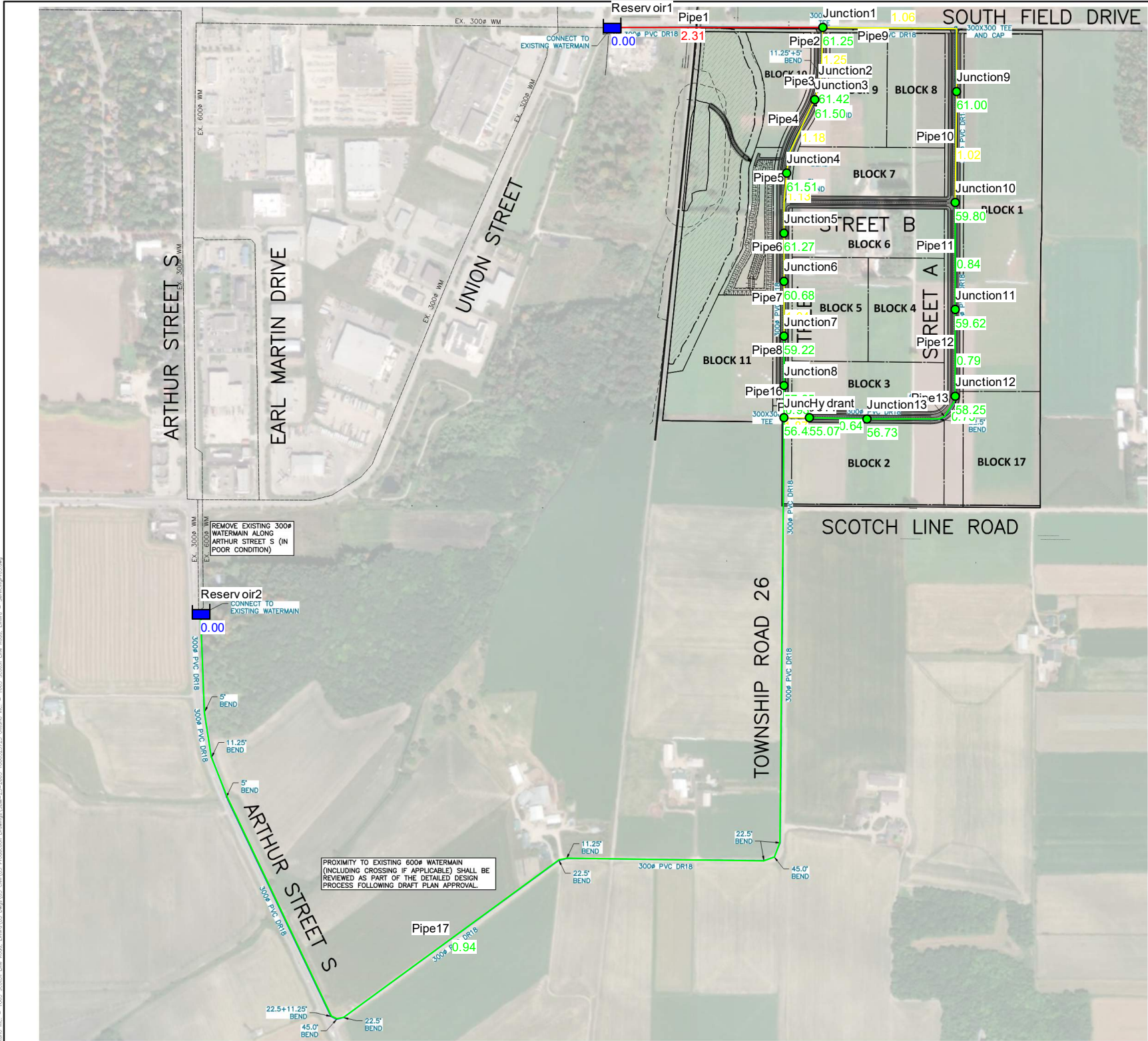
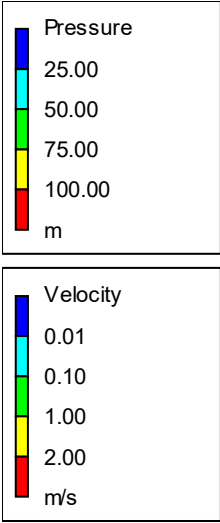
Link ID	Flow LPS	Velocity m/s	Headloss m/km	Status
Pipe1	84.97	1.20	3.65	Open
Pipe2	47.25	0.67	1.23	Open
Pipe3	43.09	0.61	1.04	Open
Pipe4	36.69	0.52	0.77	Open
Pipe5	30.33	0.43	0.54	Open
Pipe6	23.93	0.34	0.35	Open
Pipe7	17.13	0.24	0.19	Open
Pipe8	7.77	0.11	0.04	Open
Pipe9	37.71	0.53	0.81	Open
Pipe10	32.03	0.45	0.60	Open
Pipe11	7.07	0.10	0.04	Open
Pipe12	0.27	0.00	0.00	Open
Pipe13	-9.01	0.13	0.06	Open
Pipe14	-20.77	0.29	0.27	Open
Pipe15	-20.77	0.29	0.27	Open
Pipe16	1.41	0.02	0.00	Open
Pipe17	-19.35	0.27	0.24	Open

APPENDIX E

Maximum Hour Demand + Fire Flow Demand EPANET Model Results
Maximum Hour Demand + Fire Flow Demand EPANET Model Report

EPANET Water Distribution Model — Max Day + Fire Flow Demand Results

Day 1, 12:00 AM



KEY PLAN
N.T.S.

LEGAL INFORMATION

PART OF
LOT 83 & 86, GERMAN
COMPANY TRACT
IN THE
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF
WATERLOO

BENCHMARK:

MONUMENT TYPE: CANSEL CAN-NET NETWORK G.N.S.S.
RTK BASE STATION GLP2.
LOCATION: GUELPH, ONTARIO
GEODETIC ELEVATION: 315.541m
(NAD-1983/CSRS:CBNV6-20210.0)

SITE BENCHMARKS:

BENCHMARK #1
MONUMENT TYPE: METAL PIN
LOCATION: NORTH OF BUILDINGS, ADJACENT TO FENCE POST
GEODETIC ELEVATION: 352.28m
BENCHMARK #2
MONUMENT TYPE: METAL PIN
LOCATION: NORTH SIDE OF SUBJECT SITE, ADJACENT TO DRIVEWAY.
GEODETIC ELEVATION: 352.51m
(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)

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*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                 *
*                               Version 2.2                               *
*****

```

Input File: SBM-23-2603 1665 Scotch Line - Max Day + Fire Flow Demand -
2025-03-06.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
Pipe1	Reservoir1	Junction1	387.10	300
Pipe2	Junction1	Junction2	101.09	300
Pipe3	Junction2	Junction3	27.11	300
Pipe4	Junction3	Junction4	131.49	300
Pipe5	Junction4	Junction5	113.75	300
Pipe6	Junction5	Junction6	92.65	300
Pipe7	Junction6	Junction7	95.34	300
Pipe8	Junction7	Junction8	92.59	300
Pipe9	Junction1	Junction9	361.02	300
Pipe10	Junction9	Junction10	203.73	300
Pipe11	Junction10	Junction11	200.04	300
Pipe12	Junction11	Junction12	157.74	300
Pipe13	Junction12	Junction13	185.62	300
Pipe14	Junction13	Hydrant	109.89	300
Pipe15	Hydrant	Junction14	44.82	300
Pipe16	Junction8	Junction14	59.49	300
Pipe17	Junction14	Reservoir2	2511.01	300

Node Results at 0:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Junction1	0.00	413.94	61.25	0.00
Junction2	2.08	413.55	61.42	0.00
Junction3	3.20	413.44	61.50	0.00
Junction4	3.18	412.98	61.51	0.00
Junction5	3.20	412.61	61.27	0.00
Junction6	3.40	412.33	60.68	0.00
Junction7	4.68	412.06	59.22	0.00
Junction8	3.18	411.84	57.85	0.00
Junction9	2.84	412.91	61.00	0.00

Junction10	12.48	412.36	59.80	0.00
Junction11	3.40	411.99	59.62	0.00
Junction12	4.64	411.72	58.25	0.00
Junction13	5.88	411.46	56.73	0.00
Junction14	0.00	411.70	56.42	0.00



Page 2

Node Results at 0:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Hydrant	177.29	411.33	55.07	0.00
Reservoir1	-163.18	418.67	0.00	0.00 Reservoir
Reservoir2	-66.27	417.48	0.00	0.00 Reservoir

Link Results at 0:00 Hrs:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
Pipe1	163.18	2.31	12.21	Open
Pipe2	88.53	1.25	3.93	Open
Pipe3	86.45	1.22	3.77	Open
Pipe4	83.25	1.18	3.51	Open
Pipe5	80.07	1.13	3.27	Open
Pipe6	76.87	1.09	3.03	Open
Pipe7	73.47	1.04	2.79	Open
Pipe8	68.79	0.97	2.47	Open
Pipe9	74.65	1.06	2.87	Open
Pipe10	71.81	1.02	2.67	Open
Pipe11	59.33	0.84	1.87	Open
Pipe12	55.93	0.79	1.68	Open
Pipe13	51.29	0.73	1.43	Open
Pipe14	45.41	0.64	1.14	Open
Pipe15	-131.88	1.87	8.23	Open
Pipe16	65.61	0.93	2.26	Open
Pipe17	-66.27	0.94	2.30	Open

Node Results at 72:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Junction1	0.00	413.94	61.25	0.05
Junction2	2.08	413.55	61.42	0.07
Junction3	3.20	413.44	61.50	0.08
Junction4	3.18	412.98	61.51	0.11
Junction5	3.20	412.61	61.27	0.13

Junction6	3.40	412.33	60.68	0.16
Junction7	4.68	412.06	59.22	0.18
Junction8	3.18	411.84	57.85	0.21
Junction9	2.84	412.91	61.00	0.14
Junction10	12.48	412.36	59.80	0.20
Junction11	3.40	411.99	59.62	0.26
Junction12	4.64	411.72	58.25	0.32
Junction13	5.88	411.46	56.73	0.39
Junction14	0.00	411.70	56.42	0.49
Hydrant	177.29	411.33	55.07	0.48



Page 3

Node Results at 72:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours
Reservoir1	-163.18	418.67	0.00	0.00 Reservoir
Reservoir2	-66.27	417.48	0.00	0.00 Reservoir

Link Results at 72:00 Hrs:

Link ID	Flow LPS	Velocity m/s	Headloss m/km	Status
Pipe1	163.18	2.31	12.21	Open
Pipe2	88.53	1.25	3.93	Open
Pipe3	86.45	1.22	3.77	Open
Pipe4	83.25	1.18	3.51	Open
Pipe5	80.07	1.13	3.27	Open
Pipe6	76.87	1.09	3.03	Open
Pipe7	73.47	1.04	2.79	Open
Pipe8	68.79	0.97	2.47	Open
Pipe9	74.65	1.06	2.87	Open
Pipe10	71.81	1.02	2.67	Open
Pipe11	59.33	0.84	1.87	Open
Pipe12	55.93	0.79	1.68	Open
Pipe13	51.29	0.73	1.43	Open
Pipe14	45.41	0.64	1.14	Open
Pipe15	-131.88	1.87	8.23	Open
Pipe16	65.61	0.93	2.26	Open
Pipe17	-66.27	0.94	2.30	Open